TEACHERS AND COMPUTER BULLETIN BOARD SYSTEMS

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>GLOSSARY AND ABBREVIATIONS</td>
<td>v</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>ix</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>x</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>I INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II COMPUTER BULLETIN BOARD SYSTEMS - A TECHNICAL VIEW</td>
<td>3</td>
</tr>
<tr>
<td>Computer Systems</td>
<td>3</td>
</tr>
<tr>
<td>Remote Computer Communication</td>
<td>4</td>
</tr>
<tr>
<td>Some Functions of Computer Telecommunications Systems</td>
<td>5</td>
</tr>
<tr>
<td>Electronic Mail</td>
<td>6</td>
</tr>
<tr>
<td>Computer Conferencing</td>
<td>7</td>
</tr>
<tr>
<td>Computer Bulletin Boards</td>
<td>7</td>
</tr>
<tr>
<td>File Transfer</td>
<td>8</td>
</tr>
<tr>
<td>Online Editing</td>
<td>9</td>
</tr>
<tr>
<td>Resource Sharing</td>
<td>10</td>
</tr>
<tr>
<td>Definition of an Educational Computer Bulletin Board System</td>
<td>10</td>
</tr>
<tr>
<td>III LITERATURE REVIEW</td>
<td>11</td>
</tr>
<tr>
<td>Fields of Study Related to EBBs</td>
<td>12</td>
</tr>
<tr>
<td>Teleconferencing</td>
<td>12</td>
</tr>
<tr>
<td>Other Related Fields</td>
<td>16</td>
</tr>
<tr>
<td>The Research Defined</td>
<td>17</td>
</tr>
<tr>
<td>Chapter</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>IV METHOD</td>
<td>18</td>
</tr>
<tr>
<td>Subjects</td>
<td>18</td>
</tr>
<tr>
<td>The Instruments</td>
<td>19</td>
</tr>
<tr>
<td>The Items</td>
<td>20</td>
</tr>
<tr>
<td>Trial Interview</td>
<td>22</td>
</tr>
<tr>
<td>Procedure</td>
<td>22</td>
</tr>
<tr>
<td>Design</td>
<td>22</td>
</tr>
<tr>
<td>Causal Inferences</td>
<td>22</td>
</tr>
<tr>
<td>History</td>
<td>22</td>
</tr>
<tr>
<td>Maturation Effects</td>
<td>23</td>
</tr>
<tr>
<td>Selection</td>
<td>23</td>
</tr>
<tr>
<td>Mortality</td>
<td>23</td>
</tr>
<tr>
<td>Interaction Effects</td>
<td>23</td>
</tr>
<tr>
<td>Administration of the Instruments</td>
<td>23</td>
</tr>
<tr>
<td>The Data and Analyses</td>
<td>24</td>
</tr>
<tr>
<td>V RESULTS AND DISCUSSION</td>
<td>26</td>
</tr>
<tr>
<td>Introduction</td>
<td>26</td>
</tr>
<tr>
<td>Data Obtained From Arranging the Interviews</td>
<td>31</td>
</tr>
<tr>
<td>The Respondents and Their Experiences with Computers and EBBSs</td>
<td>31</td>
</tr>
<tr>
<td>Difficulties Associated with Using EBBSs</td>
<td>35</td>
</tr>
<tr>
<td>Lack of Time and Facilities</td>
<td>35</td>
</tr>
<tr>
<td>Technical Difficulties</td>
<td>36</td>
</tr>
<tr>
<td>Distinguishing Features of BBSs</td>
<td>37</td>
</tr>
<tr>
<td>The Dynamism of EBBSs</td>
<td>37</td>
</tr>
</tbody>
</table>
Chapter Page

The Amount and Type of Use of EBBSs 38
Reasons for Making EBBSs Available and for Using Them 40
EBBSs as a Curriculum Bank 42
Presentation, Graphics and the Communication Speed 44
Accuracy 45
Teachers as Information Sharers 45
Personal Communication and Electronic Meetings 46
The User-Interface and User-Friendliness 48
User-Support Materials 50
General Impressions of EBBSs 50
EBBSs as an Innovation and Tool for Innovation 54
Future Directions 58
Summary of the Main Findings 60

VI CONCLUSION 63

APPENDICES 69
Appendix I: Interview 70
Appendix II: Questionnaire 73
Appendix III: Summary of Questions Used in the Trial Interview 84

REFERENCES 85
LIST OF TABLES

1. Responses to Yes-No Items 27
2. Responses to Multiple Choice Items 28
3a. Responses to Items 4, 5 and 10 29
3b. Responses to Items 12 and 27 30
4. How Respondents First Became Aware of Bulletin Boards (Item 7) 33
5. Bulletin Boards with which Respondents have had Experience (Item 6) 34
6. How Respondents first became Motivated to Use Bulletin Boards (Item 9) 34
7. Why Respondents believed They Have Had Difficulty Gaining Access to a Bulletin Board 36
8a. Feelings About Using a Bulletins Boards (Item 25), Showing the Number of Responses to Each Scale Position 51
8b. Feelings About Using a Bulletin Boards (Item 25), Showing the Mean and Standard Deviation for Each Scale 51
9. How the Use of Bulletin Boards Could be Increased (Item 35(vi)) 56
10. The Potential Which is Seen for Bulletin Boards (Item 36) 57
GLOSSARY AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBS</td>
<td>A computer bulletin board system. The system may provide several ways of exchanging information, but will include a computer bulletin board (as described in chapter II).</td>
</tr>
<tr>
<td>Bit</td>
<td>Binary Digit. All information in a (digital) computer is ultimately represented as a collection of bits.</td>
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<tr>
<td>Chat (to sysop)</td>
<td>Real time communication with another user, such as the sysop.</td>
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<tr>
<td>Communication Speed</td>
<td>The speed at which information is sent elements of a computer system. such as from a remote computer to the host computer. Common rates are 1200 baud or 300 baud, that is, 1200 bits per second and 300 bits per second respectively.</td>
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<tr>
<td>Computer Bulletin Board</td>
<td>A way of structuring an electronic meeting, where the computer system supporting this is designed around a metaphor of a public bulletin board (as described in chapter II).</td>
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<tr>
<td>Computer Conferencing</td>
<td>A way of structuring an electronic meeting, where the computer system supporting this is designed around a metaphor of a conference.</td>
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<td>Communications Software</td>
<td>A computer program which causes a computer to emulate a terminal, but also may provide facilities such as automatic dialling, downloading, uploading and text capture.</td>
</tr>
</tbody>
</table>
### Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teleconferencing</td>
<td>Teleconferencing using computers.</td>
</tr>
<tr>
<td>Computer Literacy</td>
<td>Includes computing literacy, but also includes a knowledge of programming, computer design and history of computer technology.</td>
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<tr>
<td>Computing Literacy</td>
<td>A degree of comfort with computer technology, sufficient to be able to use it for the purpose for which the user wishes to use it.</td>
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<td>Downloading</td>
<td>The moving of information from host computer to remote computer.</td>
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<td>Dynamism</td>
<td>The dynamism of a BBS or an EBBS describes the amount of interaction users have with the system.</td>
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<td>EBBS</td>
<td>An educational computer bulletin board system (as defined in chapter II).</td>
</tr>
<tr>
<td>Editing</td>
<td>The creation and change of text or graphics on a computer system. Online editing is editing while connected to a host computer.</td>
</tr>
<tr>
<td>Electronic Mail</td>
<td>A way of structuring an electronic meeting, where the computer system supporting this is designed around a metaphor of the postal service (as described in chapter II).</td>
</tr>
<tr>
<td>Electronic Meeting</td>
<td>An electronic meeting is where several individuals exchange information on a topic over a period of time, using an electronic medium, such as a computer-based communications system.</td>
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<tr>
<td>Frameworks</td>
<td>A large scale curriculum development project of the Ministry.</td>
</tr>
<tr>
<td>Gigabyte</td>
<td>$10^9$ bytes, each byte is 8 bits, and represents 1 character.</td>
</tr>
</tbody>
</table>
Host Computer  Any computer accessed by a user who is physically distant from it is referred to as a host computer. In the case of BBSs, the user and computer are connected by the use of modem and the telephone network.

Information

Overload  This occurs when information is being delivered at a greater rate than the human receiver is capable of processing it.

Login name  The unique code assigned to each user of a multiuser computer system.

Ministry, the  The Victorian Ministry of Education.

Modem  A MODulator/DEModulator, or device which converts analog signals to digital signals, or vice versa, used to connect remote computers to host computers through a transmission line, such as the telephone network.

Multiuser System  A computer system which allows many users access at some time or other.

Remote Computer  When a computer user is connected to a physically distant computer (the host computer) through their own, local computer, this computer - remote from the host - is referred to as the remote computer. The remote computer needs to be running communications software. It is common to use a remote computer when accessing BBSs.

Remote Terminal  As for a remote computer, except that the local hardware is a terminal, not a computer. Use of a remote terminal is uncommon when accessing BBSs.
Resource Sharing  The ability for all users of a computer system to access a particular item of equipment, as scheduled by the system, such as a technical instrument, a laser printer or disk storage.

RIS  Regional Information System. The term refers to a Ministry operated EBBS.

SCI-NET  Science Curriculum Information NETwork. The name of a particular EBBS (which is technically similar to the RISs).

Sysop  SYstem OPerator. The person responsible for operating a BBS.

Teleconferencing  Electronic communication between two or more people at a distance, generally involving several locations.

Timesharing System  A computer system where several users are connected simultaneously.

Uploading  The moving of information from remote computer to host computer.
ACKNOWLEDGEMENTS

My initial use of bulletin boards with Brian Scholes and Colin Lawson, our struggles with the technology, and the discussions which we had have contributed much to deciding on and developing this thesis topic. The advice and willing assistance of my academic supervisors, Dr. Charles Poole and Dr. Rod Fawns, have, in no insignificant way, influenced the development of the thesis and my development as a thesis writer.

The untold hours of voluntary secretarial work by my mother, Ellen Chandler, who arranged interviews and proof-read manuscripts, deserves significant recognition.

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ABSTRACT

The move by the Victorian Ministry of Education to devolve curriculum development to schools has led to an increased awareness of the need for effective information exchange between teachers, regional centres and central providers of services. Computer bulletin board systems have been set up by the Ministry and by individual schools to help provide this for this need, in anticipation of them fulfilling a major role in information dissemination in the future. Such systems are a recent innovation in education - the literature shows few situations comparable in any way to the Victorian one.

This research defines what is meant by a computer bulletin board system, describes a sample of the Victorian user community's current perceptions of them, and suggests directions for the future. It is a study of 17 teachers who are users of bulletin board systems, using interviews and questionnaires. The development of both of these instruments is described and copies of both are provided.

The study shows that there are some quite profound difficulties with teachers using bulletin boards, the most immediate ones include access to computer facilities, finding time to make use of computer bulletin board systems, the unsatisfactory nature of the information which is available on the systems, and the hardware and software of the bulletin board system itself. It is concluded that the major use of the systems is not as an information dissemination tool, but as a means to learn about bulletin board technology and how it may be incorporated in the working life of teachers. The problems are sufficiently serious to preclude teachers from beginning to make serious efforts to use bulletin boards in information acquisition and dissemination.

Suggestions for development of bulletin board systems in educational environments are made, along with suggestions for further research and improvements in the both the interview schedule and the questionnaire.
In recent years there have been marked changes to curriculum and curriculum development in Victoria (as detailed by the State Board of Education, 1987). In particular, curriculum policy is now the responsibility of school councils, and the implementation of these policies the responsibility of the principal and teaching staff of schools. Developments in schools are seen as a cooperative venture between the school, the regional office and the centrally organized services of the Ministry of Education (the Ministry); there is "an obligation on the part of the government to provide curriculum support" (Ministerial Paper Number 6, 1984, section 6.3).

"Curriculum Frameworks provide promised government support for schools in planning, developing and reviewing their programs" (The Science Framework: P-10, 1987, p. 3), the provision of support materials and services being a feature of the project concept. Of the resource services being developed as part of Frameworks, the Science Curriculum Information NETwork (SCI-NET) is of particular interest. This is an example of a computer bulletin board system (BBS), a general means of information exchange, set up so that teachers can obtain and share curriculum materials (including course outlines, work units and curriculum development materials) as well as enabling private, computer-based communication between teachers (The Science Framework: P-10, 1987, p. 75).

The use of bulletin boards in this way has been an area of real interest within the Ministry. A newsletter from the State Computer Education Centre in early 1987 suggests that teachers should "watch for some big changes in the curriculum materials available for teachers on the Regional Information Systems (Bulletin Boards) and also some of the independent bulletin boards." (State Computer Education Centre, 1987a, p. 3). The existence of twelve of these Regional Information Systems (RIS) has been recently noted (State Computer Education Centre, 1987d), 7 in suburban Melbourne, 5 in rural Victoria, and of the independent bulletin boards, there are at least two which are school initiatives.
Teachers and Computer Bulletin Board Systems

(State Computer Education Centre, 1987c, p. 3) and one operated by a commercial company (State Computer Education Centre, 1987b, p. 3).

Doubt has recently been cast over the current or continuing operation of all of the RIS. SCI-NET has not been operating for several months due to the computer being relocated and then stolen (Ian Reid, personal communication, May 10, 1988), and certain regional systems may have ceased operation (Robert Carbone, personal communication, May 20, 1988). The reasons for this are unknown, but following the above discussions, it seems reasonable to speculate that the movement of personnel, and the changes in the activities occurring in the offices housing these systems, due to Ministry restructuring, may be the deciding factors.

BBSs are available and the Ministry is at least experimenting in providing some of its support services through them, yet the comments Thorngate (1985) makes regarding computer conferencing systems can be readily applied to computer bulletin board systems,

No one has been waiting around in silence for the invention of this new medium É There are now so many communication media, and so many sources of information in each, that our age may be characterized by media glut as well as information overload. There is simply no vast and virgin niche to be settled by computer conferencing É it must to some extent compete with all other media having common features. In doing so, computer conferencing must confront long established habits of media selection, well entrenched social and status hierarchies, and rewards offered to those who communicate by other means. (p. 190).

It is apposite to investigate BBSs in the educational setting. The considerations must be three-fold. First, what are the characteristics of a bulletin board system? This is discussed in chapter II. Secondly, what are Victorian community's current perceptions of bulletin boards? The research was conducted in order to provide answers to this question. The methodology is discussed in chapter IV and the results in chapter V. The third consideration is related to the second and concerns discerning what potential is seen by users of these systems and from this, directions for the future are suggested in chapter VI.
CHAPTER II


Teleconferencing is electronic communication between two or more people at a distance, generally involving several locations, and can be divided into three main types: audio, video and computer (Parker, 1983; Wedemeyer, 1986). Computer teleconferencing is therefore a broad field. The tools of the person engaging in computer teleconferencing are computer programs which provide a range of ways of structuring the communication, for example electronic mail, computer conferencing, electronic bulletin boards or file transfer (Newell & Sproull, 1982, pp. 845-846). Mason (1985, p. 38) comments on the confusion of terminology in the area by saying that one "might be excused for believing that electronic mail is identical to computer conferencing which is pretty similar to an electronic bulletin board". He also proposes that this confusion comes about because designers of computer teleconferencing systems attempt to provide the user with a range of services, and that many of these may not be able to be implemented effectively, if at all, on certain computer configurations. The so-called computer bulletin board systems under consideration represent a combination of several of these ways of structuring computer teleconferencing, not only that referred to as a bulletin board (for example SCI-NET Draft Users Handbook (1987)). A discussion of computer systems and of the methods of implementing computer teleconferencing will define the field and clarify the terminology sufficiently for its ensuing use, and outline advantages and disadvantages in BBS operation.

Computer Systems

A multiuser system gives many different users access to a computer system at some time or other, and may either enable only one terminal (and therefore one user) to be connected computer at once, or allow many terminals to be connected
simultaneously (a *timesharing* system). In a multiuser system, it is common for each user to be assigned a different *login name* (or *user name*) to uniquely identify him or her (Morris, 1983, pp. 72, 77). This is an essential feature for the implementation of electronic mail.

Typically, BBSs function on multiuser, non-timesharing systems, and are connected to users via a modem and telephone lines (see below). Despite not being timesharing, BBSs allow the sysop to monitor the operation of the BBS and provide a "chat with sysop" facility (see below). (The *sysop*, or system operator, is the person who is responsible for operating the BBS.) The reasons why BBSs are not timesharing are more practical than technical. A telephone line and modem would be required for each simultaneously connected user and a program supporting timesharing would be likely to require a more powerful computer than a program which does not support timesharing. "More powerful" refers to processor speed and the size of primary and secondary memory; overall, a more expensive and complex computer system is required. It would be unrealistic to expect private BBS operators to provide such a system, but should one be provided, greater access to the resources provided would be possible, as would *real-time communication* between users.

*Remote Computer Communication*

Computer and terminal may be connected directly or, as with BBSs, they may be connected through a transmission line (such as the telephone network), as described by Bullough & Beatty (1987). In this configuration, a *remote terminal* (or *computer*), a *modem* (which converts the computer's digital signals to the transmission line's analog signals), a transmission line, another modem and a *host computer* are required. This configuration is very convenient because telephone lines are already in place, and with the purchase of a terminal (or computer) and modem, access to many computer systems is assured, which may be in another part of the state or another part of the world.

Users of a remote computer set the configuration of their modem correctly and dial the telephone number of the host computer. A connection will be established by the remote modem and computer. The dialling may be done manually, with the
telephone handset attached to an acoustic coupler modem, or it may be done by the sending computer controlling the dialling of a direct-connect modem. In the latter case, all the user needs to do is to type in the phone number to be dialled, thus simplifying the operation.

Users of remote computers normally use a microcomputer with a modem and communications (or terminal) software rather than a terminal, thereby increasing the flexibility of the hardware. Communications software causes the microcomputer to act as a terminal of the host computer, and may provide facilities for automatic dialling, downloading, uploading, providing a printout of part of the data transmitted, or allow the storage of telephone numbers or logon sequences. The provision of more facilities may make the process of accessing a host computer either easier or harder. The possibility that the operation of the communications software is complex, together with complexities in configuring the modem, make the task of establishing a connection not as simple as the novice would prefer. Tombaugh (1985) believes that

It is not a trivial task for an inexperienced computer user to connect a terminal to a modem and contact a computer conferencing system. Thus, the more support that can be provided to help the new user develop the required skills, the better. Good documentation and a resource person who can be called for technical help are a minimum requirement.

(p. 131)

Some Functions of Computer Teleconferencing Systems

The nature of the interaction between users of a BBS is dependent upon the style of transfer available or chosen. The implementation of the various modes of communication available varies from system to system (and it is not always clear to the user that there are several different modes of communication available), and the ways in which BBSs are used will be dependent on the functions of a system and the modes of communication available. However, a discussion of the implementation of the various modes is not required for the present purpose. A selection of modes of communication in computer teleconferencing, along with some other functions of BBSs, all of which are required for an understanding of BBSs, are presented below.
Electronic Mail

Several forms of exchanging information can be considered as derivatives of electronic mail, which is implemented on many multiuser computer systems, including those not specifically designed to support teleconferencing (eg. Morris, 1983, pp. 146-52).

The postage service serves as a metaphor for electronic mail. Messages are sent by typing them up and invoking the electronic mail program to deliver them to the user with a particular login name. Messages are stored in that user's mailbox, a file on the host computer's disk which retains a copy of each message sent to that address. A computer program is invoked to scan the mailbox at the user's convenience. Computer analogies to carbon copies, replies and distribution lists are also possible. This combines the choice of the user to read mail or not with the speed of electronic communication (Newell & Sproull, 1982, p. 845; Hofmeister & Maggs, 1984, p. 2-22; Morris, 1983, pp. 146-52). For certain systems, the metaphor fails, because it may be possible to retrieve, re-read or delete mail after sending and before reading (Mason, 1985, p. 41).

One mode of interaction which it is desirable to provide is where several individuals exchange information on a topic over a period of time (Hofmeister & Maggs, 1984, p. 2-22). This will be referred to as an electronic meeting (Rhodes, 1984, p. 80), to distinguish it from a computer conference which is a particular means of supporting electronic meetings (for example, see Palme (1985)).

Electronic meetings could be achieved using electronic mail, but there are certain disadvantages associated with it. Messages are directed to specific users, thus enabling private communication, but making communicating with many individuals awkward (Mason, 1985). Palme (1985) points out that the speed and ease of electronic communication coupled with distribution lists for electronic mail can easily cause information overload for the user.
Computer Conferencing

Computer conferencing is considered by some (for instance, Palme (1985) and Pearson (1985)) to be the most superior way of supporting an electronic meeting. It can be seen as a variant of electronic mail (Newell & Sproull, 1982, p. 846), and is distinguishable from a bulletin board (refer below) by being a more structured type of interaction, though the details of this are not necessary for the present discussion.

Its superiority is considered to be due to three main points (Palme, 1985). It is more time efficient than an ordinary meeting, it helps to avoid information overload by allowing the user greater control of the communication than with electronic mail and is more suited to enabling communication between people who don't know each other well because conference participants don't need to know the names or identifications of the people who are participating in the communication.

Computer conferencing has been implemented on large timesharing machines, though there is no reason why a smaller-scale system could not implement it. However, it is not a feature of BBSs.

Computer Bulletin Boards

Computer bulletin boards (eg. SCI-NET Draft Users Handbook, 1987, pp. 11-12) are another variant of electronic mail such that the mailbox is publicly accessible and can be read by an entire community of users (Newell & Sproull, 1982, p. 846). Bulletin boards may be used for displaying items of general interest (such as notices or curriculum ideas) as well as being used to enable a electronic meeting. Knapp (1987) presents a metaphor for using an computer bulletin board,

Imagine a large conference room that's continually used for international meetings. The meeting room is furnished not with tables and chairs, but with huge bulletin boards. Unlike cafeteria bulletin boards, these boards are highly organized, with messages sorted by topic, date, contributor, and so forth. All that readers have to do is to locate (or call up) the kind of messages they wish to see.

In general, conference-goers enter and leave the room at their convenience. One participant, for example, might browse through the major topics and then choose to read all the messages on Logo and the recent messages on special education, staff development and software. This person can also post messages about any of the existing topics or begin a new topic. A series of
messages on a single topic forms a coherent conversation 'thread.' It's these conversations that provide sustaining variety in the world of [computer] teleconferencing.

(pp. 37-38)

Bulletin boards are a better method of enabling an electronic meeting than electronic mail, but perhaps not as good as computer conferencing. The advantages of computer conferencing over electronic mail, as suggested by Palme (1985) (above) also serve as a useful comparison between BBSs and electronic mail. Bulletin boards are more time efficient and more effectively enable communication between people who don't know each other than does electronic mail. Using a bulletin board is, however, a less structured mode of communication than either electronic mail or computer conferencing.

The description of a bulletin board by Knapp (1987) highlights the need for organization of the information. Different BBSs may carry different types of information, or one system may provide different bulletin boards on different topics, which may be explicitly named libraries. Search facilities may also be provided to allow users to scan bulletin titles or keywords identifying each bulletin (eg. SCI-NET Draft Users Handbook, 1987, pp. 11-14).

"Library" is the term for an area of the BBS set aside for the storing of information in specific areas of interest which is likely to have a long term use. The provision of searching and the organization of information into sub-bulletin boards and libraries invites a comparison to be made between BBSs and online databases, such as Dialog (see Bullough & Beatty, 1987, p. 184). The major distinction between online database systems and BBSs is the ease in which information may be contributed by any user in the latter case. A consideration of BBSs must critically inspect the organization of the information provided.

File Transfer

"The heart of a communications system is its capacity to send and receive information Ë if the system is to be useful to users they should be able to take information from the system and send information to the system" (SCI-NET Draft Users Handbook, 1987, p. 27). The term downloading refers to the moving of information from host computer to remote computer, uploading refers to the moving of information from remote computer to host computer.
Using file transfer, users may create letters, notices, computer programs or data without being connected to the host computer, and they may modify or printout information, or run programs obtained from the host computer. This saves the amount of time which the users must be connected to the host computer to do the things required (thus freeing the host computer for other users), and to make their own choice about what information they will obtain and how they may wish to modify it. Use of the remote computer to prepare files for transfer requires the user to be familiar with the operation of software other than the communications software or the bulletin board program, thus increasing the complexity of the task.

There are different methods in which the host and remote computer may communicate in order to perform file transfers, such as ASCII transfers or XMODEM transfers, as explained in the *SCI-NET Draft Users Handbook* (1987, p. 28). A knowledge of computer operation and terminology is required to do this effectively. Also, there are some difficulties and restrictions with using telephone lines as the means of communication, as detailed by Bullough & Beatty (1987, p. 180), and these become pronounced in file transfer. These include errors occurring in the information transmitted (though this can be rectified by good error checking being built into the modem and the communications software) and speed of information transfer being frustratingly slow.

**Online Editing**

It is normally possible to type up letters, notices, documents, etc. while connected to the host computer, though the advantages of doing so while not connected have already been mentioned. The program which allows this to happen is called an *editor* and is a very unsophisticated version of a word processor (*see* *SCI-NET Draft Users Handbook* (1987, pp. 41-45) for a discussion of one). The lack of sophistication is a major reason why documents should be prepared off-line.
Resource Sharing

A host computer may have attached to it a specialized resource, such as a technical instrument, another computer, or a high quality output device such as a laser printer. It is more cost efficient and minimizes redundancy for a community of users to have access to an expensive resource than for each user to have that particular piece of hardware (Newell & Sproull, 1982, p. 846; Lister, 1983, p. 9). All users being able to access common information is also an example of resource sharing; an important feature of a large computer system is to be able to build and expand on other's work without having to re-enter data (Lister, 1983, p. 7). However, the provision of resource sharing in a timesharing system increases the complexity of the host computer's program considerably.

Definition of an Educational Computer Bulletin Board System

An educational computer bulletin board system (EBBS) is a tool for the professional communication, information gathering and exchange of teachers and educators. As currently implemented, EBBSs support the following modes of information exchange: chat to sysop, electronic mail, bulletin board/library and file transfer, but do not allow real-time communication between users. They operate by remote computer access to a host computer by modem and telephone lines, and are not timesharing systems. Other features which may be found, but which are not essential to the structure of the communication, include the provision of online help and documentation, allowing the user to change the setup, resource sharing and providing a list of users of the system. There is no cost for registration or access, though registration may be necessary and there may or may not be time limits on user access, though these are not essential characteristics. Thus the Ministry's RISs and the school-based private boards, as referred to by State Computer Education Centre (1987c, 1987d) are EBBSs.

Computer based information exchange for teachers is a technology which is only just beginning to appear in educational circles, however. Texts such as Bullough & Beatty (1987, pp. 191-192) and Alessi & Trollip (1985, pp. 41-42) make passing references to computer bulletin boards, though Hofmeister & Maggs (1984, pp. 2-23, 2-24) list 4 EBBSs and Knapp (1987, p. 41) lists 9 EBBSs, emphasizing that they are just a few examples. Only in the more recent comprehensive reviews in education is an increasing amount of space being devoted to this technology. The "World Yearbook of Education 1982/83. Computers in Education" (Megarry, Walker, Nisbett, & Hoyle, 1983), makes no reference at all to BBSs. In "Microcomputers and Education" (Culbertson, Luvern, & Rehage, 1986), Davies & Shane are the only authors to refer to BBSs when they say "teleconference networking and electronic mail are beginning to be used in education" (p. 14). Computer conferencing is considered in some detail by McConnell (1988) in the "World Yearbook of Education 1988. Education for the New Technologies" (Harris, 1988).

This same pattern is seen in Australian literature. Computer teleconferencing did not rate a mention in an Australia-wide review of computer applications in classrooms undertaken in 1985 (Fitzgerald, Hattie, & Hughes, 1986). The review by Anderson (1984) describes an extensive database of materials implemented in Tasmania, but is a different system to a BBS. An overview and history of one of the Victorian EBBSs is detailed by the Science Curriculum Information Network. Report on the First Year of Operation (1986). Berman (1987) sets EBBSs in the
context of electronic educational resources for teachers, and they are seen to play a minor part.

There are, however, several sources which refer directly to BBSs. Views and experiences of, and recommendations by, Ministry proponents of EBBSs are given by Reid (1986), and in the Science Curriculum Information Network. Report on the First Year of Operation (1986). Knapp (1987) describes typical bulletin board interactions and considers advantages and disadvantages.

Fields of Study Related to EBBSs

Teleconferencing

There is useful information to be found in other fields of study which can be readily applied to bulletin board systems. One such area is that of computer teleconferencing in general, the literature relating to computer conferencing being as prolific as any. For instance, Harasim & Johnson (1986) report on a proposal to set up a computer conferencing system for teachers in the Ontario Department of Education. Harasim & Johnson (1985), Foster (1985) and Rhodes (1984) consider the merits and educational applications of computer conferencing and Mason (1985), Pearson (1985) and Thorngate (1985) discuss computer conferencing from a user point of view.

In other aspects of computer teleconferencing, Dowling (1987) considers some of the ways computer mediated communication differs from traditional means of communication. Dreher (1984) reports on a computer teleconferencing project in Western Australia, Conboy (1992) reports on a Victorian telephone teleconferencing project and Wedemeyer (1986) discusses developments in telecommunication in the context of educational change.

There is a notable lack of research, but wealth of opinion, in areas of computer telecommunication which can be related to EBBSs and the following 16 points on teachers using EBBSs presents the literature referred to as it applies to EBBSs.
1. The immediacy of electronic communication is combined with the time and pace of the interaction being under the user's control (Foster, 1985, p. 5; Palme, 1985). This means that:
   
   a) Expertise can be close at hand (Foster, 1985, pp. 7-11; Knapp, 1987, p. 38),
   
   b) Costs can be saved if some or all print resources and consultancy and inservice activities can be provided using EBBSs (Science Curriculum Information Network. Report on the First Year of Operation, 1986, p. 3),
   
   c) Very up-to-date information can be easily provided (Foster, 1985, pp. 7-11),
   
   d) Support services should be able to be more responsive to the needs of teachers (Dreher, 1984; Science Curriculum Information Network. Report on the First Year of Operation, 1986, p. 4),
   
   e) An increase in the interaction teachers may have with one another (particularly important for small or isolated schools) at a saving of money, time, resources and convenience is possible. Therefore, collaborative working, which often produces better solutions to problems than does work in isolation, is more possible (Conboy, 1982, p. 75; Foster, 1985, pp. 12-14; Harasim & Johnson, 1986, pp. 26-33; Reid, 1986; Rhodes, 1984),
   
   f) EBBSs may more effectively enable the involvement of non-school based groups such as parents, local industry and school support services to be involved in curriculum development (Foster, 1985, pp. 7-11; Science Curriculum Information Network. Report on the First Year of Operation, 1986, p. 4).

2. Access to potentially vast amounts of organized materials, of both electronic meetings and prepared materials, which may be reproduced in hardcopy form, is possible (Foster, 1985, p. 13).

3. Word-processors provide a flexible medium for development of materials, which may be shared by the use of EBBSs enabling adaptation of materials to the local situation, thereby reducing teacher preparation time and preventing redundancy, and enhancing the integration of new ideas (Reid, 1986; Science Curriculum Information Network. Report on the First Year of Operation, 1986, p. 3).

5. EBBSs are an incentive to learn skills such as keyboarding and word-processing (Knapp, 1987, p. 40).

6. There will be a reluctance to use EBBSs because they are new. Those with poor spelling, grammatical, typing or computer operating skills may also be reluctant (Foster, 1985, p. 62; Harasim & Johnson, 1986, pp. 26-33).


8. A change in way a teacher does his or her job will be required, and while this may be more efficient and effective in the long term, a time commitment on the teacher's part is implicit initially. Teachers must be prepared to develop new literacies as tools of their trade (Wedemeyer, 1986).

9. Intellectual, professional and social rewards must extend beyond mere curiosity about the medium and its potential. The most important motivator for users will be access to useful information (Harasim & Johnson, 1985, p. 54; Thorngate, 1985, p. 190).

10. EBBSs can provide an egalitarian form of communication where race, sex, class or physical attributes of the participants do not prejudice the communication. It may even be an anonymous form of communication, and this has not played a
Teachers and Computer Bulletin Board Systems


12. Sorting through messages may be an awkward process, depending on the EBBS software (Knapp, 1987, p. 40).

13. EBBSs cannot serve the socio-emotional function of the traditional meeting or conference to the same extent. Communication is not as personal as face-to-face or over the phone. Voice dynamics, body language and other non-verbal cues are missing (Dowling, 1987, p. 40; Knapp, 1987, p. 38).

14. Systems are not really user friendly yet, and there may be considerable differences between systems, and thick operating manuals can be more of hindrance than a help (Harasim & Johnson, 1986, pp. 26-33; Thorngate, 1985, p. 188).

15. Conversations proceeding using EBBS are at a slow pace, and typing everything one wants to say becomes burdensome. Group facilitation skills for such conversations are not known in this new medium (Knapp, 1987, p. 38; Rhodes, 1984).

16. Electronic mail will tend to be between people who know each other well, though it may enhance already established communication pathways as well as opening up new ones (Palme, 1985; Pearson, 1985, p. 172).
Other Related Fields

There are contributions in fields other than teleconferencing worth noting. The need to present teachers with materials in a flexible medium is highlighted by Connelly & Ben-Peretz (1980) because "it is generally recognized that teachers do not neutrally implement programs; they develop programs of study for their classrooms by adaptation, translation and modification of given programs and research findings" (p. 95). Young (1985) discovered that teachers' participation in regional curriculum development was shaped by three characteristics of their role as classroom teachers: the position of teachers in the educational hierarchy (teachers enjoy a position of influence), the isolation from other educators, and rewards for teaching (teachers' self-esteem is increased when they make a unique contribution and see their names in print). These points relate to the preparedness of teachers to share their expertise and ideas on EBBS, but also emphasize the need for professional social interaction between teachers.

Asheim (1982) points out that the amount of information in print and other sources, and the speed at which it can be delivered is great, but the capacity of the human receiver is limited. Information overload occurs when information is being delivered at a greater rate than can be processed by the human receiver, and can be controlled by the organization of the information and its delivery. Palme (1985, p. 10) suggests that computer conferencing is more adapted to control information overload than is electronic mail. Then there is the question which needs to be addressed of whether the design of EBBSs, and the organization of the information thereon, leads to information overload. The complementary question of whether this would be entirely implicit in the mode of communication (which could be inferred from Palme) or whether there is an element which is system dependent is not in the scope of the present discussion.

Owen (1984) asserts that teachers rely on schools for access to journals, articles, professional development materials and programs, and that such information is valued by teachers if presented in accessible forms. If teachers do not find EBBS-delivered information particularly accessible, this will clearly have implications for their usefulness. Owen also found that there were differences in the sorts of information sought by teachers with administrative positions compared
with those so-called regular classroom teachers. There is the possibility that EBBS will be perceived differently by these two groups.

The Research Defined

The wealth of opinion and little research highlights the need for this study. The particular disadvantage the researcher is faced with is that no specific research on EBBSs was located. There are reasons to suppose that EBBSs would be found useful: points 1 and 2 of those relating to teachers using EBBSs (pp. 12-15) and the work by Connelly & Ben-Peretz (1980), Young (1985) and Owen (1984). However, the remainder of the literature search suggests possible difficulties and disadvantages associated with introducing EBBSs to teachers. No matter how valid the various suggestions may be, there is nothing to suggest how the various factors interact, let alone what might be expected in the Victorian post-primary school environment. This leads to the initial statement of the research hypothesis that teachers find EBBSs useful.

As well as investigating this hypothesis, there are complementary issues which the research will illuminate. EBBSs are unlikely to be "completely useless" or "totally useful"; rather, the usefulness of EBBSs will lie somewhere between these two extremes. It is also important to discern the critical elements of use and usefulness of EBBSs. Even though certain information from the literature search is not well-founded in research, the literature surveyed serves as a sufficient collection of material on which to base the evaluation instrument and with which to compare the results of this study.
CHAPTER IV

Method

Subjects

It is unrealistic to expect classroom teachers who have been non-users of EBBSs to provide relevant data regarding how useful they have found EBBSs to be. It is also unrealistic to expect that teachers whose jobs are primarily outside the classroom (such as principals, deputy-principals, careers teachers, support service personnel) would have the same impressions of EBBSs as would teachers whose job is principally in the classroom. This leads to a modification of the research hypothesis: that classroom teachers who have used EBBSs find them useful. It also means that a way to locate classroom teacher users of EBBS had to be established.

One facility an EBBS provides is to list users of that system (eg. SCI-NET Draft Users Handbook, p. 60). Lists of users - which included the login name and the actual name of the user, and the school or institution with which the user was associated - were obtained from 2 RISs, in order to parallel the decision, described later, to focus on RISs. Users included classroom teachers in government schools, classroom teachers in non-government schools, Ministry support staff, and lecturers at tertiary institutions.

Ministry support staff and tertiary institution staff are clearly not relevant subjects for the research. Classroom teachers in primary and post-primary non-government schools, and classroom teachers in government primary schools were also disregarded for the following reasons. It is possible that the number of contact hours with students per week, the availability of facilities, and the amount and type of curriculum development activities expected of teachers may be important factors in teachers finding EBBSs useful. It is also possible that considerable variability may be found in these factors between the four different types of schools: non-government primary, non-government post-primary, government primary and government post-primary. Focusing on the latter group limits variability within the sample and make the results more applicable to this group.
A further modification of the research hypothesis is thus required: *that classroom teachers in government post-primary schools who use EBBS find them useful.*

Certain post-primary classroom teachers were also disregarded in the interests of restricting expense and travel time for the researcher. Attempts were made to contact by telephone all post-primary classroom teachers whose names were obtained from the RIS's lists, however the lists were significantly outdated to make the location of such teachers difficult. In no case was a teacher who was not currently teaching at the school listed successfully contacted. The lack of subjects by this method necessitated obtaining user lists from two school-based EBBSs. A sample size of 17 teachers, drawn from 16 different schools, was used. 17 questionnaires were completed and 15 interviews were held, the difference being accounted for by technical failure in one case and administrative problems in the second. All respondents were male, and are referred to as Mr. A, Mr. B, É through to Mr. Q. Attempts were made to locate female teachers to participate in the research, but the EBBS's and RIS's lists contained less than 5 female names, and these people were either not classroom teachers, not prepared to participate in the research, or could not be contacted.

*The Instruments*

An interview schedule (Appendix A) and a questionnaire (Appendix B) were developed in order to collect data, with 51 items in total - items A to O of the interview and items 1 to 36 of the questionnaire. The items focus on five facets of EBBSs and their users: personal information of the user and his use and experience of computers and EBBS; the impressions of a particular a particular EBBS (including its instructional quality, technical quality and content); general impressions of EBBSs (including the different modes of information transfer available); the impact of EBBS on one's professional life; and suggested future directions.
In the terms used by Kahn & Cannell (1964), the purpose of the interview and questionnaire is "information getting".

We do not equate "information" with "fact finding", but rather we think of this type of interview as concerned with attitudes, values, feelings, hopes, plans, and descriptions of self in addition to more objective factual data.

The interview schedule is semistructured (Isaac & Michael, 1971, p. 96), with the expectation that probing, or "supplementing a prepared question during the interview process" (Kahn & Cannell, 1964, p. 190) would take place. The design of the interview followed advice given by Kahn & Cannell (1964), particularly Chapters 6 and 8, and Isaac & Michael (1971, pp. 96-99).

The questionnaire and interview schedule combined provide a mixture of what Fraser (1973) terms hard data (which is objective) and soft data (which is impressionistic and subjective). Fraser (pp. 39-40) argues that all forms of data have associated threats to their validity, and in any data gathering activity, the employment of triangulation (or the use two or more independent, complementary data gathering instruments) is therefore important. While the complete independence of the instruments is not guaranteed, the use of these two methods is well suited for this study, as suggested by two of Isaac & Michael's (1971) purposes of interviews:

An exploratory device to help identify variables and relations, to suggest hypotheses, and to guide other phases of the research.

and

A supplement to other methods: To follow up unexpected results, to validate other methods, and to go deeper into the motivations of respondents and their reasons for responding as they do.

The Items

The impressions of a particular EBBS constitute a description of an item of software, and a detailed format for this activity is provided by MicroSIFT (1982). Indeed, items 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 and 27 have been directly taken or inspired by MicroSIFT items 4, 5, 6, 7, 15, 16, 18, 20, 21, 1, 2, 24 and 22 respectively, thus employing all the MicroSIFT items relevant for this
activity. The respondents were requested to restrict responses to one system for the purpose of this part of the questionnaire, not so much to enable comparisons between systems but to help overcome problems of selective memory. The reality was that for some of the respondents, their use of EBBSs were sufficiently small and in the past so that their responses were, in fact, an amalgam of their various experiences, something which was freely admitted during the interview.

The different modes of information transfer are particularly clear to the user of an RIS (eg. SCI-NET Draft Users Handbook, 1987) so, it was not only decided to attempt to focus on RISs, but to structure items 12, 31 and 32 of the questionnaire to provide specific information in this regard. In practice, these items did not function particularly well. Some of the respondents’ names were drawn from lists obtained from school-based EBBSs, and it was a strong possibility that they would have no knowledge of clearly structured modes of interaction, let alone in the terms used by RISs. As well, many of those whose names were obtained from lists from RISs were poorly acquainted with the terminology and the operation of the system. Items E, L and M of the interview schedule faced a similar fate.

Questionnaire items relating directly to experience with computers or EBBSs (nos. 4, 5, 6, 7, 8, 9,10, 11, 12 and 28) stem from those used by Harasim & Johnson (1986, p. 82). The semantic differential (item 25) was adapted from Conboy (1982, p. 90), and the remainder of the questionnaire items were developed from the perspective of the available literature.

Terminology potentially foreign to the respondents was not used. The phrase "educational computer bulletin board system" was simplified to "bulletin boards", and examples were given to guide the recognition of the type of system. "Types of information" (items E and F) was the simplification, in concept as well as expression, of "modes of communication". In the case of item M, of which the intention was to refer to the difficulties in using communications software, the EBBS program, and in establishing the remote connection, such terminology was not used at all. This practice may have led to a lack of definition on the respondents' part regarding different modes of information exchange, different types of information, and different pieces of technical equipment interacting. Items E, F, G, I, J, K, L and M tended to elicit responses which overlapped, though in different ways for each respondent. This is a problem of the frame of reference,
discussed by Kahn & Cannell (1964, pp. 113-121): the respondent must interpret the interview and questionnaire items with respect to his own experience and was clearly different to the interviewer's, the latter being at a more sophisticated level. It is generally true that the level of use and expertise in EBBSs was found to be at a novice level.

**Trial Interview**

One trial interview (including completion of a questionnaire) was held and discussion on the suitability of the questions was integrated with the interview, a summary of these discussion points is found in Appendix C. Changes to items 7, 13 and 14 were made following this procedure. A larger trial was not possible because of the lack of suitable, accessible respondents, and this underlines the status of this study as exploratory in the area of teachers and EBBSs as well as a trial of the two instruments used.

**Procedure**

**Design**

In the terms used by Campbell & Stanley (1966, p. 5-8), the study design is a one-shot case study and may be represented as

\[
X \ O
\]

where X is the independent variable, corresponding to use of an EBBSs and O the dependent variable, corresponding to responses to the interview and questionnaire. Campbell & Stanley identify 6 weaknesses with this study design and these are dealt with in turn:

**Causal inferences.** The drawing of causal inferences from a study of this design is invalid. The issues discerned relating to teachers and EBBSs are not intended to be interpreted in this way.

**History.** The experiences of each respondent in addition to the independent variable are different and the influence of these on the outcomes of the study is not being controlled by the study design. There are conceivably many factors which influence teachers' opinions of EBBSs, which may vary from day to day. Similarly, there are many factors which affect how a person responds to an interview.
Maturation effects. Processes operating as a function of the passage of time are not controlled by the study design. An important maturation effect for this study is memory, which is described by Kahn & Cannell (1964, p. 44) as a process by which events recede into the past, modified, changed and distorted so that they fit more comfortably with our experience and our image of ourselves.

Selection. Biases resulting from the selection of respondents are the result of a deliberate decision in this study. The results can thus be generalized only narrowly and cannot be assumed to apply to teachers at large.

Mortality. The loss of respondents is not a major concern because comparisons are not undertaken in this study. However, there are incomplete sets of data for two respondents, though the data which is available from these respondents indicates that they would have been unlikely to have contributed perspectives on the topic not covered elsewhere.

Interaction effects. Interaction effects between respondents and the independent variable or the interviewer are not controlled in this study. The experience each person has had with EBBSs will be different, and indeed, it would be impossible to create an environment where the experience with EBBSs was identical for each respondent. This causes a loss of generalizability, because all of the identified attributes of teachers using EBBSs will not be applicable in all situations. The interaction effect between the respondent, the instruments and the interviewer will be different for each instance.

Administration of the Instruments

Telephone appointments were made with the 17 teachers, and the interviews were conducted during the school day, either in free periods, during lunchtime or immediately after school. All interviews were conducted in close to private conditions, either in an interview room or a quiet section of a staff room. There were minor interruptions to most interviews, but in no case did this appear to distract the respondent from his train of thought. In the case of Mr. P, the interviewer was significantly disturbed by the presence of background noise.

The administration of the two instruments proceeded according to the following procedure. The research being undertaken was explained to the
respondent, who was then asked to complete the questionnaire. The interview then took place and was tape recorded in all cases for later transcription.

The time spent with each respondent in data collection ranged from 20 minutes to 55 minutes, the mean time being 37.9 minutes.

The Data and Analyses

Perhaps the major limitation with this study, as it is with all research, is that the assumption must be made that the respondents truthfully answered each question. Some result, such as items 4, 12, 17, 18, 22, 23, and 31 must be treated with caution because comments to the effect of "well, I don't really know, but I put something down" were made during the course of some interviews, and it is unknown for how many respondents this really applied. For these items, this effect can be attributed to the general lack of experience with and knowledge of EBBSs.

It is often true that the fate of the obvious is to be forgotten, and the possibility that respondents have only brought information to the interviews about issues which are of obvious concern to them cannot be disregarded. The interviews were, on the whole, negative in tone, and focus on issues of direct concern. Problems dominate, because the things which go well for the EBBS user are never mentioned because they are obvious and often small considerations compared with the problems with EBBSs.

Only the non-descriptive questions of the questionnaire provide hard data which may be statistically analysed. Owen (1962, p. 362-363) describes a sign test which provides suitable analysis for the data collected. In cases where subjects choose between two categories, the sign test indicates if there is statistical difference between the number of subjects who chose one category rather than another. The significance level was set at p<0.05.

Sign test analysis was carried out on "yes-no" responses (items 2, 11, 26, 28, 29, 30, 31, 32, 33, 34 and 35) and on the four-category multiple choice questions (items 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24) by grouping responses to
"strongly agree" and "agree" into one category, and responses to "disagree" and
"strongly disagree" into another.

The descriptive statistics mean and standard deviation were calculated for the
semantic differential (item 25), and the mean for items 1 and 8. The remaining
items of the questionnaire (items 3, 4, 5, 6, 7, 9, 10, 12 and 27) are not suitable for
statistical analysis.
CHAPTER V

Results and Discussion

Introduction

The data obtained from the 17 respondents are presented below. It cannot be treated as singularly derived from experiences with EBBSs, because some respondents had used BBSs which were not EBBSs, and their understanding of one could not be separated completely from their understanding of the other.

The data obtained from the questionnaire (excepting items 1, 3 and 8) is summarized in Tables 1 to 10. The items are organized into tables by question type for ease of presentation. Thus, Tables 1 and 2 present items where statistical analysis was appropriate, Tables 3 and 4 present items for which statistical analysis is not appropriate, and the remainder of the data is tabulated throughout the presentation.

Cross-tabulations of data from various questionnaire items are not presented because the sample size was not large enough for any significant results to be obtained. However, in an extension of this research, cross-tabulations of interview items 4 and 5 with items 10, 11, 13, 14, 15, 16, 19 and 21 would be desirable in order to investigate any differences in the perceptions of "barely competent" and "highly competent" users of EBBSs.

The results of both questionnaire and interview are discussed together, quotations from the interviews integrated into the text to provide or substantiate the discussion, as is other literature. This chapter is organized by theme, and the organization, while related to the structure of questionnaire, is not identical to it because of the somewhat unexpected relationships between items which became apparent in the course of collecting interview data. Unless questionnaire items are directly referenced, it should be assumed that the information was obtained from the interviews.
Table 1
Responses to "Yes-No" Items.

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Are you a holder of an administrative position with a time allowance?</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Have you ever had difficulty gaining access to any bulletin board system?</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>26</td>
<td>Are you still using the bulletin board system you metioned above?</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>28</td>
<td>Would you recommend this method of communication?</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>29</td>
<td>Have you made use of the curriculum information available on the bulletin board?</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>Have you contributed to the curriculum information available on the bulletin board?</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>31</td>
<td>Have you made use of the notices available through the &quot;bulletin board&quot; or &quot;electronic mail&quot;?</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>32</td>
<td>Have you contributed to the &quot;bulletin board&quot; or &quot;electronic mail&quot;?</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>33</td>
<td>Is using a bulletin board system helping you professionally in any way?</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>34</td>
<td>Has this form of communication (or information obtained from such systems) had much impact on other staff?</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>35</td>
<td>Could use of this form of communication be increased by:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(i) more motivation and encouragement for users?</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(ii) inservice training?</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(iii) better documentation and information?</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(iv) making the program easier to understand and use?</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(v) making more time available at school to use the system?</td>
<td>14</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 2

Responses to Multiple Choice Items.

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item</th>
<th>Number of responses in each category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>13</td>
<td>There are well-defined reasons why bulletin board systems should have developed and are generally available</td>
<td>7</td>
</tr>
<tr>
<td>14</td>
<td>The bulletin board system achieves its defined purposes for all users</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>The organization of the information and facilities is clear and logical *</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>The bulletin board system is easy to use</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>User support materials (such as manuals etc.) are readily available *</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>The user-support materials help the user make the best use of the facilities provided +</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>All teachers could easily and independantly operate the program</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>Setting up bulletin board systems for teachers is an appropriate use of computer technologies</td>
<td>13</td>
</tr>
<tr>
<td>21</td>
<td>The bulletin board system is reliable in normal use</td>
<td>4</td>
</tr>
<tr>
<td>22</td>
<td>The information stored on the bulletin board system is accurate</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>The curriculum information available on the bulletin board system is of high quality #</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>This information has value to you in your setting #</td>
<td>2</td>
</tr>
</tbody>
</table>

Response Key
A - Strongly Agree
B - Agree
C - Disagree
D - Strongly Disagree

Note. N=17, except * indicates N=16, + indicates N=15. # indicates 1 response of B/C.
### Table 3a

**Responses to Items 4, 5, and 10. (Statistical Analysis is Not Appropriate). (N = 17).**

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item and possible responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>What is your computing background or experience?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Study at tertiary level</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>B. Training in a short course or inservice</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>C. Self-taught</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>D. Barely any background at all</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>E. Other - Experience in Industry</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Do you consider your ability to use a computer to be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Highly competent</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>B. Just making do</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>B/C. Between &quot;just making do&quot; and &quot;barely competent&quot;</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>C. Barely competent</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Approximately how many times have you accessed a bulletin board system?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Less than 5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>B. Between 5 &amp; 15</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>C. Between 15 &amp; 30</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>D. Over 30</td>
<td>10</td>
</tr>
</tbody>
</table>
Table 3b

Responses to Items 12 and 27. (Statistical Analysis is Not Appropriate). (N = 17).

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item and possible responses</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Which facilities of a bulletin board system have you used?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Bulletin board</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>B. Electronic mail</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>C. General library</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>D. Private library</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>E. Talk to system operator</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>F. Other - Uploading</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>For the bulletin board system under consideration, would you</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. recommend?</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>B. not recommend?</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>C. recommend with changes?</td>
<td>5</td>
</tr>
</tbody>
</table>
Data Obtained From Arranging the Interviews

There are three observations originating from making the interview appointments worth recording. Firstly, there are fewer female than male EBBS users. This is surprising, considering the research of Fitzgerald, Hattie, & Hughes (1986, p. 25) who found that a greater proportion of female classroom teachers use computers than do males.

Secondly, comments like "at one time, there was someone at the school who knew something about bulletin boards" were made several times, yet efforts to locate teachers not teaching at the school stated on the lists of users from EBBSs failed. Lists of users are clearly not being kept up to date. It would be interesting to investigate whether many schools have the hardware available to make use of EBBSs, but are lacking in expertise, and whether teachers equipped with that expertise who move from school to school are actively transferring their skills into new situations.

Most respondents perceived themselves as novices in using BBSs, and this led to an initial reluctance to be interviewed. It can be safely stated that it is a very select group of classroom teachers who have a good working knowledge of this technology.

The Respondents and Their Experience with Computers and EBBSs.

This section incorporates data from items 1, 2, 3, 4, 5, 6, 7, 8 and 9.

The range of years teaching experience for the respondents ranged from 3 years to 24 years, and the mean and standard deviation for the number of years teaching being 14 and 6 respectively.

The teaching areas in which the respondents have taught included (with one exception) mathematics, science or computing. One respondent indicated teaching experience only in engineering practices. The subjects which the other 16 respondents had taught included various combinations of mathematics, science and computing. Fifteen respondents indicated teaching experience in mathematics, 13 indicated teaching experience in science and 14 included teaching experience in computing.

Regardless of whether respondents were holders of an administrative position or not, in discussion over interview items B and N, over half of the respondents were of the opinion that holders of administrative positions would have less time and opportunity to use EBBSs and incorporate them into their teaching life. The reasoning behind investigating any differences between these groups of teachers (including questionnaire item 2) stemmed from Owen (1984), as discussed in Chapter III, who suggested that there may be differences in the information gathered using EBBS and the general
perception of EBBS by teachers with administrative positions compared with teachers without such positions. Furthermore, the time teachers have available is presumably decreased by having administrative responsibilities (supported by the data), which is somewhat offset by having a time allowance, but the time allowances may give the teachers more flexibility in organizing their duties, which may include the use of EBBSs.

Even though it is indicated in Table 1 (item 2) that respondents tend to be holders of administrative positions with a time allowance and there were no observable differences between the data obtained from those with administrative positions and that obtained from those without such positions. It would be surprising if any comparisons of the data yielded a significant result due to the small sample size, but even with a larger sample size, differences between teachers with administrative positions and teachers without would be unlikely, for two reasons. The conclusion to the study (Chapter VI) is that the major use of EBBSs is not as an information gathering or disseminating tool, so that any differences could not be due to the type of information gathered, and furthermore, it is a fact (discussed in more detail later) that almost all the use of EBBSs is taking place outside of school hours. When EBBS are used mainly during school hours and for information gathering and disseminating, it would be interesting to investigate whether there are differences between the two groups of teachers, and whether this is due to the type of information gathered and available or whether it is due to the amount of free time at school.

The most common method of acquiring computing experience for the respondents was by being self-taught, the next most common was some study at tertiary level (item 4, Table 3a). Data from throughout the interviews (particularly in response to item A) showed that respondents did not consider tertiary experience to be a major contributor to their computing experience, but being self-taught or having experience in industry were considered to be major contributors. This is consistent with research conducted by Fitzgerald, Hattie, & Hughes (1986, p. 25), who found that "regular [computer] users have had substantial inservice or preservice courses or have had a diploma or certificate in computer education". Item 5 (Table 3a) shows that the respondents tend to perceive their ability to use a computer to be high, and this is not surprising, given their background.

The length of time since a respondent first used any BBS ranged from 3 months to 4 years, and the mean length of time being slightly under 2 years. The most common way of becoming aware of BBSs was by general reading and advertising, and not through Ministry mail or computer consultants (Table 4). Twenty-three BBSs were
mentioned by respondents and 5 of the 7 most frequently referred to are clearly identifiable as EBBSs (Table 5). The reasons respondents used bulletin board initially are clearly indicated in Table 6, and in all cases can be safely attributed to curiosity, for one purpose or another.

Table 4
How Respondents First Became Aware of Bulletin Boards (Item 7). The Numbers of Respondents Indicating a Particular Method is Indicated in Parentheses. (N=17)

<table>
<thead>
<tr>
<th>Method</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through a user group</td>
<td>1</td>
</tr>
<tr>
<td>From friends and colleagues</td>
<td>3</td>
</tr>
<tr>
<td>Computer magazines, advertising, newspapers, general mail, or general</td>
<td></td>
</tr>
<tr>
<td>Regional computer consultant</td>
<td>2</td>
</tr>
<tr>
<td>Mail from the Ministry</td>
<td>1</td>
</tr>
<tr>
<td>Inservice</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 5

**Bulletin Board Systems With Which Respondents Have Had Experience (Item 6).**

*Those in Bold Have Been Definitely Identified as EBBSs.*

<table>
<thead>
<tr>
<th>System</th>
<th>Experience Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tempest (13)</td>
<td></td>
</tr>
<tr>
<td>SCI-NET (11)</td>
<td></td>
</tr>
<tr>
<td>Comet (7)</td>
<td></td>
</tr>
<tr>
<td>AUSOM (6)</td>
<td></td>
</tr>
<tr>
<td>SCEC (5)</td>
<td></td>
</tr>
<tr>
<td>Eastern Region (3)</td>
<td></td>
</tr>
<tr>
<td>Viatel (3)</td>
<td></td>
</tr>
<tr>
<td>Alien (1)</td>
<td></td>
</tr>
<tr>
<td>Megaworks (1)</td>
<td></td>
</tr>
<tr>
<td>AUSOM Mac (1)</td>
<td></td>
</tr>
<tr>
<td>MBUG (1)</td>
<td></td>
</tr>
<tr>
<td>Keylink (1)</td>
<td></td>
</tr>
<tr>
<td>Computer Pals (1)</td>
<td></td>
</tr>
<tr>
<td>Bush Telegraph (1)</td>
<td></td>
</tr>
<tr>
<td>Tullacom (1)</td>
<td></td>
</tr>
<tr>
<td>CEG NSW (1)</td>
<td></td>
</tr>
<tr>
<td>CSIRO (1)</td>
<td></td>
</tr>
<tr>
<td>Victoria College (1)</td>
<td></td>
</tr>
<tr>
<td>Liblink (1)</td>
<td></td>
</tr>
<tr>
<td>Micom (1)</td>
<td></td>
</tr>
<tr>
<td>Telememo (1)</td>
<td></td>
</tr>
<tr>
<td>Down Under (1)</td>
<td></td>
</tr>
<tr>
<td>Nostromo (1)</td>
<td></td>
</tr>
</tbody>
</table>

Table 6

**How Respondents First Became Motivated to Use Bulletin Boards (Item 9). The Numbers of Respondents Indicating a Particular Way is Indicated in Parentheses.**

* (N=17)

- Curiosity to see how they worked, and what they contained (9).
- Enthusiastic about the possibilities of accessing, sharing or contributing to curriculum materials using computer technology (10).
- Interested in obtaining public domain software (1).
- Interested in on-line chatting (1).
- Trying to find a use for the school's modem (1).
- Use as an example in teaching (1).
Difficulties Associated with Using EBBSs

Lack of Time and Facilities

None of the respondents have made any serious use of EBBSs during the school day (except for demonstration to classes). Mr. D summarized one of the reasons for that as follows:

My main use is at home. That's where you have an opportunity to have a real good go at it, keep calling back if you can't get on. And if you get onto something interesting, be able to sit there for a couple of hours. You can't really do that at school. The bell goes and you're off somewhere else.

The issue of time was perceived to be a substantial inhibitor to teachers using EBBSs, and it seems anomalous that there were differing opinions about whether giving teachers more time to use EBBSs would increase the use of the systems (item 35(v), Table 1). That there is no need to give teachers more time at school was explained by Mr. H, who seemed to be looking towards an idealistic future which certainly did not apply to his own experience,

There is sufficient time É for lesson preparation É instead of browsing through a book on a particular aspect of their teaching - [teachers] could browse through the bulletin board instead.

Technical reasons and insufficient facilities are a problem leading to use outside of school hours, as noted by Mr. E,

Here at school we have a switchboard system which doesn't allow É [us] É to ring through with the modem. We've only got one direct line and we usually don't have access to that, because it's used in the senior staffroom. Which means if I want to use a bulletin board, I need to take a modem home at night.

Reid (1986) suggests that the use of EBBSs should be appropriate for schools because most schools in Victoria have computers available. This is, in general, true (Fitzgerald, Hattie, & Hughes, 1986, p. 18), and certainly true for all the schools used in this research. However, in nearly all these schools, staff would have to go out of their way to use EBBSs. It was suggested by Mr. P that if schools wish to encourage use of EBBSs, a dedicated computer and telephone line should be provided. It was also suggested that with the current state of EBBSs, this sort of expense would be a misplaced use of resources.
Table 7

Why Respondents Believe They Have Had Difficulty Gaining Access to a Bulletin Board
(Item 11). The Numbers of Respondents Indicating a Difficulty is Indicated in Parentheses. (N=17).

____________________________________________________________________

Computer link at 1200/75 or telephone lines are unreliable (4).

EBBS security system barring entry (2).

Forgot password (1).

Misunderstanding protocol or unfamiliarity (3).

Intermittent problems with the bulletin board or unable to make the connection for no attributed reason (2).

System not operating in specified hours (1).

____________________________________________________________________

Technical Difficulties

Eleven respondents suggested that they had found difficulty in accessing a bulletin board (item 11, Table 1). No correlation was detected between items 5 and 11, so it is not a problem restricted to any one ability level in computer usage. Overall, this was attributed to a range of reasons (Table 7), the major ones being general unfamiliarity, difficulty in establishing the remote connection (either in modem use or problems with the telephone line), problems with the protocol of using login names, passwords, etc. and problems with the EBBS, though EBBSs were generally thought to be reliable (item 21, Table 2). The communication speed is a problem of some significance which is dealt with later, as will the user-friendliness of the systems and the computer literacy of teachers. The types of difficulties are consistent with the possible areas of complexity and difficulty identified in chapters II and III.

One major reason for some of these technical difficulties occurring was the use of pirated communication software, which was not particularly user-friendly and for which manuals were not available, and modems which did not work particularly well with the computer or the communications software. Teachers who were making a serious effort to use EBBSs made sure they were not hampered by these difficulties.
Distinguishing Features of BBSs

BBSs may be distinguished on the basis of their technical characteristics (which includes the user-friendliness of the system), but it is also clear from the research that they can be distinguished on the bases of the information which is provided by them and the dynamism of the system. Issues of the information available and the user interfaces are dealt with separately, but the "dynamism" of an EBBS is defined below because this terminology is incorporated elsewhere.

The Dynamism of EBBSs

The dynamism of a BBS is the term chosen to refer to the amount of interaction users have with a BBS. A BBS would be considered dynamic if it was regularly accessed by a large group of users, each of whom actively participated in the communication to the system (such as answering technical queries, contributing curriculum information, using electronic mail or using the system as a means of advertising). Most boards were described as being quite "dead", and the comment by Mr. F on the relative use of boards sums up the situation:

What I've perceived the use [of bulletin board systems] to be was a lot of teachers getting together and sharing their work … the more I went into bulletin boards, the more I found that teachers weren't using computers and even less were using bulletin boards. So that's been disappointing. … I went right off bulletin boards for a year … because I wasn't getting anything out of them. I was uploading files to various boards, and I wasn't getting any feedback, I wasn't hearing people saying 'I use that in class, I found that great, I think you should have done this …'. I wasn't getting any feedback at all, there weren't many teachers uploading pieces of work that I could use.
The dynamism of an EBBS is also reflected in how carefully the system is maintained, and most respondents commented that there were amounts of outdated, unuseable or trivial information on the system. For example, Mr. H made the comment that

We tried a number of different bulletin boards … The information in them was … just a lot of messages, for example … sort of scribblings on the wall … graffiti-ists, just about. People just didn't know what to do with them … people like us … just having a look to see what it was like … there was no serious use.

No BBS was identified as being particularly dynamic, and the lack of dynamism was reflected in (and partly created by) a small number of enthusiastic users of each system, who tend to dominate the use of the system, and often the information on the system is to those users' tastes alone. This further discouraged other users.

The Amount and Type of Use of EBBSs

The amount of use made of BBSs and of the different ways of using them to communicate (bulletin board, electronic mail, libraries, talk to sysop) appears to be quite high (item 12, Table 3b), which implies a level of use and of usefulness which does not really apply. As previously noted, questions comparing the various modes of communication have little merit because of the experience of the user community.

The high amount of use of BBSs, and indeed the high volume of use (ie. number of accesses since first using) can be explained entirely by the respondent's curiosity in investigating the systems. The following quotes illustrate this.

Mr. J, I thought, oh, yes, this is worth trying out, just to see how the idea of a bulletin board works, just in general. So I tried contacting [one of the bulletin boards] … and discovered that there were some interesting documents there. There were quite a lot of documents that had been conference papers from a computer conference, so I downloaded quite a few of those conference papers and there were some of those that were useful for us to have a look through to see - much in the same way as you might read a magazine article, to find out some background on various aspects, such as desktop publishing, or teaching notes.

However, he did not use bulletin boards much,

… because there is not much time within the school day to get it done, so … I've tried it out at home, at irregular times. … The first time I looked, it appeared like there were quite a lot of useful files … the second time I looked it appeared that nothing had changed … there wasn't anything terribly new. The other way I might have used it if there were some other colleagues for which I would normally try to be in regular contact with, if there was a way that I could use that for mail communication with them, but in fact none of the other users were known to me.
Mr. K, I use it occasionally to contact other schools. I've used … the education department one. I'm not using any particular one in isolation. … Sometimes I just connect - get a phone number off a list - and see if there's something interesting. I go through topics such as science, biology to see what they have. If there's nothing of interest there, I just drop it.

The lack of suitable, high-quality information (see later) has been justified while users are merely investigating EBBSs. It has also been criticized; how are teachers supposed to have a full picture of what is possible unless the information is realistic, and not mere "graffiti"? This type of information alone would frustrate Mr. M,

I tend to be a bit out in front of what's happening in secondary schools, and I've been funded to try out a lot of this stuff, so … that I can provide information to other teachers … well, what is the best kind of modem to buy? What are the bulletin boards available? How can they assist you? I'm trying to find out all that kind of information.

The quote from Mr. M indicates the importance of the investigative use of EBBSs. It is only through practical experience that the issues of how EBBSs need to evolve, what equipment should be used, how EBBSs can be used by teachers and what changes will be required in teachers' professional life. The view that eventually on-line communication will be used in education was certainly held by the respondents. This general direction, and taking positive steps towards developing the systems and literacies required is suggested by Wedemeyer (1986).

Contributing to the direction education is taking is compatible with one of the suggestions of Young (1985) (mentioned in chapter III) concerning why teachers participate in curriculum development - they enjoy a position of influence in their profession. This was certainly identified by Mr. F,

One reason why I'm using bulletin boards is I'm trying to … make a name for myself, and I can see the bulletin board an area where I can become known outside the school.

Another important use of BBSs is the hobbyist use, as stated by Mr. G,

There will be hackers who mess around with bulletin boards for the rest of all time, because people are getting the same thing out of bulletin boards as they are getting out of ham radio.
Since the use of EBBSs is mainly in investigative or hobbyist ways, and users are having difficulty finding sufficient time and hardware resources to make use of the systems, then it is hardly surprising that EBBSs are not dynamic. An investigative or hobbyist use of EBBSs, together with the possibility that certain EBBSs are no longer functioning explains why only about half of the respondents have continued to use the system they nominated to focus on for the purpose of completing most of the questionnaire items (item 26, Table 1).

It is clear that the major type of use of EBBSs is not in the active retrieval and dissemination to assist the users in their classroom or curriculum development practice. Item 33 (Table 1) suggests that EBBSs are helping some users professionally, and this must be in an investigative capacity. Of those who believe EBBSs are not helping them professionally, there are some who have learnt about the systems, and want facilities, time and suitable information available to be retrieved (which is lacking, see later) so that EBBSs can be used as an information gathering tool. There are also some who do not get sufficient access to computer facilities to even effectively investigate EBBSs.

**Reasons for Making EBBSs Available and for Using Them**

A significant number of respondents believe that there are well-defined reasons why EBBS should have developed and are generally available (item 13, Table 2). The well-defined reasons suggested in the interviews have in common the idea of access to information. Some want to share information, others simply want to access it. This is consistent with the findings of Fitzgerald, Hattie, & Hughes (1986, p. 30), who found that using computers for access to information is seen by Australian teachers to be a major advantage for introducing computers into schools. The ability to access information in this way is seen as having the following advantages, consistent with the advantages of electronic communication suggested in Chapter III: reduction in the duplication of materials may eventuate, the speed and potential flexibility of access may be time-saving and travel saving for teachers, and a more continuous form of inservicing and direct access to people may result.

Statements such as these may constitute well-defined reasons for setting up EBBSs, but it is more likely that they are really reasons for investigating the systems. It was clear that no-one was using EBBSs in the ways which they felt the systems could or should be used.

The comments of those who disagree with there being well-defined reasons for setting up EBBSs are perhaps the most accurate in their assessment of the situation,
and point to the diversity of the curriculum environment which would need to be supported by EBBSs, the need for teachers to share materials and the limitations of the current hardware to do what is expected.

Mr. G, There might be one well-defined reason - that someone from some school or organization wants to get some kudos or publicity. If they were set up for some other reason, then you would be ringing them up and finding enormous quantities of extremely valuable stuff, and the operating people would be getting grants of the order of $100000 rather than the order of $5000 to purchase the hardware. And they would be adding hardware and updating hardware every three months. Because they are not doing that, then obviously there is no well-defined reason for setting them up. There are a large number of reasons and a large number of myths for setting them up. … People reckon that there’ll be huge amounts of curriculum material on the things, and I’ve seen some good curriculum material stored, but, see, the state of Victoria is such a diverse curriculum environment that you find a bulletin board being swamped for ages with just information about primary mathematics, just information about secondary biology, or something. Who ever happens to be cut-and-thrust at the moment. If you take every VCE guideline, and every frameworks booklet, … there would be several gigabytes of information. … So, obviously, unless you get fair-dinkum software, fair-dinkum hardware, you’re just not going to have that sort of stuff available, so there’s nothing that can be done about the collection of general curriculum material.

Mr. N, If you look at [one of the private boards], the reason it developed was [the sysop]. No other reason. … But it's people who make bulletin boards, and not the usefulness of the bulletin board itself. Mr. N further commented that users are widespread and have dissimilar aims as to why they're on the bulletin board, for example,

Some people do really want you-beaut lesson plans, and other people want ministerials, and other people want 'here's how I do it', and if you're not finding what you want, then you don't use it.

The lack of universally perceived well-defined purpose for EBBSs and the variance in the information needs of the user community is reflected in the responses to whether EBBSs achieve their defined purpose for all users (item 14, Table 2).
Perceptions of the Information Available

**EBBSs as a Curriculum Bank**

The information most commonly seen as useful is that which is directly applicable in a specific subject area, and then, as a sub-class of that information, that which can be directly taken from the bulletin board and used in class. There is also an element of difference identified in the information requirements of teachers, depending on their professional development -

Mr. H, In the time that I've been teaching science ... I have things pooled away, if you like ... the ideas there, at the time I looked, didn't strike me as being worth a try.

Mr. I, Things which I found least useful were typical lesson preparation things, course outlines of 'this is how we do year 8 science at school X' ... [not very useful because] I've been doing it for too long. If I was a first year out or a beginning teacher, I'd find it pretty useful, but nowadays, I find it easier to generate my own programs within schools, I don't have to look around. I'd only look around if some course changed because of what the ministry said, so if there was now going to be a major swing in terms of VCE courses - and even then you get most of that from a central source, like VCAB, rather than from teachers.

While there needs to be a balance between re-inventing the wheel, so to speak, working from personal experience and thinking through issues for oneself, this latter quote highlights a strongly felt need for "higher level" information (such as documents from the Ministry, VCAB, or Frameworks guidelines or resource books) by some respondents.

Rosenau (1979, p. 13) makes some pertinent comments directed at information resource centers, which can be applied to EBBSs, their design and their operators, in this context,

[The center] needs to know a good deal about the audience to which to send its messages or from which it expects to get requests to help. ... It is simply not enough to broadcast to the educational community as a whole that an information center has been established and is ready to serve educators of all sorts. Instead, a careful plan must be prepared that spells out for the staff of the center what portion of the total audience it can best serve and what segments it can it is most likely to be able to reach effectively and efficiently.

The information, the organization of it and the publicity of a system must be specifically targetted to reach and resource a particular clientele.

Mr. M suggested that,

The level of curriculum support in Victoria is at an all time low presently ... and teachers develop what they can as quickly as they can, and they don't want to put a lot of time into refining it ... because you haven't got the time to do it.
It is unrealistic to expect that the generation of well refined, usable (in whatever way), good quality materials should be produced and made available on an EBBS solely by teachers who fully occupied in the classroom.

The flexibility of the medium for delivering information was seen as advantageous in providing curriculum information, and this is consistent with teachers being active implementers and adapters of curriculum materials and programs (Connelly & Ben-Peretz, 1980), as referred to in chapter III.

Information described as useful, apart from curriculum information, was technical information, conference papers, software reviews, budgets and public domain software. Only one EBBS was mentioned where all these types were found, and user group BBSs tended to be better providers of some of this information than did EBBSs. The sentiment that many of the EBBS users tended to be more interested in computers or computer science curricula than they were in curriculum issues in general was expressed, thus detracting from the overall idea that EBBSs should support all areas of the curriculum.

For all materials which would be available on EBBSs, all respondents believed that it should be of high quality and up-to-date data, and several suggested that instructional materials should be field tested. However, insisting on quality control of material may not be compatible with the usual style of use of bulletin boards. For example, Mr. M,

what could happen … is that [bulletin boards] become defacto curriculum banks, but without, necessarily … being - inverted commas - good material. It's a value-free thing. You put a file on there, and really it's just on there … but there's nothing to say that it is, say, rated as A or B.

From the interviews (particularly responses to items F, J and N), there was general disappointment expressed regarding the amount of useful, high quality information available, although some information from EBBSs certainly had been used by some respondents (item 29, Table 1). This is an anomaly which cannot be entirely reconciled with the responses to item 24 (Table 2), that the respondents tend to consider that the information has value to them in their setting.
Presentation, Graphics and the Communication Speed

Mr Q. suggested that,

We're continually buying in textbooks, just to increase our list of experiments. ... The background theory doesn't change, what changes is the presentation.

The presentation, as well as the ideas, is of concern to those who would like to take information off EBBSs and take it directly into class. In this regard, Mr. B suggested,

a lot of the stuff that I looked at hasn't been all that inspiring. It's all straight text. It needs to be something really worthwhile, that I can use in my classroom. ... Worksheets that use graphics and things like that. Teachers would use these as an enhancement ...

It is certainly true to say that the production of novel or new classroom materials, in well-presented, graphic form, is something which would be time consuming for teachers, and it would therefore be beneficial to have such available on EBBSs, but this was not constantly expressed. There was certainly comment made regarding the inadequacy of the communication speed, which is a related issue. For instance, Mr. E,

The speed of transfer is way too slow. The size of files that you would want to transfer or programs you would want to transfer is much longer than they would have been a few years ago. ... Although faster speeds are possible now they're nowhere fast enough to make it a really user-friendly system. I've downloaded files which have taken half an hour ... and when you load it in and have a look at it, it may not be what you want, anyway.

With small amounts of information, communication speed is not a problem. To transfer a 2 page document, 500 words per page, at 300 baud would take less than 30 seconds. Larger documents, involved in providing the range of information sought, and graphics, which entail larger amounts of information per page than does text, present a problem. For instance, a 50 page syllabus document with 500 words per page would take approximately 90 minutes at 300 baud, compared with 20 minutes at 1200 baud or 10 minutes at 2400 baud. Substantial or well presented materials cannot be conveniently provided using EBBSs at communication speeds of 300 or 1200 baud.
Accuracy

This was tested by item 23 (Table 1), and the lack of significance amongst the responses could be another example of respondents not really knowing, because the accuracy of information, or lack of, was not an issue identified during the course of any interviews. There were some interesting issues raised concerning the accuracy of the information on EBBSs, however. There was a general belief that people take the attitude that, as Mr. M put it, because "it's on computer, it must be correct. Anything printed must be correct." This coupled with the ease of altering information could cause considerable problems, leading to contamination of material, rendering it virtually unusable. The ease of altering information is also an advantage. Once there is a mistake in a text book, it is there for the life of the book, but with EBBSs, the mistake is there only until someone finds it.

Teachers as Information Sharers

It is required that in using BBS teachers be prepared to share their information and ideas. No respondent completely doubted that teachers in general would be prepared to share good ideas, though there were degrees to which it was felt that teachers would be prepared to make their creations available. The opinion ranged from teachers being hesitant from fear of being criticized (though if criticism occurred in this way, one respondent suggested, it could be a constructive thing) through to Mr. P,

I can see people quite proud to have their own name up on resources of this and that. Most of them would enjoy that. A bit of kudos, a bit of recognition.

This coincides with one of reasons Young (1985) suggests for teachers being involved with regional curriculum development, as mentioned in Chapter III - it is a reward for teaching if teachers make a relatively unique contribution and see their names in print.

This is potentially a strong motivating factor for teachers to use EBBSs, but it remains a fact that few have uploaded information on to BBSs (item 30, Table 1). This can be attributed to several factors. Uploading was generally considered to be the most complex of the operations of the EBBSs, the simple investigative approach taken by most users who would not be bothered by complex operations, and an element in which, as Mr. M put it, "teachers are too busy just coping" to be bothered taking the time to upload.

These inhibiting factors are exacerbated by the fact, articulated by Messrs. F and H, that teachers are not producing their own material on word-processors. Even Mr. F,
who considered himself prepared to use a computer to do anything, said he found it easier to hand-write a worksheet than to word-process it. If teachers had material set up on computer, it would be a more realistic expectation for them to upload that on to an EBBS. The major problems are access to facilities, typing and computer operating skills and time, as identified in chapter III.

Personal Communication and Electronic Meetings

While the recognition of different modes of communication was not well defined for various reasons (item 12, Table 3b; items 31 & 32, Table 1), as previously noted, "Electronic Mail" and "Talk with Sysop" were clearly recognized.

Both "Electronic mail" and "Talk with Sysop" tended to be seen as a method of help on the system (and to a certain extent, so was the general posting of items to the bulletin board), restricted by the dynamism of the boards, the speed of the interaction and the amount of access users have to EBBSs, as elaborated on by Mr. B,

There are public mail sections, and I find those quite interesting … to get tips on general computer use. When I have trouble, I sometimes just put in a query and try to get a response. If it's a dynamic board, you can get a response really quickly. I sometimes chat on line with people, to get immediate feedback. I did that earlier on, I don't do that so much now … because it takes more time to type in a message. Its probably frustrating if you're a slow typist, and you can't express yourself quite as easily when you're typing as you can when you're speaking. It's more profitable to ring them up on the 'phone.

"Seeking help" is an important type of use which would tend to promote the use of EBBSs. Rosenau (1979, pp. 10-11) refers to research as to why educators preferred various information sources over others. Five of the most common reasons were - it is likely to have the information wanted, it is near at hand or accessible, it responds to my particular problem or question, it is easy to use and is usually available when I need it. Dynamic, user-friendly EBBSs would fulfil these needs.

The type of communication which is being promoted by the "help" usage of EBBSs is informal and often anonymous, which Dowling (1987, p. 43) considers has not always been acceptable in society, but may become important because we now have a means of supporting it - the BBS. Mr. G illustrates this point well,

The potential strength is that you can communicate with people you don't know, because the stuff is put up there. Well, I've got a bulletin board in my room here, and anybody can come in here, and find a timetable, some information on promotion positions, or some software … logo distribution service or whatever, that's what a bulletin board is - … you put something up that's of interest, generally, and anybody who want's to look at it can get at it.
Electronic mail was also seen as a fast, user-controlled version of the regular mail service, limited by how well one knows other users. This is in line with the findings of Pearson (1985, p. 172), mentioned in chapter III, that electronic mail will tend to be between people who know each other well, but it may open up new communication pathways. Electronic communication between a small group of users, originating because of a general plea for assistance is an ideal way to begin to establish new links between people.

In communication for "help" purposes, it does not matter who reads the mail, but for personal communication, a guarantee of privacy is needed. For respondents who, given sufficient access to equipment and reasonable dynamism of the system, would communicate with colleagues, this was a concern. If electronic mail will tend to be between people who know each other well, then this further amplifies the concerns about privacy.

Flexibility in contacting people is a distinct advantage of electronic mail, suggested in Chapter III following Foster (1985, p. 12), a fact that can be attested to by the researcher in the difficulty that was found in contacting teachers to arrange the interviews. It was articulated well by Mr. J,

The electronic means of communication is perhaps another way to try to make up for the deficiencies in other ways at the moment. It's hard to maintain direct communicating with a teacher. If you try to contact a teacher, you usually find he's busy that period or whatever, you're never able to get … through at the right time, so leaving messages could be a way of solving a problem that's known to be a major problem to contact teachers.
The User Interface and User-Friendliness

All the EBBSs referred to were menu driven, and were similar in that sense, as was noted by Mr. G,

All bulletin boards are about the same. Once you learn how to do each particular 'thing' with the particular bulletin board it's fine, but until you learn how to do each particular thing, it's a mystery.

However, differences between systems were noticed, as commented on by Mr. C,

Each different bulletin board has it's own format, it's own different sorts of commands. I don't find them very friendly at all.

The sentiment was expressed that the differences would be more profound for an inexperienced computer user than for an experienced one, for example, Mr. K,

It's just choosing the topic … if you're familiar with the use of the computer … if you're not familiar, it's confusing.

While there was a tendency for respondents to suggest that the organization of the information and the facilities was clear and logical, this does not imply that the systems were easy to use (items 15, 16, 19, Table 2). The general disagreement with item 19 ("all teachers could easily and independently operate the system") is reflected in the responses to whether use of EBBSs could be improved by making the program easier to use (item 35(iv), Table 1).

There was generally much harsher criticism of the operation of the communication software and the ease of establishing the link successfully than there was about the user-friendliness of the EBBS programs. For instance, the following comments by Mr. F,

I think the problem doesn't lie so much at the bulletin board end as at the user end. The software people are trying to get on to the bulletin board with, can be less user-friendly than the bulletin board software. Setting up the system from school or home is probably the hardest step, I should say. Making sure the modem is compatible with the computer, making sure the card has the right DIP switches, making sure your software is running the way it is supposed to run. I would say that's probably the biggest stumbling block. Once you've got on to a board … you find it quite easy.

By far the most universally critical comments made were in relation to the computer literacy of teachers. There was no doubt in any respondent's mind that the computer literacy of teachers was well below that which it ought to be. Mr. G's comments express this succinctly,

Teachers in general have as much grasp of technology as a monkey has of brain surgery. The level of acceptance of technology, the level of 'happiness' with technology is just abysmal. … Not that it's hard, not that they can't be trained, but they won't be - that they're not interested.
What is needed, for purposes of using EBBSs, is what Klassen (1983, p. 44) calls *computing literacy*, or feeling the same degree comfort with the technology as most of us feel towards our car. It is the "combinations of skills embodied in applications software that allow you to drive down computing 'streets' safely and confidently" (p. 44). Clearly, there is a minimum computing literacy for EBBS users, which contrasts with *computer literacy*, which, according to the definition given by Pantiel & Petersen (1985, p. 44), would embrace "computing literacy", but also include programming, knowledge of computer design and the historical perspective of computers.

Computing literacy for EBBS users could lead to a full program of computer literacy. The opinion that dynamic EBBSs with plenty of useful information will not only be essential for teachers actively involved with EBBSs, but could be a strong enough motivator to encourage teachers to begin using computers was stated several times. The latter part of this statement fits in well with the findings of Harasim & Johnson (1985, p. 54), as mentioned in chapter III, that the most important motivator for computer conference users is that they receive ample, useful information each time they access the conference. In the EBBS setting this of course means a very large data bank is required.

The ways which information can be searched for, which are supported by the system should have an impact on how easy to use EBBSs are, as was suggested in Chapter III (Asheim, 1982; Knapp, 1987). However, there was very little criticism expressed in this regard, and this is attributed to the relatively small amount of information which had to be searched through on systems as they currently are. Keyword searching was seen as superior method to the forty-character descriptions found on some systems, because pinpointing what is of interest may mean reading through all the forty-character descriptions or even scanning every document on the system. For a BBS with a decent amount of information, a cross-referencing facility would be required.

Those who suggest that changes should be made to EBBSs (item 27, Table 3b) all referred to the user-friendliness of the program, the organization and structure of the information, and the system limitations (such as relatively small amount of disk space and speed of transmission) which directly relate to the usefulness and the user-friendliness of the system.
User-Support Materials

It was made clear in the interviews that insufficient documentation and user guides is a problem, even though this is not entirely reflected in items 17 and 18 (Table 2). The reason for the abstentions from completing these items was that those concerned had not seen such materials and did not know what was meant by these items. Mr. G summed up another one of the problems,

No-one's ever got the right instructions. Quite often the little bits of information they send you out are wrong, they've been changed or updated ... they're all amateur organizations and they're always making changes and forgetting to tell people.

There was mixed opinion about the online help facility, which was seen as a means of providing user-support. Some preferred to have something they could read, others found that on-line help would be supplementary to other documentation, still others found it to be sufficient on its own.

General Impressions of EBBSs

The data indicates that the respondents believe that setting up EBBSs is an appropriate use of computer technologies (item 20, Table 2), and that this style of communication is recommended (item 28, Table 1), though this could be from a sense of deja vue with the direction of technology in education rather than feeling personally happy with the style of communication.
### Table 8a
Feelings About Using an Bulletin Boards (Item 25), Showing the Number of Responses to Each Scale Position. (N = 17)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfying</td>
<td>2 : 10 : 3 : 2 : 0</td>
<td>Dissatisfying</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relaxed</td>
<td>2 : 10 : 2 : 3 : 0</td>
<td>Tense</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic</td>
<td>3 : 3 : 7 : 4 : 0</td>
<td>Static</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productive</td>
<td>3 : 9 : 3 : 2 : 0</td>
<td>Counter-productive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directed</td>
<td>2 : 6 : 7 : 2 : 0</td>
<td>Aimless</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>1 : 12 : 3 : 1 : 0</td>
<td>Bad</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 8b
Feelings About Using Bulletin Boards (Item 25), Showing the Mean and Standard Deviation and Graphically Displaying the Mean for Each Scale. (N = 17)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>5</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfying</td>
<td></td>
<td>Dissatisfying</td>
<td>2.29</td>
<td>0.82</td>
</tr>
<tr>
<td>Relaxed</td>
<td></td>
<td>Tense</td>
<td>2.35</td>
<td>0.90</td>
</tr>
<tr>
<td>Dynamic</td>
<td></td>
<td>Static</td>
<td>2.71</td>
<td>1.02</td>
</tr>
<tr>
<td>Productive</td>
<td></td>
<td>Counter-productive</td>
<td>2.24</td>
<td>0.88</td>
</tr>
<tr>
<td>Directed</td>
<td></td>
<td>Aimless</td>
<td>2.53</td>
<td>0.85</td>
</tr>
<tr>
<td>Good</td>
<td></td>
<td>Bad</td>
<td>2.24</td>
<td>0.64</td>
</tr>
</tbody>
</table>

**Note.** Overall Mean = 2.39
There is consistency in the responses to the 5 scales of the semantic differential (item 25, Tables 8a and 8b), indicating neither a strongly positive nor a strongly negative response regarding attitudes to EBBSs. There are no significant differences between the means of the scales used and they are all very close to 2.5.

Isaac & Michael (1971, p. 98) suggest that one purpose of an interview is to "follow up unexpected results, and validate other methods ...". Data presented elsewhere in this study suggests that the results from item 25 must carry little weight in an overall assessment of attitudes to EBBS mediated communication. In particular, one might expect similarly consistent means, but rather closer to 5 - the negative end of the scale. Indeed, Dowling (1987) and Harasim & Johnson (1986, pp. 26-33) consider computer communication to be something which most people have not had experience with, which is rather "remote", lacking in verbal cues, and therefore a means of communication not generally well liked. There are four possible reasons for this discrepancy, detailed as follows:

Firstly, it is quite possible that the responses to item 25 were inaccurate because of the novice level of understanding and investigative uses of BBSs which were found. What does it really mean to have satisfying, relaxed, dynamic, productive, directed and generally good electronic communication if EBBSs have not been used for this in a serious, continuous way? This is yet another potential example of item design problems which did not become apparent until data collection had begun, and effected the results to many items (see Chapter IV).

Secondly, the respondents are generally experienced computer users who may adjust themselves better to computer communication than would inexperienced users, and therefore the expected difficulties with this medium would not be apparent in this study.

The third factor which needs to be taken into account is that expected difficulties with EBBS communication, after Dowling (1987) and Harasim & Johnson (1986, pp. 26-33), may not actually be prevalent, and this would certainly be good news. It is unlikely that this, or the fourth possibility, was a substantial contributor to the results obtained.

An investigation of whether such potential problems with EBBS-mediated communication are in fact observed needs to be left until a time when EBBSs are more generally accessible and useful.

Finally, a semantic differential test requires detailed and extensive development (eg. McCallon & Brown, 1971) if it is to be a good indicator of attitudes, and such rigour was lacking in the development of this item. (The sample size of this study alone
prevented this). There is no doubt that a well-designed semantic differential to assess attitudes to EBBSs would be a convenient tool to provide developers of an EBBS with some formative evaluation of the system. The instruments used by Conboy (1982) and McConnell (1988), and the techniques used by Mitsos (1961) and McCallon & Brown (1971) provide a good basis for the development of such an instrument.

Mr. F made particular note of incompatibility problems, a common disappointment with EBBSs:

One thing that put me off was the incompatibility of various files. There were a couple of files on Tempest, for example, that could only be accessed by Macintosh users. And I was peeved off that my Apple IIe couldn't do it, and I thought that one of the things that a bulletin board was supposed to do, was to unite all 'religions' and different types of computers.

Another technical problem is that of telephone charges, which did not effect any respondent, but was certainly recognized by many of them. The amount of on-line time required to learn and then use an EBBS would make it expensive for country areas, or for anyone, should timed charged local calls be introduced. In these situations, teachers would have to be very keen to be prepared to use EBBSs at home and therefore on their own telephone accounts.

Mr. K, who was the only one of the respondents who spoke with a strong accent, made these comments regarding electronic mail,

For example, because I have an accent - my experience - some people just switch off. If you have an accent, they don't listen. … They just don't concentrate because of what? The accent is there, and they're telling me I can't speak properly … so all those aspects there create difficulties in communication. It's so much easier to write it or to put it through the computer.

This is an example of the advantages of the egalitarian nature of electronic communication, suggested by Harasim & Johnson (1986, p. 26-33) mentioned in Chapter III. Users of electronic communication cannot be prejudiced towards other users because of poor or accented language, physical disabilities, or race, to name a few potential handicaps of communication, because these attributes are, in general, not known to other participants electronic communication.

Along a similar theme, Mr. C commented that some teachers will use EBBSs because that's the style of communicating that they're most comfortable with, but many will not feel drawn to use them on the basis of the communication style. The skills required and degree of comfort felt with EBBS technology were certainly issues
suggested by the literature (Chapter III), but for which a solution has yet to be proposed (Dowling, 1987).

**EBBSs as an Innovation and Tool for Innovation**

EBBSs can help teachers and schools address the problems associated with a diverse curriculum environment and the increasing rate of change occurring in education. Cooke & Verloo (1984) report on the reason for setting up a database in California,

> An advisory committee discovered that easy access to the newest teaching materials was almost impossible for the state's ... educators. In a state as large and diverse as California, ... there was no central clearinghouse for instructional resource materials. The inability of teachers and teacher educators to keep up with changes in the field was thought to be a major factor contributing to the inadequate preparation of many high school graduates for jobs or further education.

(p. 36)

While EBBSs as a curriculum databank may help teachers cope with changes in education, the use of them also requires changes in the way teachers work. Firstly, as has already been mentioned, teachers would need to use word-processors as an integral part of their teaching and preparation. The second point is that the mere provision of curriculum materials in any medium does not guarantee their use, as was found by Kennedy (1985), and teachers, principals, resource centre personnel and subject co-ordinators all have a role to play in the effective use and dissemination of materials. This leads to the third point, that teachers need to be active curriculum developers and improvers. That is, their professional life must include actively seeking out new information and resources and incorporating that into their classroom practices and the school's curriculum. Comments like that of Mr. G are therefore worrying,

> [For a while], we were actively grabbing stuff, [but] in terms of the school curriculum, once you've got the software to run the programs you're going to run, you stick with that software.

The fourth point is that teachers need to be active producers of information and resources, though it has already been identified that it is unrealistic to expect teachers to be the sole developers of materials available on EBBSs. These considerations show that the effective use of EBBSs will involve change in the school at the individual and school level, perhaps greater than that for any other technology introduced into schools.

There are many important aspects of establishing a process of change which would cause teachers to use EBBSs in an active way, and support them in doing so.
Fullan (1983, Ch. 15) summarizes of various facets of change processes to be considered, but a full treatment of these is beyond the scope of this thesis.

The issue of time, which has already been identified as a substantial problem for teachers attempting to use an EBBS, deserves mention, because the concepts of change exacerbates the problems associated with time. Fullan (1983, p. 293) refers to the "myth of unlimited resources", by which is meant that there can never really be enough of a resource (such as time) to effectively implement a change. Time for change needs to be part of the teacher's job, but a surprising amount can be accomplished when a small amount of time is organized regularly.

It was identified in chapter III, mainly following documents written by Ministry officers (Reid, 1986; Science Curriculum Information Network. Report on the First Year of Operation, 1986), that EBBSs should not only support, but encourage curriculum development processes. Despite the hopes that EBBSs would encourage collaborative working between, schools, regions, and non-school groups, and that they would encourage teachers to learn word-processing skills in order to make use of searching and retrieval of information in their curriculum development activities, these traits were not observed in any respondent's school. This is due to three interrelated issues: the use of EBBSs is investigative, there are problems associated with the systems and the information thereon, and because schools have no plan for change associated with the effective use of EBBSs (as discussed above), teachers are not encouraged to move beyond mere investigation.

The mere provision of EBBSs does nothing more than invite the teacher and the school to change in ways which seem appropriate to them, and it needs to be left to future research to determine the extent of that change in curriculum development and teachers’ skills, and whether providing EBBSs is more effective than other methods of promoting change. As yet, teachers in general have not had time to become well informed in the use of EBBSs, let alone have a chance to decide on directions for changes which should result from having the equipment and the skills.
### How The Use of Bulletin Boards Could be Increased (Item 35(vi)). The Numbers of Respondents Indicating a Particular Method is Indicated in Parentheses. (N=17).

<table>
<thead>
<tr>
<th>Method</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster communication speed</td>
<td>1</td>
</tr>
<tr>
<td>Make it easier to use, increase familiarization</td>
<td>2</td>
</tr>
<tr>
<td>Professional support and inservice</td>
<td>4</td>
</tr>
<tr>
<td>Ensure the information is of value and worth communicating</td>
<td>3</td>
</tr>
<tr>
<td>Each school being required to use a modem and specific bulletin board</td>
<td>1</td>
</tr>
<tr>
<td>Providing a permanent location and dedicated line; facilities always on call</td>
<td>1</td>
</tr>
<tr>
<td>Funding for hardware and software (particularly modems)</td>
<td>3</td>
</tr>
<tr>
<td>Access to documentation</td>
<td>1</td>
</tr>
<tr>
<td>Publicizing of benefits to teachers</td>
<td>1</td>
</tr>
<tr>
<td>Schools to work with regions to set up networks for file transfer</td>
<td>1</td>
</tr>
<tr>
<td>Help for country schools (008 or subsidy)</td>
<td>1</td>
</tr>
<tr>
<td>Strong ministry involvement in a formal way</td>
<td>1</td>
</tr>
<tr>
<td>Time to learn the system</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 10
The Potential Which is Seen For EBBSs (Item 36). The Numbers of Respondents Indicating a Particular Potential is Indicated in Parentheses. (N=17).

<table>
<thead>
<tr>
<th>Potential</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing a buy and sell service</td>
<td>1</td>
</tr>
<tr>
<td>Providing syllabi and curriculum</td>
<td>2</td>
</tr>
<tr>
<td>Increased speed of transfer</td>
<td>1</td>
</tr>
<tr>
<td>Allowing in-house modification of other's work</td>
<td>1</td>
</tr>
<tr>
<td>Sharing of software</td>
<td>1</td>
</tr>
<tr>
<td>Regional networks, school based - rather than centrally based - being</td>
<td>1</td>
</tr>
<tr>
<td>established for ideas exchange and advice</td>
<td></td>
</tr>
<tr>
<td>Wide-spread communication between teachers, including interstate and</td>
<td>3</td>
</tr>
<tr>
<td>overseas</td>
<td></td>
</tr>
<tr>
<td>Sharing of information</td>
<td>3</td>
</tr>
<tr>
<td>Reducing duplication of effort</td>
<td>2</td>
</tr>
<tr>
<td>Dissemination of useful and up-to-date information. Could replace</td>
<td>3</td>
</tr>
<tr>
<td>written information</td>
<td></td>
</tr>
<tr>
<td>Growing, unlimited or great potential</td>
<td>4</td>
</tr>
<tr>
<td>Very little until difficulties are overcome</td>
<td>1</td>
</tr>
</tbody>
</table>
Most users see increasing potential for EBBSs, so long as adequate hardware and software are used on remote computers as well as on EBBSs (Tables 9 and 10). Item 35 (Table 1) shows that motivation, encouragement, inservice training and professional support for users, making the EBBS program easier to understand, providing documentation, providing more time at school and more facilities for teachers to use EBBSs are, at present lacking, and which must be addressed if the use of EBBSs is to increase.

Teachers must be convinced that it is worthwhile to use EBBSs. The equipment must be available, the time must be available and the types of information available must be diverse and the quality must be high, this way the information will be useful for all users. (Harasim & Johnson (1985, p. 54) consider that the most important motivator for users is access to useful information.) The issue at the heart of the situation is described by Mr. F,

I’ve gained a lot of knowledge about bulletin boards and other systems, but nothing very practical at this stage, in terms of helping me with teaching, saving time - all these things which computers are supposed to do. … I’ve made some contacts, I’ve met a lot of people, and that’s been of great benefit, but it still hasn’t reduced my workload.

EBBSs must be seen as useful, otherwise the decisions made about the long term use of the systems will indubitably be unfavourable.

Some constructive comments were made suggesting ways in which EBBSs could be made a more worthwhile tool for teachers and schools. These were as follows:

An idea which many respondents had was for schools to have a computer and telephone line permanently set up in a central location to be used in contacting EBBSs. A complementary suggestion was also made to reduce or eliminate the "paper warfare" which is distributed by the Ministry (Table 10), for example, Mr. B,

The Ministry might be able to use a bulletin board as the basis of some sort of system for sending memos. You might have a person who regularly accesses the board to see if there is any message from the Ministry or region and have them distributed.

This is an example of what is meant by "strong Ministry involvement in a formal way" (Table 9). A very constructive suggestion was made by Mr. N, who suggested that use of an EBBS might be suitable as a means for teachers to communicate for consensus moderation. Teachers have to gather together periodically for this purpose, and the employment of an EBBS would certainly save on teacher travelling time and expense (particularly important in country areas), probably cut down on the extent to which
teachers would need to be released from normal duties for moderation, and allow more continuous communication between members of the moderation group.

One very sensible suggestion can be discerned relating to organization of information, quality control and restrictions placed on EBBS use because syops are not full-time. Such restrictions include making sure the information is up-to-date and not "graffiti", general system maintenance and having someone available to "chat" to. Mr. G suggested that a full-time editorial staff should be employed, to classify and cross-reference contributions, and other respondents made similar suggestions relating to having a full-time syop. It was recognized that editorial staff would be considered to be contrary to the notion of "bulletin boards", that contributions are contributions, regardless of what anyone else thinks about them. This principle cannot be enforced, alongside ensuring that the information is of a high standard and suitably classified. With wide-scale use of EBBS, this would fully occupy more than one full-time person.

The issue of subsidies or funding (Table 9) needs to be seen in two ways. Firstly, there is the issue of it needs to be worthwhile to the school to provide adequate computer communications facilities. The quality of the information and the utilization of it are the key factors here (discussed below), and the feeling was certainly expressed that if the Ministry wants schools to be involved with EBBSs, and these key factors are still to be realized, then the Ministry had better provide the equipment! However, the cost of one computer, modem and communications software is well within the budget of a school, so long as it can be justified. The second way of interpreting the statement is a purely practical one: if large numbers of schools are going to be involved in purchasing such equipment, surely the Ministry could organize the purchase of sets of equipment which would be standard in all schools at a bulk discount rate.

The EBBS hardware and software must be sufficient to support the communications expected of the system. Mr. G's comments deserve reiteration,

If you take every VCE guideline, every Framework booklet, … there would be several gigabytes of information … so, obviously, unless you get fair-dinkum software, fair-dinkum hardware, you're just not going to have that sort of stuff available, so there's nothing that can be done about the general collection of curriculum material.

…

So, if it were used by anywhere near … 1% of the teachers across the state, you wouldn't get on, it'd always be engaged.

It is clear that a fast time-sharing system with a very large amount of memory must be provided if EBBSs are to be as useful as many expect them to become.
Summary of the Main Findings

The 14 points below summarize the main findings of the study. Points b to k also encapsulate the perceptions of the respondents relating to EBBSs. A summary of the suggested future directions of EBBS is incorporated in the conclusion. A summary of the likely effects, advantages and disadvantages of EBBSs, drawn from literature on teleconferencing, was presented as 16 points in chapter III. These considerations have been dealt with throughout the discussion, and, in general, have been found to provide an accurate description of many aspects of EBBS, though the literature did not suggest that dynamism would be an important feature, or that the use of EBBSs could be simply investigative. It has not been appropriate to comment in any detail on those issues relating to electronic meetings and facilitation of change cannot properly, because the type of use of EBBSs does not provide sufficient data in these areas, but these are areas which need to be investigated when the major use of EBBSs is no longer investigative.

a) The respondents were male, with teaching experience in mathematics, science or computing and tended to hold administrative positions. They are generally competent computer users.

b) The information available on EBBS tends to cater for teachers of these subject areas.

c) The average length of time since any of those interviewed had first used an EBBS was approximately 2 years.

d) Large quantities of suitable information is not available on EBBS. A wide selection of information needs to be made available on EBBS for them to be patronized to any serious extent, because of the diversity of the user community. Such information would include classroom materials (particular that of complex or graphic design), curriculum guidelines, documents from the Ministry or VCAB, advertisements, textbooks, computer software, software reviews and examples of program budgeting.

e) There is serious doubt as to whether EBBS hardware and software is capable of supporting high volume access to sufficient quantities of information.
f) An important characteristic of EBBSs is their dynamism, which reflects the frequency of use by a wide user-community, and the quality and up-to-date nature of the information contained on the system. Lack of dynamism with the systems investigated is a major issue.

g) Lack of time at school is a major inhibitor to using EBBS, and effects the changes required in a teacher's professional life and in curriculum development. Because of this, it is unrealistic to expect that classroom teachers can be the major contributors to EBBSs, at least while the majority of their materials are not produced on word-processors.

h) Lack of access to suitable equipment is a second major inhibitor to teachers use of EBBSs, as would be telephone costs for time-charged calls.

i) The lack of computing literacy of teachers, suitable to operate an EBBS, is a major obstacle which must be overcome if EBBSs are to be widely used in schools.

j) The low user-friendliness of the EBBS program, the complexity of the operations required to establish a connection with an EBBS and the lack of system documentation and guides are other major problems.

k) If they were fully operational, EBBSs would reduce teacher time, cost and travel, reduce redundancy in materials developed and provide increased inservicing, collaboration and consultancy for teachers. Teachers have become involved with investigating EBBSs in the hope that these goals are presently realized, or will be in the near future.

l) The major type of use of EBBSs is that of investigation. No respondent has regularly obtained information which is particularly useful for professional development or classroom use. Formal electronic meetings or general use of electronic mail are not occurring.

m) A "help-seeking" use is potentially important, but this being severely restricted by the problems outlined in points f, g and h, namely the lack of dynamism of EBBSs, the lack of time to use them and the lack of access to suitable equipment.
n) No EBBS has firmly established aims to its operation, or if reduction of teacher time, cost and travel, and avoiding redundancy in materials developed and increased inserviceing, collaboration, and consultancy for teachers (point k) constitute implicit aims, no EBBS achieves them.
CHAPTER VI

Conclusion

Two potential applications of EBBSs have been identified, use as a curriculum bank or in supporting personal communication and electronic meetings. The data collected suggests that any significant use of EBBSs is as a resource bank only. It is only with respect to this that the research hypothesis, that classroom teachers in government post-primary schools who use EBBSs find them useful, can be analysed. From the discussion in Chapter III, and the reasons the respondents gave for being initially interested in EBBSs, the supposition could be drawn that EBBS should be found useful as a resource bank which would be actively drawn upon by teachers, which would reduce teacher time, cost and travel, redundancy in materials developed and provide increased inservicing, collaboration and consultancy for teachers. There was no sense in which they have been found useful in achieving these aims.

The investigative activities, motivated by curiosity, are without doubt the principal use of EBBSs. This constitutes a useful and essential (albeit limited and temporary) activity among the users of EBBSs. It is justified by the belief that teachers as a part of the whole educational community need to go through the stage of learning about EBBS and on-line computer technology in general. The issues of how EBBSs are used, how they can help teachers and what changes will be entailed in the tasks teachers do are amongst the important unknowns which need to be addressed, and it is only by practical experience that the answers will be discovered.

In terms of understanding the different purposes for which EBBSs can be used, Mason (1985, p. 36-39) has developed an analogy between the types of users of computer teleconferencing systems (originally applied to computer conferencing systems) and the types of people involved in the exploration and eventual colonization
of North America. In this analogy, each user of an EBBS plays a role corresponding to one of the following:

**Explorer** - The adventurer, for whom life's work is to discover new frontiers.

**Pioneer** - This individual sees value to himself and to the advancement of his discipline by moving into new territory. The pioneer believes with passion and is prepared to sacrifice much to move into the new domain. The pioneer is prepared to put up with a harsh environment; ease of use is a luxury. The work done by explorers is recognized, understood and applied.

**Settler** - The settler is less passionately driven to improve his lot or that of his discipline, and the move into new territory is a one-time major commitment, driven by inability to progress the traditional way or being over-sold on the benefits of a change in approach. This individual is willing to work hard, expects guidance and stability, has higher expectations but less resources and cannot endure the hardships which the pioneer can.

**Frontiersman** - This person acts as a guide, protecting the settlers and pioneers from unfriendly environmental elements, and tends to drift to where he is needed.

The descriptions of pioneer and explorer embrace virtually all users of EBBSs (and certainly all the respondents), including the BBS hobbyists and those who are out to make a name for themselves in a new field. Many of these pioneers are reluctant, users who were under the impression that the time is ripe for settling, but found that they needed to become a pioneer or not be involved at all. Drawn on by an element of the pioneer spirit, they opted for the pioneer role, but would really prefer to be settlers. For explorers and pioneers, their interests in simply developing EBBS and their profession means that they find EBBS are useful, but for the settler and would-be settler, the systems do not offer much.

The data is applicable, then, to how the transition can be made from systems which support explorers and pioneers to systems which encourage settling. It is the aim of settling which is the sole reason for attracting some users in the first place, and, one must suppose (because the aims of establishing EBBSs are ill-defined), has been the reason for setting up EBBSs.

The key issues related to teachers using EBBSs have been isolated, and are recognized to be strongly interactive and are summarized in chapter V. Not all the
issues will apply to every school situation, and many of them could not be predicted from the literature search. At the risk of unjustifiably emphasizing certain aspects, the following must, in practical terms, be areas of definite concern: the quality and type of information, and the inability of teachers to be the sole or major developers of this information; the dynamism of the EBBSs; the computing literacy of teachers; the user-friendliness of EBBSs; the support which the existing hardware and software can offer; and the time required to effectively integrate the use of EBBSs into a curriculum development program.

*The Science Curriculum Information Network. Report on the First Year of Operation* (1986, pp. 6-9) describes the outcomes of the initial stages of the SCI-NET project, on the basis of what appear to be anecdotal comments rather than research. Many of the key areas identified correspond closely with those areas of concern identified above, yet there is no mention that it is in these areas which promoters of EBBSs should be improving the product. The type of use of EBBSs is an important aspect which this research has identified, not discussed by any of the literature. It is clearly not sufficient to assume that EBBSs will automatically be integrated into schools because of their many advantages. The issue of the sorts of information and who provides it is something which runs counter to the themes in the SCI-NET report document. It is unrealistic to expect the development of most materials to occur at the school level.

It was suggested that the number of contact hours with students per week, the availability of facilities and the amount and type of curriculum development activities expected of teachers may be important factors in teachers finding EBBS useful. The choice of subjects for the study which developed from these suspicions has been partially vindicated, because these are some of the important factors for the respondents. It would be interesting to research what the relative importance of each factor is, and whether there are in fact differences between and within the various school sectors (eg. government, non-government, post-primary and primary) on the
importance of each factor. If differences are found, the reasons for differences would also be appropriate research.

The major outcome of any study of EBBSs, including this one, must, of course, be to suggest directions for future development. In this study, it can be only to a limited extent, because such a small, selected sample of teachers was used. Assuming that the issues established in this study are applicable to a greater or lesser degree to the introduction of EBBSs to the school environment, the recommendations are made.

1. Schools should be recommended to make permanently available a computer with modem and telephone line.

2. A particular computer system capable of producing high quality graphics and communications software should be recommended for schools to use, to make the task of inservicing easier, and to alleviate the file-incompatibility problems.

3. Similarly, a particular modem should be recommended, and it should provide good error checking and the ability to support communication at 2400 baud at least.

4. One EBBS be set up to provide services for schools.

5. The publication of thorough system documentation and user guides on the EBBS combined with that on the recommended communications software must take place.

6. A small team of full-time curriculum support, editorial and technical staff be assigned to maintaining, promoting and inservicing activities concerned with the EBBS.
7. A substantial database of materials should be built up, initially by the support staff, and then later by schools and teachers with substantial amounts of materials already available on word-processor should be encouraged to transfer their work. The information should cater for wide diversity of users, should be of high quality, and be relevant to other fields as well as maths, science or computing curricula.

8. The EBBS needs to operate on a large timesharing machine, supporting substantial quantities of disk storage and several simultaneous remote connections.

9. The EBBS should enable users to share resources, such as laser printers or graphics plotters, which could be available at various sites around the state.

10. The EBBS program should provide good structure to distinguish the modes of information exchange and the various sorts of information available, good cross-referencing and keyword searching, user-friendly operation and substantial on-line help.

11. If it can be correctly inferred from Palme (1985) that computer conferencing is a better way of providing electronic group conversations on given topics than are either electronic mail or EBBSs, then the EBBS should have as one of its modes of operation a computer conferencing service. This would support consensus moderation and organized discussion on given topics, such the development of curriculum guides and resource materials.
12. A computer conferencing system is worth setting up on a trial basis, to determine if it is a better way of mediating discussions than electronic mail or bulletin boards.

13. One of the tasks of the EBBS support staff should be to act as editor of the information submitted.

14. The Ministry should start communicating with schools using the EBBS. Initially, this would need to combined with paper memoranda, but would ultimately provide further incentive for schools to make regular use of EBBS.

15. Once there is sufficient information on the EBBS for it to be justified contacting the EBBS regularly, schools should appoint one person to the position of educating staff, to make regular searches and to act as information disseminator. This person needs to be given a time allowance and needs to be initially inserviced in order to act in the role of a local frontiersman.

16. A school-wide commitment to the use of EBBSs needs to take place, once a local resource person has been appointed. Planning, being prepared to change, individual and corporate commitment are essential activities for what must be a long-range staff development program. Implicit in this is provision of adequate computer hardware for word-processing and remote communications and increasing the computing literacy of teachers.

17. Certainly at the time of school-wide involvement in EBBSs, but also before that, schools must encourage the use of EBBSs in areas other than maths, science and computing, and also by female teachers.
This study needs to end where it began, placing EBBSs in the context of curriculum development and support. They are clearly a powerful tool not only in supporting curriculum development but in promoting it, but this aim is yet to be realized. The study has identified the characteristics of a bulletin board system, described a user community's perceptions of EBBS, and discerned the critical elements of use and usefulness of EBBS in order to draw conclusions on the general research hypothesis that teachers find EBBSs useful. The conclusion, that EBBSs are found useful, but not for the expected activities is central to the presentation of the research, but the discernment of critical issues and suggestions of directions for the future are of more practical significance. The potential for EBBSs in curriculum support will not be realized until the areas of difficulty are resolved.
Introduction (presented to the interviewee)

The purpose of this complementary questionnaire and interview is to gather data for research, conducted within the faculty of education at the University of Melbourne. The research is concerning teachers and the use of educational computer bulletin board systems (which I will simply refer to as bulletin board systems). Examples of these systems are SCI-NET, SCEC-NET, Eastern Region, Comet and Tempest, but, at any stage, do not restrict yourself to considering these systems if you have used any others. However, focus your attention on bulletin board systems which provide similar services (such as "bulletin board" and "electronic mail" communication with colleagues, and access to curriculum information).

The routine I would like to follow is as follows: for you to fill out a questionnaire, and then for us to proceed to the interview, which I would like to tape-record (for ease of collation of points arising in our discussion). Is this alright with you, or do you have any questions? In that case, we'll move on directly to the questionnaire.

The questionnaire is in five sections. A large proportion of the questionnaire is in multiple choice form. For such items, write the response of your choice in the space provided. For some items, more that one response may be appropriate. Other items require a short, written response. These should be written in the space provided. Any other forms of response are as indicated, as required, throughout the questionnaire. Please leave blank any items you find difficult to respond to. Issues addressed in these can be taken up on the interview.

[The questionnaire is filled in, followed by the interview, based around the following questions]

A. Could you expand upon the experience you have had with computers?
B. Could you describe the use you have made of bulletin board systems?

C. You note that you have used more than one bulletin board system.
   If you had chosen another bulletin board system to describe, would there be any
   significant differences in how you filled out the questionnaire?

D. You have been a high/moderate/low volume user of such systems.
   What are the major reasons for that?

E. Describe the sorts of information available to you through the system. Which sort
   is the most useful to you? Why? Which sort is the least useful to you? Why?

F. What do you think of the information available on the system? (Too awkward to
   access, not sufficiently useful to you, too little available, too much available –
   information overload, you don't feel the need to access much of it)

G. Do you think that teachers find the need to access curriculum information in the
   scale which could be provided by these systems?

H. Does this form of communication allow you to keep up with developments in the
   subject areas you teach in, or has it the possibilities of doing so?

I. You strongly agree/agree/disagree/strongly disagree with the statement that there
   are well-defined reasons why bulletin board systems should have developed and
   are generally available. What do you believe these well-defined reasons are? (or,
   what things do you believe contribute to such reasons being poorly defined?)

J. Presumably, teachers may find different bulletin board systems better for them to
   use than others. Describe the major strengths and weaknesses of the system you
   have concentrated on.

K. Describe the major strengths and weaknesses of this form of communication.

L. Do you think that this form of communication could be beneficial for
   teachers? Why? (Refer to access to useful and up-to-date information - and
   computer communication and collaboration with colleagues)

M. Do you see any major difficulties or disadvantages with any teachers using a
bulletin board system? If so, what are they? (The differences between difficulties in using a computer, communications software and a bulletin board system need to be clarified).

N. Could you elaborate on the ways in which teacher's use of this form of communication could be increased?

O. Is there anything you would like to add?
APPENDIX II

Teachers and Computer Bulletin Board Systems

Questionnaire

INTERVIEWER USE ONLY  (Confidential Information for methodological reasons and identification of interviewees)  Date: ____

Name: ____________________________  Sex: _____

School: ____________________________

Time of conducting interview and completing questionnaire:

__________________________________________

Comments on timing of interview/questionnaire (eg. before school, after school, at lunchtime, between classes, etc.)

__________________________________________

__________________________________________

Comments on environment of interview/questionnaire (eg. in a private area, in a common area, some interruptions)

__________________________________________

__________________________________________

__________________________________________

__________________________________________

Length of interview  ____________________
FOR THE INTERVIEWEE TO COMPLETE

Please complete the following questions concerning teachers and the use of educational computer bulletin board systems (which will be referred to as bulletin board systems). Examples of these systems are SCI-NET, SCEC-NET, Eastern Region, Comet and Tempest, but, at any stage, do not restrict yourself to considering these systems if you have used any others. However, focus your attention on bulletin board systems which provide similar services (for example, "bulletin board" and "electronic mail" communication with colleagues, and access to curriculum information).

There is a mixture of multiple-choice and short answer questions. Please write short answers in the space provided and circle the best response for multiple choice questions.

A. Personal Information

1. How many years teaching experience do you have?
   ______________________________________

2. Are you a holder of an administrative position with a time allowance?
   Y. Yes
   N. No

3. What subjects are you teaching or have had experience teaching?
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________
4. What is your computing background or experience?  
(More than one response may be desirable)  
A. Study at tertiary level  
B. Training in a short course or inservice  
C. Self-taught  
D. Barely any background at all  
E. Other (please specify) ________________________________

5. Do you consider your ability to use a computer to be  
A. Highly competent  
B. Just making do  
C. Barely competent

6. Name the bulletin board systems with which you have had experience  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________

7. How did you first become aware of bulletin board systems?  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________  
________________________________________________________________
8. Approximately when did you first use a bulletin board system?

______________________________________________________________________________________

9. Briefly describe what motivated you to use bulletin board system initially -

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

10. Approximately how many times have you accessed a bulletin board system?

    A. Less than 5
    B. Between 5 & 15
    C. Between 15 & 30
    D. Over 30

11. Have you ever had difficulty gaining access to any bulletin board system?

    Y. Yes
    N. No

    If yes, briefly describe why -

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________
12. Which facilities of a bulletin board system have you used?

(More than one response may be desirable.)

A. Bulletin board
B. Electronic mail
C. General library
D. Private library
E. Talk to system operator
F. Other (please specify)___________________________________________

B. Impressions of a bulletin board system

*Please restrict all responses in this section to one bulletin board system only.*

*Indicate which system that is:*

______________________________________________

INSTRUCTIONAL QUALITY

13. There are well-defined reasons why bulletin board systems should have developed and are generally available

A. Strongly agree
B. Agree
C. Disagree
D. Strongly disagree
14. The bulletin board system achieves its defined purposes for all users
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

15. The organization of the information and facilities is clear and logical
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

16. The bulletin board system is easy to use
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

TECHNICAL QUALITY

17. User support materials (such as manuals etc.) are readily available
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

18. The user-support materials help the user make the best use of the facilities provided
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree
19. All teachers could easily and independently operate the program
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

20. Setting up bulletin board systems for teachers is an appropriate use of computer technologies
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

21. The bulletin board system is reliable in normal use
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

22. The information stored on the bulletin board system is accurate
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree
23. The curriculum information available on the bulletin board system is of high quality
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

24. This information has value to you in your setting
   A. Strongly agree
   B. Agree
   C. Disagree
   D. Strongly disagree

C. General Impressions

25. Place a cross on each continuum to best describe your feelings about making use of a bulletin board system

   Satisfying ____ : ____ : ____ : ____ : ____ Dissatisfying
   Relaxed ____ : ____ : ____ : ____ : ____ Tense
   Dynamic ____ : ____ : ____ : ____ : ____ Static
   Productive ____ : ____ : ____ : ____ : ____ Counter-productive
   Directed ____ : ____ : ____ : ____ : ____ Aimless
   Good ____ : ____ : ____ : ____ : ____ Bad

26. Are you still using the bulletin board system you mentioned above?
   Y. Yes
   N. No
27. For the bulletin board system under consideration, would you
   A. recommend?
   B. not recommend?
   C. recommend with changes?

28. This method of communication, would you
   A. recommend?
   B. not recommend?

**D. Impact on Professional Life**

29. Have you made use of the curriculum information available on the bulletin board?
   Y. Yes
   N. No

30. Have you contributed to the curriculum information available on the bulletin board?
   Y. Yes
   N. No

31. Have you made use of the notices available through the "bulletin board" or "electronic mail"?
   Y. Yes
   N. No

32. Have you contributed to the "bulletin board" or "electronic mail"?
   Y. Yes
   N. No

33. Is using a bulletin board system helping you professionally in any way?
   Y. Yes
   N. No
34. Has this form of communication (or information obtained from such systems) had much impact on other staff?
   Y. Yes
   N. No

E. *Looking Towards the Future*

35. Could use of this form of communication be increased by:
   i) More motivation and encouragement for users?
      Y. Yes
      N. No
   ii) Inservice training?
       Y. Yes
       N. No
   iii) Better documentation and information?
        Y. Yes
        N. No
   iv) Making the program easier to understand and use?
        Y. Yes
        N. No
   v) More time at school to use the system?
        Y. Yes
        N. No
   vi) Other (please specify)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
36. What potential do you see for this form of communication?

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
APPENDIX III

Summary of Questions Used in the Trial Interview

* Did you find any of the questions badly phrased?
* Did you find any of the questions difficult to understand, because they seemed to presume expertise you do not possess?
* Do any of the questions seem obscure?
* Do any of the questions seem unnecessary? Why?
* Are there any questions you think should logically be added?
* Does it seem to be a sensible method of collecting data about the topic?
* Does the process seem too long? How could it be made more efficient?
* Are there any other suggestions you would like to make?
References


Footnote

1 A discrepancy exists in the numbering of these two newsletters. Two completely different newsletters bear the title "Newsletter of the State Computer Education Centre of Victoria. No 2. 1987". There is no date or other coding to distinguish them.