EDUCATIONAL INTERPRETERS’ SIGN LANGUAGE VOCABULARY
DEVELOPMENT PRACTICES AND INTERNET USE

By

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We accept this thesis as conforming to the required standard:

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ABSTRACT

Sign Language interpreters working in schools often face isolation in terms of their Sign Language vocabulary development opportunities. The internet appears to offer a reasonable but unexplored solution to this form of language isolation. The purpose of this study was to determine the key demographic characteristics of educational interpreters in British Columbia, the resources they use to learn new vocabulary, and to shed light on their internet use and access levels.

The key demographics that were associated with interpreters' access to time and materials in advance of a lesson were job title and graduation from an interpreter training program. Interpreters with job titles that reflected their status as interpreters had on average 2.3 hours more preparatory time a week than interpreters who had job titles focused on their role as an educational assistant. Interpreters reported encountering unknown English vocabulary an average of 6.7 times a week. Human resources (colleagues, Deaf adults) were used significantly more often than non-human (books, CD-ROMs, videotapes, internet) for developing new vocabulary. The human characteristic of a resource also had a significant effect on its satisfaction rating. The internet scored the highest dissatisfaction rating of all resources. The resource use results showed that convenience was more important than quality. Books were used more often than videotapes, CD-ROMs, and the internet; however, the latter three had higher percentages of very satisfied users than books.

Internet connection speed and the design of internet vocabulary resources online were identified as current issues keeping the internet from reaching its potential as an easily accessible visual resource. Access to the internet was limited due to lack of time. There was much disparity between the amount of preparatory time written into job contracts: 33% percent of interpreters
reported having no preparatory time, while only five subjects were aware of preparatory time written into their contracts.

Based on the open-ended comments and suggestions made by participants, the internet appears to be a viable vocabulary development tool for educational interpreters. However, in the opinion of the survey participants, the currently available internet-based Sign Language dictionaries are clearly inadequate with regard to meeting their needs. To address the identified inadequacies the study concludes with a set of recommendations synthesized from the survey data for designers of internet-based Sign Language resources aimed at supporting educational interpreters.
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The group that I unfortunately cannot thank personally, yet the ones most intricately
involved in this research are the 33 educational interpreters who took the time to fill out and
return this survey. Educational interpreters in B.C. are the very front-line workers with children
who are deaf and hard of hearing using Sign Language and deserve more credit for their efforts
than could possibly be afforded by these words. To all the educational interpreters in B.C., thank
you.

DEDICATION

This work is dedicated to Quinn.
CHAPTER 1

Introduction

Jennifer recently graduated from the Douglas College Interpreter Training Program. She is well qualified and was immediately hired to work as an educational Sign Language interpreter for Sarah, a profoundly deaf grade 3 child attending school in a remote school district of British Columbia. Jennifer was excited at the thought of becoming one of Sarah's communication connections to her classmates and teacher. She settled quickly over the summer in her new home and was looking forward to getting her hands moving in her new role. During the second week of school, the classroom teacher gave Jennifer the lessons she would be required to interpret for the following day. Problem: the Math lesson involved equations that contained vocabulary with which Jennifer was not familiar in American Sign Language (ASL).

Jennifer learned most of her signing vocabulary from instructors or by interacting with the Lower Mainland Deaf community. Now she had neither to rely on for this new vocabulary. In addition, there were no local Deaf adults to approach in this remote town. How will Jennifer pick the appropriate signs for interpreting the lesson tomorrow? What will she do to develop appropriate ASL vocabulary in similar circumstances for the rest of the year?

Problem Statement

Sign Language interpreters working in integrated educational settings are usually the primary, if not the only, language models within their school for children who are deaf or

---

1 Sign Language with capital S and L is used to represent all manually rendered language from American Sign Language to different forms of manually coded English (MCE).

2 American Sign Language is the predominant language of deaf and hard of hearing individuals who are members of Deaf communities throughout North America. Just as is the case with spoken languages, regional dialects and accents exist; however, the foundational structure of the language and core vocabulary are the same across regions in Canada and the U.S.A.

3 Deaf with a capital D is used when referring to members of a Deaf community. These members are typically characterized by their use of American Sign Language to communicate with each other and by their social
severely hard of hearing who use Sign Language as their primary means of communication. Furthermore, the majority of English/ASL interpreters learned Sign Language as a second language in adulthood. Where there is no Deaf community or ASL specialist(s) to access for new ASL vocabulary, there is a heightened risk that new vocabulary in the interpreter's second language will not follow conventional signs commonly used in educational settings. Interpretation using unconventional signs models language for the student that potentially has limited transferability to other signing situations.

American Sign Language has its own word order and grammatical structure that has evolved over time to take advantages of the strengths of the manual/visual modality in which it is rendered (for a review of Sign Languages used in schools, see Coryell & Holcomb, 1997). Although it is widely accepted that English has influenced ASL, ASL is not simply the rendering of English into the air. That is to say, there is not a one-word to one-sign correspondence. Sometimes one sign requires many words to interpret and vice versa. Therefore, before modelling the appropriate language to a child in the classroom, an interpreter must have a strong command of the English and Sign Language vocabulary related to the topic of discussion. Like spoken languages, ASL also displays regional variation or dialectical differences. Another complicating factor that impacts on ASL use is that it has no written form. Most North American Sign Language users read and write English. The implications of this are discussed in the literature review.

There is currently little research and, therefore, little explanation of how Sign Language educational interpreters go about learning new vocabulary in their second language while working in integrated settings. Questions such as the following were unanswerable using prior research: Would it be better to create a book, video, CD-ROM, or internet-based vocabulary interaction patterns. A small d is used when referring to the audiological condition of having a severe to profound
resource to support educational interpreters’ vocabulary development? The internet is the newest available resource and has, therefore, received the least amount of study in this domain to date. A reliable set of data was needed to better understand the current vocabulary development practices of interpreters. It is hoped that these data will be useful to administrators and policy makers for selecting appropriate means to support interpreters, and by extension, the children with whom they work.

Relevant demographic information on British Columbia’s educational Sign Language interpreters was also needed to shed as much light as possible on their vocabulary development and internet use. Factors such as age, gender, and work experience may expose relationships that will allow future researchers and policy makers to better target their research and support programs for interpreters.

Research Goals

1. Describe the relevant demographic characteristics of selected British Columbia educational interpreters.
2. Describe the resources that are used by Sign Language interpreters in integrated educational settings for developing unfamiliar vocabulary.
3. Describe the current extent of access and use of the internet by educational interpreters.

Background

Educational interpreting in British Columbia

In 1999, in British Columbia, 1426 students were listed as deaf or hard of hearing under the Ministry of Education guidelines for funding (B.C. Ministry of Education, 1999). In order to receive funding, these students had to be enrolled in either their local school or a district-level resource program (Appendix A). The Ministry does not report the details on individuals’ hearing loss.
loss and language use, and, therefore, an estimate was used to ascertain the number of integrated
students who are deaf or hard of hearing and who are receiving their education with the
assistance of a Sign Language interpreter. Based on U.S. figures for students who are deaf and
hard of hearing and use educational interpreters (Gallaudet Research Institute, 1999), a
conservative figure of 20% is used to determine that an estimated 286 students in the province of
B.C. receive some part of their education through an educational Sign Language interpreter.

Sign versus spoken language interpreting

The case of sign language interpreters as a subset of all language interpreters is very unique
because of the modality switch between English (oral/aural modality) and ASL (manual/visual
modality). Sign language communication requires visual contact between communicators.
Spoken languages do not. Therefore, an interpreter working from English to Mandarin, for
example, and requiring new Mandarin vocabulary, may use the phone to contact a colleague,
Chinese community member, or Mandarin expert. For an English/ASL interpreter, the problem is
more difficult due to the need for face-to-face contact with the colleague, community member, or
ASL expert. If the need for new vocabulary is immediate, both rural and urban interpreters in
integrated settings experience the same face-to-face constraint due to working with a
visual/manual language.

The need for quality interpreting – The case of vocabulary transfer

The importance of access to standardized ASL vocabulary used by the Deaf community is
not trivial. Educational interpreters play a direct role in ensuring that opportunities are available
to the students with whom they work. That is to say, if interpreters models inappropriate or
unconventional vocabulary to students, then the students’ social, academic, and employment
opportunities may be unfairly limited when they come into contact with other signers.
Transferability of vocabulary is something any majority language speaker takes for granted;
however, the Sign Language, which deaf and hard of hearing children receive and use in the classroom may not always be used by other Deaf community members. The following quote by Bob Alcorn, a notable Deaf community member, in Humphry and Alcorn (1995) exemplifies this situation:

You can imagine the shock, anger, and sense of despair that came over me the first time I had to have an interpreter help me communicate with a d/Deaf teen. To my dismay, the lad (who was going to school just miles from a large community of Deaf people) was using a signing system as foreign as if he had been born in another country. I get angry every time I think of it. To my way of thinking, splintering our community by replacing our language with this wide array of signing systems is a form of genocide! (p. 18)

In yet another example, deaf students so frequently arrive at Gallaudet University in Washington, D.C. with non-standard Sign Language that the University has set up a special summer language immersion program for these incoming students. One major goal of the New Signers Program is to help deaf and hard of hearing people become fluent in America Sign Language (Gallaudet, 2000). The program requires the students to arrive on campus early for their first fall term, thus incurring extra expenses and lost time at best, and at worst developing a sense of frustration and anger at the fact that their language skills are not easily transferable from their K-12 education.

Existing research gap

As mentioned above, there is little research into how sign language interpreters develop new vocabulary in what is, for most of them, their second language - ASL. A literature search into the processes which ASL/English interpreters use for ensuring their ASL vocabulary is
accurate and current turned up no articles. Furthermore, it is apparent both directly and indirectly from the literature on the performance and status of educational interpreters that this group requires professional development opportunities (Johnson, 1991; Jones, Clark, & Soltz, 1997; Schick, Williams, & Bolster, 1999) This study was aimed at providing more detailed information about the professional development practices of educational interpreters in the domain of vocabulary use and development.

It is important to note, however, that there is a body of work that establishes criteria for good interpretation, as well as a body of work that discusses how to become fluent in one’s second language. Furthermore, following ASL syntactic rules while performing interpenetration into ASL is also critical to rendering accurate messages (Humphrey & Alcorn, 1995). Due to time and resource limitations, however, this study will not specifically deal with factors other than vocabulary development. By studying vocabulary development resources used by Sign Language interpreters, a picture emerged which sheds light on other facets of their second language learning.

The potential of the internet

The internet is already being used by Deaf communities around the world to begin to overcome the face-to-face limitation of ASL by using video clips and animated gif images\(^5\). The Deaf World Web (2001), an online encyclopedia of Deaf-world topics, lists 11 online dictionaries. This number is sure to grow as the bandwidth of the internet increases and access becomes more prolific and affordable. The speed of access, the searchability of these dictionaries, and the ability to access them from anywhere makes these online resources a

---

\(^4\) Gallaudet is the only liberal arts university in the world for the Deaf. Except in exceptional circumstances, an undergraduate student must be deaf or hard of hearing to attend. Undergraduate courses are taught using ASL.

\(^5\) An animated gif is a series of pictures played in sequence to make a rudimentary video.
potential improvement over books, videos, and CD-ROMS. In addition, an internet resource can be cost-effectively upgraded to add new content and support more users.

Unfortunately, all the online dictionaries in the world, including those yet to be created, will not support educational interpreters if they do not have internet access in their classroom, school, or home, do not have the time to access the internet during their work day, or do not have the comfort level or skills necessary to go online. Spending money and time developing internet resources for interpreters without knowing their current vocabulary development practices and their current access to and comfort with the internet would be a step in the dark.

Significance of the Study

If it is true that “simply knowing is half the battle,” then for interpreters it is hoped that this study brings to light their current practices for developing vocabulary when in settings isolated from Sign Language specialists or Deaf community members. Whether in an urban or rural area, language isolation occurs in a visual language as soon as one does not have face-to-face contact on a regular basis with other users of the language. The combination of understanding current practices and having a snapshot of educational interpreters’ access to and comfort level with the internet will, it is hoped, provide administrators and policy makers with the knowledge necessary to make effective resource delivery decisions for interpreters. In this light, it is hoped that this study may become a solid stepping-stone to a more comprehensive study incorporating the use of video and the internet to provide “on-demand” examples of curriculum-related Sign Language for educational interpreters.

On an academic level, this study starts to fill in the gap in the literature relating to the language development behaviours of ASL/English interpreters working in integrated settings. Although the study will be confined to British Columbia, the findings should be transferable to contexts outside of B.C. and Canada that are bound by similar technological and social
development. Educational interpreters are widely used throughout North America to deliver education in integrated settings (Gallaudet Research Institute, 1999).

Definition of Terms

For definition of terms relating to education and deafness, see Table 1. Table 2 contains terminology used in the document related to computers and the internet.

Table 1

**Educational and deafness terminology**

<table>
<thead>
<tr>
<th>Terminology</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Deaf</td>
<td>Refers to members of a Deaf community who typically socialize using American Sign Language with other Deaf or fluent hearing individuals.</td>
</tr>
<tr>
<td>Deaf community</td>
<td>A group of deaf, hard of hearing, or associated individuals who share the common language (ASL), experiences, and goals of Deaf people, and reside in a confined geographic region.</td>
</tr>
<tr>
<td>deaf or hard of hearing</td>
<td>Medical terms for an individual's hearing status. Visual communication is common for individuals with a profound hearing loss (deaf), or a severe hearing loss (hard of hearing).</td>
</tr>
<tr>
<td>mainstreaming</td>
<td>In this paper, mainstreaming, inclusion, and integration are used interchangeably on a macro level. Although many authors have analysed the use of these terms in the light of actual practice and specific outcomes, that is not the focus of this study.</td>
</tr>
</tbody>
</table>
| inclusion             | For this study, mainstreaming, inclusion, and integration refer to the practice of educating children who are deaf or hard of hearing in their local school within a classroom of children who are not
deaf or hard of hearing.

**manual/visual modality**

Signed languages are presented manually (by the hands and body) and are received visually (by the eyes). These languages are considered three-dimensional because multiple meaning units (morphemes) are often presented simultaneously.

**oral/aural modality**

Spoken languages are presented orally (by the mouth), and received aurally (by the ear). These languages are considered two-dimensional because their message must be sent and received linearly, one phoneme at a time.

**Sign Language**

The term Sign Language with a capital s and l is used globally in this study to refer to all forms of signed languages, including ASL and different forms of signed English.

**sign system**

A sign system is an adaptation of an oral/aural language or any other system of invented signs. A commonly referenced sign system is Signed English. Signed English is a manual representation of English that attempts to follow the grammatical structure and syntactic rules of English in a manual form.

Throughout this study, the term manually coded English (MCE) is used to represent all sign systems currently in use, unless otherwise stated.
<table>
<thead>
<tr>
<th>Terminology</th>
<th>Definition</th>
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<tbody>
<tr>
<td>animated gif</td>
<td>A series of digital still images saved in .gif file format that are played in sequence to create the appearance of motion. Analogous to old-style flip-comics.</td>
</tr>
<tr>
<td>bandwidth</td>
<td>The amount of digital information that can be transferred over wire, cable or fibre optics between two points. The higher the bandwidth, the more information can be carried</td>
</tr>
<tr>
<td>download speed</td>
<td>The speed at which data are capable of being transferred to the client computer from the host. Measured in bytes per second (bps).</td>
</tr>
<tr>
<td>internet</td>
<td>The intertwined connection of computers that can access one or another's data using file transfer protocols and telecommunications infrastructure phone lines, copper cable, fibre optics, or wireless radio or satellite networks.</td>
</tr>
<tr>
<td>on-demand video</td>
<td>Video available through the internet that can be accessed at any time by the user of the website.</td>
</tr>
<tr>
<td>virtual community</td>
<td>A group of individuals who share a common interest and use the internet to communicate about that interest. Virtual communities can be extensions of geographical or other bounded communities, or they can exist entirely on the internet.</td>
</tr>
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CHAPTER 2

Introduction

I owe a great deal to my many wonderful professors in Social Work. They have taught me so much and have given me a path to follow the rest of my life. However, I owe my greatest debt to the countless numbers of interpreters who sat in my classroom and allowed me to learn Social Welfare History, Methods of Social Work, and even Statistics. It was through their hands that I learned my most important lessons and it was through their voices that I expressed my ideas and questions. My interpreters have provided the link for me to connect to my education. I do not believe that I could have finished my degree without them. I will forever be indebted. (Sanderson, Siple, & Lyons, 1999, p.3)

The above quote was taken from a letter written by a deaf student after graduation from a university social work program. In words better than my own, it captures the reason why the energy and resources of study would be well spent on the examination of the professional practices of educational interpreters who work with students who are deaf and hard of hearing and who use Sign Language. Specifically, why do we need to know more about educational interpreters’ vocabulary development practices, their use of the internet, and their backgrounds?

In the following review of the literature, the background to the current educational context for integrated children who are deaf and hard of hearing in British Columbia is provided through a discussion of integration practices in the broader context of Canada and the United States. A brief history of the Sign Language interpreting profession is presented in order to provide the context for educational interpreters’ current state-of-affairs. This review then narrows to a focus on relevant demographic characteristics of educational interpreters, their work context, and their new vocabulary development. Finally, the problem of “unknown vocabulary” for an educational
Inclusion Practices in the Education of Students Who Are Deaf and Hard of Hearing

Throughout North America, the numbers of children who are deaf and hard of hearing educated in their home districts has been increasing over the past two decades, while the number of children who are deaf and hard of hearing educated at residential schools has been decreasing. In a review of 30 years of the education of students who are deaf in the United States, Holden-Pitt and Diaz (1998) found that in 1978, 46% of students who were deaf and hard of hearing were educated in integrated situations. By 1997, that figure had risen to 69%. This trend follows a general trend in society to have inclusive schools, that is, schools that use integration of students with special needs into educational settings with their peers who do not have special needs, in an attempt to foster "equitable access to learning, achievement, and the pursuit of excellence in all aspects of education" (Special Education Branch, 1995, p. Intro. 7).

In the United States, the legislative beginning of the inclusive schools movement was the passing of Public Law 94-142 in 1975. This federal law mandated the education of all handicapped children in the least restrictive environment. It specifically stated that handicapped students should be educated with non-handicapped students to the greatest possible degree. The second piece of federal legislation further supporting the inclusion of students with a disability in regular classrooms was the Americans with Disabilities Act of 1990 (Holden-Pitt & Diaz, 1998; Sanderson et al., 1999).

In Canada, and more specifically British Columbia (B.C.), the movement gained much of its strength through the application of the Canadian Charter of Rights and Freedoms and the development of a stronger Provincial School Act in the 1980s than existed previously (MacKay, 1986; Siegel & Ladyman, 2000). In B.C., the School Act (1996) states:
A person is entitled to enrol in an educational program provided by the board of a school district if the person (a) is of school age, and (b) is a resident in that school district. (School Act, 1999, Part 2, Division 1, #2, [online])

Furthermore, a family wishing to enrol their son or daughter in the B.C. School for the Deaf or another provincially funded program must first enrol their child in their home district. The district may then make an application on behalf of the family and student to the provincial program.

Impact of mainstreaming on the education of students who are deaf and hard of hearing

The shift from residential schooling to mainstreamed schooling for students who are deaf has had a direct effect on the Deaf communities of North America. Historically, the schools for the deaf were the physical locations where American Sign Language and Deaf culture were transferred between generations (Evans & Falk, 1986; Luetke-Stahlman, 1984; Padden, 1994). While the students who were deaf and hard of hearing were at the school, the control of ASL rested literally "in the hands" of its primary users – the Deaf and hearing staff and the students who were deaf and hard of hearing. The advent of increased inclusion in neighbourhood schools transferred the control of language modelling, at least to a degree, from primary ASL users to interpreters. Stewart, Schein, and Cartwright (1998) made this point clearly in their discussion of interpreting in primary settings; “young deaf children … may have no knowledge of signs when they come to school, so the interpreter becomes, in effect, the child’s sign teacher, opening the next question, which signs to teach?” (p. 104)

One result of the inclusion movement has been that the Sign Language used by students and educational interpreters can vary from school to school. In one school, a child may be learning Signed English (Bornstein, Hamilton, & Saulnier, 1983) and down the street, a student may be learning ASL. In spite of some shared vocabulary, upon meeting, these two students may
experience difficulty understanding each other due to the different word order, representations of pronouns, gender-specificity of pronouns, and verb tenses of the languages (Coryell & Holcomb, 1997). Similarly, interpreters utilizing different language systems may experience some difficulty supporting each other professionally. When they contact each other, there is no guarantee that they are using the same Sign Language with the children with whom they work.

This situation has arisen, in part, as a result of the previously stated question: Which signs to teach? Over the past 30 years, the education system has been dealing with the simultaneous recognition of ASL and the development of MCE systems for educational use. The seminal article that brought ASL into the academic light was written by William Stokoe in 1960 and entitled, "Sign language structure: An outline of the visual communication system of the American Deaf." Following this, Stokoe, Casterline, and Croneberg (1965) published the first dictionary of ASL. From these early works, an entire field of linguistic and sociolinguistic research into ASL and the North American Deaf community was spawned (Cokely & Baker, 1980; Lucas, 1989, 1990; Wilcox, 1992).

Concurrent with ASL research during the 1970s and '80s, researchers interested in improving children's English literacy skills by manually representing English in the visual medium invented sign systems. These systems ranged on a continuum from almost completely invented by the researchers or committee members, to slight manipulations of ASL in order to better represent English syntax (for a review of manually coded English systems see Coryell & Holcomb, 1997). One factor that all invented sign systems share is that they all borrow vocabulary from ASL.

One cumulative effect of the inclusive schools movement has been the scattering of students who are deaf or hard of hearing from the schools for the deaf into their home districts and schools. In fact, so many children are now integrated that the demand for educational
interpreters has mushroomed. Over one-third of Sign Language interpreters in the United States (Gustason, 1985) and in Canada (Schien & Yarwood, 1990) obtain their employment in public schools.

History of the Interpreting Profession: 1960s to the Present

In the United States, the beginnings of professionalization for interpreting preceded the public laws that spurred on the inclusion movement by a decade. The National Registry of Interpreters for the Deaf (RID) was founded in 1964. At the time the organization was created, there were no formal education programs for interpreters, no code of ethics, no formal recognition from governments, and less than 300 full-time practitioners throughout the United States. "One simply became an interpreter by interpreting" (Stewart et al., 1998, p. 16).

Prior to the 1960s, interpreters were typically volunteers. They were hearing people who "were related to or worked with deaf people, such as family members, teachers of deaf students, or members of the clergy" (Sanderson et al., 1999, p. 3). These people were not interpreting in local schools because the majority of children who were deaf and hard of hearing and required Sign Language received their instruction at residential schools for the deaf throughout North America. Before having their own organization, Canadian interpreters joined RID if they wished to be certified or to be affiliated with a professional organization. In 1979, the Association of Visual Language Interpreters of Canada (AVLIC) was founded (Stewart et al., 1998).

Both RID and AVLIC were established with the goal of making the job of interpreting more professional. The means to professionalization was the advent of national certification processes. The creation of professional organizations and the practice of high quality interpreting were not simultaneous. By 1981, for example, minimal qualifications continued to be the norm for hiring interpreters. Schreiber (1981, as cited in Stewart et al., 1998) quoted the director of the National Association of the Deaf making the following comments regarding Sign Language
interpreters at that time: “At the present we have at least four minimum requirements with regard to interpreters. These are: they must be able to hear; they must be able to sign; they must be willing; and they must be available” (p. 50).

The literature on the hiring of educational interpreters at that time is sparse; however, more current research by Jones, Clark, and Soltz (1997) shows that by 1996 the situation was almost the same for this sub-group of interpreters as it was described by Schreiber in 1981. They found that of 222 currently working sign language educational interpreters in public school settings in the United States, more than 65% did not hold certification and more than 55% were not evaluated before being hired.

Although there is little to report on the professional progress of educational interpreters over the past twenty years, based on the literature there is evidence that academic attention was being paid to other areas of Sign Language interpreting. Over the past decade, there has been a growth in the number of training programs for interpreters (Dahl & Wilcox, 1990; Programs for Training Interpreters, 2000), the development and refinement of professional certifications (AVLIC, 2000b, RID, 1997a), the establishment of state standards for hiring interpreters (Salend & Longo, 1994; Schick, Williams, and Bolster, 1999), and an increasing focus on interpreters’ signing performance (Schick et al., 1999; Strong & Rudser, 1985).

The interpreting profession, in many ways, is trying to catch up with the shift to mainstreaming deaf and hard of hearing students. When mainstreaming became the dominant way of educating children who are deaf, few administrators and policy makers gave the issue the necessary thought to ensure its success. “The use of interpreters [was] an easy solution to integrating deaf students into regular classrooms” (Stewart et al., 1998, p. 215). In the early stages of the mainstreaming movement, many of the questions being dealt with now relating to the effectiveness of educational interpreters were not yet conceived.
Recently, educational interpreting has begun to receive more attention as a specialty in the interpreting profession. Recognition that educational interpreting has been a neglected area of the interpreting family was recently forthcoming from RID (RID, 2001). This organization dedicated one of its monthly issues of its journal VIEWS to the topic, it initiated a national conference of educational interpreters in August of 2001, and it hired a full-time coordinator for public relations and legislative relations that is responsible for advocacy for educational interpreters. RID does not yet offer educational interpreter specialization certificates, although, other specializations, such as legal and medical interpreting, have their own certifications (RID, 1997a). It seems reasonable to assume that it is only a matter of time before either RID or AVLIC offer an educational interpreting certificate. AVLIC has no specialty certificates; however, this organization recently struck a committee focused solely on interpreters in educational settings (AVLIC, 2001b).

The professionalization of educational interpreter practice has lagged behind the interpreter field in general. Schick et al. (1999) summarized the risk of having unqualified educational interpreters by stating that when an interpreter is not qualified “this means that a child who is still learning language is trying to learn a language as well as academic material and rules of discourse via a language form that is itself inadequate” (p. 151). It is hoped that recent recognition that educational interpreters require unique training, certification, and professional development opportunities will minimize situations like the one described by Schick and her colleagues in the future.

Educational Interpreting

A common description of the educational interpreter’s role is: “to facilitate communication between deaf and hearing individuals throughout the educational environment, both academic and extracurricular” (Sanderson et al., 1999, p. 2). This description should be considered the
primary role of an interpreter. However, the educational interpreter’s role involves more than interpreting due to the unique characteristics of educational settings. Based on the recommendations of the Commission of Education of the Deaf (1988), Shroyer and Compton (1994) recapped the essential skills and knowledge that an educational interpreter needs. The recommendations include: “tutoring skills, fluency in at least two languages, appreciation of two different cultures, content knowledge, knowledge of language acquisition, cognitive development, program evaluation and consultation” (p. 474).

Due to role confusion, interpreters are often asked to undertake tasks that take away from their primary role. These tasks include: “copying and filing, playground supervision, bus attendant duty, lunchroom duty, and monitoring study hall” (RID, 2000, p.1). This list is easily expanded by adding: classroom supervision while the teacher is away from the class (Hayes, 1993), marking, and arranging classroom or hallway displays. Furthermore, “asking interpreters to take on tasks for which they may not be prepared may force them to violate the principle that they should not accept assignments beyond their capabilities” (Stewart et al. 1998, p. 193).

One reason the interpreter’s role becomes expanded is the perception that the interpreter is on “down-time” when not interpreting. For example, it is not all right for the interpreter to be called away to staple up a display if the child is writing a test or doing quiet seatwork. Educational interpreting requires that the interpreter is always alert to the communication needs of the student, which requires that the interpreter be “at the ready” to interpret if something is spoken to the child or if the child wishes to pose a question or make a comment.

Part of the confusion over the role of educational interpreter is due to the fact that, they are typically supervised by individuals who know little or nothing about the interpreting profession. In British Columbia, the School Act (1996) and the Manual of Policies and Procedures for Special Education (1995) contain ambiguous guidelines for supervision. Potential confusion
arises because the Province does not provide sufficient guidelines to clearly indicate whether the classroom teacher, school principal, district special education principal, or the qualified teacher of the deaf and hard of hearing (TDHH) is the supervisor of the educational interpreter.

The above discussion of supervision focuses on external supervision, that is to say, supervision of the educational interpreter by others. The code of ethics of AVLIC (2001a) and RID (1997b) depends on the principle of internal supervision; that is, interpreters supervising themselves. In the AVLIC code, under the section entitled “Professional Accountability,” the first line states: “Interpreters accept responsibility for all professional decisions made and actions taken” [online]. Of specific relevance to this study are the decisions that interpreters make regarding the resources they use to develop new vocabulary. It is important to note that AVLIC or RID certification is not required to be an educational interpreter in B.C. and, therefore, the interpreters working in B.C.‘s schools may not be affiliated with either organization nor subscribe to either of their codes of ethics.

Educational interpreters are faced with the complex task of working in an isolated language environment, often without knowledgeable support from supervisors or peers. When communicating in a visual language, isolation occurs when there is no face-to-face contact on a regular basis with other competent users of the same language. Furthermore, the educational interpreters working in these settings may have been hired without proper qualifications (Jones et al., 1997; Schick et al., 1999). In recent studies, educational interpreters have expressed a self-awareness of their current situation and signalled the desire for more professional development opportunities. In the Jones et al. study, more than 95% of interpreters responded that they would like more interpreter-related professional development than they were receiving at the time of their the study. One possible reason for the high demand for professional development is explained by the results of a survey by Dean (1999, cited in Dean & Pollard, 2001). Interpreters
reported that 66% of the skills they learned, including knowledge of sign vocabulary, were learned on the job. It is clear that the work context and professional organization of educational interpreters is in a state that requires ongoing support. This pressing need for professional support is the fuelling force behind this study.

Key Demographics of Educational Interpreters

The foci of this study are the vocabulary resources used by interpreters and their internet access and use. In order to bring the best possible understanding to these topics, the first research question of this study asks: “What are the relevant demographic characteristics of educational interpreters using Sign Language in British Columbia?” Based on the literature, the following demographic characteristics were selected as having potential relationships to interpreters’ vocabulary resource and internet use.

Certification, professional affiliation and training

Individuals who have completed training programs in Sign Language interpreting and/or who hold certification may have been exposed to different vocabulary development resources and developed differing attitudes towards those resources than individuals who have not been exposed to similar training or the certification process. A core component of Sign Language interpreter training programs is ASL curriculum, which contains new ASL vocabulary (Douglas College, 2001). Both AVLIC’s and RID’s certification processes include vocabulary assessment as one of the domains of performance assessment (AVLIC, 2001c; RID, 1997b). In British Columbia, the Ministry of Education recommends to local school districts that for hiring they use the qualification proxies of graduation from a training program or professional certification.
A Sign Language interpreter, often referred to as a visual language interpreter, should meet standards established by: the Registry of Interpreters of the Deaf, Inc. (R.I.D.), or, the Association of Visual Language Interpreters of Canada (AVLIC); or be a graduate of the Douglas College Visual Language Interpreter Training Program or an equivalent program from another institution. (The B.C. Manual of Policies and Procedures for Special Education Services, 1995, p. E.54)

Furthermore, professional affiliation with either AVLIC or RID is also potentially relevant to Sign Language interpreter resource use, due to the fact that both organizations have a professional code of ethics that highlights ongoing professional development as a tenant of good practice (AVLIC, 2001a; RID, 1997b). It is hoped that the responses concerning interpreters’ vocabulary resource use, in combination with demographic information regarding their training, certification, and professional affiliations, will provide rich information for better understanding any links between training, certification, professional affiliation, and new vocabulary development practices.

Unlike the Provincial government, the current study does not use certification and training as a measure of interpreting skill. The results of a study by Dahl and Wilcox (1990) showed that “graduates of interpreter training programs who obtain employment as public school interpreters are not adequately prepared” (p. 275). They pointed out that the 45 training programs they surveyed provided very few courses on the education of children who are deaf, language systems used in schools, or issues specific to classroom interpreting. The courses identified in the Dahl and Wilcox study that related to educational interpreting were child development, child language development, foundations of deaf education, or tutoring. Of their respondents, 22% did not include any of the above topics in any part of their program. In B.C. the only interpreter training program is offered by Douglas College. The Douglas College program contains one course.
entitled, "Change and Development: Lifespan" that is related to the topics considered important in the Dahl and Wilcox study (Douglas College, 2001). Simply stated, "graduates of interpreter preparation programs have varying degrees of skill level, and the possession of a degree in interpreting does not guarantee the ability to interpret effectively" (Sanderson, 1999, p. 5).

Certification is not used as a skill proxy because neither AVLIC nor RID offer specialized certification in educational interpreting. The AVLIC certification process is aimed at measuring voice-to-sign and sign-to-voice interpretation between ASL and English (AVLIC, 2000b). This presents an institutional bias against those interpreters who work with students who require a MCE system. There is no evidence in the literature regarding educational contexts that suggests certification alone can guarantee success, any more than non-certification can predict poor performance.

**Personal characteristics**

The only personal characteristics included in this study are age, gender, and family background. The interpreting profession is relatively young, and it is possible that one's age could have a relationship to the type of training one received and the attitudes one holds towards the job of interpreting. The Sign Language or sign system originally learned by a particular interpreter may no longer be in use, or may not be the requested language by the educational team overseeing the child's education. A self-report of the Sign Language used by the individual interpreter is not present in this study, due to the fact that researchers have proven the self-reporting of language use to be unreliable (Schick et al., 1999; Strong & Rudser, 1986; Woodward & Allen, 1987, 1988).

Family history has been included in the study in order to ascertain whether or not there is a relationship between new vocabulary development practices and Sign Language background. A study by Strong & Rudser (1986), which included 15 interpreters from hearing families and 15
interpreters from families with Deaf parents, showed that all of the top performers (5) were from the Deaf-parent group. They also found that having Deaf parents did not guarantee strong performance. Although this study is not assessing performance, being from a Deaf family may impact the amount of vocabulary available to the interpreter and, therefore, his or her need to access new vocabulary resources. Furthermore, family background may also impact the interpreter's judgement regarding the utility of different resources.

Work characteristics

The key work characteristics identified from the literature for understanding new vocabulary development and internet use by interpreters are the amount of preparation time available to the interpreter, the vocabulary demands of the assignment, and the availability of resources around the work place. Preparation time is considered in order to shed light upon the opportunities an interpreter has to learn unknown vocabulary before a lesson occurs, or to learn unknown vocabulary that arose during a class and requires review. The new vocabulary needs of an interpreter may be related to the demands of the assignment. For example, if the assignment is grade 12 algebra, chemistry, or biology, the sign vocabulary will be more technical and specific than in an elementary or primary setting. The resources available to interpreters in the school will likely bear a relationship to the resources they choose to use. For example, if there are other adult signers in the school, these individuals are potential vocabulary resources. Another relevant work factor is access to computers in the school. Computer access will directly impact the opportunities to use CD-ROMs and the internet as resources.

Professional Development

The second research question of this study focuses on interpreters' professional development. Specifically, what resources do educational interpreters access to learn new
vocabulary? Before focusing on the specifics of new vocabulary development, a broader look at the professional development needs of this group is required.

The overall need for professional development for educational interpreters is both directly and indirectly evident in the literature (Dean & Pollard, 2001; Jones et al., 1997; Schick et al., 1999). The indirect evidence is based on the lack of assessment, lack of requirement for certification, unclear supervision guidelines, and low status of educational interpreters in the school system. The direct evidence of the need for professional development comes from studies by Jones et al. (1997), Schick et al. (1999) and Dean (1999).

Over three years Schick et al. (1999) assessed the interpretation performance of 18 interpreters at both the beginning and end of their study. There was no significant difference found between interpreters’ initial scores and their second scores. The findings tell us that the interpreters in the study did not improve over the course of three years. This is in contrast to what one might have expected, due to the fact that over half of those tested the first time using the Educational Interpreter Performance Assessment (EIPA) received scores that were below a minimally acceptable level. The expectation could easily have been that the interpreters in the study would undergo some professional development in the prolonged period between tests. The consistency of their scores, however, suggests that either the professional development was unsuccessful or no professional development was undertaken. A third possibility is that the interpreters did improve, but that the raters became tougher over the course of the study.

The Schick et al. study was based in Colorado, where a minimum score on the EIPA of 3.5 is required to be hired. A person hired at this level “would be able to communicate much of the information in the classroom, but would still have frequent errors in grammar, vocabulary, rhythm, and prosody” (p. 148). In addition, the task force who recommended the minimum standard reported “that an individual below this level needs more instruction and mentoring than
could be realistically expected in most schools” (p. 148). Less than one-half of the currently working interpreters in their study met the minimum standard.

Jones et al. (1997) take a direct route to uncovering educational interpreters’ need for professional development by asking interpreters about their training, certification, and need for ongoing training (Jones et al. 1997). Dean (1999, cited in Dean & Pollard, 2001), on the other hand, takes an indirect route by asking interpreters how they developed their skills. Jones et al. found that 65.4% of interpreters held no certification, 56.1% were not evaluated prior to hire, 25.6% were never evaluated, 36.5% had not received any interpreter inservice, and 95.5% expressed a need for continued interpreter training while on the job. Dean reported that 66% of the skills educational interpreters learned, including knowledge of sign vocabulary, were learned on the job.

Within their profession, educational interpreters are not unique when it comes recognizing their need for ongoing training. The interpreting profession as a whole recognizes the need for professional development. Both AVLIC and RID have expressly stated in their code of ethics that interpreters should be undertaking ongoing professional development:

2.4. Ongoing Professional Development

2.4.1 Members will incorporate current theoretical and applied knowledge, enhance that knowledge through continuing education throughout their professional careers and will strive for AVLIC certification.

2.4.2 Members will aim to be self-directed learners, pursuing educational opportunities which are relevant to their professional practice. This could include but is not limited to peer review, collegial consultation, mentoring and regular feedback regarding specific areas of skill development. (AVLIC Code of Ethics, 2001a, [online])
There is evidence in the literature that educational interpreters are aware of their professional responsibility and wish to act on it. Jones et al. (1997) found that of the 222 educational interpreters surveyed, more than 35% of respondents reported having never received interpreting in-service training, but that over 95% expressed a need for continued interpreter training. When combined with the fact that over 65% of the respondents did not hold certification, the overwhelming response by educational interpreters for more professional development suggests that the root of their desire is not simply compliance with the AVLIC or RID code of ethics, but a need to provide better quality interpreting to their clients.

Focus on Vocabulary Development

This study focuses on vocabulary development over other forms of language development, such as syntactic structure and discourse conventions, for several reasons. First, vocabulary development is considered a significant domain in the literature with regard to fluency and accurate interpretation. Second, there is currently no discussion in the literature as to how interpreters develop unknown vocabulary. Finally, the need for vocabulary development by educational interpreters will be ongoing, which requires professional development solutions that are also ongoing. Educational interpreter vocabulary use was most recently measured by Schick et al. (1999). The EIPA they administered contained a vocabulary use domain. The scores on this domain were only marginally better than the state-wide minimal standard set for hiring educational interpreters in Colorado. Schick and her colleagues concluded that interpreters at the minimally acceptable level of performance require ongoing support with their Sign Language development and use.

Two sources of challenge for educational interpreters with regard to vocabulary development are first, the rendering of technical vocabulary in Sign Language for a particular English word or concept (Hayes, 1993), and second, the advent of new signs. The advent of the
internet is a good example of both challenges. Along with the internet came new vocabulary that required the development of new Sign Language. E-mail, website addresses, and web connections are all topics of discourse that did not exist in common language a decade ago. As the Deaf community adopted new signs to discuss these topics, the signs did not automatically disseminate to interpreters working in isolated contexts, that is, in settings away from Deaf communities. Furthermore, an interpreter working in a technology class would be responsible for rendering output for many complicated and specific terms related to the internet, such as fibre optics, intranet, java, html, and perl.

In yet another example, Stewart et al. (1998) provided a description of how existing Sign Language can change over time to create new vocabulary. He described recent vocabulary changes in ASL that were based on making some ASL signs more politically correct. This movement led to the replacement of signs for countries that made reference to physical features of their inhabitants. For example, the signs for Africa, China, and Japan have all changed in the past five years.

New vocabulary development and sign modifications over time “tax the interpreter to remain current” (Stewart et al., 1998, p. 128). Stewart made the point that according to the *Oxford Dictionary of New Words* (Oxford University Press, 1991), the English language added 750 articles in one year. Due to the fact that many ASL users also use English as their written language, ASL may well eventually add new signs to accommodate the new concepts. This represents a substantial challenge for isolated interpreters who, as previously reported, may have a current sign vocabulary use that is barely adequate (Schick et al., 1999).

The literature has not addressed the vocabulary development practices of interpreters. It is not clear to what extent interpreters use colleagues, deaf individuals, books, videos, CD-ROMs, or the internet to learn new vocabulary. This gap in the literature makes it impractical for
agencies to support the vocabulary development of interpreters. Agencies cannot currently know which medium holds the most utility. In an effort to shed more light on the resources that interpreters use to develop their vocabulary, research question two asks: What are the current resources educational interpreters using Sign Language in British Columbia’s public schools access for developing unknown vocabulary?

The Promise of the Internet

The advent of the internet and the world wide web presents an opportunity to address some of the professional development issues that educational interpreters face. The bandwidth of the internet has recently grown to the point where individuals with modems with a speed of 56.6 kilobytes per second (Kbps) or greater can easily download and view short video-clips of a few seconds. Individuals and groups in the Deaf community around North America have been taking advantage of this fact to develop online dictionaries. These dictionaries use English words for searching their database and then show the appropriate sign vocabulary in video format for the word when selected. The “ASL Browser,” produced by the University of Michigan (2000), contains thousands of video-clips at the click of a mouse. Another dictionary, “Handspeak” (Lapiak, 2001) contains over 3000 signs. The concept of an online dictionary is neither novel nor new in English; however, for a language that does not have a written form, it may represent a very important sociolinguistic development in ASL and the Deaf community. Teachers, interpreters, students, parents, and anyone else now interested in the vocabulary of ASL can go online to the same source and receive sign vocabulary through consistent sign models. Furthermore, if they wish to view other examples, they can access more than one online dictionary.

The need to learn new vocabulary is a lifetime endeavour for interpreters. The internet provides a potentially cost-effective way to centralize the resources for interpreters and promote
their vocabulary development in spite of their professional isolation. Before marshalling resources to create centralized Sign Language dictionaries, it is important to assess the current use of the internet by educational interpreters, as well as their level of computer comfort and skill with the internet. In an effort to provide data for these uncharted territories, research question three of this study asks: What are the current internet use and access characteristics of educational interpreters?

Summary

The available research in the field of educational interpreting points to the need for effective professional development for this group. The specific domain of vocabulary development is an area of present and ongoing need. A currently available tool for interpreters is the internet. Since 1996, the internet has been explored as a tool for extending professional connections and professional development for rural teachers and students (Bauer, 1997; Heinrich, 1996; Johnson, 1997; Tremblay, 1996). What is not clear in the literature is how, or how often, educational interpreters currently use the internet for their professional development or professional connections. Before further resources are marshalled to support interpreters via the internet, more needs to be known about their current vocabulary development practices and their internet use.
CHAPTER 3

Method

The aim of this study was to take a snapshot of educational interpreters’ current practices in terms of their development of new sign vocabulary. Therefore, the nature of this study was descriptive. Data were collected through the self-reporting of interpreters. The method of this study was to use a questionnaire to gather detailed information about the demographics of the population, their vocabulary development characteristics, and their internet access and use. The population referred to are educational interpreters working in integrated classrooms throughout British Columbia who use Sign Language to work with students who are deaf or hard of hearing.

Research Questions

This investigation attempts to provide answers to the following questions:

1. What are the relevant personal characteristics of educational interpreters using Sign Language in British Columbia’s schools?
2. What are the current resources which are used by Sign Language interpreters in integrated educational settings in order to develop new vocabulary?
3. What are the internet use and access levels of educational interpreters in British Columbia?
4. Are there:
   a. relationships between personal characteristics and vocabulary development practices?
   b. relationships between personal characteristics and internet use?
   c. relationships between vocabulary development practices and internet access levels?
Description of Population

Children who are deaf or hard of hearing and integrated into their local schools may be receiving the services of a Sign Language educational interpreter. This individual's job title may be Educational Interpreter, Educational Interpreter/Assistant, Communication Facilitator, Educational Assistant, or some other variation. The defining factor for this group is that members are expected to interpret the classroom instruction and conversation of students from English into Sign Language for a student or group of students. Furthermore, depending on the student and the situation, they are expected to interpret the Sign Language from the student who is deaf or hard of hearing into spoken English.

In British Columbia, individual school districts hire interpreters and province-wide statistics are not kept on those who provide this service. In 1999, 1426 students were listed as deaf or hard of hearing under the Ministry of Education guidelines for funding (B.C. Ministry of Education, 1999). An estimate must be used to ascertain the number of these students who are receiving their education, at least in part, through a Sign Language interpreter. Based on U.S. figures for students who are deaf or hard of hearing and use educational interpreters (Gallaudet Research Institute, 1999), a conservative figure of 20% is used to determine that an estimated 286 students in the province of B.C. receive some part of their education through an educational interpreter (Appendix A).

A sample of the interpreter/signing support staff population was chosen based on two surveys done by van Gurp (2001a, 2001b). The first survey was of Teachers of the Deaf and Hard of Hearing (TDHH) around B.C, and the second was of the District Special Education Principals. Based on the data from these surveys, a sample of 25 districts in B.C. was identified. These districts contained individuals who had responded to previous surveys regarding educational interpreting, thus increasing the likelihood of a high response rate. Furthermore, each
district identified had at least one educational interpreter or special education assistant whose job required signing to a deaf or hard of hearing student. The total number of educational interpreters in the sample was 66. The chosen districts represented a mix of urban and rural districts. A summary of van Gurp's data shows the number of students and interpreters reported by each district and is presented in Appendix B.

Instrumentation

This investigation used a questionnaire (Appendix C). The development of the instrument was a synthesis of ideas from the literature and feedback from thesis committee members. In addition, feedback was sought from three experienced educational interpreters working at the BC School for the Deaf.

Research question one of this study was addressed in the demographic section of the survey. The relevant personal factors identified were gender, age, training, certification, family background and years of experience. The work context of the educational interpreter was also captured in this section through questions related to job titles, formalized and informal preparation time, preparation materials, and interpreter's perceived need for vocabulary development.

Research question two was addressed by questions related to the frequency of use of the various resources available to interpreters. Furthermore, the interpreters' impressions of the utility of each type of resource were also captured on a three-point scale. The resources historically available to interpreters for vocabulary development include other Sign Language users (hearing or deaf), books, videotapes, CD-ROMS, and most recently, the internet.

Research question three was addressed by questions relating to internet access and use. The questions are broken down into computer availability and access to the internet. Three contexts were considered for each access question, namely, the classroom, the school, and the home. A
task analysis identified that searching and viewing of web pages is considered the minimum skill level needed to view Sign Language dictionaries online. Based on these findings, a set of questions assessing participants' comfort levels with computers and the internet were added to the questionnaire. Individuals who reported not using the internet or computers were asked to record the barriers to access and use of the internet that they perceived or encountered.

The final set of questions on the survey related to the hypothetical development of a resource designed to provide curriculum-related ASL vocabulary video-clips via the internet. The questions attempted to assess the interpreter’s attitude toward such a model, and their suggestions as to who should be the Sign Language models. Space for open-ended comments on the internet as a resource tool was left at the end of the survey.

One weakness of the questionnaire development process was that only limited pilot testing was undertaken. To address this limitation, the researcher undertook an item-by-item alignment check to ensure that each research question was appropriately operationalised into a set of questions (Cox, 1996) (see Appendix D). The items were then checked for an appropriate level of discrimination. If a scale or an item did not provide enough detail, or conversely, there was too much detail, then the item or the scale was changed. The clarity of the questionnaire directions and the readability of the items were addressed by review of the three-member research committee. Of specific importance, when examining the van Gurp surveys, was the realization that many of the individuals working with children who are deaf and hard of hearing around the Province may not call themselves educational interpreters, and may not be called educational interpreters by their colleagues.

A second limitation is the self-reporting method used to gather the data. Due to the fact that the present study was both descriptive and preliminary in this area, the risks of using a self-report measure were outweighed by the advantage of the knowledge gained for future research and
projects. In order to minimize affective reactions to the instrument, items were analysed to avoid sensitive issues that might skew responses (Cox, 1996). Furthermore, no questions were asked about the signing method used with the student(s). These questions were omitted due to their poor reliability record in previous research (Schick et al., 1999). The overall length of the survey was designed to be completed in 15 minutes or less. It was hoped that the combination of short length and neutral questioning would contribute to the development of goodwill necessary for reliable responses. Comments on the returned surveys such as “good survey” and “targets important issues”, in combination with the high number of detailed comments regarding suggestion for future resources, suggests that goodwill towards the survey was achieved for many of the participants.

Data Collection

Educational interpreters were contacted through the Teachers of the Deaf and Hard of Hearing (TDHHs) throughout the province. The two surveys by van Gurp (2001a, 2001b) identified the number of educational interpreters within each district. A survey package was distributed to one TDHH in each district. The selection of the TDHH in districts where there is more than one TDHH working was based on alphabetical selection. The first person the list received the package. The package contained: (1) a letter requesting the help of the TDHH in distributing surveys (Appendix C), (2) a copy of the survey (Appendix C), and (3) a set of sealed individual survey packages to distribute to the educational interpreter(s) in that district. The individual survey packages for each interpreter were enclosed in individual sealed envelopes and contained self-addressed stamped envelopes for returning the surveys. The cover letter for the survey explained the purpose of the study, requested the participation of the interpreters, and described how to return the questionnaire (see Appendix C for survey cover letter). A fax
number for returning surveys and district permission response forms was provided, however, all surveys were mailed back.

The TDHH packages were mailed in late April. Three weeks after the initial mailings a thank you reminder was mailed to TDHHs (Appendix C). Participants were asked to return the questionnaires by June 30th, 2001. The returned questionnaires were completely anonymous. Subjects' names and districts were not recorded.

Data Analysis and Reporting

The demographic, vocabulary development, and internet access and use data were summarized into frequencies, averages, and ranges. Correlational and chi-squared analysis was then used to examine vocabulary development behaviours and internet use in light of the relevant demographic factors. Based on the descriptive nature of this study, only limited inference was made from any correlational findings. All quantitative analysis was undertaken using Microsoft Excel software. Beyond descriptive statistics of the sample, the only tests used on the data were t-tests for comparing sub-groups in the sample, chi-squared calculations for determining associations between categorical variables, and correlations for determining associations between continuous variables.

The qualitative analysis consisted of organizing written comments into themes using the constant-comparative method (Merriam, 1998). To facilitate this process, comments were entered into a spreadsheet software program for ease of coding and sorting. The emergent themes are represented in the results along with direct quotes selected from participants whose quotes appeared representative of these themes.

Summary

The data on the demographic characteristics, vocabulary development practices, and internet use of educational interpreters using Sign Language in British Columbia were collected
using a questionnaire. This measure was collaboratively designed to specifically address the questions of this study. The analysis of the data is mainly descriptive using qualitative and quantitative methods, with some limited inferences based on correlational analysis. The findings of this study gain their trustworthiness as a result of the validity of the questionnaire in relation to the research goals, the data collection process, and the data analysis and reporting procedures that were undertaken.
CHAPTER 4

Results

Educational interpreters working in isolated settings face the task of learning new vocabulary in their second language (Sign Language), often without the support of a nearby community which uses Sign Language. The internet presents a potential solution to this dilemma. The following results shed light on the applicability of this newly created resource for interpreters, as well as addressing the following purposes of this study: (1) to determine the key demographic characteristics of educational interpreters, (2) to determine the resources educational interpreters use to learn new vocabulary, and (3) to shed light on educational interpreters' internet use and access levels.

Sixty-six surveys were mailed to educational interpreters throughout the province of B.C. Thirty-three surveys were returned, for a response rate of 50%. A fifty percent response rate was deemed adequate for a survey of this type (Babbie, 1982, as cited in O'Rouke, 1999) and analysis was pursued. The results of the survey are presented below under the relevant research questions.

**Research Question 1 – relevant demographic characteristics of educational interpreters**

**Personal Factors**

Personal characteristics of educational interpreters were determined by questioning them with regard to their age, gender, signing background, and connection to the interpreting profession (i.e. training, certification, and interpreter association affiliation). The average number of months subjects have been working as educational interpreters or sign-language support staff was $M = 97.5$ (8.1 years), $SD = 70.50$ (5.88 years). The median number of months was 96 (8 years) and the mode was 72 months (6 years). The range was from 6 months to 300 (25 years) months. A disproportionate number of subjects had less than or equal to 2 years experience.
(24%). Forty-two percent had between 2.1 and 10 years of experience, and 33% had more than 10.1 years of experience.

Thirty (94%) of the 32 subjects who reported their gender were female. The mean age was determined by assigning participants the median age of the age-bracket they selected (N = 33, M = 37.4 years, SD = 8.9 years). The range was from 21.5 to 58.0 years. The actual minimum could have been between 18 and 25 years and the actual maximum could have been anywhere between 56 and 60 years.

Deaf family connection was assessed with a question regarding deaf family members. The frequencies of participants' responses regarding whether they have a deaf family connection are recorded in Table 3. Also recorded in Table 3 are the frequencies of when participants first learned Sign Language. The majority of people surveyed (70%) learned Sign Language in their adult life. Six of these respondents had deaf children and learned by necessity. Less than 10% of all participants learned Sign Language as children and the remainder (20%) learned in adolescence.

Table 3
Deaf family connection and age of learning Sign Language by frequency and percent

<table>
<thead>
<tr>
<th>Deaf connection</th>
<th>No</th>
<th>Yes</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Learned Sign</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>2 (6%)</td>
<td>1 (3%)</td>
<td>3 (9%)</td>
</tr>
<tr>
<td>Adolescent</td>
<td>5 (15%)</td>
<td>2 (6%)</td>
<td>71 (21%)</td>
</tr>
<tr>
<td>Adult</td>
<td>17 (52%)</td>
<td>6 (18%)</td>
<td>23 (70%)</td>
</tr>
<tr>
<td>n</td>
<td>24 (73%)</td>
<td>9 (27%)</td>
<td>33 (100%)</td>
</tr>
</tbody>
</table>
Subjects were asked to report whether they worked full-time or part-time. Only four of the subjects reported working part-time; however, these four subjects all worked a minimum of 80% of full time (four out of five days a week). No comparative analysis was done between part-time and full-time workers due to small marginal time difference between full-time and part-time employees and the small percentage of subjects that reported working part-time.

Three associations of professionalism were asked of each participant. These were whether the individual was certified as an interpreter, whether a current professional interpreter association membership was maintained, and whether an interpreter training school had been attended. Four interpreters reported being certified, all of whom had previously graduated from an interpreter training program. Only two of the four, however, maintained professional membership in an interpreting organization. Eleven of 33 (33%) of the respondents had graduated from an interpreter training program. The mean year of graduation for this group with the exclusion of one subject who graduated in 1976 was 1995, SD = 4.2 years. A similar percentage (39%) maintained current membership in a professional interpreter organization. A chi-square analysis, (1, N = 33) = 4.06, p < .05, showed that membership in a professional interpreter organization and graduation from an interpreter training program are significantly associated. People who report graduating from a program are more likely to maintain current membership in professional interpreter associations. Of note is the fact that nearly half (46%, n = 13) of the interpreters who maintained a professional affiliation or membership did so with an organization outside of the province of B.C. or Canada. The other 54% were associated with the Western Association of Visual Language Interpreters (WAVLI), which is associated with the national body, Association of Visual Language Interpreters of Canada (AVLIC).
Work factors

In order to place the individual in a context, the subjects’ work contexts were uncovered by asking questions relating to job titles, preparation time, preparation materials, colleagues, access to Deaf community, and grade of students they work with. Thirty-two of the 33 respondents reported their job title. The job titles that individuals held fell into three distinct categories and one “other” category. The first type (Type 1) focused on the individual’s role as an educational assistant or teaching assistant. Job titles such as Student Support Worker, Special Education Assistant, and Teaching Assistant were grouped into this category. Type 2 titles were focused on the role of interpreting. They included titles such as Interpreter, Educational Interpreter, and Sign Language Interpreter. Type 3 titles were a combination of Type 1 and Type 2, such as, Teaching Assistant/Interpreter. Type 4 titles were those titles that did not fit into any of the above categories. The percentages of Type 1,2,3, and 4 job titles were 28%, 41%, 13%, and 19% respectively. There was a significant association between job titles and whether the subject worked in an elementary or a secondary setting, chi-square (1, N = 30) = 5.57, p < .05. Interpreters working in secondary settings were more likely to have Type 2 job titles and interpreters working in elementary were more likely to have Type 1,3, or 4 job titles.

Interpreters were asked to report the average number of times a week they were provided material in advance of a lesson in order for them to prepare themselves for the interpretation. The mean number of times they reported was (n = 29), M = 3.2 times, SD = 4.6. There was a very large positive skew to these data due to two respondents who reported having more than 20 opportunities a week to preview materials for a lesson. These 2 individuals are in stark contrast to the 11 (38%) who reported having zero preview occurrences in an average week. Furthermore, another 14 (48%) were afforded less than 5 opportunities a week. A t-test showed that there was a significant effect of job title on the number of times an interpreter received preparatory
materials in advance of a lesson \( t(30) = 2.77, p < .01 \). Interpreters with Type 2 job titles received preparatory material in advance of their lesson significantly more often than did interpreters whose job title was diluted or focused on the educational assistant’s role (Type 1,3 & 4).

In addition to the number of times materials were presented in advance of a lesson to the interpreter or signing support staff, participants were asked about the number of hours of preparation time they received during an average week and whether an amount was written into their contract. Five (16%) of the 32 respondents to this question had time written into their contract, 22 (69%) did not, and 5 (16%) were unsure. The average preparation time per week for the entire group was \( n = 32, M = 1.8 \text{ hours}, \text{SD} = 1.86 \). Using a two-tailed t-test assuming equal variance to compare those interpreters who have preparation time written into their contract and those who did not, it was found that there was a significant effect of contract status, \( t(25) = -3.19, p < .05 \). Signing support staff with preparation time written into their contract \( n = 5, M = 3.9 \text{ hours}, \text{SD} = 1.78 \) had on average 2.1 hours more preparatory time per week than signing support staff with no preparatory time written into their contract \( n = 22, M = 1.8 \text{ hours}, \text{SD} = 1.86 \). There was also a significant effect of job title, \( t(30) = 4.21, p < .05 \). Signing support staff with Type 2 job titles (interpreting focused) \( n = 13, M = 3.1 \text{ hours}, \text{SD} = 1.53 \) had on average 2.3 hours more preparatory time per week than signing support staff with Type 1,3, and 4 job titles \( n = 19, M = 0.8 \text{ hours}, \text{SD} = 1.48 \). Of the 13 interpreters who had Type 2 job titles, 4 (31%) had preparation time formally written into their contract. Interpreters did not feel that they had enough preparatory time on average. Only one interpreter strongly agreed with the statement, "I have enough preparation time for my interpreting duties," while 69% disagreed or strongly disagreed with the statement.

A total of 31 respondents reported the grade of the students they worked with at the time of the study. Elementary school was defined from kindergarten to grade seven and secondary was
from grades 8-12. Twenty-three (74%) people worked in elementary settings, while eight (26%) worked in secondary. Six (19%) of the respondents reported working in more than one grade setting, requiring them to split their time between students. In the elementary setting, 11 (35%) subjects worked in primary (K-3), 9 (29%) in intermediate (grades 4-7), and 3 (10%) in both.

Subjects' access to signing support at their school was assessed by asking if there were Deaf adults or other signing support at their school. Eighty-two percent (N = 33) of the respondents did not have a Deaf adult working in their school and 61% had no other signing support staff working in their school. Nineteen (58%) of the respondents had neither a Deaf adult nor another signing support staff working in their school. In a separate question, 73% of interpreters either disagreed or strongly disagreed with the statement, “I receive enough support with my Sign Language vocabulary development.”

Although there are not many Deaf adults working in the schools, 21 (64%) of the participants reported that their school was situated in a community that contained a Deaf community. There was no question on the survey to determine the size of the community and whether the individual had access to its members for vocabulary development support. Future research aimed at analysing resources for interpreters would benefit from more detailed community descriptions and from collecting data on school locations (rural vs. urban).

Interpreters were asked to self-report the number of times during an average week they encounter an English word or concept for which they do not know the established (or new) sign (n= 31, M = 6.7 times, SD = 5.51). The maximum number of times reported was 20 and the minimum was 1. When unknown vocabulary frequency was individually correlated with preparatory time, work experience, and age group, no significant relationships were found (r = -0.08, p > .05; r = 0.05, p > .05; r = .01, p > .05, respectively). There was also no significant effect of job title when the group was split into Type 2 titles in one group and Type 1,3, and 4 titles in
the other, $t(29) = 1.23$, $p > .05$. There was also no significant effect of having graduated from an interpreter training program on reporting of encounters during an average week with unknown vocabulary ($t(29) = .30$, $p > .05$).

In order to test the hypothesis that the demands of secondary school interpreting are more vocabulary intensive, a correlation was done between the age of the students that interpreters worked with and the number of times they reported not knowing the appropriate vocabulary. No significant association was found between the grade for which interpreters worked and the number of times they reported unknown vocabulary in an average week ($r = 0.31$, $p = .096$).

**Research question 2 – current resources used to develop unfamiliar vocabulary**

In order to determine which resources interpreters used to develop new vocabulary, subjects were provided a list of common resources and asked to represent the frequency of their use by selecting one of the following choices; quite often, sometimes, very little, or never. Participants who used the resource were then asked to rate their satisfaction with the resource as very satisfied, somewhat satisfied, or not satisfied. The frequencies of use and satisfaction levels of users are presented in Table 4. By measuring the number of participants who reported using a resource at least some of the time, a measure of overall usage for a resource was calculated. The resource reported as most often used by signing support staff was colleagues. Fifty-six percent of the respondents asked colleagues quite often for vocabulary suggestions. Asking colleagues had the second highest satisfaction rating with 48% of participants being very satisfied with this resource. Twenty-nine people (91%) reported asking Deaf adults for vocabulary suggestions. Using Deaf adults as a resource scored the highest satisfaction ratings (67%).
Table 4

**ASL resource use: Frequency and satisfaction by percent**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Frequency of use</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qu. Often</td>
<td>Some-tmes</td>
</tr>
<tr>
<td>Books</td>
<td>32</td>
<td>47%</td>
</tr>
<tr>
<td>Videotapes</td>
<td>32</td>
<td>16%</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>32</td>
<td>0%</td>
</tr>
<tr>
<td>Internet</td>
<td>32</td>
<td>9%</td>
</tr>
<tr>
<td>Colleague</td>
<td>32</td>
<td>56%</td>
</tr>
<tr>
<td>Deaf Adult</td>
<td>32</td>
<td>50%</td>
</tr>
</tbody>
</table>

Videotapes and books, which both have a long legacy as popular learning tools for ASL learners, both had high saturation rates: 94% of the respondents have used them at least some of the time for vocabulary development. Books were used much more frequently than videotapes (47% versus 16%, respectively, reported using them quite often). Videotapes, on the other hand, received much higher satisfaction scores than books (29% were very satisfied with videotape vs. 10% with books).

Of the six resources available, CD-ROMs and the internet are the most computer dependent and the most recent to be added to the resource options for learning new vocabulary. Both resources were used dramatically less than the other options. Fifty-six percent of respondents never use CD-ROMs and 44% never use the internet. Both the internet and CD-ROMs had only a 17% very satisfied response rate. The internet as a resource had the distinction
of scoring the highest dissatisfaction score of all options. Thirty-three percent of respondents reported that they were not satisfied with the internet as a resource for learning new vocabulary.

Due to the fact that internet-based Sign Language vocabulary resources are in their infancy, an exploratory, open-ended question was added to the questionnaire regarding the content of online dictionaries. Each response was entered into a spreadsheet, where two different theme analyses were done. The first analysis involved the participants’ attitude toward the potential of the internet as a resource. Comments were separated into two categories, with ambiguous comments or blanks omitted. Of the 26 comments that were categorized, 21 were positive and 5 were negative. Many of the positive responses were from participants who reported never having tried the internet as a resource. For example, one participant (subject 15) said, “I’ve never used an online dictionary, but would love to check one out.” Subject 29 stated:

I think online dictionaries is a wonderful and useful resource especially for interpreters and educators who live far from larger centres (i.e. Vancouver, Calgary, Toronto) and often feel isolated and unable to access proper resources workshops etc. Although online dictionaries is secondary to asking a Deaf ASL specialist, I think it is a necessary tool for Interpreters and other sign support staff.

Individuals who reported using the internet had on average longer comments than those who did not, $M = 268$ characters and $M = 146$ characters respectively. For the purpose of gathering feedback based on experience, only comments from those individuals who reported using the internet as a resource in section two of the questionnaire were analysed for themes ($N=19$). The constant-comparative method, as described by Merrian (1998), was used to determine significant themes. Some individuals touched on more than one theme in their comments, in which case a tally was added to each theme discussed in their comments. Two themes emerged as dominant in the comments. The first was summed up by the phrase, “the
content is too basic.” Or, as one participant (subject 16) said, “Most of the time the online dictionary has only limited signs and signs I already know.” Fourteen of the subjects touched on this limitation of current internet ASL dictionaries. The second dominant theme was the “need for content organization.” Participants want to be able to access content by theme or subject. The three comments in Table 5 are examples of comments related to the theme of “content organization.” Nine participants mentioned the need for better content organization.

Table 5
Sample comments for the “need for content organization” theme

<table>
<thead>
<tr>
<th>Subject #</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>It would be nice to have a list of websites pertaining to specific signs i.e. chemistry, biology, math, Shakespeare etc. Would save hours searching.</td>
</tr>
<tr>
<td>33</td>
<td>Would like to see dictionary with &quot;unit vocab.&quot; i.e.: development of butterfly, salmon unit, photosynthesis etc.” For interpreters specifically having dictionaries grouped in subject specific or theme.</td>
</tr>
<tr>
<td>22</td>
<td>The educational environment is always taught in themes in younger grades &amp; more specific at higher levels.</td>
</tr>
</tbody>
</table>

Two participants commented on the fact that current dictionaries have a “one-word = one-sign” style and this does not provide enough context to learn Sign Language. One participant commented on the lack of Canadian content available in online dictionaries. Finally, two participants commented on the frustration with the speed of downloading pictures (subjects 3 & 25). A review of the speed of internet connections available to these two individuals showed that neither of them had access to high speed connections in the classroom, school, or at home.
The last question relating to the development of online resources asked participants, “If an agency were to develop a comprehensive online dictionary for signing support staff, who should the sign models be?” Participants were allowed to select more than one group if they wished. The results are presented in Table 6. They show a clear majority of support for Deaf ASL specialists, Deaf community members, and interpreters. Hearing ASL specialists, however, received less support to be models than Deaf children. There were a total of 105 supportive responses from a total of 32 participants, meaning that, on average, each participant selected just over three groups to be Sign Language models (3.28 groups).

Table 6

Who should be the sign models for online dictionaries? by percent

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>yes model</th>
<th>no model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaf ASL specialists</td>
<td>32</td>
<td>97%</td>
<td>3%</td>
</tr>
<tr>
<td>Hearing ASL specialists</td>
<td>32</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>Deaf community adults</td>
<td>32</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>Interpreters</td>
<td>32</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Deaf children</td>
<td>32</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

The final analysis related to resource use was undertaken to determine the overall satisfaction ratings of all the resources combined, the human resources combined (colleagues and Deaf adults), and non-human resources combined (books, videotapes, CD-ROMs, internet). The results showed a significant association between human characteristic and the overall ratings of satisfaction $t(145) = -6.25$, $p < .01$. Colleagues and Deaf adults, on average, received higher satisfaction ratings than books, videos, CD-ROMs, and the internet.
Research question 3 – internet use and computer access levels of educational interpreters

The participants’ computer and internet availability was assessed in three contexts, namely, the classroom, the school, and the home. The summary of computer availability and internet connectivity for the three contexts is presented in Table 7. The survey questions focused on the presence of computers, the presence of an internet connection, the speed of the connection, and the computer availability when needed. With regard to the connection speed, the questionnaire asked participants if the connections were fast (ADSL, Cable, T1, T3, etc.), medium (56.6 kbps dial-up), or slow (less than 56.6 kbps). Upon further analysis, however, it was deemed that a more useful categorization would be to group the medium and slow categories together due to their relatively small speed difference and due to the substantial speed jump from medium to fast connections. The availability of computers was assessed by asking participants how many times, out of ten, the computer was available when they wished to use it. Finally, participants were asked to identify the key constraints to using computers within each context.

Table 7

Computer and internet availability by percent

<table>
<thead>
<tr>
<th></th>
<th>Computer Present</th>
<th>Connected to Internet</th>
<th>Speed of Connection</th>
<th>Availability per 10 tries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Yes</td>
<td>No</td>
<td>n</td>
</tr>
<tr>
<td>Classroom</td>
<td>32</td>
<td>81%</td>
<td>19%</td>
<td>32</td>
</tr>
<tr>
<td>School Location</td>
<td>32</td>
<td>94%</td>
<td>6%</td>
<td>32</td>
</tr>
<tr>
<td>Home</td>
<td>32</td>
<td>88%</td>
<td>13%</td>
<td>32</td>
</tr>
</tbody>
</table>

The classroom context is the locale where interpretation events occur most often and, therefore, represents the closest placement of the computer as a resource for using the internet to
develop new vocabulary. Fifty-eight percent (n = 32) of interpreters indicated that internet-connected computers were available in the classrooms where they worked. However, only 4 out of the 20 connections were high-speed. The average availability of classroom computers to interpreters was roughly six out of ten times. That is to say, for every ten times an interpreter needed the computer, it was available six times. Comments on the key limitations to classroom use of computers by the participants centred on two main themes. The first theme was “students first.” Comments about students using the computers and high student/computer ratios made this limitation very clear. The second theme was “lack of time.” Expressions such as, “I’m too busy interpreting” and “not enough time” were representative of this theme.

The second context analysed was the general school context. Computers available in this context were located in staff rooms, computer labs, or other staff specific locations. Ninety-four percent (n = 32) of the participants had computers available that were connected to the internet in their school for staff use. Thirty-two percent of these were connected to the internet with fast connections. The average availability of these computers was seven out of ten times. The key limitation to availability in this context was the fact that computers were “in use” when they were needed. Either students were using them because the computers available were in a lab or other staff were using them. The prioritising of lab computers for students is a continuation of the “students first” theme from the classroom context. A few comments representative of the “in use” limitation are “[I have to] wait in line,” “2 computers/25 staff,” and “other staff using.”

The home was the third context for which participants reported their computer access and internet connectivity. The home is the furthest context from interpretation events, which predominantly occur in the classroom. The percentage of participants who had computers in their home that were connected to the internet was 78 (n = 32). Of these connections, 36% were high-speed and 64% were medium or slow. More people had high-speed connections in their home
than were available in either the classroom or the greater school context. The availability of computers in the home was 9.9 times out of 10. The only limitation suggested by one individual who was connected to the internet at home was that her husband worked from home and required the use of their computer.

The second dimension of computer use addressed by the survey was the participants' comfort levels with computer programs and the internet. The threshold skills were determined for using ASL dictionaries online and three questions were derived to assess whether an individual was comfortable operating at these thresholds. Table 8 summarizes the questions and the frequencies of different comfort levels on a four-point Likert-type scale. Over 90% of the respondents were comfortable or very comfortable using computers for e-mail, basic computer software, and for searching out and viewing web-pages.

Table 8

**Computer and internet comfort levels by percent**

<table>
<thead>
<tr>
<th>Question</th>
<th>n</th>
<th>very comfortable</th>
<th>uncomfortable</th>
<th>very uncomfortable</th>
<th>never tried</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you comfortable using e-mail?</td>
<td>32</td>
<td>66%</td>
<td>28%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Are you comfortable using basic computer programs, for example CD-ROMs?</td>
<td>33</td>
<td>52%</td>
<td>42%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Are you comfortable using the internet to search out and look at web pages?</td>
<td>33</td>
<td>48%</td>
<td>42%</td>
<td>9%</td>
<td>0%</td>
</tr>
</tbody>
</table>

In order to determine whether individuals' comfort levels were a result of work-based training, subjects were asked if they had received any training from their employer with regard to computers and using the internet. Only 15% (N = 33) of respondents had received any internet or computer training from their current employer.
Research question 4a – relationships between personal characteristics and vocabulary development

In order to ascertain if certain traits could be associated with more or less likelihood to use resources in general, each person was given a “total resource” score. This was derived by first giving each response to each resource use a score. For example, if someone reported using books “quite often,” a score of three was assigned. “Sometimes” was given a score of two, “very little” a score of one, and “never” a score a zero. Scores from all the resources for an individual were then totalled to determine the total resource score. An individual who reported using all the resources all of the time received a score of 18. A person who never used any of the resources received a total score of zero. The range of this set of derived scores (n = 32) was from 4 to 15. The mean was 9.9, with a standard deviation of 2.69.

In order to determine if there were associations between total resource use and personal factors, total resource scores were used in a series of t-tests with graduation from an interpreter training program, job title, access to a Deaf community, and access to other signing support staff as sub-group dividers. The results of those t-tests are presented in Table 9. None of the subgroup comparisons showed a significant difference between groups. Caution in interpreting this result must be used due to the nature of the derived scores. A more focused investigation should ask for the amount of time an individual spends with each resource over a specified period of time. As it stands now, an individual may use the internet for 20 hours a month to learn new ASL vocabulary and have a total resource score of four or five, while someone who uses five different resources for three hours each a month and self-declares his or her activity as frequent use would have a resource score of 15. The individual who uses the internet for 20 hours may actually spend more time learning ASL vocabulary than the individual using multiple resources for 15 hours in total. The total resource score does not capture this subtlety.
Table 9

Subgroup t-test results for total resource use

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>df</th>
<th>T stat</th>
<th>T sig. (2-tailed)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training program graduate: yes vs. no</td>
<td>30</td>
<td>-0.004</td>
<td>2.042</td>
<td>0.997</td>
</tr>
<tr>
<td>Job title: Type 2 vs. Type 1,3,4</td>
<td>30</td>
<td>-0.768</td>
<td>2.042</td>
<td>0.449</td>
</tr>
<tr>
<td>Access to Deaf community: yes vs. no</td>
<td>30</td>
<td>-0.268</td>
<td>2.042</td>
<td>0.790</td>
</tr>
<tr>
<td>Access to other signing support staff: yes vs. no</td>
<td>30</td>
<td>1.357</td>
<td>1.697</td>
<td>0.185</td>
</tr>
</tbody>
</table>

Research question 4b – relationships between personal characteristics and internet use

The main resource of study for this investigation is the internet. Eighteen of 32 respondents reported using the internet at least some of the time for vocabulary development. A series of chi-square analyses comparing work experience, training program graduation, job title, and membership in an interpreting association were undertaken to determine if there was an association between any of these traits and an individual’s access to the internet for vocabulary resources. The results of the analysis are available in Table 10. None of the associations were significant.
Table 10

Selected demographics and use of the internet as a resource

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>df</th>
<th>Calculated Chi-square</th>
<th>Chi-square critical (.05)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Experience (≤ 2 years vs. &gt; 2 years)</td>
<td>1</td>
<td>1.52</td>
<td>3.84</td>
<td>0.217</td>
</tr>
<tr>
<td>Training program graduate: yes vs. no</td>
<td>1</td>
<td>0.02</td>
<td>3.84</td>
<td>0.888</td>
</tr>
<tr>
<td>Job title: Type 2 vs. Type 1,3,4</td>
<td>1</td>
<td>0.25</td>
<td>3.84</td>
<td>0.618</td>
</tr>
<tr>
<td>Membership in an interpreting association</td>
<td>1</td>
<td>0.25</td>
<td>3.84</td>
<td>0.618</td>
</tr>
</tbody>
</table>

A comparison of personal factors and internet comfort levels was not undertaken due to the fact that over 90% of all respondents reported that they were comfortable or very comfortable using the internet to search out and view web-pages. When this fact is coupled with the fact that only 56% (n = 32) of interpreters have used the internet to search out and look at ASL dictionaries online, one could suggest that awareness of these sites as a potential resource may have been a limiting factor. Online ASL dictionaries have not been available for as long as books, videotapes, and CD-ROMs. In spite of the high comfort levels with computers reported by interpreters, 79% percent agreed or strongly agreed with the statement, "I would like more support regarding computer skills and internet access at my job."
CHAPTER 5

Discussion

The purposes of this study were to determine (1) the key demographic characteristics of educational interpreters in British Columbia, (2) the resources educational interpreters use to learn new vocabulary, and (3) their internet use and access levels. Furthermore, data were collected for the purpose of guiding future resource developers who are interested in using the internet as the medium for Sign Language support. This chapter looks at each research question individually, followed by a discussion of unexpected findings, implications for practice, and implications for future research.

Research question 1 – demographic characteristics of educational interpreters

Personal Characteristics

The demographic findings of this survey are consistent with the largest and most recent survey of educational interpreters in the United States (Jones et al., 1997). Specifically, if you were an interpreter in a British Columbian school at the time of this study, there is a better than nine in ten chance that you are female, in your thirties, and an adult learner of Sign Language. You work at least four days a week and there is approximately a one in three chance that you have been on the job less than two years.

The levels of certification reported by Jones and his colleagues (1997) were higher than found in this study; Jones et al. reported 35% certification as opposed to 12% of the surveyed BC interpreters. The reasons for the difference between the two regions could be due to a number of factors working in unison. The Registry of Interpreters for the Deaf (RID) in the U.S. may have an easier or more accessible certification process than the Association of Visual Language Interpreters of Canada (AVLIC). Certification may be required more frequently for employment in the regions studied by Jones et al. or certification may be attained as part of the
training process that interpreters in the Jones et al. study underwent. Regardless of the source of the
difference, relatively few educational interpreters in both contexts are working with a current
certification.

In B.C. the “Special Education Services: A Manual of Policies and Procedures” (Special
Education Branch, 1995) outlines that certification or graduation from an interpreter training
program is suggested as a prerequisite for hiring interpreters. Only one in three interpreters
surveyed had graduated from an interpreter training program. Over half of those had graduated
from Douglas College in New Westminster, B.C. Douglas College is similar to the majority of
interpreter training programs studied by Dahl & Wilcox (1990) in that it does not offer a specific
educational interpreter program and it offers limited instruction in the areas of educational
psychology and language development.

Another measure of professionalism addressed was whether or not individuals maintained
membership in a professional interpreting association such as the Association of Visual
Language Interpreters of Canada (AVLIC). Thirty-nine percent of interpreters maintained a
current membership. No previous study has reported professional membership statistics for this
group or similar groups, making comparison impossible. Of interest to future researchers may be
the fact that those interpreters who graduated from an interpreter training program were more
likely to maintain active membership than those who had not. The reasons for or against
maintaining memberships were not requested in this survey.

Work Context

In order to place the individual within a context, questions regarding job title, preparation
time, preparation materials, contact with other signers, and proximity to Deaf community were
asked. When these factors were analysed for interactions, a pattern related to job status emerged
that is supported by previous research. Numerous studies have pointed to the fact that the
interpreter’s role should not be compromised by other duties, such as preparing classroom materials for the teacher, marking, supervising children, tutoring, preparing classroom displays, and photocopying (Hayes, 1993; Jones et al., 1997; Salend & Longo, 1994; Stewart et al., 1998). This study found that an individual’s job title was significantly associated with preparatory time and access to materials before a lesson for preparation. Job title is not specifically studied in the above-mentioned studies; however, all of these studies discuss the duties and roles of the educational interpreter. The consistent theme is that the more non-interpreting duties that are requested of an individual, the more that person’s ability to provide quality interpretation is diminished. In this study, individuals who reported having a job title that clearly represented their role as an interpreter (Educational Interpreter or Interpreter) received more preparatory time and more access to materials prior to lessons than did those interpreters who had job titles that were diluted (Educational Interpreter/Special Education Assistant or Communication Facilitator).

Two professional benefits (more prep time and more access to materials prior to lessons) that relate to job title were identified in this study. Job title could simply be an associated variable for other components of the work context that impact the educational interpreter’s job, or it could be a critical variable. Future research would benefit from a more detailed description of the duties of British Columbia’s educational interpreters and from an analysis of their job descriptions. Researchers interested in a set of job duties previously used for collecting such data should see Jones et al. (1997).

Research question 2 – current resources used to develop unfamiliar vocabulary

Demand for resources

Before discussing which resources were used and how, a determination of the need to develop new vocabulary was undertaken. No previous study had used a self-report to ascertain the number of times a subject faces unfamiliar vocabulary while interpreting in the classroom.
It appears that the need for access to resources for new vocabulary is universal across interpreters of different personal, training, and professional backgrounds. On average, interpreters reported almost seven incidents per week of unknown Sign Language vocabulary for an English word or concept. There were no significant associations between this self-reported figure and an individual's preparatory time, years of work experience, age, or the grade of the student with whom the interpreter worked. Furthermore, subgroup analysis based on dividing the group along job titles, graduation from an interpreter training program, and professional association membership also found no significant associations.

The universality of need for professional development in the area of vocabulary development is supported by the fact that 73% of the participants indicated that they would like more support with their Sign Language vocabulary development. Jones et al. (1997) found even stronger support for more professional development amongst the educational interpreters they surveyed in the U.S. Over 95% of the subjects in their study expressed a need for continued interpreter training.

Educational interpreters' openness to professional development is very promising in light of the findings by Schick et al. (1999). Using their Educational Interpreters Performance Assessment (EIPA) on educational interpreters from Colorado, they found that the average interpreter has a command of Sign Language vocabulary that barely meets the minimum standards for working in the state of Colorado. At this level of vocabulary development, Schick and her colleagues concluded that interpreters need ongoing and regular support with their language development.

**Vocabulary development resource use**

When it comes to which resources interpreters prefer for Sign Language vocabulary development, clear preference for "human resources" over "non-human resources" was found.
The human resources (colleagues and Deaf adults) were used significantly more often than non-human resources (books, videotapes, CD-ROM, and the internet). There was also a significantly higher satisfaction level associated with the human resources compared to the non-human. This finding appears to be a confirmation of the obvious: people would rather deal with other people than inanimate resources.

The most frequently used non-human resources were books. Surprisingly, books also received the lowest number of “very satisfactory” responses compared to all the other resources. This juxtaposition demonstrates the importance of convenience to busy interpreters. Considering that the average preparatory time for interpreters a week is 1.8 hours and that interpreters reported being “too busy”, it is not surprising that interpreters are willing to put up with lower quality resources in order to have them easily accessible. In contrast to books, videotapes were used significantly less often; however, their satisfaction ratings were almost triple that of books. This demonstrates the importance of complete visual signals when learning a visual language. Books provide static renditions of signs with arrows or multiple pictures to represent movement. Videotapes show language in action using human models; the researcher refers to this as a “richer context” for the vocabulary. Subjects considered viewing signs in context a desirable element to include in future resource development. Therefore, the results suggest that an ideal vocabulary development resource would combine the rich context of video with the convenience of books.

Research question 3 – internet use and computer access levels of educational interpreters

One might think that the internet provides the aforementioned combination of convenience and rich content. However, compared to all other resources, the internet had the highest dissatisfaction ratings. The reason for the high levels of dissatisfaction with current online dictionaries may relate to the high levels of expectation held by interpreters for the medium.
Future research could consider whether a high level of expectation coupled with a high level of need, followed by a disappointing experience, may lead to higher levels of dissatisfaction.

It is the author's belief that the internet still holds promise as a potential resource for educational interpreters in the domain of Sign Language vocabulary development. The question that needs to be answered is: Why is what sounds so good in theory (the convenience and rich context of the internet) not working in reality? To answer this question, the nature of the resource needs to be recognized. Online dictionaries (along with books, CD-ROMs, videotapes) are distance education resources. In order to assess the potential of the resources with regard to meeting their goal, the ACTIONS model has been adopted from the book *Technology, Open Learning and Distance Education*, by Bates (1995). The letters of the acronym stand for:

- **A** - Access: How accessible is a particular technology for learners? How flexible is it for a particular target group?
- **C** - Costs: What is the cost structure of each technology? What is the unit of cost per learner?
- **T** - Teaching: What kinds of learning are needed? What instructional approaches will best meet these needs? What are the best technologies for supporting this teaching and learning?
- **I** - Interactivity and user-friendliness: What kind of interaction does this technology enable? How easy is it to use?
- **O** - Organisational issues: What are the organisational requirements, and the barriers to be removed, before this technology can be used successfully? What changes in organisation need to be made?
- **N** - Novelty: How new is this technology?
S – Speed: How quickly can courses be mounted with this technology? How quickly can materials be changed? (p. 1-2)

All of the above considerations are relevant to designers of resources planning to support educational interpreters. However, question three of this study dealt specifically with interpreters’ access to computers and the internet. According to Bates, “access is usually the most important criterion for deciding on the appropriateness of a technology” (p. 2). In the case of educational interpreters, access can be considered in three distinct domains. First, the resource must be physically available. In the case of a book, it must be nearby when needed. In the case of the internet, an available computer must be nearby that is connected to the internet. Second, the interpreter must be afforded the time and resources necessary to make meaningful use of the internet. Finally, the interpreter must possess the minimum skill set necessary to use the resource.

Interpreters in this survey reported having reasonable physical access to computers within their school context. Ninety-four percent of interpreters had access to a computer connected to the internet in their school; however, only 32% of these connections were high-speed in nature. This lack of high-speed connections is a barrier to accessing video on the internet. Although video can be viewed on modems that are medium and slow in speed, the data of this survey suggest that higher quality resources will be overlooked in favour of easily accessible resources.

The second dimension of physical access was the number of times computers were available to interpreters when they wanted to use them. Within the overall school context, computers were available an average of 7 out of 10 times when wanted by an interpreter. This does not present an overwhelming barrier to access to the resource.

One of the dominant themes that emerged from the data was that interpreters do not have enough time during their day to use the computer. Almost one-third of participants had no
preparatory time during their average week. Furthermore, interpreters were rarely given materials to prepare in advance of a lesson. Preparatory time with no material to prepare loses its function.

The third component of access that was not a barrier to internet use for interpreters was skill and comfort levels with computers. Searching out and viewing web pages was identified as the minimum threshold skill necessary for using online dictionaries. Ninety percent of participants were comfortable or very comfortable with this activity.

The comments from interpreters regarding the inadequacy of current online resources for Sign Language make it clear that access is not the only limitation to the success of the internet as a distance learning tool. Using the Bates (1995) ACTIONS model, the second deficiency identified is with the ‘T’ – teaching component of the model. Current online dictionaries do not meet the learning needs of educational interpreters. According to interpreters, current online resources are “too basic” and they need better organization. The current level of vocabulary of online Sign Language dictionaries is suitable for beginners, offering nothing for the intermediate to advanced Sign Language user. As well, it was suggested that the content should be organized by subjects. Furthermore, themes that match the ones taught in classrooms should be identified and used as organizers.

Research questions 4a and 4b – relationships between factors

There were no significant correlations or associations found between any of the personal factors, professional factors, or work-related factors and the needs and practices of educational interpreters with regard to developing unfamiliar vocabulary. This is interesting in light of the comments made in the literature that some subjects and grade levels have more technical demands than others (Hayes, 1993; Salend & Longo, 1994; Stewart et al., 1998). For example, one would expect grade 12 physics to place more technical vocabulary demands on an interpreter.
than the vocabulary requirements of Grade 3. When separated by grade, however, there was no significant difference in the number of times that subjects reported experiencing unknown vocabulary. The consistency of self-reported need for vocabulary development may be consistent across grade-levels due to the fact that more skilled interpreters are placed in more demanding work situations (subjects). It is also possible that respondents have prior experience in their current subject area and grade level assignments and, therefore, have previously learned much of the vocabulary. Both hypotheses require further study by future researchers.

The set of associations tested in research question 4b were between personal and professional factors and internet use and computer access. These results also showed no significant associations. The lack of association in this area was less surprising. Over 90% of subjects reported being comfortable using computers and the internet for basic activities. In this group, and increasingly in society in general, using the internet has become a basic skill. It is now the exception to find professionals or individuals who do not use the internet or have access to computers at work and at home.

**Unexpected findings**

This study set out to look at vocabulary development practices of educational interpreters, with a specific focus on the use of the internet as a resource. One of the most interesting findings that emerged from the data concerns the work context of interpreters. Interpreters with job titles that focused on their role solely as an interpreter were entitled to more professional benefits than those interpreters who had job titles that were either diluted by adding a second focus (e.g., interpreter/educational assistant) or were unclear (e.g., communication facilitator). The professional benefits associated with the job title of interpreter were significantly more preparatory time and significantly more access to preparatory materials in advance of a lesson. The implications of these finding are discussed below under the implications for policy section.
The second set of unexpected findings is that no associations were found between personal factors, professional factors, and work-related factors and vocabulary development behaviours. The researcher expected to find a link between personal characteristics and the number of times individuals reported experiencing situations when they do not know a sign for an English word or concept. One reason for the lack of associations may be the reliance on self-reporting of behaviours for the independent variable in this study. This and other limitations of the study are discussed in the next section.

Limitations to the study

The primary limitation of this study is that it used a self-report measure to determine the independent variable, which was then used for analysis against personal and work factors. Interpreters declared the number of times during an average week that they felt they did not know the correct sign for an English word or concept. Due to the exploratory and descriptive nature of this study, the researcher believes this limitation was acceptable. However, these results should not be used for high-stakes decision-making. Results should be verified with observational data that do not carry the same validity concerns that self-reporting measures do (Merriam, 1998).

A second area of concern is that the professional association measures collected in this study are not measures of professional competence. No claims of competence can be made based on the professional demographic measures accumulated. The only true measure of competence is qualified assessment. Jones et al. (1997) asked interpreters if they were assessed prior to their hiring; only 56% were assessed prior to hire. In jurisdictions where assessment does not occur, such as British Columbia, competence is assumed if an individual has graduated from an interpreter training program or holds a certificate of interpretation from either AVLIC or RID (Special Education Branch, 1995).
The number of respondents to the survey was 33. Although this figure was deemed acceptable for analysis, operations requiring the population to be divided, such as, in the case of t-tests, led to a decrease in the power of the findings due to smaller than desired sample sizes. For this reason, significant effects should be interpreted with caution.

Finally, the survey received a 50% response rate. While this rate is acceptable for this type of survey according to Babbie (1982, as cited in O’Rouke, 1999), one must speculate as to why the other 50% of respondents did not return their surveys. Two possibilities relate to the distribution method and time of year. It is possible that educational interpreters never received their surveys. Distribution of the surveys was done through the Teachers of the Deaf and Hard of Hearing in various B.C. school districts. Furthermore, surveys were mailed in May, which is close to the end of the school year. May and June are very busy months for all school staff, which could have negatively impacted survey response rates.

Implications for practice

Educational interpreter preparation

The results of this survey have implications in the area of computer training for interpreter preparation programs. The level of computer skill necessary to use the internet as a Sign Language resource is minimal. Most individuals in this study possess this minimum level of skill. Large amounts of computer training should not be added to the curriculum of interpreter training programs. Internet-based resources should be introduced to students and college-wide resources should be available to students who need to bring their computer skills up to the minimum threshold. Any additional allocation of time and resources within interpreter training programs places the program at risk of cutting valuable language and interpreting-related instruction in favour of unnecessary computer instruction.
Educational interpreter professional development

The two main implications for educational interpreter professional development lie in suggestions for the future design of educational resources and in the type of resources preferred by educational interpreters. The group surveyed preferred to receive their vocabulary support from human resources as opposed to inanimate resources (books, video, CD ROM, internet). Where possible, administrators and policy makers should seek to create professional development opportunities with Sign Language experts. In urban centres, where Deaf communities are present, this may be possible. However, bringing educational interpreters together from all over rural B.C. is financially prohibitive and a questionable use of funds, given some of the resource alternatives available.

When an inanimate resource is necessary, it is clear from the results that video is more satisfactory than books; however, the inconvenience or availability of video limits its use. The internet can provide on-demand video to individuals with high-speed connections. The existing problem for internet-based sites is that they have not been designed with the educational interpreter in mind.

In order to remedy the current weakness in online resources, professional development resources designed for interpreters on the internet will benefit from following a distance education model, such as the one put forward by Bates (1995). Within such a model, the authors of the internet Sign Language resource would take into consideration the access levels of interpreters, the relative costs of different technology choices, the teaching and learning goals of the project, the interactivity and user-friendliness of the resource, and the extent to which it would be designed to be easily updated and maintained.

The following design suggestions are based on the comments from the survey:
1. The Sign Language content needs to have sufficient depth so as to be comprehensive within subject areas included in the resource.

2. The content needs to be organized by theme or subject so as to provide context to the learner.

3. The theme and subject organizers should follow the curriculum guidelines set forth by the Ministry of Education.

4. The content must be searchable as well as browsable by topic.

5. The language models should come from a variety of backgrounds including: Deaf adults, ASL specialists, Interpreters, and Deaf children. (A preference for Deaf over hearing ASL specialists was present in the results).

A professional development resource that would meet these requirements could be created using the province of British Columbia’s Integrated Resource Packages (IRPs). Each subject taught in the Province has an IRP that contains the content for the curriculum in the form of ‘expected learning outcomes’. The IRPs also contain multiple samples of lessons, further resources, and are divided by grade level. By using IRPs as the organizer for creating Sign Language vocabulary support sites, the interpreter would be immediately tied to the same content organizer that classroom teacher should be following. For example, if a Grade 3 class is studying math, the interpreter could go online and find examples of signs that represent the Grade 3 math vocabulary. The signs within each section of the site would be conceptually linked and opportunities to extend the interpreter’s learning would occur.

Educational interpreters’ competence levels are often criticised in the literature; however, little attention is paid to viable solutions (Johnson, 1991; Jones et al., 1997, Schick et al., 1999). A recent notable exception to this trend is Dean and Pollard’s (2001) task-analysis approach to interpreting and their detailed suggestion regarding the merits of apprenticeship-style training for
interpreters. The present study suggests another solution for professional development of interpreters working in isolated settings: Internet-based Sign Language vocabulary resources that follow the principles of effective distance education delivery and design (as set forth in Bates, 1995), which includes integrating educational interpreters into the design process.

**Educational interpreter policy**

The results of this study carry implications for administrators and provincial policy makers in three main areas: job descriptions, hiring practices, and computer access. The data do not tell us the specific hiring details of each district; however, they do make clear that interpreter's job title is a contributing factor to the allocation of professional benefits. The researcher assumes that job titles and job descriptions are inter-related and the job title reflects the duties outlined in the job description. The benefits related to the job title of interpreter are increased preparatory time and increased access to materials from teachers for preparation. There are potentially other benefits and drawbacks associated with job titles that affect the work place environment and individual stress levels. Questions regarding the role of job title and job description were not the primary focus of this study. However, the results indicated that the simple act of rewriting a job description and re-focusing a job might be one of the most cost effective and politically effective ways of improving interpreters' status within schools, and potentially improving their performance in the classroom.

Very few educational interpreters in this study held certifications and only about one-third had graduated from an interpreter training program. These statistics suggests that individual districts are not following the provincial hiring recommendations in British Columbia. The "Special Education Services: A manual of policies and procedures" (Special Education Branch, 1995) outlines that certification or graduation from an interpreter training program are suggested as prerequisites for hiring interpreters. In order for certification rates and the hiring of graduates
from interpreter training programs to increase, either the province of B.C. or individual school districts will need to change certification and graduation from a training program from a suggested prerequisite to a required one.

When it comes to using the internet as a resource, the most limiting access barrier facing interpreters is the lack of high-speed internet connections in school. If quality Sign Language resources that can be used for quick reference become available over the internet, the internet may become an important resource for educational interpreters. Use of such a resource will require priority access for interpreters to computers with high-speed access within the school. This initiative will take education on the part of the interpreter and school administrators and will become something of a necessity as internet vocabulary resources begin to reach their full potential. In order for interpreters to have access to the internet that is quick enough to justify its use as a resource, school-based internet connections in schools must qualify as high-speed. Until such a time as high speed connections are easily accessible in schools, it will continue to be quicker to grab a book from the shelf than to wait for an internet-delivered video-clip.

Policy-makers interested in supporting the professional development of educational interpreters must also consider who should create and maintain resources to support educational interpreters. Any cooperative or individual efforts should take advantage of existing research into the design of distance educational resources and consider all the components of the ACTIONS model presented by Bates (1995). Individual and group efforts that do not take into account the costs, organisational issues, and speed of updating material may reduce their chances of successfully supporting educational interpreters over the long-term.

Implications for research

The self-report measure used to discover the number of times individuals face unknown Sign Language vocabulary for an English word or concept has limited utility for reporting levels
of competence and making associations to personal and professional factors that may influence an individual’s level of working vocabulary. Future researchers interested in this area should consider using direct observations of signed messages or an assessment tool like the EIPA designed by Schick et al. (1999) to assess the actual need an interpreter has for the development of new vocabulary.

The unexpected impact of job title on the conferring of professional benefit, namely preparatory time and access to lesson materials in advance of a lesson, leads to many questions deserving of further study. How well does the job title reflect the job description? How do job title and co-workers’ perceptions of the interpreters’ responsibilities interact? Is job title a critical factor in creating status for educational interpreters, or is it an associated variable to other factors not captured in this study? What other professional benefits can be associated with job title for educational interpreters?

This study found a clear preference for human over non-human resources for learning vocabulary. This preference, however, is not a measure of utility. The effectiveness of different resources for learning Sign Language vocabulary needs to be considered in order to determine which resources should be financially supported. Further research is also needed to confirm that it is the availability and convenience of books over CD ROMs and videotapes that leads to their increased use, despite CD ROMs and videotapes having higher satisfaction ratings.

More research into Sign Language resources presented over the internet is needed to determine whether improvements of interpreters’ access and improvement to the resources will increase interpreters’ use of these tools and their satisfaction levels. This study speculates that the reason for such high dissatisfaction rates amongst those people who have used the internet for vocabulary development is due to unmet high expectations. This hypothesis needs to be confirmed in future research.
Conclusion

Deaf students are increasingly being educated in their home schools in situations where they are receiving their instruction through a Sign Language interpreter. This study has shown that there are numerous times every week when the average interpreter does not know the correct sign for a given word or concept. When learning new sign vocabulary, interpreters expressed a significant preference and higher degrees of satisfaction for human resources over non-human. The fact remains, however, that when humans are not available, non-human resources such as books, videotapes, CD ROMs and the internet have to suffice. The oldest of these resources (books) was the most used but also did not create high satisfaction responses by its users. The newest resource (the internet) was used significantly less and had the highest reported level of dissatisfaction. The root of the dissatisfaction with the internet could be related to its inability to live up to users’ expectations and its full potential as a resource.

In order for the internet to reach its potential the access needs to be improved and internet site designs needs to be addressed using principles from the distance education field. Specifically, the redesign of online resources should be guided by feedback from educational interpreters. Feedback in this survey included the following points: the online Sign Language resources should be more comprehensive, they should be organized by topic or in connection with the curriculum, and they should use a variety of sign models. Furthermore, access in the school must be high speed and the interpreter must have access to an online computer, if not in the classroom, then somewhere in the school where the interpreter is not required to undergo long waiting periods.

Although the future of the internet is incredibly promising with regard to providing resources to distributed and distanced professionals, the current Sign Language resources are not successful learning tools for educational interpreters. In order to realize the internet’s potential,
resources need to be developed that meet the specific requirements of educational interpreters and more detailed research needs to be undertaken to ensure that designers understand and properly articulate those needs in the form of relevant Sign Language learning resources.
REFERENCES


Available: http://www.douglas.bc.ca/calhtm/programs/plslan.htm


of sign language interpreters in inclusive education programs. Exceptional
Children, 63, 257-268.


Diego, CA: Academic Press Inc.


Luetke-Stahlman, Barbara. (1984, Spring). Classifier recognition by hearing-
impaired children in residential & public schools. Sign Language Studies, 42, 39-
44.

MacKay, Wayne. (1986). The equality provisions of the Charter and

Merriam, Sharon B. (1998). Qualitative research and case study applications

O'Rourk, Thomas. (1999). The importance of an adequate survey response


Programs for training interpreters. (2000), American Annals of the Deaf,
145, 184-190.

Registry of Interpreters for the Deaf (January, 2001). Educational

Registry of Interpreters for the Deaf. (April, 2000). Interpreting in
educational settings K-12 [Fax-on-demand] Available: 800/736-9280


Van Gurp, Susan. (2001a). [Signing students and educational interpreter


APPENDIX A

Incidence of deaf/hard of hearing children in B.C. school districts

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<tr>
<th>Description</th>
<th>Number</th>
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<tr>
<td>Total number of deaf/hard of hearing children funded by B.C. ministry in 1999, excluding the three provincially funded programs (B.C. Ministry of Education, 1999).</td>
<td>1426</td>
</tr>
<tr>
<td>Sub total of urban districts¹</td>
<td>761</td>
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<tr>
<td>Sub total of rural districts (1426-761)</td>
<td>665</td>
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<tr>
<td>Estimate of % receiving some instruction through interpreter²</td>
<td>20%</td>
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<td>Estimated number of students receiving at least some instruction in ASL through an educational interpreter in B.C.</td>
<td>286 students³</td>
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Notes:

1. Urban districts included all school districts in the Greater Vancouver Regional District, the Capital Regional district and the Francophone education authority as defined by the B.C. government.

2. Estimate is based on the Gallaudet Research Institute Regional and National Summary Report of Data from 1998-99 Annual Survey of Deaf and Hard of Hearing Children and Youth. The figures are American and report that 34% of integrated students receive support services from a sign interpreter. Because of the potential differences in policy and reporting, a conservative estimate of 20% is used based on the available data.

3. Students include those in kindergarten half time, kindergarten full time, Grades 1-12, and those on job training.
### APPENDIX B

Survey results: Signing students and educational interpreters

<table>
<thead>
<tr>
<th>District #</th>
<th>District Name</th>
<th>Number of signing students in district</th>
<th>Grades of signing students</th>
<th>Number of interpreters (signing assistants reported by District Special Education Principal)</th>
<th>Combined estimated # of signing support staff in district</th>
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<td>Prince Rupert</td>
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<td>Bulkley Valley</td>
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<td>Prince George</td>
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<td>k-10</td>
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80
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<th>District</th>
<th>Students</th>
<th>Interpreters or Signing SEAs</th>
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<tr>
<td>Peace River South</td>
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<td>Comox Valley</td>
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<td>Campbell River</td>
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<td>Kamloops</td>
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<td>1-12</td>
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<tr>
<td>Coast Mountains</td>
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<td>3</td>
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<tr>
<td>N. Okanagan-Shushwap</td>
<td>5</td>
<td>5, 6, 7, 7, 9</td>
</tr>
</tbody>
</table>

Totals 52 students 46 interpreters or 66 interpreters or signing SEAs signing SEAs

**Note:** a. A blank indicates that the survey was not returned for this district in this category. It does not represent a zero value.
APPENDIX C

Introductory Letter to educational interpreters

Questionnaire

Letter to teachers of the deaf and hard of hearing

Follow-up letter to teachers of the deaf and hard of hearing
### Part 1a - Personal Information:

1. Number of years as educational interpreter? _____ years and _____ months
2. Are you full time or part time?  
   - **Full**
   - **Part** (if part, what is your full time equivalent – FTE (0-1.0)) _____
3. Job title?
4. The deaf or hard of hearing student(s) with whom you work are in grade(s) ________.
6. Gender  
   - **Male**
   - **Female**
7. Are you from a family with Deaf members?  
   - **No**
   - **Yes**
8. If yes, what is your relation to your Deaf family member? (mother, father, brother etc.) ________
9. When did you first learn to sign? circle one( infant) (child) (adolescent) (adult) ________

### Part 1b - Work and Community Information:

10. Estimate how many times during an average week you are given a lesson outline, reading material, or you generally know the curriculum far enough in advance of the actual lesson or activity in order to prepare for signing the material. Number of times: ________
11. Estimate how many times during an average week you encounter an English word or concept for which you do not know the established (or new) sign. According to experienced interpreters, these situations may be represented by resorting to fingerspelling or inventing a sign. Number of times: ________
12. Estimate the amount of time during an average workweek you have for interpreting-related preparation. Amount of time: ________
13. Is there an amount of time written into your contract?  
   - **No**
   - **Yes**
   - **I don’t know**
14. Amount of time: ________
15. Are there Deaf adults working in your school?  
   - **No**
   - **Yes**
16. If yes: How many? ________
17. Are there other signing support staff working in your school?  
   - **No**
   - **Yes**
18. If yes: How many? ________
20. Do you hold an interpreter certification?  
   - **No**
   - **Yes**
21. If yes: Which one(s)?
22. Do you currently hold a membership to an interpreting association?  
   - **No**
   - **Yes**
23. If yes: Which one(s)?
24. Have you ever graduated from an interpreter training program?  
   - **No**
   - **Yes**
25. If yes: When? ________
26. If yes: Which one(s)?
27. A Deaf community can be described as a community of Deaf adults, children, and/or families that gather together for social occasions both privately and publicly. They typically use American Sign Language as their main language of communication when with other members of their community. By this definition, is there a Deaf community in the town where you work?  
   - **No**
   - **Yes**
Part 2 – New Vocabulary Development:

Description: We are interested in the different resources that you use when you encounter English concepts or words for which the sign vocabulary is unfamiliar to you. Below, is a list of resources that interpreters have used to learn new sign vocabulary.

Please complete each row by placing a checkmark in: (1) How often you use this type of resource? and in (2) How satisfied you are with this type of resource?

<table>
<thead>
<tr>
<th>Resources</th>
<th>How often you use this type of resource?</th>
<th>How satisfied are you with this type of resource?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed Sign Language dictionaries and books</td>
<td></td>
<td></td>
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<tr>
<td>Sign Language videotapes</td>
<td></td>
<td></td>
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<tr>
<td>Sigh language dictionaries on CD-ROMs</td>
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<tr>
<td>Sign Language dictionaries on internet</td>
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<td></td>
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<tr>
<td>Contact another interpreter/colleague</td>
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<td></td>
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<tr>
<td>Contact a Deaf adult</td>
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<tr>
<td>Other (please describe):</td>
<td></td>
<td></td>
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Part 3 – Computer access:

Instructions: We are interested in your computer access at school and at home. Please fill in each row.

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<thead>
<tr>
<th>Context</th>
<th>Computer(s) present</th>
<th>Connected to the internet</th>
<th>Speed of connection</th>
<th>Availability (# of times available out of 10 when needed)</th>
<th>Key limitation(s) to availability (add your comments here)</th>
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</thead>
<tbody>
<tr>
<td>School classroom(s)</td>
<td>Yes</td>
<td>Yes</td>
<td>Fast¹</td>
<td>10987654321</td>
<td></td>
</tr>
<tr>
<td>Other location(s) in school (staff use)</td>
<td>No</td>
<td>No</td>
<td>Med.²</td>
<td>10987654321</td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td></td>
<td></td>
<td>Slow³</td>
<td>10987654321</td>
<td></td>
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</table>

Notes: 1) A fast connection would be a T1, cable, ADSL, or similar speed connection. 2) A medium connection would be a 56.6kbps modem. 3) A slow connection is anything less than a 56.6kbps modem and requires long waits for web pages with lots of graphics. 4) Computer availability refers to how readily you can access the computer. It is measured by the number of times out of 10 that the computer is available to you when you want it. If you can rarely access a computer in the classroom, you might circle a 1 out of 10.
APPENDIX D

Questionnaire alignment check
# Questionnaire Alignment Check

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<th>Guiding Questions plus</th>
<th>Part 1</th>
<th>Part 2</th>
<th>Part 3</th>
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