INTERNET KNOWLEDGE AMONG FAMILIES IN MULTICULTURAL VANCOUVER: IS THERE A GENERATION GAP?

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Abstract

The digital divide is not merely a matter of computer ownership and Internet access. Rather, it is a multi-dimensional problem concerning equality, opportunity and participation. Having knowledge about the Internet reinforces effective use of it. However, little is known about the distribution of Internet knowledge throughout society.

Teenagers are revealed to be the most frequent Internet users. Do they know more about the Internet than their parents? In Canadian families, who knows most about the Internet – fathers? Mothers? Teenagers? What about English, Mandarin and Cantonese-speaking nuclear families? What variables determine Internet knowledge?

This study was designed to investigate the distribution of Internet knowledge in English, Mandarin, and Cantonese-speaking families. English and Chinese versions of the *Internet Quiz* were administered to114 families resident in the Lower Mainland of British Columbia. The *Quiz* was a reliable and valid index of Internet knowledge. To be eligible for inclusion in this study, there had to be at least one parent and one child aged 12 to 19 years in the family and completed the *Quiz*. Data were analyzed with SPSS. Internet knowledge scores were calculated and various comparisons were made between groups and within families.

Altogether, 182 parents and 147 teenagers participated in this study. Overall, there was no wide Internet knowledge divide between parents and children. Fathers knew most about the Internet in families. Internet knowledge was not evenly distributed across English, Mandarin, and Cantonese-speaking groups. And the patterns of Internet knowledge generation gap were dissimilar in the three language speaking families.

For children, the best predictors of Internet knowledge was socio-economic status (SES), gender and mothers' education, but for parents, the best predictors were language and education along with SES.

There were many knowledgeable but "uneducated" respondents. In future research, it would be desirable to use qualitative methodologies or observations to investigate how people acquire Internet knowledge. Moreover, the *Internet Quiz* measured a tiny part of Internet knowledge, and the findings here may suffer from restriction of range. Future research can create extended and refined instruments and include more families to further investigate distributions of Internet knowledge and influence of the Internet on family life.

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CHAPTER ONE

THE WIRED CITY

Father, Mother, Children and the Computer

> Adults often regale each other with stories about how their hard disc was fried or a virus killed their computer. This is a serious matter and at the centre of such stories is the fact Johnny or Sally sorted out the problem. Many parents say that when the computer misbehaves, they turn to their teenage children. As a 16-year-old Chinese informant contacted for this study said, "Without me, my mother can't even e-mail her friends and relatives in China. I tried to teach her how to get online with step-by-step instructions, but she couldn't get it. My father is computer literate, but sometimes he has to get my help with searching for things on the Internet."

In the 1960s, the generation gap concerned differences in values, lifestyles, and ideologies between parents and their children. These conflicts continue but have now been joined by tension about information technologies, especially the Internet. When children get home from school, how many spend a few hours surfing online before parents get home? Although the "home" computer has taken on an importance comparable to the television or family car, little is known about the dynamics of its use in average families. In Vancouver, this is a particularly interesting question because of its diversity and heavily wired population. In Vancouver, it is hard to know the meaning of "average".

Anecdotal evidence suggests teenagers dominate Internet use at home. A 1995 study on home computing conducted by Carnegie Mellon University concluded, "Teenagers are central to Internet use at home. They often provide the motivation for parents to invest in a computer, ...become sources of expertise within the household, and catalyze Internet use by other family members" (Quoted in Tapscott, 1998, p.36). On Oct. 4, 2002, the British Broadcasting Corporation reported an interesting study by NOP Research

(http://www.nua.ie/surveys/) which found that, in UK, children knew significantly more about the Internet than about books. Six out of ten children surveyed knew what a "homepage" was but only 9% of them could explain a "preface" (to a book); 70% knew what "www" stood for, but less than a quarter understood RSVP was asking them to reply to an invitation. The General Social Survey on individual Internet use in Canada in 2000 (Dryburgh, 2000) showed that during the 12 months prior to the survey, 90% of 15- to 19-year-olds used the Internet, the highest proportion of any age group, and they liked playing games and using online chat services.

In many families, when there is a computer problem, it is the teenagers who sort it out. Do teenagers become "knowledge authorities" because they understand new technology better than adults? For many children, using new technology is as natural as breathing, while for adults, learning something totally new involves hard work. Their established thinking must be changed to accommodate new things. This is in sharp contrast to the traditional notion that parents, especially in Chinese families, are assumed to know more than their children. Some parents are uneasy about new media and wonder about their effects on their children and family life.

Although many parents now think children should use the Internet, they are concerned about its potential risks and effects. Yet in such a harsh economic climate where both parents have to work to make ends meet, few fathers and mothers can spend the same amount of time with their children as parents had done in earlier times. Moreover, the individual nature of the medium, the small computer screen and the individual mouse control made it much harder for parents to monitor their children' access to online content.

Over half of Canadian households with children aged 5 to 18 purchased a computer specifically for their children and 83% of them had access to the Internet. However, only

64% of these households reported they monitored children's Internet use by supervising their time only. Thirty-three percent did nothing to supervise children's Internet use, less than 10% of households used methods such as using monitoring software or an Internet provider who filtered out unacceptable sites (Dryburgh, 2000).

Parents and children have always struggled over technology and family assets. In western countries, almost every teenager has to carefully negotiate use of the family car. In Asian families, there are questions about using telephones or regulating TV viewing. What happens if little Tom surfs the web and plays games all weekend while mother wants him out to the Chinatown New Year parade or, in Anglo families, a visit to grandma? Moreover, in multicultural cities like Vancouver, educators, policy analysts and observers wonder whether the generation gap (concerning Internet knowledge) between parents and teenagers in Asian families is the same as or different from that in Anglo families.

Internet use is interesting, but it is less relevant to this study than Internet knowledge. With millions of people in love with the Internet, there are justifiable concerns at the possibility some people know more about it than others and almost nothing is known about the distribution of Internet knowledge in families. Who knows the most about the Internet? Father? Mother? Son? Daughter? Grandfather?

The Net Generation

The Net Generation, a group following on the heels of Generation X, is Tapscott's (1998) term for those born between 1977 and 1997 and representing 30% of the population. What makes them stand out is not just their large numbers, but the fact they are the first generation to grow up with digital media.

Many children love the Internet and embrace it with enthusiasm. Interest in Internet-based communities starts around early adolescence when teenagers begin to seek autonomy.

Unlike other media where children are passive viewers and recipients, the Internet provides a vehicle for teenagers to explore the self and to gain a sense of independence and autonomy as well as powers of abstract reasoning. They are most likely to think abstractly in areas in which they have had extensive experience. Moreover, the Internet encourages children to cross geographical boundaries. It is an entirely different multicultural world in which young people can feed their curiosity. The only boundary on the Internet is their imagination.

The Internet provides adolescents with the experience of transcending household or institutional contexts and boundaries. "Face-to-screen" interaction on the Internet results in the attenuation of face-to-face relationships and simultaneously enhances personal quality of the adolescent as an autonomous information consumer. With the Internet, adolescents witness the extraordinary reach of interactive networks and a shrinking of geo-spatial worlds.

For Tapscott (1998), young Internet users may become strong advocates of lifelong learning. They see the need to update and maintain their training, skills and abilities – the currency for establishing a successful career. Online learning is acceptable because of its flexibility. Learning paradigms will be shifted from linear to hypermedia learning, from instruction to construction and discovery, from teacher-centred to learner-centred, from absorbing material to learning how to navigate the world of learning objects, from school to lifelong learning, from one-size-fits-all to customized learning, from "learning as torture" to "learning as fun", from the teacher as transmitter to the teacher as facilitator.

Young Internet users appear extraordinarily tolerant. In cyberspace, no one cares whether you're black or white, attractive or ugly, rich or poor. They respect people with expertise and knowledge. They begin to develop self-reliance, confidence and social skills required for effective interaction in the digital society at an earlier age than their parents' generation. They can find what they need quickly and easily. They expect things to happen

fast because information moves at light speed. Many feel they don't need protection on the Internet.

The Internet provides a fun place for this generation. It enables young users to establish friendship with e-pals and learn about peer relationships and teamwork.

Parent–Adolescent Conflict

As long as people exist, there will be conflicts, and families are no exception. Intergenerational conflict, particularly between adolescents and parents, has been a topic of interest and research since emergence of adolescent psychology a century ago.

Adolescence is a transitional process of physical and physiological growth through which a teenager matures. Piaget argues that the capacity for abstract thinking begins around age 11 and "leads teenagers to become more argumentative, self-conscious and self-focused, and idealistic and critical" (Burk, 1996, p.559). Identity is recognized as the major personality achievement of adolescence and crucial step toward becoming a productive and happy adult. Morality changes from concrete, externally controlled reasoning to more abstract, principled justification for moral choices.

Teenagers struggle to adjust to a new body, feelings, interests, longings, reasoning abilities and an identity. However, they are not the only family members undergoing a major life transition. Many parents, in their late 30s, or 40s, or early 50s, are encountering joys and difficulties of mid-life. They might experience a job promotion, reevaluate the past, face physical decline, and develop an awareness of mortality and inevitability of death. (Levinson, 1978). Some experience divorce, loss of a spouse, remarriage or/and c hanging relationship with aging parents. They are often sandwiched "between the increasingly complex, costly and disturbing needs of adolescents... and the increasing problems and needs of the grandparents" (Chilman, 1968, p. 307).

To teenagers and parents, the consequences of puberty are momentous and rapid. Within years, the charming little child turns into a rebellious and uncontrollable stranger. Parents are often caught unprepared for dramatic change and find it hard to decide what to do.

Puberty affects adolescents' emotional state and social behaviour as well as their self-image. It produces the desire for increased physical and psychological separation from parents, thus resulting in increased parent-child conflict. Interactions between two generations do not happen as often as expected by parents who recognize an important stage in the family life cycle - parenthood - will soon be over. Teenagers often stay in their rooms with doors closed when parents want the family to be together. They choose to be with peers instead of going to church or on an outing with parents. The teenagers' ability to reason about social relationships can also be a source of conflict. The former image of a parent as an all-knowing authority is challenged. At this point, teenagers are more likely to argue and disagree with parents. Adolescents' striving for identity and autonomy and parents' monitoring and control can trigger intergenerational conflicts. In their attempt to establish themselves as independent, self-governing individuals, teenagers turn from family to peers, with whom they explore courses of action that depart from earlier, more secure and stable patterns (Burk, 1996).

Most disputes between parents and adolescents are about everyday family matters such as school, household behaviour, social life, friends, personal hygiene, curfews, and self-responsibility. However, intergenerational conflict is a natural process and plays an important role in shaping adolescent development. Adolescents must experience conflicts as they seek to establish an independent and autonomous identity. And it does not mean they need no parental involvement. Teenagers whose parents are involved with their school career

are more likely to score higher on achievement tests, earn better grades, and complete more years of schooling than those whose parents are less supportive (Burk, 1996). Although schools, peers and media such as television and the Internet often make a considerable impact on teenage life, parents remain a powerful source of influence on their children's values and educational plans. "Parental warmth and acceptance combined with firm (but not overly restrictive) monitoring of teenagers' activities is strongly related to many aspects of adolescent competence" (Burk, 1996, p.602). Parents and teenagers must establish a balance of togetherness and independence. This mature and mutual relationship is often achieved by middle or late adolescence.

In the age of digital technology, globalization, AIDS, crack cocaine, terrorism, increasing divorce or single-parent families, urban youth are different from their baby boomer parents. Moreover, the shift from the traditional broadcast media to the new interactive digital technology such as the Internet further influences family relationships.

Immigrant Families

A common belief is that immigrant adolescents may face additional problems especially... "in the domain of self-concept, identity conflicts and conflicts with parents...The literature suggests that the experience of migration and culture change may exacerbate these normal developmental crisis for immigrant adolescents" (Aronowitz, quoted in McLaren, 1992, p.2). The process of immigration and cross-cultural adjustment places significant pressure on parents and children as well. Thus, immigrant adolescents are likely to encounter more intergenerational discord and conflict than their counterparts in the host country.

In Canadian cities such as Vancouver, there are more and more Asian immigrant families. Unlike their children who take on Canadian values quickly, many Asian parents,

born and educated in Asia, continue traditional ways. As a consequence of Confucian cultural traditions, Asian parents usually place a great emphasis on children's academic achievements, filial piety, respect for elders, and reverence for traditions. They vary in the degree of concern with maintaining their children's interests in home languages and cultural traditions. They firmly believe education is the means of upward mobility and success. Asian parents tend to be more authoritarian than Euro-American counterparts. They usually discourage children from talking back.

On the other hand, Asian teenagers, whether born in or out of the receiving country, often feel caught between standards of the host society and traditions in their culture of origin while being educated at schools, socializing with peers and living with parents who remain monocultural. Lack of common language and lines of communications between parents and children, and the contrast between parents' traditional values and children's westernization are among the catalysts for intergenerational conflicts.

Asian children have a particular fluency in quantitative fields such as mathematics and science. "Among Asian American high school students and college-bound seniors, including the one quarter whose best language was not English, typical scores on quantitative aptitude and mathematics achievement tests were higher than white peers" (Hsia, 1988, p.205). In a city with a high level of Internet use like Vancouver, do Asian children know more about the Internet than Anglo counterparts? What about their parents?

Multicultural Vancouver

"A British Columbian smokes Virginia cigarettes, drinks South American coffee, eats Ontario cheese, California oranges, Norwegian sardines and Alberta butter... At noon, a British Columbian will either eat in a café owned by a Greek specializing in confusing the public by using French words to describe American foods – or, he will go to the luncheon of

some service club founded in the U.S.A. and listen to a European tell how he escaped the Russians in Bulgaria" (Mather, 1958, p. 482).

Some 44 years after this local author's depiction, many oriental ethnicities have been added to B.C. Adrienne Clarkson, a Chinese-Canadian, is the current Governor-General of Canada. British Columbians also had David Lam, an immigrant from Hong Kong as Lieutenant Governor and Ujjal Dosanjh, an Indo-Canadian Premier, not long ago. Although most of them were born elsewhere, Vancouverites are keenly aware they are living in a region where life has been increasingly shaped by its multicultural nature. Over these years, Vancouver has become a gateway to such Asian centres as Singapore, Hong Kong, Shanghai, Seoul, Taipei, Tokyo (Delany, 1994). Chinese constitute 15.4% of Vancouver's population and Chinese language is Canada's third most common mother tongue (*Statistics Canada*, 2002a) but the "first" in Richmond, B.C. where more than half of the residents are from Asia or descended from Asian-Canadians. Richmond is more like Hong Kong than a North American city.

In Canada, Chinese communities are large and dynamic. The immigration of Chinese can be traced back to as early as 1858 when they came from California to British Columbia in search of gold and better fortune. In the late 19th Century, Canada was in urgent need of labourers just as the Qing Dynasty in China began to decline, suffering from both internal unrest and foreign invasions. Thus, between 1881 and 1885, over 17,000 poor Chinese peasants, leaving their immediate family members at home half a world away, were imported to this distant and strange country to build the Canadian Pacific Railway as well as to get their "gold mountain" dream. Canadian Pacific Railway, with no rivals in the country's history, achieved the dream of a transcontinental Canada. By mid 1886, regular trains were

running through the Pacific shores, thereby enabling Vancouver to merge as the new West Coast terminus.

These "old-timers" (Ng, 1999) were Cantonese-speaking male laborers from eight rural counties in the Pearl River Delta region (where the author worked from 1993 to 2000) in Guangdong Province of China. Most of them filled jobs shunned by whites. They were miners, laundry men, restaurateurs, domestic servants, and poorly paid. Yet, back home, they were called "Uncle Gold Mountain" because of the large remittances sent home, and their hometowns became famous as "qiao xiang" (native places of overseas) where little was known about the long period of legalized discrimination, racism, humiliation, and hardships they had withstood in the receiving country. These early pioneers had great faith that, through hard work, they could survive and things would be better for future generations. The arrival of their wives and young children during the 1950s somehow relieved them from their "bachelor life" (Ng, 1999). Immigrants then were overwhelmingly comprised of family class.

The implementation of a universal point-system in 1967 led to another immigration wave of Chinese. The sale of Expo'86 to the Hong Kong developer Li Ka-shing prompted the "discovery" of wealthy Hong Kong investors and entrepreneurs class immigrants who changed the distribution of Chinese communities in Vancouver. The fear of possible societal changes due to the return of Hong Kong to Mainland China in 1997 and the "Financial Turmoil" that swept over Southeast Asia in the late 1990s were the two most important factors in immigration decision-making by immigrants from Hong Kong. The number of immigrants from Hong Kong to British Columbia, Canada, reached its peak in 1994 and declined drastically after 1997.

The last decade of the 20th century saw the biggest arrival of immigrants from Mainland China and Taiwan as well as from Hong Kong. China has become the number one immigrant source in the late 1990s. Community Airport Newcomers Network (C.A.N.N.) reported having served 29,767 (the first of the top 10 source countries) new immigrants from the People's Republic of China, compared with 1,716 (the fifth) from Taiwan and 659 (the eighth) from Hong Kong at the Vancouver International Airport between April 1, 2001 and March 31, 2002 (S.U.C.C.E.S.S Annual Report 2001-2002). Newcomers from Mainland China consisted largely of skilled workers under the immigrant category of independent class. These Mandarin-speaking professionals were well-educated elites in the prime of life, joining the brain drain to Canada. They were attracted by Canada's stable political and social systems, established education systems, and abundant natural resources. Their immigration dreams were made possible by China's open policy.

Although all these Chinese immigrants appear to be homogeneous to the host society, "their dissimilar pre-migration experiences, lack of a common language, and different trajectories of entry and settlement have led to the formation of culturally distinct and largely separate communities" (Ng, 1999, p.138).

Why Internet Knowledge

Critical theorists say "knowledge is power". Knowledge denotes power, but power is rarely distributed equally. Those with knowledge often have socio-political and other kinds of power. Those without it are often powerless. This and other reasons fuel the agitation about the "digital divide" which may distinguish Internet users from non-users.

The digital divide is "the perceived gap between those who have access to the latest information technologies and those who do not" (Compaine, 2001, preface). However, it is not merely a gap that cheap computers and low-priced Internet access can bridge. Unlike

many other technology-inspired products such as radio and television sets that achieved near-universal adoption over time without government intervention or even private programs, the Internet has unlimited potential for acquiring knowledge, innovation and creativity, and fresh opportunities leading to political, socio-economic, and other kinds of advantages. The digital divide is a multi-dimensional crisis that concerns equality and social justice. Simply being connected to the wired world is of little value. Making better use of the connection, fostering individual accomplishment and building a better society are the challenge.

The utility of almost all technology is enhanced if people *know* about it. In the early days, unreliable automobiles worked well with those who were familiar with their mechanics. The first radio required knowledge and skills about adjusting them to receive imprecise signals as well as building the sets. In the earliest years of computers, only engineers with ample knowledge about the machines were able to make the "monsters" work well for them. Although, today, it is much easier to use intelligent devices, and with a PC, a power cord and a telephone line, a beginner can have a good chance of getting online in several minutes, a wide range of knowledge about technology, especially in the case of the Internet, enables better and wiser use of them. This is particularly the case for children who may be endangered by pornography, obscenity, gratuitous violence, cyber bullying, hate speech and criminal activity on the Internet. Many Asian parents have been brought up in a protected environment that relies on strict censorship by government. They tend to believe the Internet is a kind of magical black box that brings forth only benefits for their children. Parents do not often realize there are also evils and dangers lurking in cyberspace, preying on young and unsuspecting minds. Letting children surf the Internet unsupervised can be like leaving them unattended on a busy street corner because. Knowledge about the Internet helps

parents realize they have to take responsibility for supervising their children when they surf the Internet.

In Singapore, a small nation which has been praised as "a textbook example of high-tech success story" (Leer, 1996, p. 28), there was a claim that "Internet-dumb parents" (Channel News Asia, 1999) damage families. It was suggested the preoccupation with success, poor parenting skills and fathers not playing an active part in family life, damage Singaporean society. Many teenagers view their fathers as "cold, aloof and authoritarian". According to their government Committee on the Family, Internet-savvy parents can better relate to their children. "They can play with their children ... (and) ... create better cohesion. So we need to get parents to be more computer savvy so they can communicate with their children." Therefore, being Internet literate would be a place for parents to start building relationships with their children.

To be Internet literate involves more than manipulating a mouse or downloading free software. Compare the situation to driving a car, few parents will give the key to their children who have learned mere motor skills such as starting up, steering, changing lanes and pulling over. To be safe and responsible drivers in the driving community, children must be "educated" about driving. When anything unusual happens, young drivers, with relevant verbal information and intellectual skills (Gagne, 1977), have the capacity to deal with the situation.

The 2000 General Social Survey found about 61% of British Columbians used the Internet, the highest among all provinces and territories in Canada – 62.7% of urban residents reported they used the Internet, compared with 58.3% of their rural counterparts (Digital Divide in British Columbia, 2001). However, current surveys and studies are largely preoccupied with Internet **use**, with questions such as who is using it and what for, who is

not and why. With more than 553 million worldwide Internet users (http://www.nua.ie/surveys/), it is very interesting to investigate use patterns and attitudes of these Internet users. However, this study is not intended to replicate what agencies like *Statistics Canada* have done. Rather, it is designed to test what people know and don't know about the Internet, and more specifically, what is known and unknown about the new technology in families. Although more than half of Canadians go on line and 27% of non-Internet users express interest in doing so (Dryburgh, 2000), little is known about the distribution of Internet knowledge throughout society, especially in families with teenagers. The research conducted by Australian Broadcasting Authority (2000) shows that in Australia, parents are perceived as the most frequent Internet users and experts in the family, but what about in Canada where nine out of every ten teenagers are avid Internet users? Who knows more about the Internet in Canadian families? Is there an Internet knowledge generation gap? Does the knowledge difference arise from Internet use? Language spoken at home? Educational background? Gender? Birth order? Socio-economic status?

Purpose of the Study

Vancouver, the biggest city in B.C., is one of the best places to study the cultural dimensions of Internet knowledge due to its diversity and "connectedness". In average families, who knows most about the Internet? What about knowledge differences among English, Mandarin and Cantonese-speaking nuclear families? Do the same or different patterns of Internet knowledge apply within these families? What variables account for the most variance in Internet knowledge?

Therefore, the purpose of this study was to:

- Find out who knows most about the Internet in Vancouver families –fathers, mothers, sons, or daughters ?

- Compare patterns of Internet knowledge in English, Mandarin and Cantonese-speaking families in Vancouver.
- Identify variables that account for substantial variance in parents' and children's Internet knowledge.

Chapter One has provided an overview of the thesis, parent-adolescent conflict, their changing relationship, immigrant families, multicultural Vancouver and the purpose of this study. Chapter Two discusses influence of technologies such as radio, TV and the Internet on family life. Chapter Three outlines research strategies and methodology; Chapter Four describes characteristics of respondents and details the research results about Internet knowledge between groups and within families; Chapter Five discusses variables that account for substantial variance of one's Internet knowledge; Chapter Six presents nine findings derived from research results; the last chapter is about the conclusion, Cantonese attitudes, and future research needed.

CHAPTER TWO

TECHNOLOGIES AND FAMILY LIFE

During the 50th anniversary celebrations of the CBC, a favourite image had a prairie farm family clustered around a radio listening to Foster Hewitt's "hockey night in Canada" broadcasts. Prior to television, radio was the main way to follow hockey. The image evokes a sense of home, hearth, maybe a flickering fire. It denotes harmony, enjoyment and family solidarity.

Technologies have always been a central aspect of family life. However, here at the dawn of the 21st century, they come and go more quickly than before. Super8 cameras, 8-track audiotapes, 78 rpm records, 35 mm slide projectors, lasted at least a few years. Remember the PC-Junior – the computer for children? Although launched with enormous fanfare and enjoying early popularity, the notion children needed their own computer didn't last. New technologies arrive and depart with increasing speed. Radio existed for 38 years before it acquired 50 million listeners, and TV took 13 years to reach that number. The Internet crossed this threshold in only four years (Moscovitch, 1998).

Radio and People

Radio Days

In 1899, Guglielmo Marconi, an Irish-Italian inventor, became an overnight celebrity for his "wireless" coverage of the America's Cup Yacht Race for the New York Herald (Petroski, 1997). In the 1910s, Lee de Forest, whose vacuum tube was a key element in development of effective radio receivers, transmitted nightly concerts of phonograph music. He was also the first to advertise his radio apparatus on radio. KDKA Pittsburgh was the first

radio station to transmit programs for entertainment and broadcast news to the public. It announced the victory of Warren G. Harding over James Cox in the 1920 American presidential election (Wood, 1994).

Radio sales grew from $60 million in 1922 to over $350 million in 1924. Radio was entering its golden age in the 1920s, an era of comfortable affluence before the stock market crash that led to the Great Depression. As depression deepened, food and shelter became the first priority for families and little could be spared for entertainment. However, the availability of smaller receivers at reduced prices enabled radio to be a popular medium during the Depression and war years. Live, on-the-scene news reports were broadcast from overseas battles. Music and soap opera were heard. Sports events were followed by fans glued to a radio. Tuning in became a familiar and habitual activity naturally integrated into rhythms of daily life. Citizens everywhere – on front porches, in pubs, grocery stores, parlors, on the road – were listening to radio. It was truly a revolutionary technology. Life on the farm and in the city was never to be the same.

Living rooms became dominated by large and powerful electric console receivers. Families, often including three generations, gathered around the early table models to listen to news, music and radio dramas. Their imaginations conjured up images of announcers and actors.

On 13 October, 1940, numerous families were listening attentively to the then 14-year-old Princess Elizabeth talking to evacuated children on her first radio broadcast on BBC. Through CBC Radio Overseas in the Second World War, Canadian families heard sounds of battle, along with reports of their fighting sons and husbands, and learned - in only hours – what was going on at the battle front.

The imminence of the Second World War turned radio broadcasting and film into a means of disseminating propaganda. On battlefields, the "Lilli Marlene" nightly broadcasts of soulful music forged a bond between two opposing armies. Lilli Marlene became legendary with the British 8th Army in much the same way as American marines in the Pacific fell in love with "Tokyo Rose" (Wood, 1994).

When the Emperor of Japan made his first radio broadcast, announcing his country's capitulation on August 15, 1945, Asian families who suffered from the Japanese invasion listened in tears. Hundreds of Japanese soldiers committed hara-kiri when they heard the news on the radio.

In the 1950s and 60s, a typical family in China spent an evening like this: father reading newspapers, mother knitting a sweater, children doing their homework while tuning in to news, music or Beijing opera. Radio plays were all the vogue. Children hurried home to follow their favourite radio programs. The Cultural Revolution in the 1960s once again proved radio broadcast to be the most powerful instrument of propaganda. Different factions used it for brainwashing.

BBC is the leading international broadcaster in the world, with a total global audience of 120 million. On the evening campus, Chinese students were standing around a transistor radio, listening to BBC or VOA English programs. In Tiananmen Square, Chinese student supporters of democracy held high a banner saying "Thank you, BBC".

Ninety-nine percent of Canadian households own a radio. The average listener tunes in for about 21 hours a week. Teenagers (12–17 years) listen only half as much as that (Moscovitch, 1998).

The advent of television saw some fall-off in radio audiences and changing of listening patterns. Yet its low price, immediacy, accessibility and portability make radio still

an essential component of daily life. Radio can spend the entire trip with you and be your source of information and entertainment on the road. Many people listen to radio at work. Phone-in and service at audience's request increase interaction between radio broadcasters and listeners.

Prior to television, Queen Elizabeth II made her annual Christmas broadcast by radio. Across Canada and the Empire, on farms, remote outposts or dense urban enclaves, families immobilized by Christmas dinner gathered around (often a tombstone) radio and listened for the stentorian tones of the announcer saying "This is the B.B.C.". Then the Queen would read her 4-5 minute speech in her "Queenly" accent. Most adults would be hard-pressed to recall the content of these broadcasts. However, even for non-royalists it's the memory that counts – mother, father and children home for Christmas. In Canada, maybe snow and a tree cut from the local forest. In the southern hemisphere (e.g. Australia, New Zealand, South Africa), the brightness of the sun and the post royal-speech walk on the beach.

Radio Knowledge

Although radio is quite benign, it is important that citizens had basic knowledge about it. On Oct 30th, 1938 there was a remarkable scene immediately following broadcast of the Orson Welles' radio drama *War of the Worlds.* Panic was sowed among tens of thousands of listeners. They were convinced the Earth was being invaded by aliens because of the highly dramatized realism (in honor of Halloween) embedded in the radio play (Pawlowski, 2000). Roads were clogged as citizens fled to "safety" with blankets, supplies and guns in their cars. In fact, these people, mostly middle-aged and older, were taken in by nothing except a few effective voices and sound effects. Younger listeners were less gullible because they had radio knowledge and recognized Orson Welles's voice.

A dramatized broadcast of H. G. Wells' *War of the Worlds* also drew people into a world of fantasy. In November 1944, the play caused a panic in Santiago, Chile, and in February 1949, it stirred up unrest when broadcast by a radio station in Quito Ecuador. In this incident, the radio station was burned by a furious mob.

During World War II, Winston Churchill's radio broadcasts became a rallying point in all corners of the British Empire. The speeches were finely crafted, used evocative imagery and were delivered with all the right pauses, inflections and emphases. Trouble is that it was not Churchill doing the talking. It was an actor. Because few people had radio knowledge, British authorities got away with the deception.

These examples demonstrate that without "knowledge", gullible people become powerless and are vulnerable to be manipulated. However, radio is not the only medium that serves as a good example where this is the case.

Television and Families

Television World

It drives its predecessor away, takes up residence in the home's best space, the living-room, and moves into bedrooms and kitchens as well. It dominates the family. It acts as an intimate companion, babysitter, storyteller, entertainer, educator, and know-it-all family manager. It is a sometimes-beloved-and-sometimes-annoying family member. It has been taken for granted. Few can remember, or care to remember, what days were like before it. Fewer can imagine what life would be like without it. It is television.

Many people say if they have to, the last item to discard is the television set. The single biggest selling consumer item in the world is a colour television set. Seventy percent of the households on the planet own a TV. Less than 1% of Canadian and American families do not have the appliance (Moscovitch, 1998; Nielsen Media Research, Inc., 1998). The

combination of sounds and images offered by television has profoundly influenced family life. Television programming plays a dual role as a reflection of the values and ideals of a society and a creator of attitudes and beliefs of its viewers, especially younger ones.

Television was regarded as the magic of the 20th century because viewers could hear and see people. The first network television broadcasts began at the end of World War II. Television played a great part in freeing families from stresses arising from the War. Men were back from the battlefield. Women who had plunged into the workforce to support the war effort were reluctant to now become solely apron moms. Double-income families enjoyed the comforts of unprecedented affluence. Chairs and sofas were clustered around the television set. Families in the 1950s cuddled up on the living room sofa and watched comedies such as Father Knows Best in which father, clad in a well-pressed suit, patiently dispensed sage advice to his wife and children (Pawlowski, 2000).

People noticed the tears on Her Majesty's face (presumably resulted from the emotional pressure and physical strain of the heavy crown as well) when the Archbishop of Canterbury placed the St. Edward's Crown on Queen Elizabeth II on June 2, 1953. They watched Kruschev thumping his fist on the table at the United Nations. They listened to John Lennon, Elvis and Martin Luther King. They witnessed in real time the assassination of J.F. Kennedy who was the first US president to fully utilize the power of television and the veiled mourning face of his widow and little son. Millions of Chinese people watched mournfully the funeral of Chairman Mao in 1976. Billions remembered destructive attacks on the heart of New York on September 11th, 2001 and bombardment of Vietnamese villages, Iraqi houses and Afghan caves. In 2003, it seemed like the war in Iraq was being run by CNN in Atlanta.

Family Dynamics

When television was first introduced into households, families generally believed watching it brought them together. Although there was little talk during television viewing time, family members used television' characters, stories, themes, jokes and jargon to facilitate conversations at work and home. Family togetherness around television is comparable to the cave-dweller's fire that drew people for "warmth and safety and togetherness" (Boorstin, 1971). Because much of the time family members spend together is in the presence of television, it at least partially defines the context within which family interaction occurs. When co-viewing, family members share physical space, gaze in the same direction for hours, and perhaps touch one another. It can stimulate a feeling of solidarity, relaxation and harmony because of shared emotional reactions such as laughter, sorrow or anger although television viewing is often a discontinuous and dynamic activity. Mother goes and makes coffee; brother goes to the bathroom; father answers the phone. For many families, television provides a gathering point, but can be a source of turmoil due to disparate viewing needs, habits and desires of family members.

In many Canadian homes, there are now several TV sets – 59% of Canadian households have two. More than a third own at least three sets (Moscovitch, 1998). Having several sets is likely to result in less family co-viewing, communication and interaction, and an overall sense of alienation. It becomes increasingly difficult to identify and solve family conflicts and problems. Television then offers an escape for family members by allowing them to tune out problems while they tune in to more television in isolation. A woman may perceive television as a rival which her husband uses to avoid a marital dispute when he devotes whole weekends to football games. But the effects of television as a stress-reducer

and addiction-reliever are only temporary. If tension continues to build, this "triangle-other" relationship (Bowen, 1985) will inevitably end in something very undesirable.

The exception to this trend is that siblings often watch together. They discuss the content of the program, predict what happens next, debate whether it is interesting or "dumb". By explaining the plot to younger children, older ones show their greater knowledge and more "mature" interpretations of the content.

Television puts parents in a dilemma. On the one hand, it serves as the electronic babysitter or even the "third parent" in the home and gives parents "time off". On the other hand, it results in less play, reading, socializing, conversation, and even sleep. It promotes obesity in family members.

Parents have become increasingly worried about their children's media encounters. According to the UNESCO Global Study on Media Violence (Groebel, 1998), "the world's children spend an average of three hours daily in front of the screen. That is at least 50% more time spent with this medium than any other out-of-school activity including homework, being with family or friends, or reading. Thus, TV has become a major socialization factor and dominates the life of children in urban and rural areas around the globe." By the time the average North American child graduates from high school, s/he will have spent 15,000 hours of television compared with 11,000 hours in the classroom (Moscovitch, 1998).

A child may begin to "watch" television prior to his/her birth. Before a child learns to read, s/he is learning what life is about, what values are important, how adults behave, how people fight, and how they achieve success in life. S/He learns more about sex, drugs, alcohol and violence from the media than any other source and at an increasingly early age. Since young children tend to place much trust in television, it becomes one of the most important factors that influence their psychological and cognitive development. They think

what appears on TV must be okay. They use media to guide them through a period of enormous uncertainty when they approach adolescence. Parents' regulation on media encounters, however helpful, generally is insufficient as a controlling strategy. Children may hear about it from peers or watch it somewhere else when they are not allowed to watch a specific program at home.

Few parents actively control their children's television viewing or provide instructive mediation. Rather it is used as reward or punishment. Television has caused "the disappearance of childhood" and created an "adult-child" (Postman, 1982). Television is frequently used as a framework for a family schedule. Mother rushes home to catch a favorite soap opera. Children cut playtime short to watch their afternoon cartoons or favourite music shows. Father tunes in to news or sports games at dinner time. Nighttime activities are organized around television. A late-night talk show encounters one with the decision to watch or to sleep. Television has penetrated family life and changed it forever.

It is important for citizens to know what lies behind images seen on TV. Unlike "Orson Welles" incident, simulations have long been commonplace and tricking the public has become the rule rather than the exception. When planes struck the two towers in New York on September 11, 2001, few people initially believed it. We are now living in an age of simulation confusion. "Don't believe everything you see on TV. TV producers have different purposes. Use your mind to judge what you see." That is parents' advice to their children. However, in a sense, it is media such as television and the Internet that are raising the present generation.

Television has penetrated almost every nook, cranny and piece of tundra in Canada. If the average citizen was dumped onto a desert island for a few years and could only take

one technology, which would it be? Certainly, many people can't survive without television. But, a considerable number – maybe a majority – have a new companion: the Internet.

The Internet and Families

Birth of the Internet

The Internet evolved from ARPANET, a child of the Cold War. In August 1957, the former Soviet Union test-fired an Intercontinental Ballistic Missile. Consequently, on October 4, 1957, the USSR launched Sputnik, the first space satellite to orbit Earth. A month later, Sputnik II was launched. In 1974, a wall around West Berlin was created to prevent skilled and professional workers from emigrating westward toward capitalism. All these factors with their implication that the Soviet Union could theoretically deliver a nuclear weapon to the mainland United States increased tensions between the then two superpowers. American people lived with an almost daily concern about the possibility of nuclear war. "Fallout shelter" signs were very popular in American cities.

President Eisenhower did not want to be surprised like this again. In November, 1957, James R. Killian Jr., then president of MIT, was appointed as presidential science advisor and soon became known as America's "missile czar" (Segaller, 1998). On January 7, 1958, the U.S. formed the Advanced Research Projects Agency (ARPA) under the auspices the Department of Defense.

J.C.R. Licklider, an experimental psychologist, was hired as the first director of the Information Processing Techniques Office (IPTO) at ARPA. In his paper "Man Computer Symbiosis", he proposed computers should be developed with the goal "to enable men and computers to cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs" (Licklider, 1960, p.4). "He had this concept of the intergalactic network which he believed was everybody could use computers

anywhere and get at data anywhere in the world" (Segallar, 1998, p. 40). He contributed the idea of "interactive computing" at the time when working with a computer meant punching holes in paper tape or cards.

At that time, there were no personal computers. All computers were large, expensive, punch-card-driven giants that filled entire air-conditioned rooms. Only those select technicians in white coats had the privilege to touch them.

In 1966, Robert Taylor occupied the desk in Room 3D-200 at the Pentagon. As the successor of Ivan Sutherland and the third director of IPTO, he constantly received requests from research contractors for more resources, especially expensive computers, and noticed there was a lot of duplication of research. He wondered why existing computers at ARPA-funded research institutions could not be linked and the computing resources and results shared. He decided to carry out his plan of saving money. The ideal candidate he chose to lead the project was Larry Roberts, a 29-year-old computer scientist who received his degrees from the Massachusetts Institute of Technology.

In early 1960's, when the newly elected President, John F. Kennedy, exhorted his compatriots to "pay any price, bear any burden, meet any hardship, support any friend, oppose any foe to assure the survival and the success of liberty" (Fallon, 2000, p.14), a student named Leonard Kleinrock laid the foundation for packet switching which was the key invention for the Internet.

Paul Baran, a Polish American working at the RAND Corporation, contributed two key ideas to the development of the ARPANET. The first was the idea of building a distributed network. It was born of his interest in the survivability of communication networks in the event of a nuclear attack. The second was a technique for transmitting data that is to break messages into small, regularly sized pieces – "message blocks" as he called,

before sending them out across the network. "Hot potato routing" took in message-blocks and passed them on as quickly as possible. Each block would be rejoined into a whole when they were received at their destination. Donald Davies, Head of Computer Science at Britain's National Physical Laboratory (NPL), independently created a similar system in which the message blocks was termed "packets".

Standing on the shoulder of these pioneers, Larry Roberts laid out plans for networking all ARPA-sponsored computers directly over dial-up telephone lines at a meeting for ARPA's Principal Investigators (PIs) in 1967, but received cold responses and huge technical obstacles of facilitating communication between machines with incompatible operating systems and languages. However, Wesley Clark, who ironically did not want to put his Washington University mainframe on the network, suggested that instead of the "giants", small computers at each site should be used for network packet switching. All the minicomputers could speak to one another. Each host computer would be connected to the network via its small computer that acted as the "interface". This solution formed a core component of Larry Roberts' plan. The minicomputers were dubbed Interface Message Processors (IMPs). ARPA commissioned Bolt, Beranek, and Newman (BBN) to build IMPS. The first IMPs were positioned with four participants. The first site was UCLA, home to Leonard Kleinrock's Network Measurement Centre. The second was Stanford Research Institute (SRI), where Doug Engelbart, the inventor of the computer mouse, worked. The University of California at Santa Barbara did advanced graphics. The fourth was the University of Utah where Ivan Sutherland, the Sketchpad graphics inventor, was installed. ARPANET started.

In 1971, Ray Tomlinson, an MIT graduate working at BBN, happened to send the first e-mail on the ARPANET. Unlike "What hath God wrought" transmitted by Samuel

Morse and "Mr. Watson, come here; I want you" uttered by Alexander Graham Bell, the content of that very first e-mail was forgotten, and its sender thought it was not what he was supposed to be working on. He was also responsible for the choice of @ as a separator, an icon familiar to e-mail users today. A 1973 survey revealed that three-quarters of all the traffic on the Net by then was e-mail (Naughton, 1999). "E-mail was to ARPANET what the Louisiana Purchase was to the young United States" (Hafner & Lyon, 1996, p.189).

In 1974, in a milestone publication "A Protocol for Packet Network Intercommunications", Bob Kahn and Vint Cerf outlined a transfer control protocol for which they were considered the "fathers" of the Internet. In 1983, ARPANET changed over to the TCP/IP (Internet Protocol) networking protocol, thus the Internet was born. Individual networks such as BITNET, CSNET sprouted and grew. In 1986, the National Science Foundation created NSFNET backbone that connected five super-computing centres. Two years after NSFNET went online, more than 60,000 hosts were on the Internet. In the late 1970's, the University of British Columbia became a member at BITNET.

The ARPANET was retired in 1990. By then, the Internet had really taken off, but mostly at universities and research institutions. In early 1990s, two major milestones occurred in the evolution of the Internet. One was Mosaic; the other was the World Wide Web.

Story of World Wide Web

Many people use the term "Internet" and "Web" interchangeably. In spite of the ubiquitousness of World Wide Web, few people knew it was born in Geneva and its inventor was Tim Berners-Lee, an Englishman who perhaps inherited computing gifts from his programmer parents.

In 1989, when working as a consulting software engineer at CERN (the European Organization for Nuclear Research in Geneva), Berners-Lee submitted a proposal to develop an information system he called the World Wide Web. For this web of information, he created a set of protocols. The Hypertext Transfer Protocol (HTTP) was the language computers would use to handle information-exchange over the Internet. Hypertext pages were formatted using the Hypertext Mark-Up Language (HTML) which Berners-Lee had proposed and were given addresses on the Internet. Berners-Lee called this address a Universal Resource Identifier (URI –now known as URL, Uniform Resource Locator). When WWW was released in 1991, it was all text-based, with no pictures, sound, or video on the screen.

In early 1993, Marc Andreesen, a low-paid undergraduate intern at the National Centre for Supercomputing Applications (NCSA), entered the story of the Internet and WWW with Mosaic – a new user-friendly and graphical rich browser he and Eric Bina had developed at the University of Illinois. In the following year, Netscape Navigator was posted for download on the Internet by Netscape Communications Corp. (originally called Mosaic Communication Corp.) which was started by Andreesen and Jim Clark, founder of Silicon Graphics, Inc. This new browser was a better Mosaic. By 1996, it was used by 75% of Web users, and the Vice President of Technology in his early twenties incredibly found himself worth $58 million (Naughton, 1999). However, Microsoft Internet Explorer has now replaced it as number one browser.

CDNet, the first national network in Canada, was set up and run by the University of British Columbia in mid 1980s.

Internet in Families

By the mid 1980s, the computer had become a family device. The cover of N*ewsweek*'s summer 1995 special issue, "Computers and the Family", was a picture showing a little boy excitedly engaged with a laptop computer while his former football star father, mother and four siblings were in an outdoor setting. Microsoft ads for Microsoft Bob interface showed a white nuclear 1950s-style family gathering around the Computer. (Chodos, Hamovitch & Murphy, 1997)

Just as many families rely on their children to handle the VCR, children now take on many responsibilities with the use of the Internet at home. Many children are adroit navigators of cyberspace. They are comfortable and familiar with the new technology and fascinated by the information and images that can be explored at the touch of a keystroke. The Internet offers them opportunities to explore new ideas, visit foreign lands, meet other children, and participate in challenging games.

Technology is created to make life easier, more enjoyable and less stressful. Yet it is not always the case. For example, people have been greatly concerned about how television viewing models inappropriate and risky behaviours such as premature sexual intimacy, smoking and violence. Asian parents also have concerns with health-related issues like its harm to the eyes and addiction.

The Internet is more than a parallel to television due to its multi-dimensional nature. In addition to concerns similar to those with t elevision, other Internet-related issues have been raised such as censorship, privacy, security and copyright. For example, most people believe giving a credit card number on the Internet is more risky than over the phone. Yet, up to 26% of British Columbians have purchased goods and services by Internet (*Statistics*

Canada, 2002b). Some parents involved in this study told stories of how they went e-shopping with their children.

The cyberspace is also a huge dump into which everyone puts useful or useless information. To make the system efficient, one has to sift tons of junk mail that buries good information. "You have mail" becomes an everyday experience.

With the Internet, parents have to rethink what is means to be a "child" when that child has been "growing up digital" (Tapscott, 1998). The huge volume of communication on the Internet makes it impossible to monitor. Online chat-rooms are a gender and identity workshop. On the phone, it is easy for parents to tell whether the caller is a child or not. On the Internet, no one knows the person is not an adult. Online interactions often occur under such circumstances where nothing is known about each other except their online persona, and that can be judged by their words only.

The Internet represents an extraordinary contradiction in contemporary social life. On one hand, it is decentred, democratic and social in allowing global connectivity and "putting cultural acts...in the hands of all participants" (Poster, 1997, p.222). On the other hand, it promotes antisocial behaviour by attenuating human association and face-to-face communication and being highly solipsistic (Holmes & Russell, 1999). While Internet users expand their online horizons, they reduce their direct face-to-face interactions with families and friends and outdoor activities. Many adults view digital technology as more of a detractor than contributor to their quality of life (Tapscott, 1998).

In spite of speed, efficiency and effectiveness information technology provides, it has not made life easier, but busier. The leisure time it is supposed to produce has caused more time to spend on it.

Internet knowledge

It is almost certain that those who **use** the Internet are more familiar with it than non-users and that having knowledge about it reinforces such use. These days, many adults and children, regardless of whatever language they speak at home, are frequent and adroit Internet users. Many parents say their teenage children use the Internet more often than themselves at home. How much do they know about the Internet? Are there any Internet knowledge gaps between parents and their teenage children? What about fathers and mothers, sons and daughters? English, Mandarin and Cantonese speakers? Who has the most and least Internet knowledge? What variables determine their knowledge levels about the Internet? With this as a backdrop, the primary purpose of this study was to measure the Internet knowledge generation divide within English, Mandarin and Cantonese families and across the generational and gender divides. The goal was achieved by surveying families resident in Greater Vancouver Regional District (GVRD) of British Columbia, Canada. The task was to measure the distribution of Internet knowledge both *between* groups and *within* families, and to identify variables that account for the most variance in Internet knowledge and use.

CHAPTER THREE

RESEARCH STRATEGIES AND METHODOLOGY

In this study, an *Internet Quiz* was administered to 329 respondents from 114 families (parents and their children aged 12 to 19 years old) who were residents in Vancouver and its adjacent suburban municipalities such as Burnaby, Richmond, Surrey, and Coquitlam in British Columbia, Canada. Data were collected over a five-month period from August to December 2002. They were then entered into a spreadsheet and analyzed with the Statistical Package for the Social Sciences (SPSS) Version 11.0.

Sampling Strategies

Since the purpose of this project was to study parents and their teenage children, purposeful sampling was employed. The criteria for including participants into this study were as follows:

1. In each participating family, there had to be at least one parent (mother, father, or adult caregiver) and one child. Grandparents were excluded.
2. The child had to be in the 12 to 19 year age range.
3. Each respondent spoke either English or Chinese (Mandarin or Cantonese) mostly at home.

In this study, a "family" referred to all members living in the same household who met the above criteria and who completed the *Internet Quiz.*

It was not easy to catch families when both parents and their teenaged children were all at home. Hence, during the early stages of data-collection, a snowball sampling plan was used. The researcher started by approaching families of her acquaintances in neighbourhood. The study was briefly introduced to parents over the phone. If they were interested, an appointment would be scheduled. When the researcher knocked at the door of the potential respondents' home at a mutually agreed upon time, eligible family members were waiting

either in the living-room or at a kitchen table. After carefully reading the Introduction Letter (see Appendix I), the mother or father would sign to consent for themselves and assent to their child(ren)'s participation. Oral consent was also obtained from children. Each person had to complete the *Internet Quiz* independently, and s/he was not allowed to share answers or discuss them with other family members. Participants uncertain of any of the 16 multiple-choice *Quiz* items were encouraged to guess. When they finished the *Quiz*, the researcher would check and make sure each question on the back page of the *Quiz* was also answered.

When participants completed the *Quiz*, a chat would follow. Topics mostly concerned answers to uncertain items, Internet use in families and Internet anecdotes. Many respondents were also curious about the results of the study. Afterwards, respondents were asked for names and telephone numbers of comparable families where there was at least one parent and one teenage child. A copy of the Introduction Letter was left for the next potential families. Thus, another cycle began.

Due to snowball sampling, many families were from the same area. Hence, during the latter stages of data-collection, a wider sampling plan was implemented. Families were approached in public places such as community centres, parks and churches. Respondents were invited to complete the *Internet Quiz* when they were lining up to the Tall Ship Show in Steveston, Richmond, strolling in the Surrey Flea Market, barbecuing in Central Park, Burnaby, watching children's hockey in Killarney Community Centre, Vancouver, or having lunch in the United Church, Coquitlam.

The *Internet Quiz*

Although there were a few Internet knowledge tests such as the Internet Knowledge Pretest which was available online: http://www.mcps.k12.md.us/departments/isa/elit, the

research instrument used in this study was the *Internet Quiz* created by Boshier (2003). The *Quiz* measured neither attitudes (towards the Internet) nor motor skills (associated with its use). Rather, its focus was on verbal information (e.g. who invented the Web?) and intellectual skills (e.g. Why the Internet continued running on Sept. 11, 2001). The *Quiz* consisted of 16 multiple-choice items, each of which was accompanied by five (multiple-choice) responses. Eight items were loosely based on Gagne's (1977) verbal information type of learning outcome. No particular skill was needed to correctly answer these items. For example, respondents either knew – or did not know - the name of the person who invented the World Wide Web. The other eight items involved deductive or other kinds of reasoning of Internet syntax and procedures. To get the correct answer, the respondent had to know the rule behind the item. For example, could they select the correct URL from a list that contained four jumbled sets of syntax? These eight items involved intellectual skills (Gagne, 1977).

The instrument was deliberately called a quiz, not a test or questionnaire. The first item, shown here, was a filler – **not** scored but deliberately amusing and easy to answer - to get respondents started.

1. *What does www stand for?*

Web of Wild Women	☐
Web of Wise Washingtonians	☐
Wildlife Web of the World	☐
Wild Web of Workmen	☐
World Wide Web	☐

Verbal Information items concerned the meaning of acronyms such as "URL", "ISP", identifying a web browser, a search engine, the inventor of the World Wide Web, the

developer of *Internet Explorer*, and the language for constructing Web Pages; intellectual skill items involved Internet syntax and procedures such as the meaning of "cookies", the term for an e-mail attachment, and definition of the World Wide Web. They also included recognizing non-centrality/invulnerability of the Web, distinguishing correct URLs and e-mail addresses, evaluating the most direct way to get software upgrades and locating old school mates on the Internet.

On the front page of the *Internet Quiz*, it was stated "Your Name is Not Required". The 16 multiple-choice items were on inside pages. The back page contained ten questions which asked respondents to provide socio-demographic data about themselves. And for this study, an item measuring the variable of parents' educational background was added to the *Quiz*.

Psychometric Properties of the *Internet Quiz*

In an earlier study (Boshier, 2003), the *Internet Quiz* was administered to 3,208 citizens in the B.C. Lower Mainland and some of its psychometric properties derived. Factor analysis of data secured from respondents involved in this study suggested the *Internet Quiz* contained four factors (see Table 1).

After orthogonal rotation, "Terminology" (Factor I) was comprised of seven items and accounted for about 24.2% of the variance. Items with high loadings on "Terminology" mostly concerned terms associated with the Internet. "Political Economy" (Factor II) was composed of 3 items which concerned the political foundations (e.g. its dispersed nature) of the Internet and accounted for 8.6% of the variance. "Syntax" (Factor III) contained 2 items and concerned Internet syntax. "Conceptual Origins" (Factor IV) included 4 items that concerned concepts embedded and the history of the Internet.

Table 1

Factor Structure and Loadings for the 15 Scored Internet Quiz Items

Item Number	Item/Whole Correlation	Factor Loading	Item Content
Factor I: Terminology			
Item 16	.54	.72	Successful way to locate old school mates
Item 11	.57	.71	Meaning of "ISP" acronym
Item 7	.64	.67	Term for e-mail attachment
Item 6	.51	.55	Example of a Web search engine
Item 4	.53	.54	Meaning of "cookies"
Item 9	.49	.54	Meaning of "URL" acronym
Item 2	.53	.42	Example of a Web browser
Factor II: Political Economy			
Item 10	.58	.67	Most direct way to get software upgrades
Item 14	.51	.63	Non-centrality/Invulnerability of Web
Item 8	.41	.54	Definition of the World Wide Web
Factor III: Syntax			
Item 3	.36	.67	Distinguishing a correct URL
Item 13	.45	.65	Distinguishing a correct e-mail address
Factor IV: Conceptual Origins			
Item 15	.28	.87	Identifying the inventor of "WWW"
Item 5	.34	.79	Developer of *Internet Explorer*
Item 12	.52	.57	Language for constructing Web pages
Item 1	.36	.54	Meaning of "WWW" abbreviation

Reliability of the *Internet Quiz*

For item/whole correlation purposes, five-response multiple-choice items were recoded into a binary (i.e. right/wrong) format.

The reliability of the *Internet Quiz* was examined by c alculating Cronbach's alpha that is the average of all possible split-half coefficients. As a general rule, alpha should exceed .80 (Bryman & Cramer, 1997). In this case, it was .78, showing that all items were

tapping a general factor and were reliable measures of Internet knowledge. Each *Quiz* item correlated with the total (or whole-scale) score. These ranged from a low of .28 to a high of .64 with an average of .48. Hence, none of the 15 *Internet Quiz* items had a lamentably low or excessively high relationship with the total score. In this and an earlier study (Boshier, 2003), the question respondents were most likely to answer incorrectly concerned the identity of the person who invented the Web. Most respondents chose Bill Gates. Only 16.4% (24 children and 30 parents) got it right. However, compared with the 5% of the audience who chose the right answer when the same question was asked conversely in the popular television program "Millionaire" broadcast on Dec. 17th, 2002, this correct percentage was much higher.

The original *Internet Quiz* was in English. Because this study involved Chinese respondents who were more comfortable with their own mother tongue, a Chinese version of the *Internet Quiz* (and the Introduction Letter) was developed. The author was responsible for its translation. Prior to immigrating to Canada three years ago, she was a teacher of English in Jiangmen Education (Teachers' Training) College in Guangdong Province and also worked as an English-Chinese translator. A person who spoke both Chinese and English and was not involved in this study back translated the Chinese version into English. The Chinese version proved to be conceptually accurate and reliable.

Table 2 shows item means, SDs, item/whole correlation coefficients and alpha if item was deleted for both the earlier (Boshier, 2003) and the current study. With few exceptions, the means, SDs and item/whole correlations derived from this study were comparable to the earlier one. Coefficient alpha was satisfactory in both situations. In view of the fact the current study involved data pooled from a Chinese and English version of the *Quiz*, it was gratifying to have a coefficient alpha that suggested both *Quiz* versions were reliable.

Separate alphas were calculated for English and Chinese versions. This yielded a coefficient alpha of .74 for the English and .74 for the Chinese forms of the *Quiz*. Both forms were acceptably reliable.

Table 2

The Internet Quiz Item Means and Reliability Data for Two Studies

Item n=17	Mean[1] n= 2,568	Mean[2] n= 295	SD1	SD2	Corrected Item/Whole r1	Corrected Item/Whole r2	Alpha[1] if item deleted	Alpha[2] if item deleted
Item 1	.99	.96	.09	.21	.20	.36	.73	.72
Item 2	.67	.56	.47	.50	.41	.48	.71	.71
Item 3	.90	.90	.29	.29	.33	.30	.72	.72
Item 4	.70	.56	.46	.50	.33	.30	.72	.72
Item 5	.82	.77	.38	.42	.30	.27	.72	.72
Item 6	.82	.79	.38	.40	.30	.27	.71	.71
Item 7	.90	.76	.30	.43	.49	.65	.71	.70
Item 8	.66	.60	.47	.49	.29	.33	.71	.72
Item 9	.71	.55	.46	.50	.33	.42	.71	.71
Item 10	.86	.78	.34	.42	.44	.52	.71	.71
Item 11	.89	.79	.31	.41	.38	.52	.71	.71
Item 12	.68	.62	.46	.41	.44	.47	.70	.71
Item 13	.89	.84	.30	.37	.38	.39	.71	.72
Item 14	.65	.52	.48	.50	.39	.44	.71	.71
Item 15	.18	.17	.38	.38	.20	.22	.72	.73
Item 16	.92	.65	.38	.48	.42	.48	.71	.71
Total score	11.19	9.86	2.90	3.21	----	----	.77	.77

For Boshier, 2003, standardized item alpha= .78
For Huang, 2003, standardized item alpha= .77

There was considerable variation between items (F=668.99, df =14, p<.001) which concerned different aspects of Internet knowledge. Corrected item-whole correlations ranged from a high of .65 to a low of .22 with an average of .40. In most cases, dropping any item would have little impact on mean total scores. Corrected item-whole correlations ranged from a high of .55 to a low of .15 (with an average of .34) in the English version and high of .62 and low of .13 (with an average of .36) in the Chinese version.

Validity of the *Internet Quiz*

Concerning validity, there are several issues. The first concerns the meaning of "knowledge". The second is whatever it is, how knowledge can be measured. Ask 30 educational psychologists, psychometricians or philosophers the two questions and there's a good chance of getting 30 different answers. Soon thereafter there will be heavy artillery exchanges amongst those claiming knowledge is always "situated," "subjectively-derived," embedded in "lived-experience" or woven into patterns of power and oppression.

"In a very general sense a measuring instrument is valid if it does what it was intended to do" (Nunally, 1967, p. 75). The *Internet Quiz* was designed to measure Internet knowledge – what people know about the Internet. The task in this thesis was to measure Internet knowledge in families and it was not deemed necessary to get into artillery duels. Concerning content, construct and face validity, not a single respondent in Boshier's (2003) or this study disputed whether or not the *Quiz* actually measures Internet knowledge. On the contrary, almost without exception, they seemed to enjoy doing it; most commented on how "fair" it was and were anxious to know correct answers for questions of which they were uncertain.

However, while writing this thesis, there were challenges – not from respondents who completed the test or an audience of distinguished scholars at a conference of the *Comparative and International Education Society* – but from academics worried about how a short 16-item *Quiz* could be a valid measure of anything as new and dynamic as Internet knowledge.

In this and the earlier study on Internet knowledge (Boshier, 2003), there was a need to produce a parsimonious rendering of Internet knowledge and instrument that could be completed in public places like bus stop and coffee shop in a few minutes.

There was no place in this project for those who desire to capture every little nuance of meaning in something like Internet knowledge and tend to produce lengthy measuring instruments. Long tests like the MMPI or the 16PF that get inflicted on (often captive) first year psychology students could never be used in a park and community centre and be completed by teenage children.

However, critics, the *Quiz* authors and users are agreed about one thing. It is **very** useful to ask – what is Internet knowledge? And, in this context, a second question is – whatever it is, can it be measured with 16 multiple-choice questions?

Boshier (2003) developed the *Internet Quiz* by asking graduate students to suggest items that tapped their understanding of what they thought constituted Internet knowledge. Hence, items were inductively derived from well-informed graduate students all of whom were avid users of the Internet. But was their definition of Internet knowledge comprehensive enough? What about other dimensions of the Internet? Should they not be there?

Even though human intelligence has been around since men and women were first dumped on this earth, there are still disagreements about what it is and how to measure it. Students of psychology are familiar with disputes that characterized the British and American view on this in the middle of the 20th century. In the U.K., Charles Spearman was convinced intelligence was a general factor that pervaded all abilities. People were "generally" intelligent or they weren't. Across the Atlantic, the Thurstone school debunked Spearman's "g" with the notion intelligence consists of six "primary mental abilities." It was possible for a person to have high "spatial" but low "numeric" intelligence. It was this debate – along with similar arguments about the nature and measurement of personality – that impelled development of factor analysis.

The Internet has only been around over ten years. At one time, it was synonymous with e-mail. Invention of the Web changed that. It continues to rapidly evolve and, as such, there is no consensus or agreed-upon definition of Internet knowledge. Hence, just like those who developed the earliest intelligence tests, the psychometrician wanting to measure Internet knowledge has to make some commitments (about what it is and how to measure it) but, at the same time, stay open because this is an evolving field.

Despite these caveats, in the *Quiz* creators' and users' view, the *Internet Quiz* is a valid measure of Internet knowledge and, from hereon, the task is to build the case by seeking recourse to various meanings attributed to "validity" by Nunally (1967).

Predictive Validity

Predictive validity is an issue when the "instrument is used to estimate some important form of behaviour, the latter being referred to as the criterion" (Nunally, 1967, p. 76). The term "prediction" is used to refer to functional relationships between scores derived from the *Quiz* and events (or variables) in place before, during or after the *Quiz* is applied.

This entire thesis, along with Boshier's (2003) large-scale study of Internet knowledge and other work underway, all illuminates aspects of predictive validity. Here is an example. On a-priori grounds, it is assumed Internet users or persons of higher socio-economic status will know more about the Internet than non-users or low status people. At the most simple level, students at university should be more familiar with it than same-aged people not at a university. As shown later in this thesis and throughout Boshier's (2003) earlier work involving 3,208 people, *Quiz* scores are significantly correlated with these and other variables – in the anticipated direction. In this regard, there is considerable evidence the *Internet Quiz* measures Internet knowledge.

Content and Construct Validity

Content validity concerns the extent to which the instrument taps or is a fair representation of the domain of content to be sampled and *construct validity* its relationship with some broad underlying construct (e.g. "knowledge"). Hence, to what extent are the 16 items in the *Internet Quiz* a fair sampling of what a reasonable person, Bill Gates or experts might consider to constitute Internet knowledge? In this regard, all test developers are familiar with the need to trade off one form of validity for another. It is quite apparent the *Internet Quiz* has high *face validity.* However, getting high validity meant it had to be short, well written, interesting and fun to complete. As such, it does not canvass every single issue that some might think are part of a broad domain labelled "Internet knowledge." For example, although in the earliest (longer) forms of the *Quiz*, there were questions about ARPA (and the US military role in Internet developments), Internet culture and the digital divide; these were deleted for various reasons. The most prevalent reason concerned overlaps in item meanings. For example, the draft question about ARPA overlapped with another one – about the non-centrality/invulnerability of the Internet and why it did not crash after September 11^{th,} 2001.

Content validity can be satisfied if the author makes explicit values that lie behind item choices. In this case, there was no desire to measure attitudes toward the Internet or psychomotor skills associated with its use. What best fitted the situation were two of the five types of learning outcomes in Gagne's (1977) "*The Conditions of Learning*". By creating items representing verbal information, the Internet *Quiz* involved the 3-Rs – recall, recognition and reasoning. Hence, could respondents recall who, for example, invented the World Wide Web? Would they recognise the name of the language for constructing a Web

page? And, when given URL's with jumbled syntax, could they use intellectual skills and "reason" to distinguish the correct from the incorrect ones?

In this study, the domain (or construct) of interest is Internet knowledge. The 15 scored items in the *Quiz* are presumed to measure the domain of interest. This is not a precise science. As Nunally (1967, p. 88-89) noted, "No precise method can be stated for properly outlining the domain of variables for a construct. The theorizing process is necessarily intuitive. Outlining a construct consists of essentially stating what one means by the use of particular words" – such as Internet knowledge.

Nunally (1967, p. 89) also claims "the way to test the adequacy of the outline of the domain relating to a construct is to determine how well the measures of the observable 'go together' in empirical investigations." Intercorrelations, perhaps followed by factor analysis (as performed here) provide evidence concerning the extent to which items are measuring the same thing. Another way is to examine the extent to which they are similarly affected by an experimental treatment. Hence, after an intense 3-week course about the Internet, did all (or just some) of the item scores go up? If all the items are intercorrelated – or respond in a similar way to an experimental treatment – it can be assumed they are measuring the same construct. Hence, as is the case with the *Internet Quiz*, the test has *construct validity.*

Just as there is today little agreement about what constitutes "knowledge", in such dynamic times, there is not likely to be much enduring agreement about what constitutes Internet knowledge. However, for present purposes, the 15 (scored) items in the *Internet Quiz* appear to be a fair sampling of important verbal information and intellectual skills involved in Internet knowledge. Until shown otherwise, the *Internet Quiz* is regarded as *content* and *construct valid.*

Socio-demographic Variables

As well as the 16 *Quiz* items, respondents were asked to provide information on twelve other variables – such as gender, year of birth, occupation, language spoken at home, type of Internet use, frequency of Internet use, eye colour, birth order, postal code and, for parents, highest educational qualification.

Several other variables were computed from information nested in the postal code. Each area in Canada has a six-digit postal code consisting of three letters and three numbers. Using *Statistics Canada* census data, researchers can secure a detailed, but composite profile of people residing in different postal codes. Like electoral districts, some postal codes embrace large chunks of territory while others are smaller. The University of British Columbia is in V6T in contrast to the sprawling V4P zone in South Surrey. Forward sortation areas (FSAs) identify the first three digits of the postal code. It is these codes that are typically used for research purposes by market analysts, political pollsters and academics.

For each FSA, *Statistics Canada* collects data on many variables, some of which were imported for the purposes of the earlier large-scale study and four linked to Internet knowledge scores. Examples included employment rate (in quintiles), literacy rate, median family income, and average number of bedrooms in dwellings within this postal code.

V6L is in Dunbar, a district about five kilometres away from the University of B.C. According to *Statistics Canada*, the median family income in V6L at the time of the 1996 census was $69,909. For present purposes, median family income was recoded into quintiles on a 5-point scale where 1 denoted the lowest and 5 the highest income. Hence, respondents residing in areas earning the lowest 20 percent (i.e. lower than $38,173) were categorized "very low", the next 20 percent of postal codes (reportedly earning around $38,174 to $42,143) were labeled "low", the next 20 percent (with median family incomes between

$42,144 to $49,227) were labeled "medium", the next 20 percent (between $49,228 to $58,312) were termed "high", and the highest 20 percent with reported incomes of $58,312 and up were termed "very high". A 1996 median family income of $69,909 was "very high". As a result, this label was added to the data string of all respondents reporting living at V6L. V6A is on the downtown eastside. Here, the 1996 median family income was $24,323 which was "very low". This label was pasted into data associated with respondents residing in that area.

In addition, a composite measure of socio-economic status (SES) was created by summing data from the four variable index (i.e. median family income, employment rate, literacy rate, and average number of bedrooms in dwellings within postal codes) described above along with other five variables such as job (not including students), income by FSA (not including students), percentage of residents with university education, average value of dwelling and dwelling value (not including students). The composite index was calculated by first recoding each variable (e.g. median family income) into quintiles. Hence, similar to median household incomes, for average value of dwelling, the lowest 20 percent were labeled "low" and the highest 20 percent were termed. Other variables were recoded in much the same way.

When the 9-item composite SES index was calculated, it yielded a Cronbach's alpha of .73. Thereafter, several combinations of variables were examined. The best was the one with four variables (median family income; percentage of population with university degrees; employment rate; literacy rate). The alpha suggested they were internally reliable since the coefficient was .84. Hence, in this study, the composite socio-economic status (SES) index was derived from the four variables listed above. In Chapter Four, statistics

concerning the 4-item SES index were presented. In later analyses, relationships between the composite SES index and Internet knowledge (in parents and children) were examined.

CHAPTER FOUR

INTERNET KNOWLEDGE IN FAMILIES

This chapter describes respondents, identifies who knew the most and least about the Internet, and examines questions concerning Internet knowledge *between* groups and *within* families in this purposive sample.

Characteristics of Respondents

The following section presents characteristics of the 329 respondents involved in this study.

Quiz Version, Age, Language Spoken at Home, and Family Structure

Table 3 shows the type of *Internet Quiz* completed by respondents, number of parents and children, and their languages spoken at home. Altogether, 182 parents and 147 children participated in this study. Of the 329 respondents, 248 (75.4%) completed the English version and 81 (24.6%) the Chinese one.

Table 3

Percentage of Internet Quiz Completed, Parents and Children, and Language Spoken at Home

Variable	Categories	n	Percentage
Quiz version	English	248	75.4%
	Chinese	81	24.6
Parents	Mother	98	29.8
	Father	84	25.5
Children	Boy	74	22.5
	Girl	73	22.2
Language spoken at home	English	169	51.4
	Mandarin	101	30.7
	Cantonese	59	17.9

Of all respondents, the single largest group was the 98 mothers who made up approximately 30% of the sample. Their mean age was 42.41 years (*SD* = 4.73); the 84 fathers constituted 26% and had a mean age of 43.99 years (*SD* = 4.72). The 74 boys consisted of 23% and their average age was 13.99 years (*SD* = 1.85). There were 73 (22%) teenage girls with a mean age of 14.32 years (*SD* = 2.02). Among the 147 teenage respondents, 97 said they were high school students; forty-eight were in elementary schools; there were only one college and one university student respectively.

In total, 169 respondents reported speaking English at home, 101 said Mandarin and 59 Cantonese. In almost all families, parents and children reported speaking the same language at home (although it was most likely that many of them were bilingual, trilingual or even multilingual). However, there were two exceptions. In one family, the parents reported speaking Mandarin at home and the child English. The other was a Cantonese-speaking father (who spoke Mandarin as well) with a Mandarin-speaking wife and daughter.

In this study, there was a range of family structures. There were some families where there was a mother, father and one son. In others, there was a mother, a father and a daughter. Or, a mother, a father, a daughter and two sons. There were also single-parent families headed by mothers or fathers. "Family" was broadly defined. Although there were no families headed by same-sexed parents, there were some blended families and common-law parents. If adults in the house claimed to be the "parents" of children found there, this was accepted. In addition, many parents were approached in public places and appeared to be alone (except for their children). They could have been solo parents or there could have been partners at home. Irrespective of whether a partner was nearby, the mother (or father) and the child (or children) were invited to complete the *Quiz*.

Of the 114 families involved in this study, 50 consisted of both parents and one child; in 35 families, there was only one parent and one child; in 17, there was a mother, a father and two children; 11 families were headed by a single parent with two children; and one consisted of both parents and three teenage children,

Fathers' and Mothers' Highest Education Qualifications

Fathers' and mothers' education qualifications arguably have a substantial impact on the Internet knowledge of themselves and their children. Therefore, an educational qualification question was added to this study's version of the *Internet Quiz*. It asked about the parents' highest educational qualifications in seven categories ranging from elementary school to post-doctoral degrees. Figures 1 shows the reported educational qualifications for mothers and fathers.

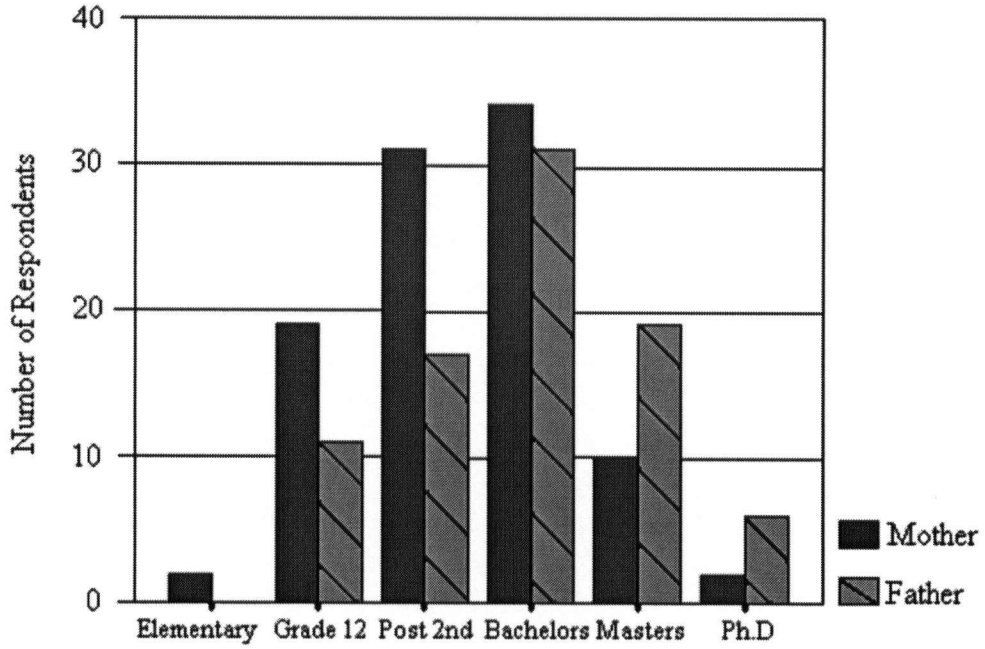

Figure 1. Highest education qualifications reported by fathers and mothers

Of all 182 adult respondents, 2 mothers and 6 fathers (4.4%) said they had doctoral-level degrees, 10 mothers and 19 fathers (15.9%) reported they held Masters degrees, 34

others and 31 fathers (35.7%) held Bachelors degrees, 31 mothers and 17 fathers (26.4%) had some post secondary educational background, 19 mothers and 11 fathers (16.5%) cited Grade 12. Only 2 mothers (1.1%) said elementary school was their highest education qualification.

Fathers' and Mothers' Occupations

Respondents also reported their occupations. Jobs were coded into nine categories. As most teenage respondents were either in the last year of their elementary schooling or somewhere in high school, the occupation question was applicable to parents only. Table 4 presents information about occupation classifications reported by the 182 parents.

Table 4

Occupational Classifications for Fathers and Mothers

Variable	Categories	*n*		percentage
		Fathers	Mothers	
Occupation classifications	Professional/technical	47	39	47.3%
	Managerial	1	4	2.7
	Clerical/sales	6	7	7.1
	Skilled worker	22	12	18.7
	Unskilled worker	2	9	6.0
	Unemployed	0	0	.0
	University student	2	4	3.3
	College student	3	7	5.6
	Homemaker	1	16	9.3

Eighty-six parents reported having "professional/technical" jobs; five were managerial; 13 with clerical/sales jobs; 34 were skilled workers; 11 were unskilled workers; six were university students; ten were college students, and 17 said they were homemakers.

Most (78.6%) parents were not in management positions; 37 (20.3%) parents held middle management jobs; there were only two (1.1%) senior manager respondents.

Types and Frequency of Internet Use

In the *Internet Quiz*, a follow-up question asked, "Have you used the Internet today or did you use it yesterday?" If "Yes", what for? Choices included e-mail, used the web, file transfer, games, chat-room and other.

Among 329 respondents, 274 said they had used it today or yesterday. Only 55 chose "No". Of the teenagers, 85.7% reported using the Internet "today or yesterday" while 81.3% of adults declared using the Internet. Fathers accessed the Internet by about 13 percentage points higher than mothers did. Results on types of Internet use reported by parents and their children are outlined in Table 5.

Table 5

Types of Internet Use by Parents and Children

Type of use	Parent			Child		
	n	Percentage	SD	n	Percentage	SD
E-mail	123	67.6%	.47	106	72.1%	.45
Web use	119	65.4	.48	92	62.6	.49
File transfer	38	20.9	.41	35	23.8	.43
Games	20	11.1	.31	74	50.3	.50
Chat-room	7	3.8	.19	45	30.6	.46
Other	30	16.5	.37	45	30.6	.49

The percentage of teenagers who had ever used the Internet for e-mail, file transfer, games, chat-room and other purposes was higher than parents. Some 65.2% of adults reported using the Internet to surf the Web, compared with 62.6% of the children. Parents often used the Internet to search for life and/or work-related information such as news, goods and services. Fathers were more likely than mothers to use the Web (72.6% versus 59.2%), but there was not much of a gender difference in Internet use between boys and girls (63.5% versus 61.6%).

E-mail represented the most popular type of use for both parent and child. To examine if Internet use correlates with Internet knowledge, respondents were also asked how often they used the Internet. Figure 2 summarizes the frequency of Internet use by parents and their children.

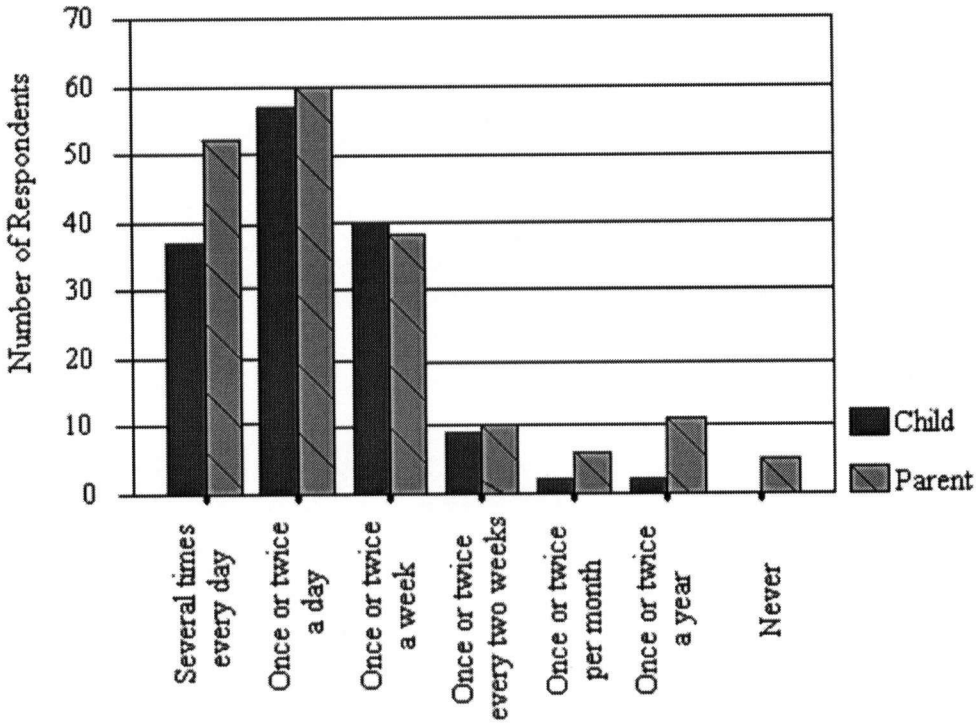

Figure 2. Frequency of Internet use reported by parents and children

In this sample, not a single child said they had never used the Internet, but one father and four mothers said they never had. Overall, children used the Internet more often than parents. Among frequent adult Internet users, fathers used it more frequent than mothers. However, the differences in frequency of Internet use between adult users did not exist for teenagers. Girls appeared to use the Internet as frequently as boys.

Birth Order

Research (e.g. Eckstein, 2000) shows birth order is associated with certain attributes such as high I. Q., and superior academic achievements. Oldest children tend to perform better in formal educational settings. To investigate whether birth order predicts Internet knowledge, respondents were also asked to provide information about their birth order on the back page of the *Internet Quiz*.

Among the 147 teenagers, 94 said they were first-born, constituting 63.9%; 37 were born second; 12 third-born; 3 forth-born; only one child was born fifth or later. Among parents, the percentage of their birth order was more evenly distributed. Among English speakers, there were 85 first-born, 56 second-born, 18 third- born, 10 fourth and later born. Among the 101 Mandarin respondents, there were 58 first, 13 second, 17 third, nine fourth, and four were fifth or later born. Twenty Cantonese speakers were first-born; 14 second and third born respectively; eight were fourth-born, and only three were born fifth or later.

Most, 278 (84.8%) respondents said they had at least one sibling in their families while 51 (15.5%) reported they were the only child in their homes.

The Composite SES Index

As stated in Chapter Three, the composite socio-economic status (SES) index was created from existing data by calculating means across a set of four variables. Figures 3 shows how respondents were distributed according to the SES index. The figure employs labels ("high", "low") that were inherent in the original data set and reflect the fact the data were divided into quintiles and the demographic units of measurement (e.g. employment percentages, literacy rates) were expressed as quintiles (from "very low" to "very high").

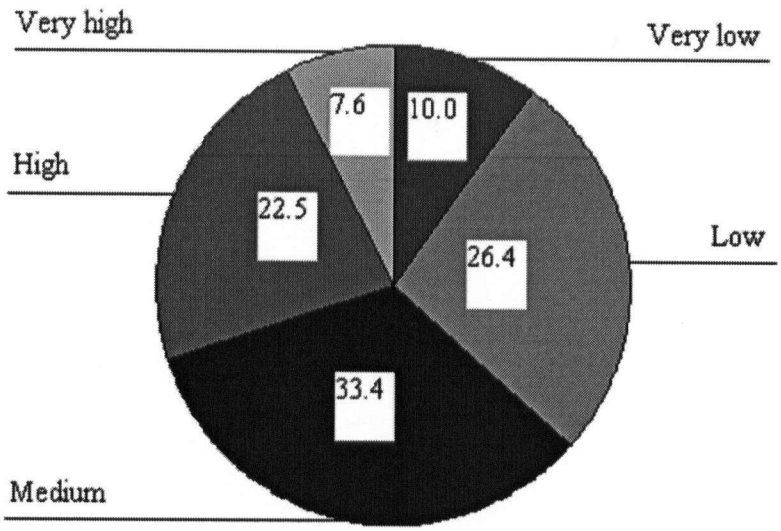

Figure 3. Distribution of respondents as measured by the composite SES index

As illustrated in Figure 3, by the composite SES index, 25 respondents resided in "very high" income areas where the reported median family income was $58,000 or more; 74 lived in "high" income areas (with the median family incomes of about $ 54,000); 110 in "medium" areas with incomes in the $45,000 range, 87 in "low" areas having incomes of around $38,000; 87 respondents were living in "very low" SES areas where the median family income was lower than $38,000. So, with the exception of very-high and very-low SES areas, respondents were evenly distributed.

Internet Knowledge *Between* Groups

The purpose of this study was to examine Internet knowledge in families using two approaches. The first involved comparing Internet knowledge (Internet knowledge) scores *between* groups such as parents and children. The second concerned Internet knowledge scores *within* families.

The results presented in the following sections were derived by measuring Internet knowledge scores between groups.

Between Groups

Table 6 summarizes overall mean Internet knowledge scores for parents and children, fathers and mothers, boys and girls as well as across the gender divide.

Table 6

Mean Internet Knowledge Scores between Groups in Respondent Families

Variable	Categories	*n*	IK Mean	S.D.	Difference	t-test	Probability
Generation	Parents	182	9.84	3.50			
	Children	147	9.61	2.90	.23	6.48	ns
Parents	Fathers	84	10.85	3.37			
	Mothers	98	8.98	3.40	1.87	3.71	p< .001
Children	Boys	74	9.45	3.20			
	Girls	73	9.78	2.57	-.33	.70	ns
Gender	Males	158	10.19	3.36			
	Females	171	9.32	3.09	.87	2.44	ns

Parents and Children

Disregarding the language spoken at home, parents had about as much Internet knowledge as their teenaged children. The 182 parents had a mean Internet knowledge score of 9.84 (*SD* = 3.50). The mean score for teenagers was 9.61 (*SD* = 2.90). There was no significant difference across the generational divide and (in this sample at least) there was scant evidence for the notion parents are Internet luddites while children are geeky geniuses.

Fathers and Mothers

Among parents, fathers knew more than mothers – a gap of nearly two points out of 15. This conforms to what Boshier (2003) found in an earlier large-scale study of Internet knowledge in Vancouver. Table 6 shows 84 fathers knew significantly more about the Internet than the 98 mothers ($t = 3.71, p < .001$). In general, fathers scored almost two points higher in the *Internet Quiz* than mothers.

Girls and Boys

However, the gender divide that separated fathers and mothers did not carry over to their children. The 74 boys received a mean score of 9.45 (*SD* = 3.20) while the 73 girls had a mean of 9.78 (*SD* = 2.57). The difference was not significant.

Males and Females

In spite of the tendency for fathers to outscore mothers, among the 329 respondents, the overall gender divide was negligible. The 158 males (with a mean Internet knowledge score of 10.19) outscored the 171 females (mean score of 9.32) by less than one point. And the difference was not significant.

Language Groups

This study concerned Internet knowledge among English, Mandarin and Cantonese-speaking respondents, and their mean Internet knowledge scores are revealed in Figure 4.

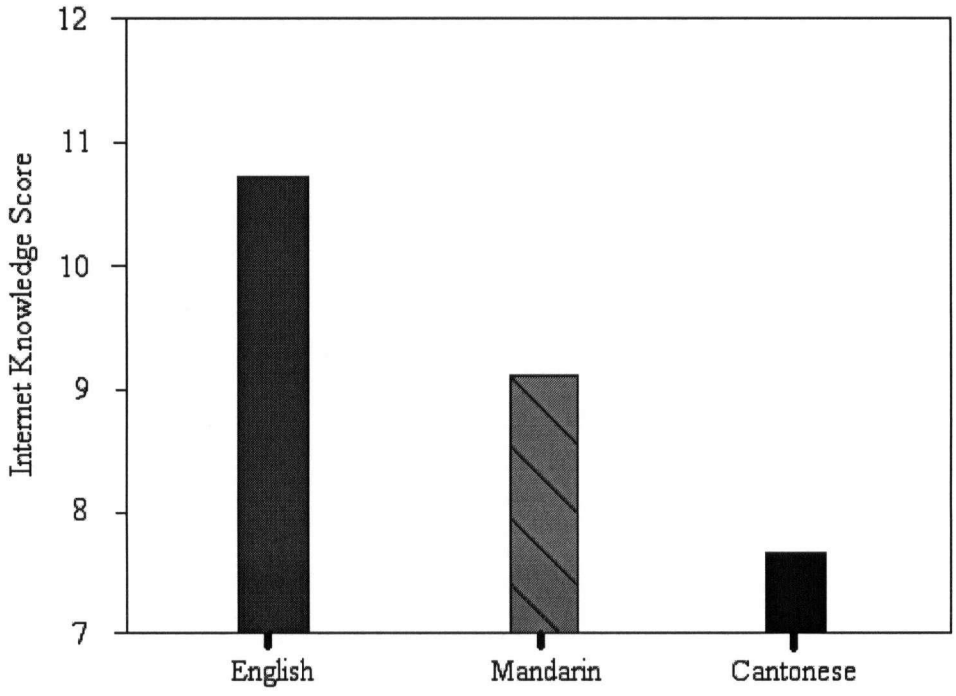

Figure 4. Mean Internet knowledge scores for English, Mandarin, and Cantonese speakers

Figure 4 shows a negative relationship between mean Internet knowledge scores and language spoken at home. The 169 English speakers obtained a mean of 10.87 (SD = 2.64) which was the highest among all language groups; the mean score for the 101 Mandarin speakers was 9.15 (SD = 3.11), which was in the middle; but the 59 Cantonese speakers had a mean of only 7.51 (SD = 3.65) which was about three and half points lower than English-speaking respondents. The difference was significant (F = 30.5, $p < .001$).

Family Roles

Internet knowledge among English, Mandarin, and Cantonese-speaking families was dissimilar across "generation-gap".

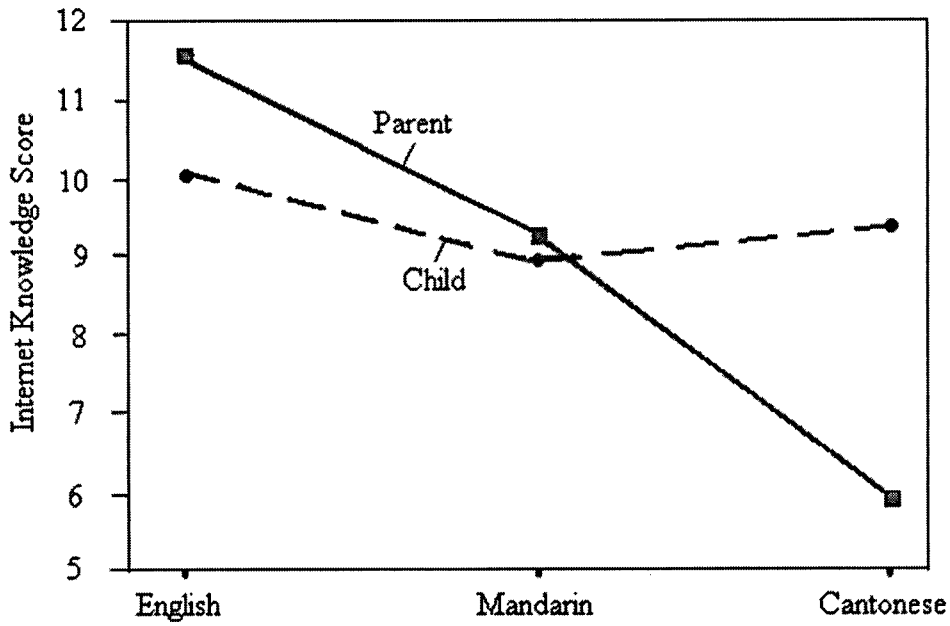

Figure 5. Mean Internet knowledge scores for parents and children by language spoken at home

As illustrated in Figure 5 above, English, Mandarin and Cantonese-speaking children had more or less the same mean Internet knowledge scores. English-speaking teenagers had a

mean Internet knowledge score of 10.04 (n = 81, SD = 2.80), the highest among three language groups of children. The mean score of Cantonese-speaking teens was 9.30 (n = 27, SD = 3.10), but that of Mandarin-speaking ones was 8.92 (n = 39, SD = 2.89), the lowest among the three. The difference among the three teenage language-speaking groups was not significant. However, these were different among parents. The 88 English-speaking parents knew the most (M = 11.64, SD = 2.23), the 62 Mandarin speakers came next (M = 9.29, SD = 3.26) with the 32 Cantonese-speaking parents scoring the lowest (M = 5.97, SD = 3.39), and the difference was significant. Thus there appears to be a large and significant Internet knowledge gap between parents and their children among Cantonese-speaking families but not in English and Mandarin families.

English-speaking Families

The mean scores for fathers, mothers, boys and girls in English-speaking families were shown in Table 7.

Table 7

Mean Internet Knowledge Scores between Groups in English-Speaking Families

Categories	n	IK Mean	SD	Difference	t	t-prob
English Fathers	41	12.32	1.94			
English Mothers	47	11.04	2.32	1.27	2.78	p<.01
English Boys	40	10.10	3.09			
English Girls	41	9.98	2.53	.12	.20	ns

The gender difference between English-speaking fathers and mothers was 1.27 (t = 2.78, $p < .01$). Yet there were no significant differences in mean scores obtained by English-speaking boys and girls.

Mandarin-speaking Families

Internet knowledge scores for Mandarin-speaking parents and children are presented in Table 8.

Table 8.

Mean Internet Knowledge Scores between Groups in Mandarin-Speaking Families

Categories	n	IK Mean	SD	Difference	t	t-prob
Mandarin Fathers	26	11.31	2.59			
Mandarin Mothers	36	7.83	2.91	3.47	4.95	p< .001
Mandarin Boys	21	8.90	3.18			
Mandarin Girls	18	8.94	2.60	-.04	.04	ns

Among Mandarin-speaking respondents, fathers scored nearly three and half points higher than mothers ($t = 4.95$, $p < .001$). It appeared the biggest gender gap was between Mandarin-speaking mothers and fathers. However, just like the situation for English-speaking children, there were no significant differences in scores for Mandarin-speaking girls and boys. They had about the same mean Internet knowledge scores.

Cantonese-speaking Families

Table 9 summarizes mean Internet knowledge scores for Cantonese-speaking groups.

Table 9

Mean Internet Knowledge Scores between Groups in Cantonese-Speaking Families

Categories	n	IK Mean	SD	Difference	t	t-prob
Cantonese Fathers	17	6.59	3.74			
Cantonese Mothers	15	5.27	2.92	1.32	1.12	ns
Cantonese Boys	13	8.31	3.35			
Cantonese Girls	14	10.29	2.61	-1.98	1.70	ns

Among Cantonese speakers, fathers scored higher than mothers, but the mean scores for both of them were quite low. The range of knowledge divide between Cantonese mothers and fathers was about the same as that between English-speaking mothers and fathers. Table 9 shows, unlike the situations between boys and girls in English and Mandarin-speaking groups, Cantonese-speaking teenage girls scored two points higher than boys. However, the difference was not significant.

Gender Groups

Although Tables 7, 8 and 9 summarize the distributions of mean Internet knowledge scores for gender groups among English, Mandarin and Cantonese-speaking respondents, a more informative view summarizes the data in a different way – boxplots with the medians and their respective semi-interquartile ranges. Figures 6 and 7 exhibit distributions of Internet knowledge scores for fathers, mothers, boys and girls from the three language groups.

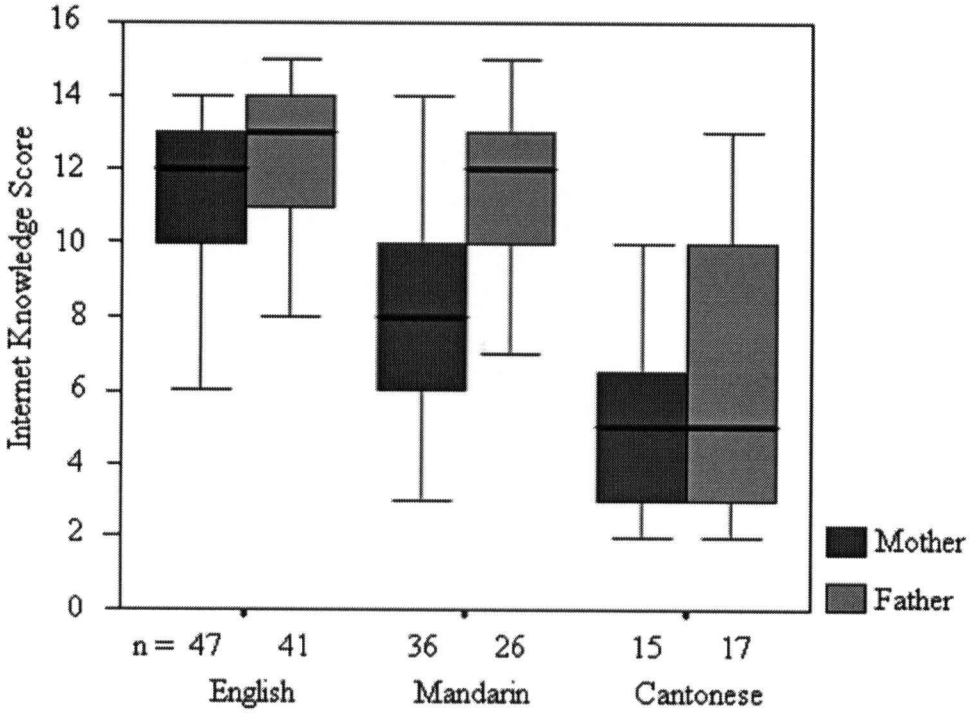

Figure 6. Median Internet knowledge scores for fathers and mothers by language spoken at home

The plot of Internet knowledge for each group is centered on the group's median. The coloured portions immediately above and below the median are the central 50% of all cases. The remaining upper and lower quartiles contain the more extreme cases—and may contain outliers as well. Figure 6 shows that the median for English-speaking mothers was 12, the same as that for Mandarin-speaking fathers, but the English-speaking fathers had a median of 13, the highest among all groups. Although, as pointed out earlier, there was a 1.32 point "gender gap" between the mean Internet knowledge scores for Cantonese-speaking mothers and fathers, the medians for both of them were the same – 5 point, the lowest of all. Except Cantonese-speaking fathers who showed the widest spread of their Internet knowledge scores, the other groups exhibited much more densely distributed patterns of Internet knowledge scores although their medians were dissimilar.

On the other hand, as displayed in Tables 7, 8 and 9 above, there was not much of a gender Internet knowledge divide between boys and girls of different language groups except that between Cantonese-speaking boys and girls, but there were data indicating the spread of Internet knowledge scores was greater for boys than for girls among all three language groups.

As shown in Figure 7, although English-speaking boys and girls obtained a similar median of around 10, the spread of the boys was wider than the girls. The same can be said of Mandarin-speaking girls and boys except that their median was one point lower than their English-speaking counterparts. However, Cantonese-speaking children demonstrated the widest gender divide among the three pairs. The median for Cantonese-speaking girls was 11, the highest of all teenage groups, and they had the narrowest inter-quintile range. But the boys acquired a median of only 8, the lowest of all teen groups and they displayed the widest range from 6 to 11.

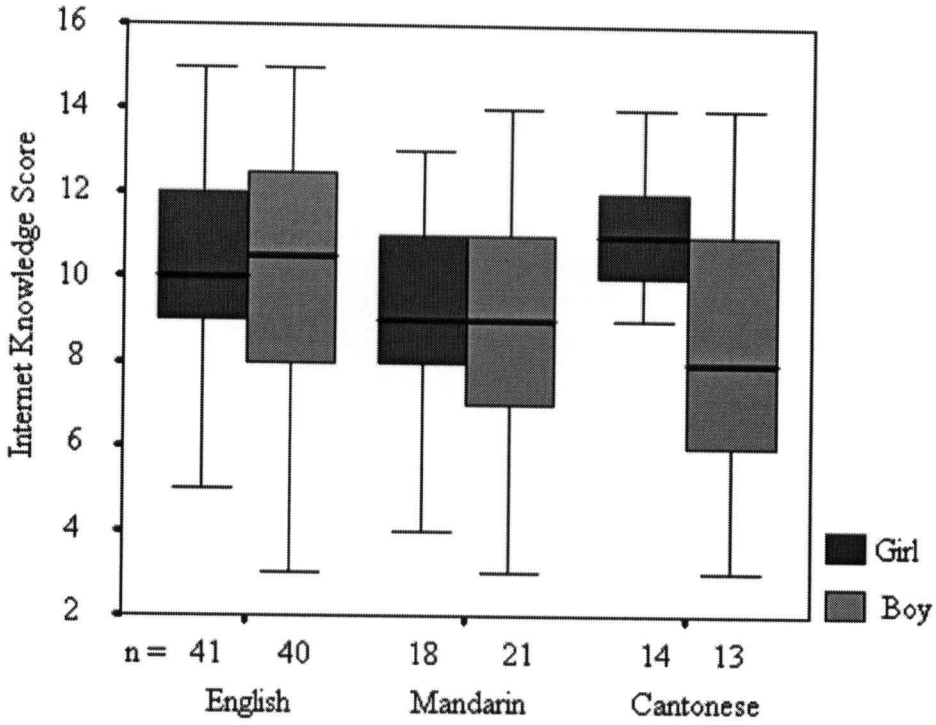

Figure 7. Median Internet knowledge scores for boys and girls by language spoken at home

Internet knowledge *within* Families

In addition to the patterns of Internet knowledge between groups, it was also instructive to measure Internet knowledge **within** families -- parents with children, fathers with their first-born son or daughter, and mothers with their first-born son or daughter -- where such pairings existed.

The *Internet Quiz* was scored out of 15 total possible points. Sometimes the parent scored highest, sometimes the child. The overall parent Internet knowledge score was calculated by summing the father's and the mother's scores and dividing by two. The overall child score was calculated in the same way. In all cases, the Parent/Child discrepancy scores were calculated by subtracting the overall "Parent" score from the overall "Child" one. If the discrepancy score was prefaced by a plus (+) sign, it meant the combined parents knew more than their combined children. A minus (-) sign indicated the children knew more than the parents. The Father/Mother discrepancy scores were derived by subtracting each father's

total score from the mother's. In this case a plus sign denoted that fathers scored higher than the mothers.

The decision to calculate discrepancy scores in this manner was not taken lightly. Critics might claim pooling data from the father and mother suppresses differences. Why add their scores together to get a combined index of "parent knowledge"? However, in view of the fact many fathers are not at home when children need Internet help, there is also a case for disregarding fathers and paying more attention to mothers. Differences scoring strategies have various advantages. However, on balance, it was concluded the safest procedure was to calculate a combined "parents" score by summing the two scores and dividing by two to get a mean.

Intra-family generation gaps (or absence) are documented in Figure 8's histogram.

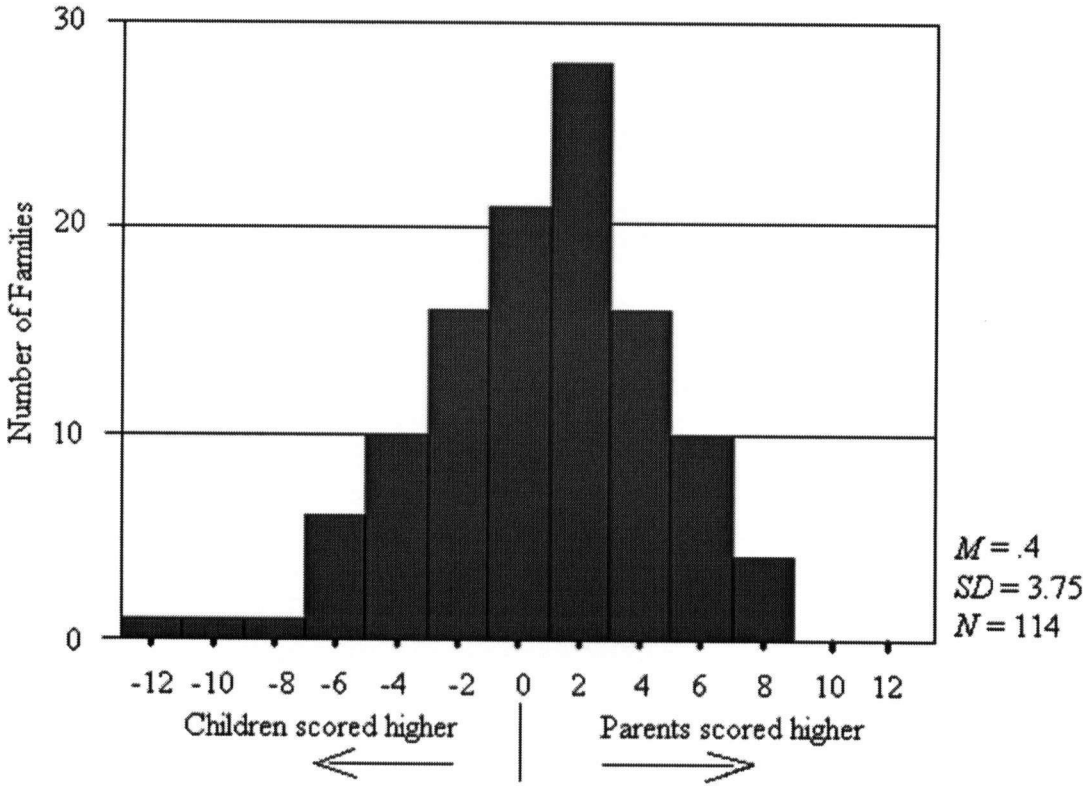

Figure 8. Overall parent/child Internet knowledge discrepancy scores within families.

Figure 8 shows the overall parent/child Internet knowledge discrepancy scores ranged widely from -12.0 to 8.0. In three families, parents scored extremely lower (i.e. -8 points and under) than their children. There were 38 families where children outscored their parents by one to seven points. In seven families, parents and children had the same scores, and there were 67 households where parents outscored their children by one to seven points. In one family, parents scored much higher (8 points) than their children. In approximately one-third of the families, children knew more about the Internet than their parents, but in nearly 60% of the families, parents were more knowledgeable about the Internet than their children.

Pairing Discrepancy Scores within Families

Overall Internet knowledge gaps (discrepancy scores within families) are summarized in Table 10.

Table 10.

Overall Internet Knowledge Discrepancy Scores within Respondent Families

Variable	Categories	Number of Pairs	Discrepancy Scores Mean	SD	t	t-prob
Within Family Discrepancy Scores [a]						
	Parent/Child	63	.21	3.38		
	Father/Mother	63	1.94	3.31	-3.02	p< .004
	Father/Eldest son	6	-1.83	3.31		
	Father/Eldest daughter	6	.83	6.04	-.66	ns
	Mother/Eldest son	8	-.38	4.93		
	Mother/Eldest daughter	8	-1.13	4.97	.46	ns

[a] Paired Samples t-Test

There was a one-fifth point gap between parents and children for the 63 families where both parents were present, but there was nearly a two-point knowledge "gap" between fathers and mothers. This difference was statistically significant ($t = -3.02, p < .004$).

There were only six families where there was a father with an eldest son **and** an eldest daughter. In these cases, the eldest sons outscored their fathers (D = -1.83, SD = 3.31). Eldest daughters also outscored their fathers but by less than one-point (D = -.83, SD = 6.04). There were no significant differences between discrepancies in the knowledge of father/first daughter and father/first son combinations.

With regard to mothers and their first children, the result was similar. Although both first sons and daughters (n = 8) knew more than the mothers, there was an over one point (D = -1.13, SD = 4.93) gap between mothers and first daughters while that between mothers and first son was less than a half point (D = .38, SD = 4.97). However, not much should be read into this because the n was low and differences not statistically significant.

The following analysis provides Internet knowledge gaps within the three language-speaking families.

English-Speaking Families

Table 11 presents discrepancy scores within English-speaking families.

Table 11.

Internet Knowledge Discrepancy Scores within English-Speaking Families

Variable	Categories	Number of Pairs	Discrepancy Scores Mean	SD	t	t-prob
English Family D-Scores [a]						
	Parent/Child	27	1.96	2.09		
	Father/Mother	27	1.07	3.05	1.42	ns
	Father/Eldest son	4	.00	2.16		
	Father/Eldest daughter	4	3.00	.82	-2.78	ns
	Mother/Eldest son	5	-.40	3.05		
	Mother/Eldest daughter	5	1.60	1.34	-1.53	ns

[a] Paired Samples t-Test

Within English-speaking families, the "generation gap" was wider than the "gender gap". There was almost a two-point gap between parents and children compared with the one point gap that separated fathers and mothers.

Fathers and first sons knew about the same. There were four cases where a father had a first son and a first daughter. While the fathers knew exactly the same as their first son (*D* =.00, *SD* =2.16), they significantly outscored their first daughter by three points (*D* = 3.00, *SD*=.82). As noted earlier, there were no significant differences between the mean scores of girls and boys. However, within families, it appears boys and their fathers are equivalent but there was 20% knowledge difference that separated fathers from eldest daughters. Was this part of a more general set of difficulties that impair relationships between fathers and first daughters? Or something specific to the Internet?

There were less significant differences between discrepancies in the knowledge of mother/first-son and mother/first-daughter combinations. In the five families where a mother had a first son and first daughter, sons knew a little more about the Internet than their mothers (*D* = -.40, *SD* =3.05), but daughters scored lower than the mothers (*D* =1.60, *SD* = 1.34).

Mandarin-Speaking Families

Within Mandarin-speaking families, the situation was different. Their within-families discrepancy scores are displayed in Table 12.

The most notable result in the table below concerns the fact most Mandarin children scored much higher than their parents. Within these families, there were nearly one and half points between fathers and mothers (*SD* = 3.42), but as shown above, the gap between Mandarin-speaking parents and children was 2.83 (*SD* =3.96). In other words, in these 12 families, Mandarin-speaking teenagers significantly outscored their parents. In the two

Mandarin-speaking families where there was a father, first son and first daughter, children scored higher than their fathers. The boys outscored their fathers by five and half points (*SD* = .71), and the girls knew remarkably more than the fathers (*D* = - 8.50, *SD* = 2.12). In the three cases where a mother had a first son and first daughter, the results were different. Although first daughters still noticeably outscored their mothers (*D* = -5.67, *SD* = 5.77), the first son knew barely more than the Chinese mothers (*D* = -.33, *SD* = 8.15). However, all the differences in the three pairs were not significant.

Table 12

Internet Knowledge Discrepancy Scores within Mandarin-Speaking Families

Variable	Categories	Number of Pairs	Discrepancy Scores Mean	SD	t	t-prob
Mandarin Family D-Scores [a]						
	Parent/Child	12	-2.83	3.96		
	Father/Mother	12	1.42	3.42	-2.80	ns
	Father/Eldest son	2	-5.50	.71		
	Father/Eldest daughter	2	-8.50	2.12	1.50	ns
	Mother/Eldest son	3	-.33	8.15		
	Mother/Eldest daughter	3	-5.67	5.78	3.67	ns

[a] Paired Samples t-Test

Cantonese-Speaking Families

Due to the small number of Cantonese-speaking respondent families, the output of within-family paired-sample t test was simpler than the other two language families.

Table 13 presents the within-family discrepancy scores for Cantonese-speaking families.

Table 13

Internet Knowledge Discrepancy Scores within Cantonese-Speaking Families

Variable	Categories	Number of Pairs	Discrepancy Scores Mean	SD	t	t-prob
Cantonese Family D-Scores [a]						
	Parent/Child	24	-.25	3.11		
	Father/Mother	24	3.17	3.29	-4.20	p< .001

[a] Paired Samples t-Test

In 24 Cantonese-speaking families where there was a father, a mother and at least one child, children knew slightly more about the Internet than their parents (D = -.25, SD = 3.11), but Cantonese-speaking fathers scored over three points higher than the mothers (D = 3.17, SD = 3.29). And the difference was significant.

Generational Discrepancy Scores within Families

Figure 9 shows parent/child Internet knowledge discrepancy scores disaggregated by language spoken at home. A score of zero means parents and their own children scored the same. The data located above the "zero-point" on this graph means parents scored higher than their children. The data below the "zero-point" reflect a reversed situation – children outscored their parents.

The patterns of the Internet knowledge generation gaps were dissimilar in the three language-speaking families. In English-speaking families, the median of Parent/Child Internet knowledge discrepancy scores was 1.75 (SD = 2.64). The discrepancy scores ranged from -4 to 8. Overall, English-speaking parents knew more than their own children. In Mandarin-speaking families, the median of Parent/Child discrepancy scores was .50 (SD = 3.31). The range extended from -8 to 7. Mandarin-speaking parents and children had about the same Internet knowledge. However, the median of Parent/Child discrepancy scores in Cantonese-speaking families was -4 (SD =4.87), and the Internet knowledge generation gaps

ranged from -12 to 5, the widest among three language-speaking families. Overall, Cantonese-speaking parents knew much **less** than their own children.

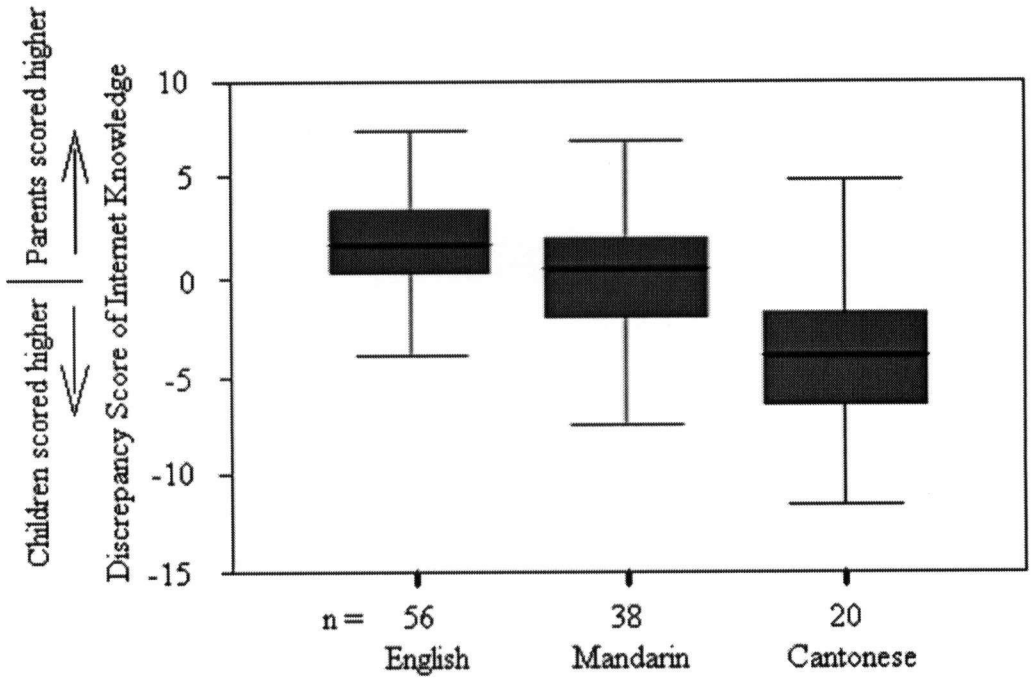

Figure 9. Parent/child discrepancy score ranges of Internet knowledge by language spoken at home

On the other hand, the spreads of the median Internet knowledge discrepancy scores were narrow in English, Mandarin, and Cantonese-speaking families. In other words, although there were parent/child differences in Internet knowledge, at least in 50% families, they were not very great.

Caution is needed here because the Mandarin and English-speaking families had similar levels of Internet knowledge. But, in Cantonese-speaking families the situation was reversed because children knew much more about the Internet than their parents.

Summary of Age and Gender Differences

Although the following figure contains information presented earlier, it is worth putting in graphical form because it clearly displays some of the most socially significant aspects of this work.

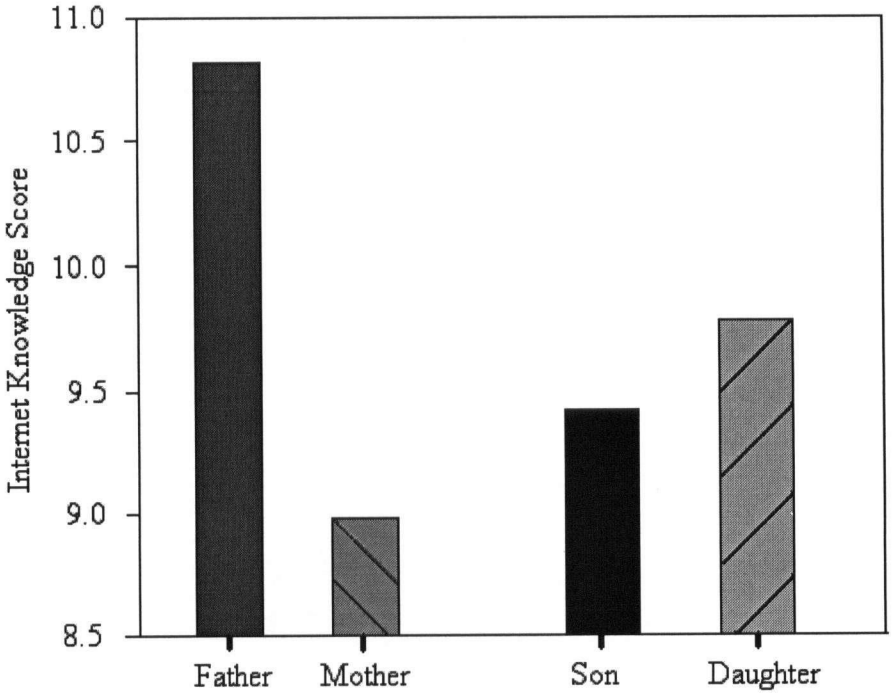

Figure 10. Graphic portrayal of age and gender differences in mean Internet knowledge scores.

Figure 10 shows clearly that among parents, there were pronounced gender differences in Internet knowledge. Fathers scored nearly two points higher than mothers and the difference was statistically significant. However, among children, girls knew slightly more than boys and there was no statistically significant difference between the scores of boys and girls. Overall, fathers knew the most and mothers the least about the Internet in families. In terms of Internet knowledge, the gender divide was wider between fathers and mothers than that between sons and daughters.

CHAPTER FIVE

ACCOUNTING FOR INTERNET KNOWLEDGE

In Chapter Four, Internet knowledge was measured and compared both between groups such as parents and children and within English, Mandarin and Cantonese-speaking families. Another purpose of this study was to identify variables that accounted for most variance in total Internet knowledge and Internet use. Is it family roles such as parent and child? Is it language spoken at home? Is it Internet use or frequency of Internet use? Is it gender or birth order? What about education level and social-economic status? Chapter Five reports how these variables were tested and what results were found.

It is informative to test first correlations between these variables and the 16 *Quiz* items and total scores before exploring how much each of the family-specific variables and socio-demographic characteristics accounted for the variance in total Internet knowledge scores and Internet use. Table 14 contains the results of data analysis.

In Table 14, the correct percentage in the first column shows all *Quiz* Items contributed to total Internet knowledge scores except the one about the inventor of the World Wide Web. For example, most respondents were able to distinguish a correct URL and e-mail address from four muddled choices. About 77% of them identified "downloading from manufacturer's website" as the most direct way to get upgrade software.

The next section discusses respectively each of the family-specific variables and the socio-demographic ones in terms of their contributions to total Internet knowledge scores and Internet use by respondents.

Family-Specific Variables

Family Role

The primary focus of this study was the presence (or absence of) of Internet knowledge gaps across the generational divide between parents and teenagers. Therefore, the

Table 14

Item Difficulty and Pearson's Correlations with Respondents' Demographics for the 16-Item *Internet Quiz*.

Quiz Item	Correct Percent	Family Role	Language	Fathers' Education	Mothers' Education	Ever Use Internet?	Frequency of Use	Gender	Birth Order	Quiz Version	SES Index	
Meaning of "www" abbreviation	95.1%	-.11	-.23	.08	.13	.18	.26	.09	-.09	-.15	.04	
Example of a Web browser	54.1	-.03	-.08	.18	.10	.14	.15	.19	-.13	-.08	.11	
Distinguishing a correct URL	89.1	-.29	-.20	.20	.05	.33	.35	-.01	-.20	-.25	.12	
Meaning of "cookies"	55.0	.13	-.20	.11	.10	.08	.11	.11	-.11	-.24	.19	
Developer of *Internet Explorer*	76.6	.02	-.11	-.02	-.06	.12	.23	.18	.03	-.17	.05	
Example of a Web search engine	78.7	-.26	-.30	.07	.12	.17	.25	.01	-.12	-.36	.28	
Term for e-mail attachment	76.9	-.01	-.29	.22	.22	.24	.26	.02	-.06	-.26	.16	
Definition of the World Wide Web	58.4	.07	-.16	.11	.10	.12	.06	.05	-.05	-.13	.06	
Meaning of "URL" acronym	53.2	.10	-.17	.07	.04	.05	.12	.00	-.01	-.21	.09	
Most direct way to get software upgrades	76.6	.15	-.16	.10	.19	.19	.20	.01	-.06	-.14	.10	
Meaning of "ISP" acronym	79.3	-.05	-.28	.09	.11	.10	.16	.09	-.18	-.29	.17	
"Language" for constructing Web pages	59.6	-.05	-.11	.05	.10	.20	.29	.07	-.09	-.19	.12	
Distinguishing correct e-mail address	83.3	-.04	-.17	.15	.12	.19	.21	-.02	-.12	-.12	.12	
Non-centrality/Invulnerability of the Web	51.4	.28	-.17	.16	.15	.14	.11	.17	-.02	-.04	.11	
Identifying the inventor of "WWW"	16.4	.01	-.12	.21	.17	.04	.04	.03	.00	-.16	.22	
Successful way to locate old school mates	65.3	.09	-.39	.08	.18	.09	.13	-.01	-.12	-.23	.23	
Total Internet knowledge score	----	.04	-.40	.25	.24	.30	.35	.13	-.18	-.38	.29	

first variable to be tested was family role (parent vs. child).

As discussed in Chapter One, interest in Internet-based communities start around early adolescence when teenagers begin to seek autonomy. Like adults, adolescents are most likely to think abstractly in areas in which they have had extensive experience. While these young minds are perceived to be frequent Internet users at home and avid navigators of the Internet, does the family role account for much of the variance of the 16 *Quiz* items and therefore the total Internet knowledge score or of use of the Internet?

As Table 14 shows, parents were more inclined to correctly answer items concerning a correct URL, non-centrality/invulnerability of the Web and Web search engines than children. But overall, family role had no strong interactions with the 16 *Quiz* items. As a result, there was a weak relationship between family role and total Internet knowledge score, and only 8.0% of the variance of total Internet knowledge score could be attributed to family roles. In addition, family role was a very poor predictor of Internet use either. It accounted for only 0.3% of the variance in the use of Internet by respondents.

Language Spoken at Home

This study concerned the distributions of Internet knowledge among the three language-speaking families. Hence the second variable to be tested was "language spoken at home".

Pearson's correlations between language (and *Quiz* version) and the 16 Quiz items (and total Internet knowledge score) in Table 14 shows that English speakers were more inclined to get the items right than were Cantonese or Mandarin speakers. For examples, English speakers were significantly more inclined than were Mandarin and Cantonese speakers to correctly answer questions about locating school mates on the Internet ($r = -.39$, $df = 327$, $p < .001$), search engines ($r = -.30$, $df = 324$, $p < .001$), e-mail attachment ($r = -.29$, df

= 328, $p < .001$), the acronyms of ISP ($r = -.28$, $df = 326$, $p < .001$) and "www" ($r = -.23$, $df = 327$, $p < .001$), the correct URL ($r = -.20$, $df = 326$, $p < .001$), and the meaning of "cookies" ($r = -.20$, $df = 322$, $p < .001$). English speakers were also more likely to correctly identify the inventor of "WWW" ($r = -.12$, df=316, ns).

The eta-square (η^2) of "language spoken at home" suggests overall, approximately 20% of the variance of total Internet knowledge score was attributed to language spoken by respondents. However, as results from Chapter Four, especially Figure 5 (see p. 58) indicated, language was not a good predictor of Internet knowledge for children. Teenagers from all three language groups had similar mean Internet knowledge scores. In fact, for teenagers, language accounted for only 10% of total Internet knowledge score. However, it was not the same case with parents. English-speaking parents outscored Mandarin and Cantonese-speaking parents by 1.7 and 3.4 points respectively. For parents, over 40% of the variance in Internet knowledge score could be attributed to the variable language spoken at home.

In terms of Internet use, only 0.8% of the variance was attributed to the variable of language spoken at home. In other words, language spoken at home is not a good predictor of Internet use by respondents. Moreover, language accounted for 3.6% of how often respondents use the Internet. Therefore, regardless of the language respondents spoken at home, there was not much difference in their frequency of Internet use either.

Education Qualification

Research on the digital divide (e.g. Whinston, 2002, Walsh, 2001) demonstrated that education levels and income are two variables that strongly affect Internet penetration rates. And, as discussed in Chapter One, parents have a great impact on teenagers' life values and educational plans, it was assumed both fathers' and mothers' educational qualifications would influence Internet knowledge of their children (as well as their own). To what extent would

the two education variables affect children's Internet knowledge scores (and their own Internet knowledge scores)? Which one would account for more variance?

Fathers' and Mothers' Education Levels

To examine this matter, mean Internet knowledge scores of the whole family were first plotted against father's and mother's education qualifications. Data in Table 14 suggests the two variables accounted for more or less the same amount of variance in Internet knowledge scores for families. It appears both fathers' and mothers' education levels have a similar impact on mean Internet knowledge scores for families. But what about their impact on their children's Internet knowledge scores? Figures 11 shows the results when children's mean Internet knowledge scores were plotted separately by fathers' and mothers' education qualifications.

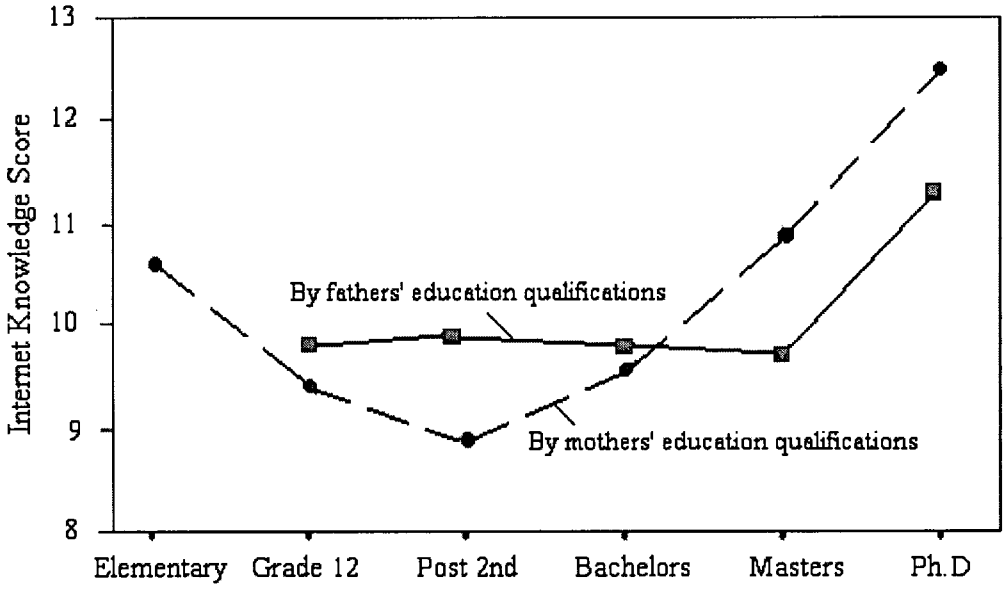

Figure 11. Mean Internet knowledge scores for children by fathers' and mothers' education qualifications

Figure 11 reveals that, within the fathers' education qualifications range from Grade 12 to Masters degrees, mean Internet knowledge scores of teenagers remained on a similar

level of around 9.9 point while children of the six fathers who reported to have a doctoral degree scored a bit above 11 points, i.e. about 1.2 points higher than others. Fathers' education background did not have a significant relationship to their children's Internet knowledge scores (F =.38, df = 4, *ns*).

Figure 11 indicated a curvilinear relationship between mothers' educational levels and their children's Internet knowledge scores. Children who had a mother with an educational background of elementary or Grade 12 obtained higher mean Internet knowledge scores than those whose mothers held some post secondary education qualifications. The upward line starting from the point of "post secondary" on the horizontal axis suggested a strong positive relationship between mothers' education level and mean Internet knowledge score for their children. In the families surveyed, there was significant correlation between mothers' education qualification and their children's Internet knowledge scores (F = 1.48, df = 5, *ns*), but it was not statistically significant.

Mothers' education qualifications accounted for up to 14.4% of their children's Internet knowledge scores while the fathers' predicted only 6.3% -- less than half of the variance predicted by the mothers' education qualifications.

While about 3% of the variance in family's Internet use was attributed to fathers' and mothers' education levels, these two variables predicted little about children's use of the Internet.

Adults' Education Qualification

Internet knowledge scores of adult respondents were presumed to have a strong relationship with their educational background. Figure 12 shows mean Internet knowledge scores for parents plotted according to their highest educational qualification and language spoken at home. There are three noticeable patterns in these data. First, for English-speaking

parents, there was not much that distinguished the scores of the poorly or well-educated respondents. However, for those speaking Mandarin and Cantonese, Internet knowledge varied according to respondents' education levels. The single Mandarin speaker reporting to have only Grade 12 didn't alter the overall relationship between educational level and Internet knowledge. Figure 12 shows that, at nearly all educational levels, English-speakers knew significantly more about the Internet than those speaking Mandarin or Cantonese ($F = 18.89$, $df = 2, p < .001$). In all language groups, those with higher education qualifications knew somewhat more about the Internet than those with lower ones ($F = 6.15$, $df = 5, p < .001$).

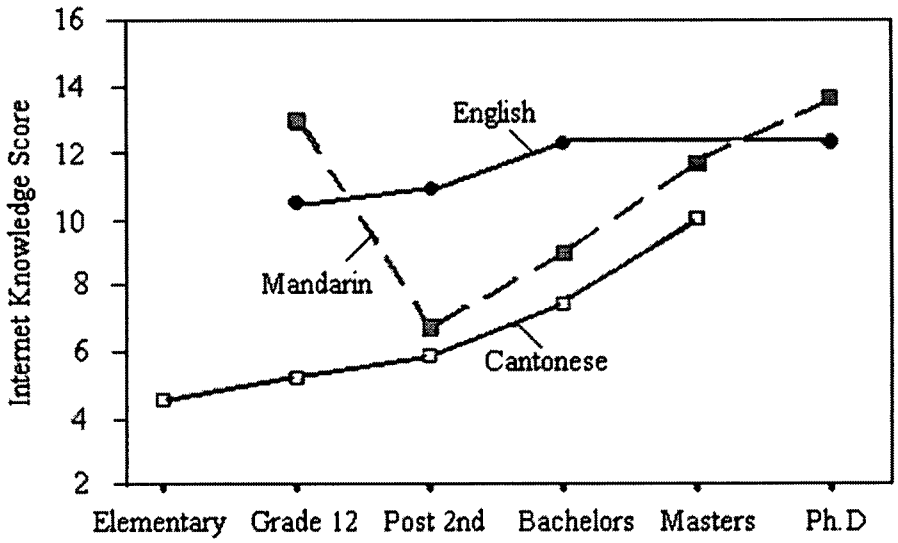

Figure 12. Mean Internet knowledge scores for English, Mandarin and Cantonese-speaking parents by highest education qualifications

For parents, there was a significant correlation between their Internet knowledge scores and education levels ($r = .514$, $df = 181$, $p < .001$) and 26.4% of the variance in Internet knowledge score was attributed to education qualification. However, for English adult speakers, the eta (η) was .46 while that for Mandarin and Cantonese-speaking parents was .65 and .66 separately. Education background accounted for 21% of the variance in Internet

knowledge scores for English-speaking parents but up to around 42.6% and 43.7% for their counterparts from the other two language groups.

Overall, less than 16% of variance in Internet use was attributed to adults' education levels. However, the situation varied among English, Mandarin, and Cantonese-speaking adults. For English adult speakers, the η was .34, Mandarin and Cantonese speakers with an η of .54 and .60. Education qualifications accounted for 11.6%, 29.5% and 36.0% of the variance in Internet use by English, Mandarin and Cantonese-speaking parents respectively.

Ever used the Internet?

Commonsense might suggest those using the Internet would know more about it than non-users. Those who reported to have used the Internet (yesterday or today) had significantly higher scores ($r = .30$, $p < .001$) in this and Boshier's (2002) study involving 3,208 adults ($r = .33$). However, did "ever used the Internet?" explain the same amount of variance in Internet knowledge for parents and children? This matter was explored by plotting mean Internet knowledge scores for parents and children according to their reported answers and the result is presented in Figure 13.

For parents, there was a significant correlation between "ever used the Internet (today or yesterday)?" and their Internet knowledge scores ($F = 39.94$, $df = 1$, $p < .001$). The 34 respondents who said "No" had a mean of 6.74 ($SD = 3.25$) but the 148 who said "Yes" obtained a mean of 10.55 ($SD = 3.16$), nearly four point higher than the former.

The 126 teenagers who reported using the Internet today or yesterday had a mean score of 9.71 ($SD = 2.89$), only .71-point higher than those who said they had not. And the difference was not significant ($F = 1.09$, $df = 1$, *ns*).

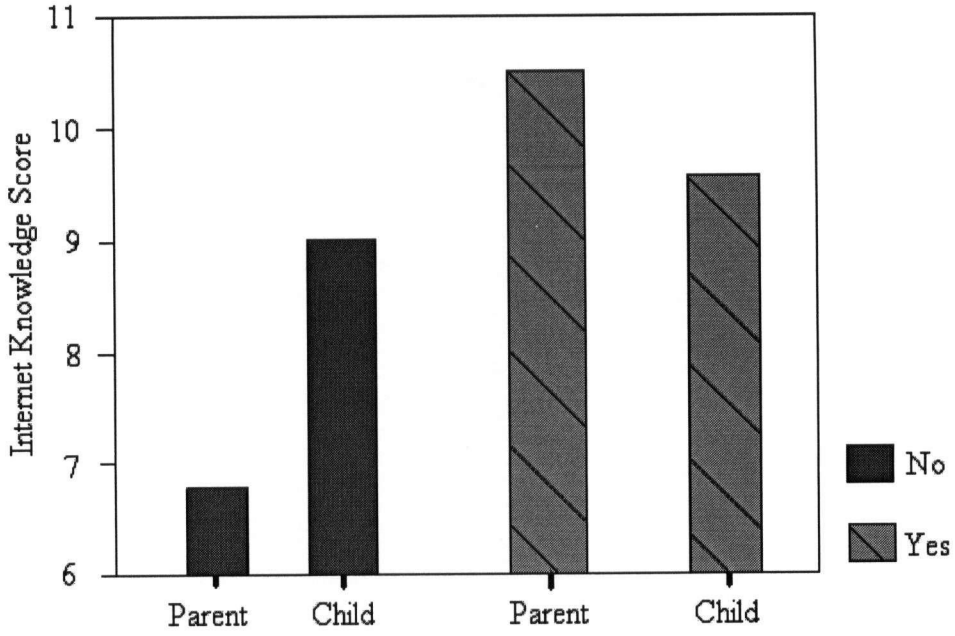

Figure 13. Mean Internet knowledge scores for parents and children by their answer to "Ever used the Internet today or yesterday?"

All 15 scored *Quiz* items correlated positively with Internet use and ten significantly so. In other words, respondents who had said they had used the Internet (today or yesterday) were significantly more inclined than non-users to correctly answer questions about:

- Example of a Web browser ($r = .14, p < .01$)
- Distinguishing a correct URL ($r = .33, p < .001$)
- Developer of Internet explorer ($r = .12, p < .03$)
- Example of a Web search engine ($r = .17, p < .003$)
- Term for e-mail attachment ($r = .24, p < .001$)
- Definition of the World Wide Web ($r = .12, p < .03$)
- The most direct way to get software upgrades ($r = .19, p < .001$)
- Language for constructing Web pages ($r = .20, p < .001$)
- Distinguishing a correct e-mail address ($r = .19, p < .001$)
- Non-Centrality/Invulnerability of the Web ($r = .14, p < .01$)

For the following items, there was no significant difference in scores for people who had or had not used the Internet (today or yesterday).

- Inventor of "WWW" (ns)
- Meaning of "URL" acronym (ns)
- Successful way to locate old school mates
- Meaning of "cookies"

- Meaning of "ISP" acronym.

"Ever used the Internet" had a considerable correlation with frequency of Internet use ($r = .70$, $df = 328$, $p < .001$) and it accounted for up to 50% of frequency of Internet use.

Frequency of Internet Use

Those who often used the Internet ought to be more familiar with it than less frequent users. Figure 14 demonstrates relationships between frequency of Internet use and Internet knowledge scores for parents and children.

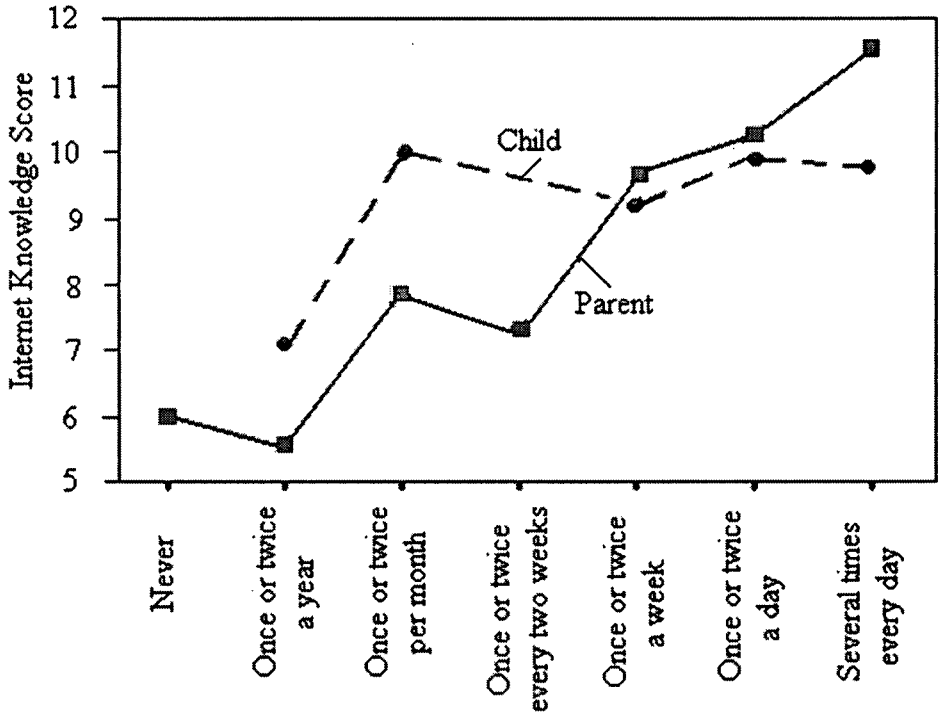

Figure 14. Mean Internet knowledge scores for parents and children by frequency of Internet use

Frequency of Internet use had a positive relationship with Internet knowledge scores for parents. The most frequent Internet users obtained the highest mean Internet knowledge scores of 11.56 ($n = 52$, $SD = 2.97$), nearly twice as much as non-users ($n = 5$, $M = 6.00$, $SD = 2.45$).

Except for the two teenagers who said they used the Internet "once or twice a year", all others had similar mean scores between 9.2 to 10.0. The difference was not significant (F = .61, df = 5, ns).

Compared with the 12.2% of the variance in Internet knowledge explained by "using" the Internet, frequency of Internet use was a better predictor of Internet knowledge for parents (η^2 = 31.3%) but not for children (η^2 = 5.6%). It predicted 53.7% of parents' Internet use but only 19.0% of children's.

Twelve of the 15 scored items were significantly correlated with frequency of Internet use. Items that correlated most with frequency of Internet use involved distinguishing a correct URL (r = .33, p < .001), the term for e-mail attachment (r = .24 p <.001), and the language for constructing Web pages (r = .20, p <.001). Items with the weakest relationship with frequency of Internet use concerned the inventor of the Web (r = .04, *ns*) and the meaning of "URL" acronym (r = .06, *ns*).

Gender

Sex differences in intellectual performance have long been studied. Although boys and girls do not differ in overall intelligence, they vary in specific mental abilities. For example, girls tend to get higher scores on language-related tests than boys while boys are inclined to outscore girls on math tests. As results in Chapter Four suggest, there appeared to be a gender divide in Internet knowledge between fathers and mothers but not between teenage boys and girls. Now the task was to test to what extent gender predicted Internet knowledge and Internet use.

Figure 15 was derived from plotting mean Internet knowledge scores for teenage boys/girls according to their language spoken at home.

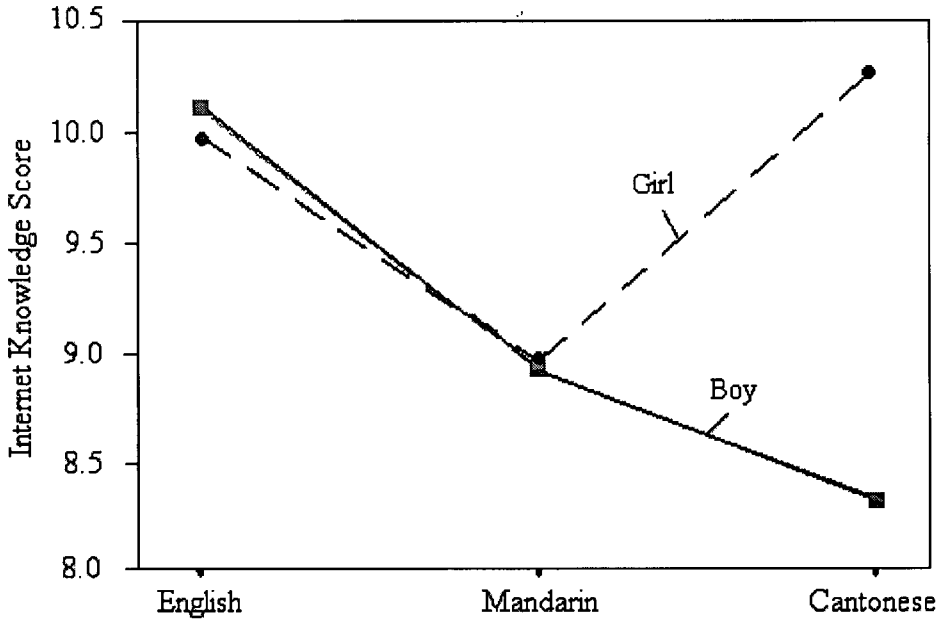

Figure 15. Mean Internet knowledge scores for boys and girls by language spoken at home

As Figure 15 discloses, English and Mandarin-speaking boys and girls obtained very similar mean Internet knowledge scores. Hence there was not a gender divide in mean Internet knowledge scores for these teenagers. However, the gender gap did exist in Cantonese-speaking children who showed a boy/girl discrepancy score of 1.98, but the difference was not significant (F=2.95, df=1, *ns*).

For teenage boys and girls, gender predicted 14.6% of their Internet knowledge scores, but only 3% of Internet use was attributed to this variable.

However, data analysis in Chapter Four indicated that, among all three language groups, there was a tendency for fathers to know more about the Internet than mothers. The knowledge gap for fathers and mothers is depicted in Figure 16.

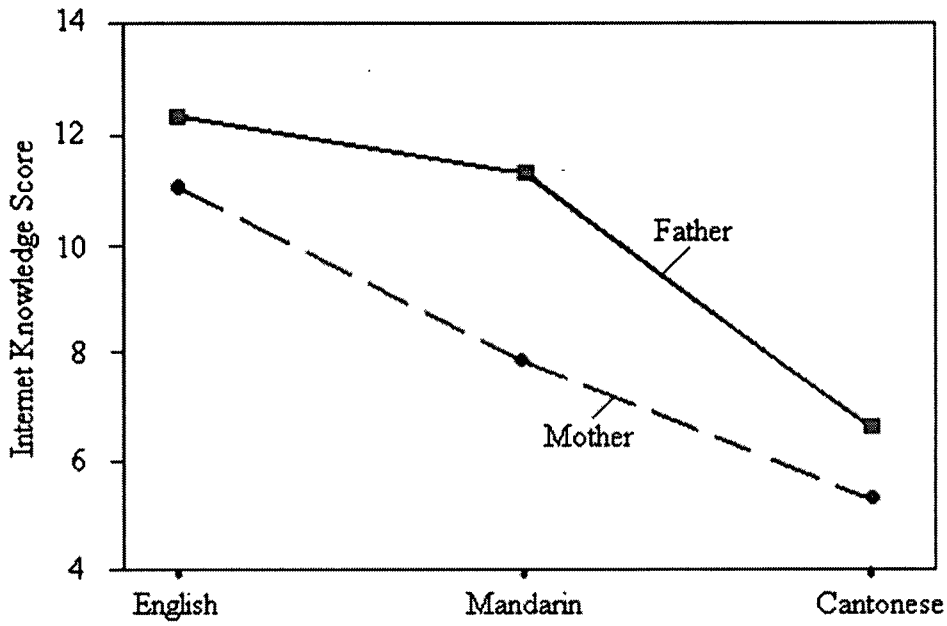

Figure 16. Mean Internet knowledge scores for fathers and mothers by language spoken at home

Clearly shown in Figure 15, overall, fathers outscored mothers in mean Internet knowledge scores by nearly two points and the difference was significant ($F = 13.74$, $df = 2$, $p < .001$).

Gender accounted for 13.7% of the variance of adults' Internet knowledge scores but 2.6% of the variance in their Internet use.

Birth Order

Some research suggests birth order is a good determinant of achievement in formal education settings. Within families, eldest (first born) children often have advantages not enjoyed as well as obligations not assumed by later borns. In Chinese families, there is a Chinese saying "The eldest brother is like a father." First-born children have more responsibilities. They are expected to serve as a role model for and take charge of later-born counterparts. The demands and expectations on first-born children are higher than on later borns. Therefore first-born children tend to perform better at school than their siblings.

Anecdotal evidence suggests that in many families, younger children wait their turn for Internet access but not until space is vacated by an older brother or sister. Moreover, older children would presumably have been using the Internet longer than younger ones. Does birth order have much to do with total Internet knowledge scores?

In general, birth order accounted for as little as 3.1% of Internet knowledge scores but for almost nothing of Internet use by respondents. But would these relationships be different between parents and teenage children, and among the three language speaking groups?

With these in mind, mean Internet knowledge scores were first plotted according to birth order and family roles.

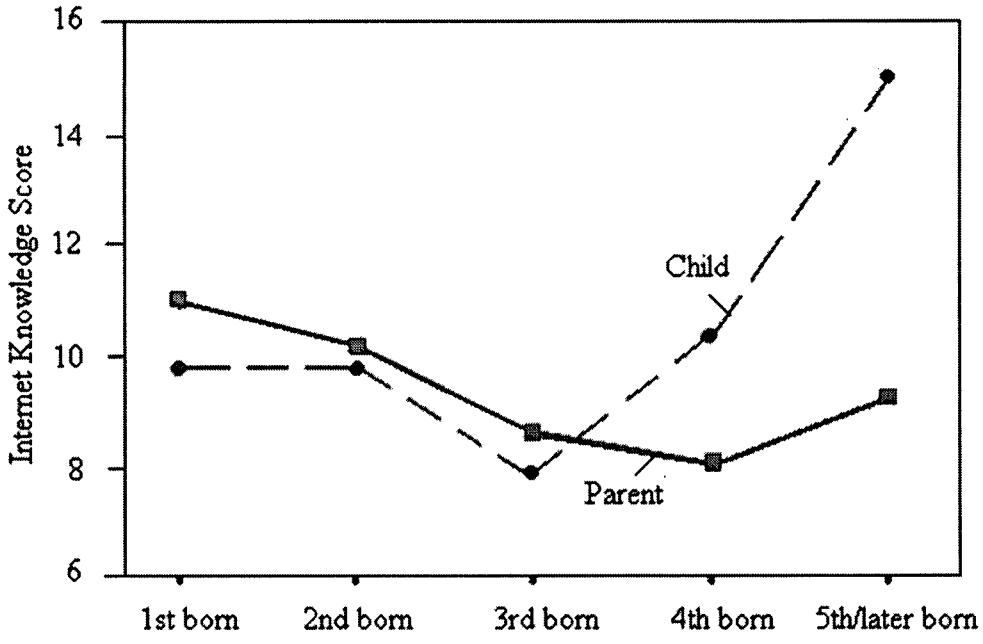

Figure 17. Mean Internet knowledge scores for parents and children by birth order

Although there was a considerable disparity in mean Internet knowledge scores between third and fifth/later-born children, not much should be read into this because there were only three fourth borns and one fifth/later born. Birth order appeared not to have much

to do with mean Internet knowledge scores for parents and for first and second-born teenagers.

To investigate further the relationships between Internet knowledge scores, language and birth order, mean Internet knowledge scores were again plotted by birth order and language spoken at home and Figure 18 was produced.

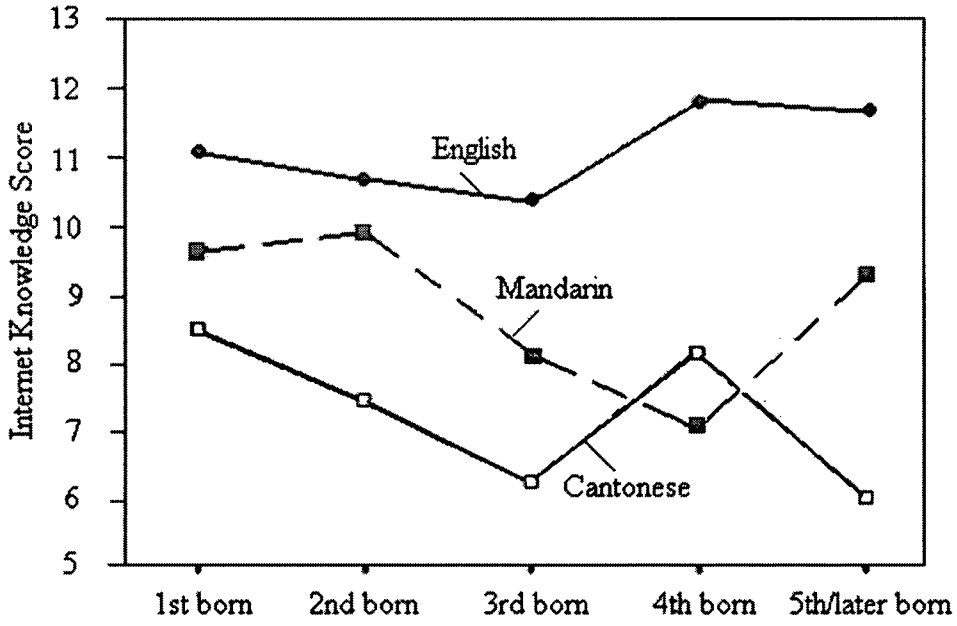

Figure 18. Mean Internet knowledge scores for English, Mandarin and Cantonese speakers by birth order

Birth order appears to have little to do with the Internet knowledge scores of English speakers. Although, among Mandarin and Cantonese speakers, Internet knowledge scores fluctuated between first borns and fifth/later borns, there was no clear linear relationship between birth order and Internet knowledge. Rather, a curvilinear relationship was illustrated in Figure 18. Overall, birth order was not a good predictor of Internet knowledge ($F = 2.27$, $df = 4$, *ns*). There was no significant interaction between birth order, language and Internet knowledge either.

This matter was further investigated by examining the relationship between birth order and Internet use (yesterday or today) as well as "frequency of use". Neither of these variables was significantly associated with birth order. Therefore, it appears younger (or later born) children in any of the three language groups were not significantly disadvantaged in their Internet knowledge.

English/Chinese Quiz Versions

Since both English and Chinese versions of the *Internet Quiz* were employed in this study and 81 respondents (mostly parents) completed the *Quiz* in the Chinese version, it was necessary to test how much impact "*Quiz* version" had on total Internet knowledge scores and use of the Internet.

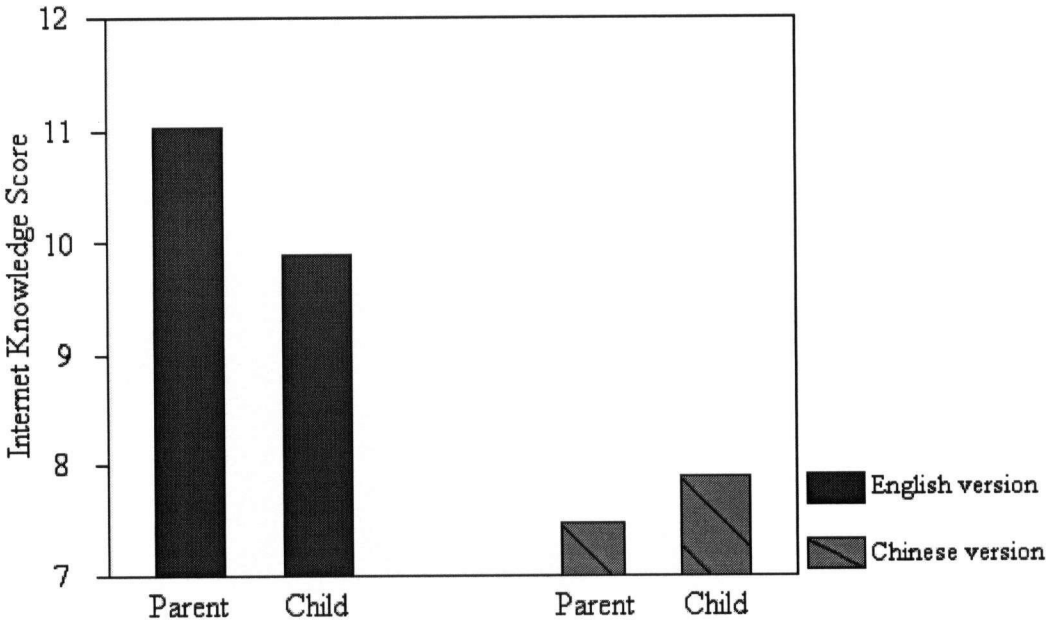

Figure 19. Mean Internet knowledge scores for parents and children by English and Chinese *Quiz* versions

Among teenagers, there were 126 who completed the *Quiz* in English and received a mean score of 9.89 (*SD* = 2.83), 21 did the Chinese version and had a mean of 7.95 (*SD* = 2.85). Hence, the version divide was about two-point wide between children, but the

difference was not significant (F = .92, df = 1, *ns*). "Version" predicted around 7.6% of the Internet knowledge scores for teenagers.

Compared with the mean score of 7.43 obtained by the 60 adults who did the *Quiz* in Chinese, the 122 parents who finished the *Quiz* in English scored over three and a half points higher (SD = 2.79). Therefore, the version divide between parents was nearly twice as wide as that between children. In fact, "*Quiz* version" accounted for up to 26.4% of Internet knowledge scores for adult respondents.

Similar to "language spoken", those who completed the *Quiz* in English were more likely to correctly answer items concerning Web search engine (r = -.36, df = 324, p <.001) and meaning of the "ISP" acronym (r = -.29, df = 326, p < .001). "*Quiz* version" predicted about 18.5% of Internet knowledge scores for respondents but little of their Internet use.

Socio-Demographic Census Characteristics

As discussed in Chapter Three, the composite socio-economic status index was created from existing data by calculating means across a set of socio-demographic variables and the composite SES index had a coefficient alpha of .84. In this section, each of the four items as well as the composite SES index were tested for their correlations with parents' and children's total Internet knowledge scores and Internet use.

Median Family Income by Forward Sortation Areas (FSA)

As Figure 19 shows, parents who were residents of very high family income areas (i.e. $58,000 and more) had the highest mean Internet knowledge score of 11.13 (n = 16, SD = 3.28); those living in high income areas (around $54,000) gained a mean score of 9.50 (n = 12, SD = 3.12), but the mean score for parents in medium family income areas (about 45,000) was 10.98(n = 46, SD = 3.16) which was about one and half point higher than the high income groups; the 35 adults residing in areas with median family income of around $38,00 obtained

a mean score of 8.97 (*SD* = 3.63), a little bit lower than those who lived in areas with median household incomes of lower than $38,000 and received a mean Internet knowledge score of 9.32 (*n*= 73, *SD* = 3.57). The difference was not significant (*F* = 2.84, *df* = 4, *ns*). "Median family income" predicted about 9.8% of Internet knowledge scores for parents but only 0.1% of their Internet use.

Mean Internet knowledge scores for teenagers from the five income groups ranged from 9.57 to 9.91. There was no significant interaction between "median family income" and mean Internet knowledge scores (*F* = .076, *df* = 4, ns). "Median family income" accounted for 8.4% of the variance in Internet knowledge scores of teenagers.

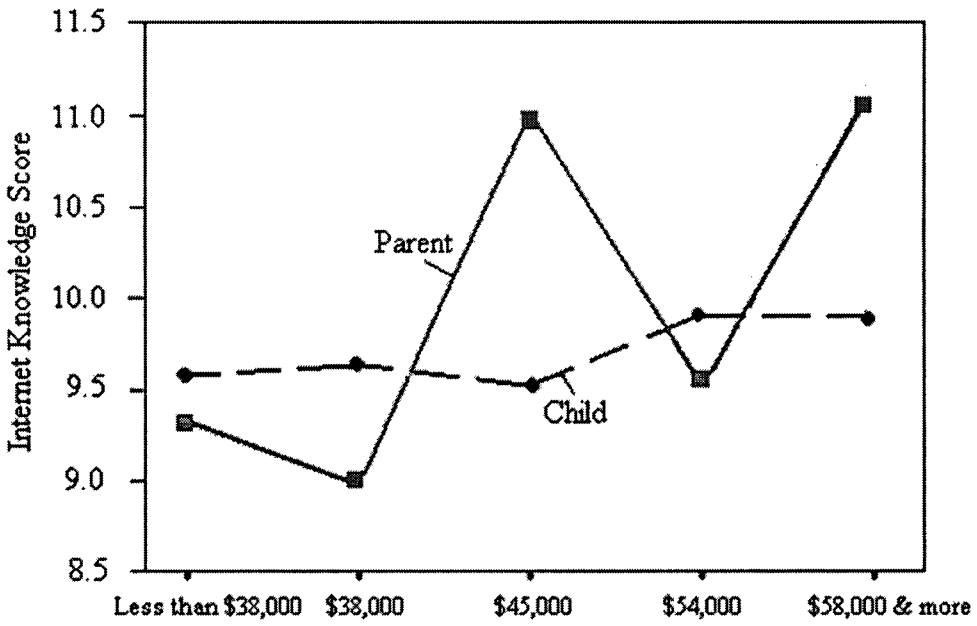

Figure 20. Mean Internet knowledge scores for parents and children by median family income quintiles

In spite of the fluctuation in the middle section of Figure 20, "income" displayed a positive relationship with Internet knowledge scores. In general, respondents residing in higher income areas knew more about the Internet than those in lower income areas.

Percentage of Residents with University Degrees

Figure 21 shows mean Internet knowledge scores for parents and children plotted against percentage of residents who held a university degree within residential areas

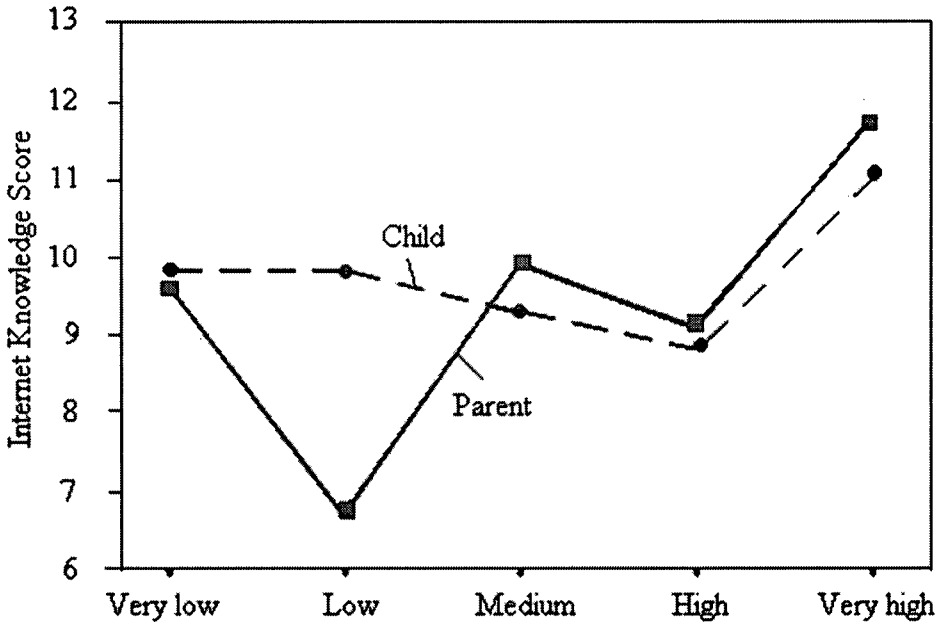

Figure 21. Mean Internet knowledge scores for parents and children by percentage of residents with university degrees quintiles

It is not a surprise to learn respondents living in areas with the highest percentage of university-degree holders had the highest Internet knowledge score (n = 42, M = 11.79, SD = 2.69 for parents, and n =33, M =10.91, SD = 2.61 for children). But what is noticeable in Figure 20 was the 16 parents living in postal codes with low percentage of university-degree holders had a mean Internet knowledge score of 6.69 (SD = 3.02), much lower than any other groups.

On the other hand, mean Internet knowledge scores for children didn't vary much and the difference was about 14%. "Percentage of residents with university degrees" had no significant interaction with their Internet knowledge scores (F = 2.58, df = 4, *ns*).

For parents, there was a significant correlation between "the percentage of residents with university degrees" and their Internet knowledge scores ($F = 8.23$, $df = 4$, $p < .001$), and this variable predicted about 13.0% of their Internet knowledge but 8% of their Internet use. For children, about 19.8% of the variance in their Internet knowledge scores was attributed to this variable, but it was a poor predictor for Internet use by teenagers.

Employment Rate

Another variable that constituted the 4-item SES was "employment rate by FSA". Figure 22 shows mean Internet knowledge scores for parents and children when plotted with "employment rate" within their residential areas.

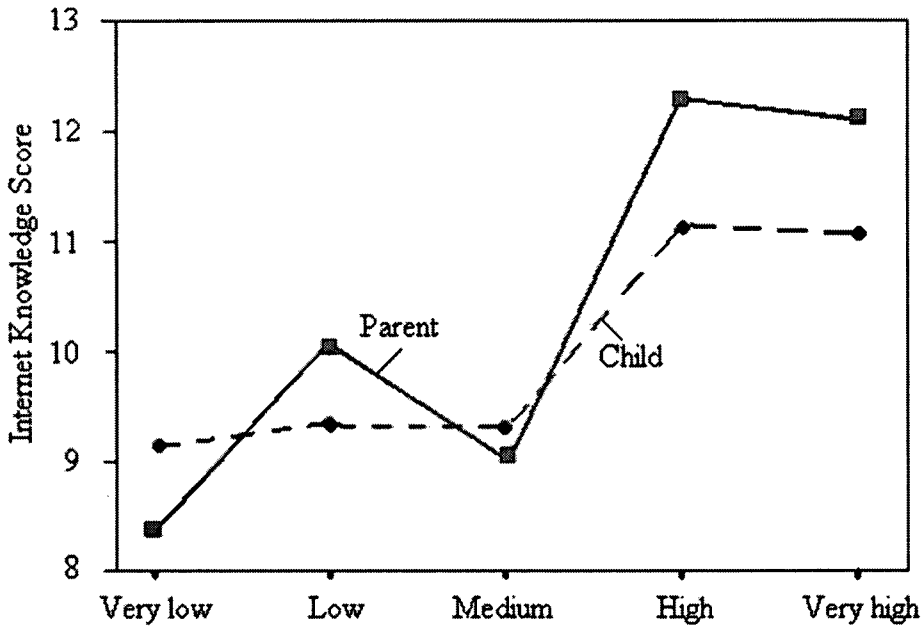

Figure 22. Mean Internet knowledge scores for parents and children by employment rate quintiles

For both parents and children, those residing in areas with "high" and "very high" employment rates outscored their counterparts in other areas. Although parents living in "low" employment rate postal codes had a mean score one-point higher than those in

"medium" areas, Figure 22 demonstrates an overall positive relationship between "employment rate" and Internet knowledge scores.

For parents, "employment rate" predicted up to 21.1% of their Internet knowledge scores and 0.6% of their Internet use; for children, it accounted for 19.9% of their Internet knowledge and 1.1% of their Internet use.

Literacy Rate

Using the Internet and acquiring Internet knowledge requires high literacy. People residing in high literacy areas should be more familiar with Internet than those living in low literacy areas. Figure 23 exhibits relationships between Internet knowledge scores for parents and children and literacy rate within their residential areas.

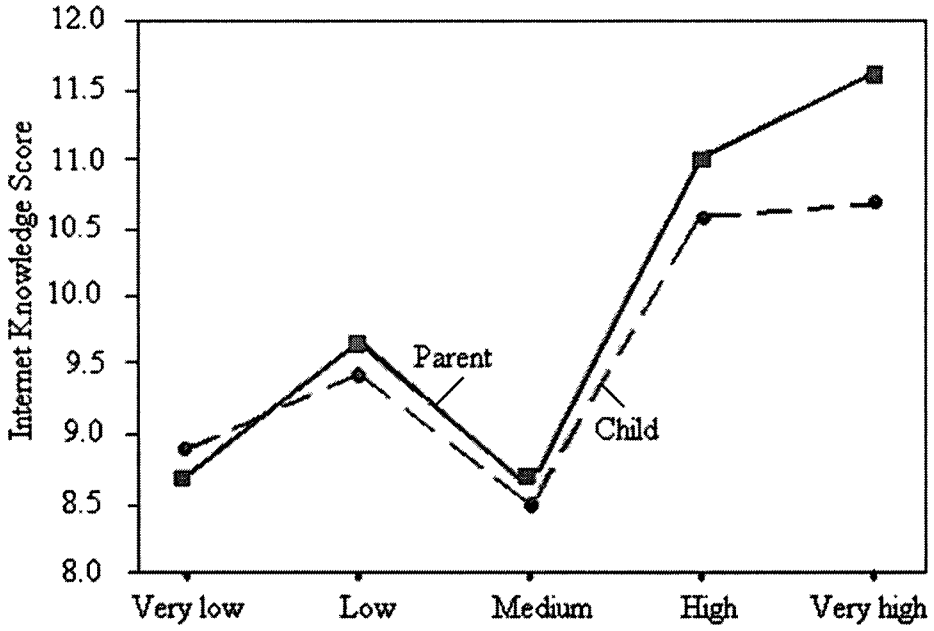

Figure 23. Mean Internet knowledge scores for parents and children by literacy rate quintiles

Overall, there was a positive relationship between literacy rate and Internet knowledge scores for respondents. In Figure 23, there was not much difference between the mean Internet knowledge scores of parents and children residing in all areas except in "very

high" literacy rate postal codes. Both parents and children showed a similar tendency that those residing in higher literacy rate areas had more Internet knowledge than those in lower literacy rate postal codes.

Mean Internet knowledge scores for parents from the five literacy rate areas ranged from 11.61 to 8.63, which means there was a three-point knowledge divide between them but the difference was not significant ($F = 3.75$, $df = 4$, ns). The mean scores for children varied from 10.64 to 8.50, showing a knowledge gap of about two-point wide. The difference was not significant ($F = 2.27$, $df = 4$, *ns*).

For parents, literacy rate accounted for about 12.9% of the variance in their Internet knowledge scores and 0.4% of their Internet use. For teenagers, literacy rate predicted about 18.8% of their Internet knowledge scores and 1.3% of their Internet use.

The Composite SES Index

Figure 24 displays the mean Internet knowledge scores for parents and children when plotted by the composite SES index.

With the composite SES index, parents showed a strong positive correlation between their mean scores and the SES index. The highest mean scores was 11.38 ($n = 13$, $SD = 3.20$); the lowest was 6.82 ($n = 17$, $SD = 2.98$). And the difference was significant ($F = 7.38$, $df = 4$, $p < .001$).

For children, there was not much difference between the mean Internet knowledge scores for each group. Their means ranged from 8.77 to 10.67, showing a two-point wide divide. And the difference was not significant ($F = 1.93$, $df = 4$, *ns*).

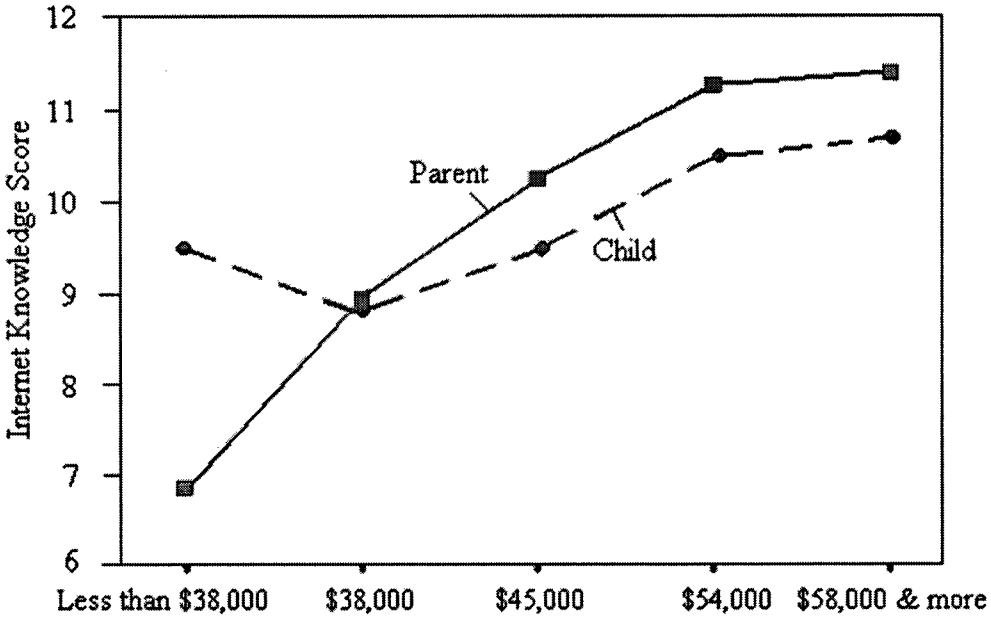

Figure 24. Mean Internet knowledge scores for parents and children by the composite SES index

In spite of few exceptions, in Figure 24, the tendency that those residing in higher SES areas tend to outscore those in lower SES postal codes is clearly illustrated.

For parents, the composite SES index accounted for 19.3% of the variance in their Internet knowledge scores. In terms of their Internet use, the SES index predicted about 0.7% of the variance.

For teenagers, the SES index predicted 19.0% of their Internet knowledge scores and 0.3% for Internet use by children.

Explaining Variance

It is informative to summarize relationships between Internet knowledge scores and family-specific variables and socio-demographic census characteristics. Table 15 shows the non-linear correlation (expressed as eta) between parents' and children's Internet knowledge scores/Internet use and family-specific variables and socio-demographic census characteristics, and percentage of variance (expressed as eta-square) that each of these

variables accounted for.

Table 15

Correlations and Variance Accounted for Parents' and Children's Total Internet Knowledge Scores and Internet Use by Family-Specific and Socio-Demographic Variables.

Variable	Eta (η)				Percentage of Variance Accounted for (Eta-square η^2)			
	IK Score		Use Internet?		IK Score		Use Internet?	
	Parent	Child	Parent	Child	Parent	Child	Parent	Child
Family-Specific Variables								
Language	.64	.32	.20	.06	40.4%	10.1%	3.9%	0.3%
Fathers' Education	.56	.25	.33	.04	30.8	6.3	11.1	0.1
Mothers' Education	.55	.38	.37	.01	30.3	14.4	13.6	0.0
Use Internet?	.49	.33	---	---	23.8	11.1	---	---
Frequency	.56	.24	.73	.44	31.3	5.6	53.7	19.0
Gender	.37	.38	.16	.17	13.7	14.6	2.6	3.0
Birth Order	.39	.21	.01	.06	15.1	4.3	0.0	0.4
English/Chinese Versions	.51	.28	.14	.17	26.4	7.6	2.1	2.8
Socio-Demographic Census Characteristics								
Median Family Income	.31	.29	.04	.07	9.8	8.4	0.1	0.5
University Degrees[a]	.36	.45	.09	.01	13.0	19.8	0.8	0.0
Employment Rate	.46	.45	.08	.10	21.2	19.9	0.6	1.1
Literacy Rate	.36	.43	.06	.12	12.9	18.8	0.4	1.3
Composite SES Index	.44	.44	.08	.06	19.3	19.0	0.7	0.3

[a] Percentage of residents with university degrees

Table 15 shows that, for parents, the best predictors for Internet knowledge scores are language spoken at home, fathers' and mothers' education levels, *Quiz* version, frequency of Internet use, employment rate and the composite SES index. Variables such as median family income, literacy rate, percentage of residents with university degrees, as well as gender and birth accounted for the least of variance in parents' Internet knowledge scores.

Frequency of Internet use, mothers' and fathers' are the best predictors for Internet use by parents. Birth order along with all socio-demographic variables largely fails to predict

parents' Internet use.

For children, socio-demographic variables such as the composite SES index, employment rate, percentage of residents with university education, literacy rate as well as gender and mothers' education background best predict their Internet knowledge scores; Birth order, fathers' education qualifications frequency of Internet use contribute least to their Internet knowledge scores.

Gender and *Quiz* version as well as frequency of Internet use predict more children's Internet use than other variables.

CHAPTER SIX

FINDINGS

The purposes of this study were to measure Internet knowledge generation gaps in Vancouver families, to compare patterns of Internet knowledge in English, Mandarin, and Cantonese-speaking families and to identify variables that account for the most variance in Internet knowledge. After doing several different kinds of data analysis in Chapter Four and Five, nine findings were derived as follows:

- **In the families surveyed, overall, there was not an Internet knowledge generation gap**.

In the 114 Vancouver families, parents obtained a similar mean Internet knowledge score with that of teenagers. Overall, there is not a generation gap between them in terms of Internet knowledge. Sixty-one percent of the parents here scored 10 points and above out of 15 but of the children, only fifty-four percent had 10 and above in the *Internet Quiz*. This study conforms to online surveys in Australia. Parents are not Internet luddites. Rather, they are quite knowledgeable about this new technology. And in families, fathers knew most about the Internet.

- **The patterns of Internet knowledge were different in English, Mandarin and Cantonese-speaking families.**

The mean Internet knowledge scores for different groups are interesting but not as fascinating as comparisons involving parents with their **own** children. As noted, the situations in English, Mandarin and Cantonese-speaking families were different. In English families, parents scored 1.6 points (11%) higher than their children, in Mandarin families parents scored only one-third of a point (2%) higher than their children. However, in Cantonese families, the situation was reversed, children scored 3.30 points (22%) higher than their parents. Therefore, compared with their own children, English-speaking parents knew more,

the Mandarin-speaking parents knew about the same, and the Cantonese-speaking parents knew less about the Internet.

- **Overall, variables that accounted for the most variance in Internet knowledge were fathers' and mothers' education qualification, followed by language spoken at home, *Quiz* version, frequency of Internet use and the composite SES index.**

Education levels have a considerable impact on Internet knowledge. Overall, fathers' and mothers' education qualifications accounted for more than 30% of the variance in Internet knowledge scores.

Language was associated with the Internet knowledge divide among the three language speaking groups. English speakers had the highest scores, followed by Mandarin speakers, and Cantonese speakers scored the lowest. Quiz version was relevant to language and played a similar role in influencing respondents' Internet knowledge scores. Those who completed the *Quiz* in English scored higher than those who did it in Chinese.

Frequency of Internet use is a good predictor of Internet knowledge. The 206 respondents who reported using the Internet once, twice to several times a day scored over 30% higher than those who were non-users or used it once or twice a year.

The composite SES index also affects Internet knowledge scores. Once again, it's a case of "to those who hath, more shall be given." It is not a surprise to discover those with the most Internet knowledge also have the best education and socio-economic status.

- **For parents, the best predictors of Internet knowledge were language, education levels, Internet use, frequency of Internet use and the SES index.**

Among the 182 parents studied here, there was a wide language divide in terms of their Internet knowledge. English-speaking parents scored much higher than Cantonese-speaking counterparts. Language explained over 40% of Internet knowledge for adults.

Adults' education qualification was also a good predictor of their Internet knowledge. English, Mandarin and Cantonese-speaking parents with advanced educational backgrounds

had roughly equivalent scores. However, among parents with a Grade 12 education or less, Cantonese knew much less than those conversing in English or Mandarin. Does this difference arise because, despite their low education levels, English speakers were more prone to use the Internet because most of it is in English? When this notion was tested by comparing "use" data for respondents who had a post-secondary qualification but nothing higher, it was found poorly-educated English speakers were significantly more likely to have used the Internet (today or yesterday) than were poorly-educated Cantonese speakers. It was the same for "frequency of use." Among parents with the lowest levels of education, English-speakers were the most frequent users of the Internet; Mandarin speakers were the next most frequent, and Cantonese the least frequent users of the Internet. This could be partly due to the fact that people in developed English-speaking countries have been using the Internet for a decade or so, whereas recent immigrants from China are "new" Internet users who are not very familiar with the new technology.

The SES index was a good predictor of parents' Internet knowledge. Those dwelling in higher SES areas tended to obtain higher Internet knowledge scores than those in lower SES postal codes. Hence, like many other things in education and life, socio-economic status makes a difference in Internet knowledge.

- **For children, the best predictors of Internet knowledge were the composite SES index along with gender and mothers' education levels.**

As data were analyzed, it became increasingly apparent that, among children, the SES index and three of the socio-demographic characteristics of respondents had more explanatory power than family-specific variables for children's Internet knowledge scores. Children living in higher SES areas were likely to know more about the Internet than those dwelling in lower SES postal codes.

For teenagers, gender and mothers' education levels also accounted for much variance in their Internet knowledge. It appears that in these 114 families, mothers' educational backgrounds had much more influence on their children Internet knowledge than fathers'.

- **Internet use is not a <u>particularly</u> powerful predictor of Internet knowledge for respondents.**

In Boshier's (2002) earlier large-scale study, there was only a modest correlation between Internet knowledge and Internet use ($r = .33$). In this study, it was $r = .30$. In the earlier study, the relationship between knowledge and frequency of Internet use was $r = .32$. Here, it was $r = .35$. Moreover, as discussed on page 99, among less well-educated respondents, there were sharp differences in the extent to which English, Mandarin and Cantonese speakers used the Internet.

In this context, there is more to knowledge than "use" because approximately 88% of the variance (in knowledge) was not explained by use. Hence, while it might appear that, like driving, you learn by doing it, when it comes to Internet knowledge, there's more to the story than just using it. For all 329 respondents, there was a significant correlation between Internet knowledge, having used the Internet (today or yesterday) and frequency of Internet use. Using the Internet (or frequency of Internet use) explained a similar amount of variance as the SES index. Therefore, when trying to explain why some people know a lot or little about the Internet, using it makes a difference. But it is less significant than language and education levels.

- **It is hazardous to talk about the "Asian or Chinese community" as if it were homogeneous. In terms of Internet knowledge, Mandarin and English speakers were similar in many aspects. Cantonese speaking adults were different from both English and Mandarin speakers.**

In this study, Mandarin and English-speaking parents had similar socio-economic status and Internet knowledge scores. If there was any outlier (or particularly disadvantaged

group), it was the Cantonese parents (particularly the mothers) who, as a group, knew comparatively little about the Internet. However, their children knew about as much as those from Mandarin and English-speaking families. So, while there was a knowledge divide that separated Cantonese children from their parents (particularly mothers), this situation did not exist in Mandarin or English-speaking families.

When the author asked a 15 year-old Cantonese boy where he got help if he had computer problems, he looked puzzled and had no answer. His father, a wealthy businessman (and an amateur painter) who completed the *Quiz* and scored 2 items right out of 15 knew very little about the Internet. Is this situation comparable to that where neither parent can help little John with his social studies or Lili with her math?

In some ways, Cantonese families surveyed resembled those in Singapore that caused their government to get agitated about damage wrought by "Internet-dumb" adults. However, rather than condemning such people it would be more prudent to determine why Cantonese mothers know little about the Internet. Could it be a case of patriarchy, culturally inscribed learned helplessness, and children telling mothers not to use "their" computers? Could it be because they hail from a more traditional and less technologically-advanced society than Canada? Do Cantonese women in Vancouver have more science/computer anxiety than is usual? In the absence of answers to these questions, more research is needed.

- **There was a gender gap (regarding Internet knowledge) between fathers and mothers across all three language groups.**

Overall, the difference in mean Internet knowledge scores between males and females was slight, and teenagers showed little signs of gender divide in their mean scores except Cantonese-speaking boys and girls. However, among parents across all three language groups, there **was** an Internet knowledge divide based on gender. In general, fathers knew nearly two points more about the Internet than mothers and the difference was significant. The widest

divide which was about three and half points existed between Mandarin-speaking fathers and mothers.

- **The Chinese and English versions of the *Internet Quiz* were comparable.**

The English version of the *Internet Quiz* was previously used in a large-scale study on Internet knowledge in Vancouver. Because this study focused on Mandarin and Cantonese as well as English-speaking families, a Chinese version was created and applied. The Chinese version had similar item/whole correlations and a comparable coefficient alpha to the English one. During data collection, it was observed both forms required the same time (4-6 minutes) and effort.

CHAPTER SEVEN

THE END AS THE BEGINNING

As the Information Society advances toward the Knowledge Age, the infrastructure emphasis on computers and communication networks calls on a scientifically and technologically literate population. "Well-educated, well-trained, highly motivated and creative people...are the best assets for Europe to live and prosper in the digital world of the next millennium" (Leer, 1996, p. 66). Simply being connected to the digital world is of little value. Making better use of the connection to unprecedented amounts of information and enriching one's life by participating in political, economic, educational and social activities are the primary goals. By constructing the digital divide around knowledge about the Internet, it becomes a multi-dimensional "software" problem that concerns socio-economic status, language, education levels and learning opportunity. By identifying those who had less Internet knowledge and fewer learning opportunities, policy makers and educators can prudently and efficiently target support to disadvantaged people.

Conclusion

This study is significant in several aspects. First, it is one of the few studies that attempt to explore Internet knowledge in Vancouver. Measuring Internet knowledge is not the same as calculating the number of computers. It requires a great deal of effort. Second, this study explores the Internet knowledge divide by gender and across generation in families. By involving fathers, mothers, sons and daughters, this study reveals one aspect of generation and gender gaps. Third, this study investigates patterns of Internet knowledge in three different language-speaking families. It contributes to knowledge about Canada's multiculturalism.

The outstanding finding of this research concerns parents. Contrary to popular stereotypes, parents generally knew more about the Internet than children. The Web Wide

Web was only invented in 1991. Prior to that, other parts of the Internet were available only to a bare minority of academia. Many children but few parents learned about the Internet at school. Somewhere, the 182 parents who completed the *Internet Quiz* had learned a fair amount, and obtained a mean Internet knowledge score comparable to that for the 147 teenagers. In these Vancouver families, there was not an Internet knowledge generation gap that separated parents from teenage children.

However, Internet knowledge was not equally distributed among the three language groups. English speakers scored 12 and 23 percentage points higher than Mandarin and Cantonese speakers respectively.

The patterns of Internet knowledge generation gap were dissimilar within the three language speaking families. In English-speaking families, parents outscored their own children while in Mandarin-speaking families, parents and their children had about the same amount of Internet knowledge, but in Cantonese-speaking families, parents knew much less than their own children.

Language is a variable associated with Internet knowledge. Although a Chinese version of the *Internet Quiz* was created and used in this study, part of it, especially some choices to *Quiz* items, were still in English. Moreover, about 87% of the Internet is in English. These along with other reasons reduce non-English speakers' chance of learning about the Internet and scoring high in the *Internet Quiz*.

Increasing levels of education and socio-economic status positively influence Internet knowledge. The more you have of one, the more you have of the other. Internet knowledge as well as most of information in cyberspace is geared towards those with average to advanced literacy levels. And gaining knowledge and competence about the Internet costs substantial time, money and effort. Therefore, it is not surprising to discover those who enjoyed

privileges such as high socio-economic status and education levels were more familiar with the Internet and used it more frequently than less advantaged individuals.

Within these families, mothers' education background had greater influence on their children's Internet knowledge scores than fathers'. It might be partly because mothers have often been seen to be more involved with socialization of their children than have fathers.

This study also reveals gender differences in Internet knowledge and Internet use among parents. Regardless of language spoken, fathers generally scored nearly 13 percentage points higher in the *Internet Quiz* and accessed the Internet by about 13 percentage points more than mothers. However, the differences based on gender of parents were not present among teenage children. Girls had a slightly higher mean Internet knowledge score than boys and reported using the Internet as often as boys.

Birth order is generally a good predictor of achievement in formal educational settings. However, in this study, there was little evidence that suggested a discernible difference between Internet knowledge scores for early borns and those born later. By and large, birth order was not associated with Internet knowledge scores for parents or children.

This study shows the young people are very familiar with the Internet. However, this does not decrease the need for parents to be aware of what their children are doing online. Digital technology has made parenting trickier than before. In order to help children to be judicious media consumers, parents need to learn about the technology. Moreover, the Internet provides a tool for parents and children to explore and share the riches in the wired world and to learn from each other. If properly used, it can bring a family together.

The Internet has the potential to enable citizens to participate in economic, political, and social activities, to improve the quality of their life, and to build a better society. Current research on the digital divide focuses on statistics about computer ownership and Internet

access. Attention needs to be paid to how the Internet is being used because meaningful and effective use of Internet access is more crucial than having it. Having knowledge about the technology buttresses the effectiveness of Internet use. If various levels of government believe their own rhetoric about the importance of the Internet in the "knowledge economy", steps should be taken to build Internet knowledge amongst the least advantaged members of society. No one should be left behind as the world advances into the 21st century.

Cantonese Attitudes

In this study, the task was to get the *Internet Quiz* completed by one family and then move to the next house. Sometimes there were Internet-related conversations such as about how the family handled the Internet. Almost all families surveyed had at least one personal computer and Internet access (many have high speed Internet access) at home, and many of them have access to the Internet elsewhere such as at work or at school. However Chapter One illustrated that the digital divide is not simply a "hardware" problem. Nor will the mere presence of equipment eliminate causes that jeopardize the possibility of acquiring knowledge about new technology.

In this study, the Internet knowledge disadvantaged concerns a minority group. Cantonese-speaking parents had the lowest mean Internet knowledge score among three language groups and knew significantly less about the Internet than their teenage children. Although almost all Cantonese-speaking families have at least one computer and Internet access at home, some parents reported those facilities were for their children and they had never touched them. Anecdotal evidence suggests some respondents were voluntary non-users. One Cantonese-speaking mother said she did not need the Internet in her life and she was too old to learn "new tricks". There are at least five possible explanations for such attitudes among people.

- Motivations.

As the 2000 General Social Survey (Dryburgh, 2000) data show, many adults learn about computer and the Internet for work or school-related reasons or out of personal interests. For many Cantonese parents, their jobs do not involve using a computer or the Internet. Cyberspace is not part of their personal life. Although many Cantonese parents in Vancouver have ambitious aspirations for the education of their children, their own education is modest and this, coupled with a tendency to work long hours, diminishes the chances and motivation of acquiring Internet knowledge.

- Technophobia.

Casual observations of less well-educated Cantonese women in Vancouver suggest some have a sense of technophobia. They perceive computers as a masculine tool and possess greater computer anxiety than men. The computer remains a black box. They, as individuals, do not feel confident about learning about the new technology. They typically rely upon family and friends and media such as radio and television as repositories of information.

- Cultural differences.

The Internet was born out of U.S. military and university complex and grew up almost entirely within a western culture foreign and distant to some Cantonese parents who were brought up in a traditional eastern culture. Language is also a barrier to their using and learning about Internet. Although Internet content in Chinese is increasing, English has always been the dominant language on the Internet. To those who are more comfortable with their own mother tongue, language is a stone that blocks their road to the virtual world.

- Learning Attitudes.

One of the significant findings of this study is that many parents were very knowledgeable about the Internet. They learned about it somewhere outside schools.

However, Chinese educated in Asia looked to their teachers for direction and guidance. Self-directed learning is experienced initially as anxiety-producing. Less well-educated Chinese parents tend to think they are too "old" to learn "new tricks", especially the computer and Internet. And they are afraid of being a dull learner and killing the computer.

- The digital divide in China.

Personal computers were available to average Canadian families two decades ago. In 1994, only about 18% of Canadians were using the Internet. During 2000, more than half of Canadians over 15 years of age reported being Internet users. However, although China has made amazing progress in the past 20 years, computer ownership and Internet connectivity in China are still much lower than in Canada. Personal computers became affordable to urban Chinese families in the late 1990s. By the end of 2002, an estimated 60 million of Chinese were using the Internet, making up only 4.6% of China's population (CNNIC, 2003). Moreover, Internet access was not equally distributed. The "handful" of Internet users was mostly urban dwellers in developed cities such as Beijing and Shanghai. They enjoyed other socio-economic privileges as well as information technology. Many of the Cantonese-speaking parents surveyed were from less developed areas and were non Internet users in China.

Future Research

An earlier version of this study was presented at the 2003 conference of the CIES (*Comparative and International Education Society*) held at the University of Hawaii at Manoa, USA. During the discussion part of the session, the following points were raised:

- To what extent do the difference arises from the socio-political composition of Vancouver's Chinese society rather than "language spoken" in Vancouver?

Although Chinese families surveyed in this study are mostly from Mainland China,

it is hazardous to talk about the "Chinese community" as if it is homogeneous. As has been pointed out in Chapter One, Chinese society consists of culturally distinct and largely separate communities such as old-timers, Cantonese and Mandarin-speaking groups from Mainland China, from Hong Kong, and from Taiwan. Moreover, although people from Mainland China and Taiwan are Mandarin speakers, they differed in their socio-political compositions and other aspects as well. The same is true with Cantonese speakers from Hong Kong and Guangdong Province, China.

- To what extent were Cantonese respondents more "recent" arrivals than the Mandarin speakers or vice versa?

In the *Quiz*, there was no question that probed immigrant status. However, during discussions that occurred when meeting respondent families, the author discovered almost all Mandarin respondents are "newcomers" who have been in Canada for no more than five years. Many Cantonese speakers are descendents or relatives of those "old-timers". They are less "recent" than those Mandarin speakers.

- To what extent was mothers' SES a factor?

Studies of farm wives and other occupations suggest mothers often have a greater impact on children than fathers. In traditional Chinese families, it is the mother who takes care of and socializes more with her children while the father is assumed to be the "bread-winner" and works out most of the day. In this study, mothers' educational levels affected their children's Internet knowledge more than fathers'. However, the matter of mothers' SES was not probed in this study. It is expected to be explored in future research.

- To what extent did children speak one language to parents (e.g. Cantonese) but another (e.g. English) outside the home?

There was no question in the *Internet Quiz* that investigated this variable. The *Quiz* only asked respondents "What language do you mostly speak at home?" However, casual observations and chats with respondents suggested that, in many Chinese immigrant families, children do speak one language (i.e. their parents' mother tongue) with parents but another (i.e. English) at school or with friends. In fact, even though some Chinese parents remain monolingual, they still hope and encourage their children to learn at least one of Canada's official languages while maintaining their parents' mother tongue.

The socio-political composition of Chinese communities, immigrant status, mothers' SES and children's bilingualism are important but not fully explored in this study. Future studies can investigate how these variables affect Internet knowledge.

The 329 respondents studied here were knowledgeable about the Internet. Apart from the anomaly of the Cantonese mothers, there did not appear to be an Internet knowledge generation gap large enough to merit much concern. In these Vancouver families, parents knew plenty about the Internet. How such relationships would play out in rural families or poorer parts of Canada is not known as available data indicate access to the Internet is distributed unequally across the nation.

Because few parents studied the Internet at school or had time to take relevant courses, many must have educated themselves by the seat-of-their-pants. There would have been a lot of learning-by-doing or trial and error. However, Internet use explains only small amounts of Internet knowledge. Somehow, many parents knew who invented the World Wide Web, why the Internet didn't crash on September 11th, 2001, and who owns various browsers and search engines. These things are not necessarily "learned" from using the Internet. Where did they acquire Internet knowledge and how? Was it serendipitous or deliberate? How much knowledge was obtained through a generalized interest in technology and communication and

how much from immediate needs? In future research, it would be desirable to use qualitative methodologies or observations to investigate where and how people acquire Internet knowledge.

It is clear that in many Vancouver families, the Internet has become part of the warp and woof of their everyday lives and the home is increasingly involved in the wired world. In many households, the computer is shared – like the television or telephone. However, little is known about whether parents and children use the Internet alone or together. Nor is it clear whether parents help their children or vice versa. Does the Internet bolster or impede interaction between parents and children? Bring them together or drive them apart?

Future research can determine whether the connective properties of the Internet make it different from other technologies. How does Internet knowledge flow through families? Does the process of acquiring it consolidate family solidarity or is it an arena of conflict? Being a connective technology, there are already signs it is getting to be like the telephone. In many families, both parents and their children have their own computer. In some families, there is a LAN and attempt to share a single printer or Internet port. How do these or other arrangements shape ways in which Internet knowledge is acquired?

The Internet is a great invention of the 20th century. Cyberspace is a boundless ocean of information. The *Internet Quiz* here measured a tiny sample of Internet knowledge. There were many dimensions of Internet such as its history, psychology and culture that were not investigated yet. Moreover, due to limited time and resources, the author was able to include certain number of English, Mandarin or Cantonese-speaking families in this study, so the findings here may suffer from restriction of range. In future research, extended and refined instruments are needed, and more families (with different cultural backgrounds) need to be

sampled to scrutinize what parents and children know about the Internet and its influence on family life.

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It is essential that:

- Everyone in the family – 12 years and over – completes the *Internet Quiz*. This includes mum, dad (or adult caregivers) and all kids 12 years of age and more. It does not include grandparents.
- Everyone answer all questions. If you are uncertain about any of the multiple-choice items, guess!
- Each person in the family completes the *Quiz* independently. Do not share answers or discuss them with other members of the family.

Your name is **not** required.

The result of this study will eventually be posted on the website of the UBC *Technology and Research Network* [http://www.edst.educ.ubc.ca/tern].

We very much appreciate your cooperation!

I agree to participate in this study. By signing this form, I acknowledge that I have read and understand it and agree to the conditions as explained.

_____ _____

Signature Date

I consent / I do not consent to my child/children's participation in this study.

_____ _____

Signature Date

Your Sincerely,

Yan Huang
Researcher

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互联网知识在温哥华家庭中：父母和孩子对互联网了解多少？

本研究项目旨在发现父母和孩子(在同一家庭中)对INTERNET了解多少. 该研究包含了基于年龄(以区别家长和孩子)和家庭语言(例如, 英语, 国语, 粤语) 之上的比较.

研究者将进行一个关于INTERNET的测验. 诚邀您的家庭参与此项目. 完成该测验只需四到六分钟, 而且您无需署名. 完成测验后, 将它交给研究者. 您将不会再被打搅. 但是, 如果您想要结果的话, 请致电: 604-258-7980 或发电子邮件至yanhuang @interchange. ubc. ca索取.

该项目是由UBC 教育研究系的研究生黄燕为其硕士学位而进行的, 并由UBC的Roger Boshier教授指导.

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您也可以致电Boshier博士:604-822-5822, 或发电子邮件至roger. boshier @ubc. ca索取更多信息.

您不会被强迫完成该测验, 可以拒绝参与. 不会导致任何不良后果.

您的参与是完全自愿的, 任何时候您都可以退出. 不过如果您在这封信上签字的话, 您同意所述之条件并且同意您的孩子参加. 一旦您同意, 研究者还要获得您孩子的口头同意.

谨记, 您无需署名, 您的回答是保密的. 如果您对自己作为研究对象的权利或待遇有任何问题, 请致电604-822-8597 UBC研究服务办公室的研究对象信息热线.

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在此项目中，重要的是：

1. 您家庭中的每一位年龄在12岁或以上的成员完成INTERNET测验. 这包括妈妈，爸爸(或成年护理人)和所有12岁和以上的孩子. 不包括祖父母.
2. 每个人需回答所有问题. 如果您对多项选择中的某个问题没有把握，猜测!
3. 家庭中的每一位成员独立完成测验. 请不要与其他成员相互核对或讨论答案.

您无需署名.

本研究项目的结果最终将公布在UBC技术与研究网络的网址上[http: //www. edst. educ. ubc. ca/tern].

我们非常感谢您的合作!

我同意参加此项目. 在此表上签名，我承认我阅读，理解并同意所列之所有条件.

草签您的姓名	日期
用印刷体书写姓名	日期

我同意/不同意我的孩子参与.

签名	日期

黄燕

INTERNET QUIZ

Your Name is Not Required

Technology and Education Research Network,
Department of Educational Studies
2125 Main Mall
Vancouver, BC V6T 1Z7

The University of British Columbia

Your Name is Not Required

For each question, check one box to indicate the correct answer.

1. What does www stand for?

- ❑ Web of Wild Women
- ❑ Web of Wise Washingtonians
- ❑ Wildlife Web of the World
- ❑ Wide Web of Workmen
- ❑ World Wide Web

2. An example of a web browser is:

- ❑ Yahoo
- ❑ Infoseek
- ❑ Microsoft
- ❑ IBM
- ❑ Netscape Navigator

3. If you clicked on these which would be the most likely to open?

- ❑ http://www.cnn.com
- ❑ www\\cnn.com
- ❑ http\\cnn.com
- ❑ cnncom
- ❑ com.cnn

4. On the internet, "cookies" are:

- ❑ An electronic "firewall" to protect mainframe computers and to frustrate hackers
- ❑ A small piece of information a web site sends to a connecting computer
- ❑ A cookie-sized plastic "stored-value" card that, while people are travelling, can activate computers
- ❑ The signature file (e.g. name, telephone and fax number) at the end of corporate emails
- ❑ A high-calorie treat consumed (usually at night) by people addicted to chat rooms on the internet

5. *Internet Explorer* is a web browser developed by which company?

- ❑ Oracle
- ❑ SAP
- ❑ Netscape
- ❑ Microsoft
- ❑ IBM

6. One of the following is a Web search engine. Which one?

- ❑ Web Drivemaster
- ❑ Super-Search
- ❑ V-8 Search
- ❑ Google
- ❑ SS (Super-Search)

7. With e-mail, it's possible to send a message accompanied by a document or photo. This addition to the message is known as an:

- ❑ Add-on
- ❑ Appendix
- ❑ Addendum
- ❑ Attachment
- ❑ Additive Factor

8. The World Wide Web is:

- ❑ A mainframe computer (in Silicon Valley) that controls (or is the headquarters of) the internet
- ❑ A software language that formats "packets" of documents and pictures on the internet
- ❑ A network of server-computers that support and make available specially formatted materials
- ❑ An alliance of US military, university and corporate interests that sells software and computers
- ❑ A series of telephone lines "webbed" into some of the most remote locations in the world

17. Are you a woman or a man? ❑ Woman ❑ Man

18. In what year were you born? 1 9 ❑ ❑

19. What language do you mostly speak at home ? (print)

e.g. Cantonese, Mandarin, Spanish, English, French etc.

20. What is your occupation ? (print)

- *Note your job (e.g. student at school, university student, tree-planter, secretary, teacher, driver, restaurant-server)*
- *status (e.g. manager, worker, supervisor, apprentice, director)*

21. Have you used the internet today or did you use it yesterday?

❑ no ❑ yes → ***What for?***

E-mail	❑ no	❑ yes
Used the Web	❑ no	❑ yes
File transfer	❑ no	❑ yes
Games	❑ no	❑ yes
Chat-room	❑ no	❑ yes
Other	❑ no	❑ yes

22. What colour are your eyes?

❑ Green
❑ Blue
❑ Hazel
❑ Brown/Black
❑ Grey

23. On average, how often do you use the internet?

❑ Several times every **day**
❑ Once or twice a **day**
❑ Once or twice a **week**
❑ Once or twice every **two weeks**
❑ Once or twice **per month**
❑ Once or twice **a year**
❑ **Never** use it

24. In your family, were you born first, second, third, fourth, fifth or later?

❑ First born
❑ Second
❑ Third
❑ Fourth
❑ Fifth or later

25. Are you an only child?

❑ no
❑ yes

26. What is your postal or zip code?

❑ ❑ ❑ ❑ ❑ ❑

Many Thanks for Your Help!

27. Please indicate your highest educational qualification (parent only):

☐ Elementary school ☐ Grade 12 ☐ Post secondary
☐ Bachelors degree ☐ Masters degree ☐ Doctoral degree
☐ Post-doctoral degree

互 联 网 知 识 测 验

您 无 需 署 名

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The University of British Columbia

您无需署名

请把每一个问题正确答案在对应的☐里划x.

1. WWW代表什么?

☐Web of Wild Women
☐Web of Wise Washingtonians
☐Wildlife Web of the World
☐Wide Web of Workmen
☐World Wide Web

2. 下面选项中哪一个是网络浏览器?

☐Yahoo
☐Infoseek
☐Microsoft
☐IBM
☐Netscape Navigator

3. 如果你点击下面的网址,哪一个最可能会打开?

☐http://www.cnn.com
☐www\\cnn.com
☐http\\cnn.com
☐cnncom
☐com.cnn

4. 在互联网中,Cookie代表什么?

☐保护中心枢纽电脑,防止黑客骚扰的一道电子火墙.
☐某一网址发送给相连电脑的一则信息.
☐一种跟cookie饼干大小,具有"储存价值"的塑料卡,人们外出旅行时用它启动电脑.
☐公司电子邮件末尾的签名文件(如:姓名,电话和传真号码).
☐热衷于互联网上聊天的人常吃的一种高热量的宵夜食品.

5. Internet Explorer是哪一家公司设计的浏览器?

☐Oracle
☐SAP
☐Netscape
☐Microsoft
☐IBM

6. 下面选项中有一个是网络搜索器.是哪一个?

☐Web Drivemaster
☐Super-Search
☐V-8 Search
☐Google
☐SS(Super-Search)

7. 发电子信件时,有可能要附带发送文件或照片.这种附加信息被称作:

☐Add-on
☐Appendix
☐Addendum
☐Attachment
☐Additive Factor

8. World Wide Web表示:

☐控制互联网的中心枢纽电脑(位于硅谷).
☐用于格式化互联网上的文件和照片的软件语言.
☐支持并提供经过特殊格式化材料的电脑服务器网络.
☐销售软件和电脑的美国军队,大学和公司的联合体.
☐通到世界上某些最偏远地区的一系列电话线.

9. URL称为网址，其全称是：

☐Unified Recording Locator
☐United Replication Locator
☐Uniform Resource Locator
☐Unity Reproduction Locator
☐Unified Reaction Limiter

10. 互联网软件制造商总是提供"升级版"服务. 最直接得到升级版的办法是：
☐致电软件制造商，请其邮寄升级软件.
☐从其网址下载
☐把朋友的软件借来拷贝.
☐用附件的形式从软件制造商的网址发送电子邮件.
☐到软件制造商的地区办公室购买.

11. 在家里使用互联网，你需要一台电脑，软件和ISP. ISP是：
☐Interactive Solution Protocol
☐Information Software Procedure
☐Internet Service Provider
☐International Station Program
☐Integrated System Prerequisite

12. 如果你想在互联网上建造网页，你将要学习：
☐Hyper Text Mark-up Language(HTML)
☐Construction Procedure for Websters (CPW)
☐Internet Start and Publishing Protocols (ISPP)
☐Dot.Com Risk Averting Procedures (DCRAP)
☐Sega Gaming Interaction Devices (SGID)

13. 以下的电子邮件地址哪一个是正确的？
☐JohnSmith@hotmail
☐Yahoo.com@HarryJones
☐MaryBlackcbc.ca
☐JennyBrown@ubc
☐LindaLu@yahoo.com

14. 2001年九月十一日，互联网继续运行. 这是因为：
☐其"中心"或"枢纽"不在世贸中心或五角大厦.
☐互联网中心的软件不受攻击影响.
☐互联网遍布广泛，局部受损不会摧毁其他部分.
☐大多数电子邮件，网络浏览和其它网路活动都发生在夜间.
☐互联网的主控部分在欧洲(波恩)和亚洲(东京).

15. 谁发明了World Wide Web?

☐Bill Gates
☐Larry Ellison
☐Marshall McLuhan
☐Jim Clark
☐Tim Berners-Lee

16. 如果你试图在互联网上联络旧校友，较可能成功的方法是：
☐使用微软视窗.
☐使用MacIntosh电脑
☐试用不同的搜索器.
☐使用桌上电脑之后，再试用手提电脑.
☐将游戏软件连接到聊天室.

即将完成.....还有关于您的几个问题.....请翻页
记住，您无需署名.

17. 您的性别: □男 □女

18. 您出生于: 19□□

19. 您的家庭使用什么语言?

(比如粤语, 国语, 西班牙语, 英语, 法语, 等等)

20. 您的职业:

工作(比如学校学生, 大学生, 林业工人, 秘书, 教师, 司机, 餐馆侍应等等) 职位(比如经理, 工人, 主管, 学徒, 主任等等)

21. 您昨天或今天是否使用过电脑?
□否 □是 如果是, 用来做什么?

EMAIL	□否	□是
上网	□否	□是
传送文件	□否	□是
玩游戏	□否	□是
上聊天室	□否	□是
其它	□否	□是

22. 您的眼睛是什么颜色?
□绿色
□蓝色
□褐色
□棕色/黑色
□灰色

23. 您一般多长时间上一次网?
□每天几次
□每天一, 两次
□每星期一, 两次
□每月一, 两次
□每年一, 两次
□从来不用

24. 在您家兄弟姊妹中, 您排行第几?
□第一
□第二
□第三
□第四
□第五或更小

25. 您是家里唯一的孩子吗?
□否
□是

26. 您所居住地区的邮政编码是
□□□ □□□

27. 您的教育背景是: □小学 □中学 □大专 □学士 □硕士 □博士 □博士后

非常感谢您的合作与帮助!