



## Developing a Human Perspective to the Digital Divide in the Smart City

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This paper will outline a research in progress that explores the psychological barriers that prevent people within community from integrating information and communication technology into their lives. The research will use the Social Cognitive Theory by Bandura (1986) to examine the psychology of the digital divide. This theory postulates that a person will act according to their perceived capabilities and the anticipated consequences of their actions. Participants in the study will be members of the Brisbane community. Self-administered surveys will be used for data collection. The surveys will gather data on demographics, Internet usage and Internet self-efficacy. As part of its commitment to developing the *Smart City*, the Brisbane City Council (BCC) provides support to the current research project by allowing participants to be drawn from the 32 branches of the BCC library service. The current research is significant, as it will expand current understanding of a phenomenon that has far reaching social and economic implications. This research will aid in developing a clearer and more comprehensive picture of the digital divide, which will allow organisations, such as public libraries, to better develop and tailor services and programs to more accurately and effectively narrow the gap between the information rich and information poor in society. Thus, allowing all members of community to have an equal chance of establishing and maintaining productive personal and professional lives in this rapidly emerging digital age.

### INTRODUCTION

The digital divide between Information and Communication Technology (ICT) 'haves' and 'have-nots' has been a topic of considerable discussion since the US federal government released its 1995 report on household access to technologies such as the telephone, computers and the Internet (NTIA, 1995). Since this time many organizations have endeavoured to bridge the digital divide through a diverse range of initiatives and projects. These initiatives and projects have been developed based on the current understanding of the digital divide. This understanding has been developed primarily from a socio-economic perspective. According to current studies (Lenhart, Horrigan, Ranie, Allen, Boyce, Madden & O'Grady, 2003; NOIE, 2002; NTIA, 2002) the primary factors contributing to the digital divide are income, employment and education. As personal computer prices have fallen and Internet services to the household are becoming increasingly less expensive the socio-economic perspective of the digital divide becomes less convincing to explain all reasons for ICT non-use. The 1999 study by the National Telecommunications and Information Administration (NTIA) into the digital divide in the United States suggested that the "don't want it" attitude is fast rivaling cost as a factor explaining non-use of the Internet. Further support for this suggestion was more recently given by a Pew Internet and American Life Project (Lenhart, et al, 2003) study which stated that nearly one quarter of Americans are "Truly disconnected" having no direct or indirect experience with the Internet. Whilst another 20% of Americans were "Net Evaders", that is, people who live with someone who uses the Internet from home. Net

Evaders might "use" the Internet by having others send and receive email or do online searches for information for them. Recent criticism of the current digital divide studies (Jung, Qiu & Kim, 2001) has suggested that the studies failure to consider the psychological, social and cultural barriers to the digital divide. If all members of community are to be allowed to become active citizens and if community organisations are to develop services and resources that will contribute to bridging the digital divide efforts must be made to more clearly understand the social, psychological and cultural differences that contribute to its development.

This paper discusses a current research project into the psychological barriers of the digital divide. The paper is divided into three parts. Part one considers what the digital divide is. A brief picture of the digital inequality in Australia is outlined. The limitations of current digital divide studies are discussed. So too is the relationship between information ethics and digital inequality in the information age. Part two outlines the current research project. The research approach, the underlying theoretical framework and the expected outcomes are discussed. Part three will discuss the future and emerging trends of digital divide research, suggesting further opportunities for study and exploration.

### THE DIGITAL DIVIDE: A REVIEW OF THE LITERATURE

This section will provide a brief overview of the current digital divide literature. In particular the section will discuss current understanding of the phenomenon based upon existing research aimed at quantifying and defining the divide and considers the question whether there are two digital divides. The section will

examine current literature examining the psychology of the divide and will explore the relationship between the digital divide, information ethics and the information society. The section will finish with a brief description of the current digital divide challenge that the current research project is seeking to meet.

## **Defining and Quantifying the Divide**

The phrase *digital divide* has become the accepted manner for referring to “the social implication of unequal access of some sectors of community to Information and Communication Technology [ICT] and the acquisition of necessary skills” (Foster, 2000, p. 445). The term has been derived from the commonly held belief that access to Information and Communication Technology (ICT) such as the Internet, and the ability to use this technology is necessary for members of community if they are to fully participate in economic, political and social life.

Studies examining the digital divide abound. Three recent studies have been conducted in the United States (Lenhart et al, 2003; NTIA, 2002) and Australia (NOIE, 2002). Each study sought to establish a statistical snapshot of the current state of their nation's involvement with technology such as the Internet and computers. In the second of the studies in the US the NTIA acknowledged that the Digital Divide “is now one of America's leading economic and civil rights issues” (NTIA, 1999, p. xiii). This statement is no less true for Australia. The findings from both the US and the Australian studies highlight several interlocking factors, which heighten the digital divide: race and ethnicity, geography, income, education level, employment status and physical disability. Individuals who can be identified through these factors are more likely to represent the ‘have-nots’ in the digital divide.

## **Two Digital Divides?**

Several commentaries have emerged in recent years discussing the current studies measuring and quantifying the Digital Divide. In 2001 Jung, Qui and Kim considered the question “What is the Digital Divide? Does it mean mere ownership of Internet connections...or does the digital divide describe more fundamental inequalities in people's connection to communication technologies?” (2001, p. 3). In considering this question the authors suggested that the current studies exploring the digital divide were limited by their focus on three primary measuring techniques. These techniques include: a *dichotomous comparison* which focuses on the issue of simple access or ownership (i.e. computer owner vs. non owner); a *time based measure*, where more time spent online is equated to “regular use”; and a *measure of activities conducted online*, where frequency of engaging in activities such as online banking, online shopping are measured. Jung, Qiu and Kim suggest that these measures fail to consider the social context in which people incorporate technology. The authors suggest that the personal and social effects of the Internet must be considered in comprehending the more subtle aspects of the digital divide. Jung, Qiu and Kim suggest that once people have access to the Internet the questions to be addressed is how can and do they construct meaning from their being connected. They conclude “existing inequalities even after gaining access to the Internet can directly affect the capacity and the desire of people to utilise their connections for purposes of social mobility” (Jung, Qiu & Kim, 2001, p. 8).

Vernon Harper (n.d.) in a recent discussion paper suggests the existence of two digital divides: Access Digital Divide (ADD) and Social Digital Divide (SDD). The Access Digital Divide (ADD) is based upon cost factors and is frequently discussed in terms of the presences of computers or Internet access in the household. The Social Digital Divide (SDD) is “a product of differences that are based on perception, culture and interpersonal relationships that contribute to the gap in computer and Internet penetration” (Harper, n.d, p. 4). Harper recommends that the scholarly community build research that explores the social, psychological and cultural differences that contribute to the Social Digital Divide (SDD). Harper concludes by stating “the issues surrounding the digital divide must be redefined away from the hardware and towards humanity” (n.d., p. 5). In agreement is Soraj Hongladarom (n.d.) who stated, “one should more accurately talk about the digital divides, as there are many different kinds of the divide” (p. 3). In stating this Hongladarom points to the work by Hargittair (2002) who argues the existence of a second-level digital divide that involves the gap between the skills people have when they are online. He contrasts this to the usual interpretation of the digital divide as little more than the gap between those who possess or do not possess the technology. This view of a multiple digital divided was supported by a 2001 US study conducted by Mossberger, Tolbert and Stansbury (2003) in which 1837 US residents participated in a telephone survey exploring PC and Internet use. On completion of the project the researches concluded that there existed four types of digital divides: the access divide; the skills divide; the economic opportunity divide and the democratic divide. The need to focus on an individual's ability to use technology instead of just accessing it was further explored in the recent work by Kvasny. In her 2002 doctoral dissertation Kvasny undertakes a study of the cultural dimensions that contribute to digital divide in the United States. Kvasny suggests that her study “goes beyond describing the digital divide to analyzing *digital inequality*” (2002, p. 16) . Kvasny uses the concept of *digital inequality* “to signify a shift and distinction in focus from *access* to *use* of information and technology” (2002, p. 16).

## **The Social Digital Divide: Establishing a Psychological Perspective**

Very little research to-date has attempted to explore the psychological factors that contribute to digital inequality. One of the first studies examining the psychology of the digital divide was undertaken at Michigan State University. Conducted by Eastin and LaRose (2000) the study examines the digital divide from the perspective of Bandura's Social Cognitive Theory (1986). This theory postulates that a person will act according to their perceived capabilities and the anticipated consequences of their actions. Self-efficacy is the primary component of the theory. It is the belief that a person has that they can perform a particular behaviour or task. Eastin and LaRose developed and validated an Internet Self-Efficacy Scale for the purposes of their study. Using university students the study findings indicate that self-efficacy is a significant predictor of Internet use. According to the current socio-economic perspective of the digital divide an individual with higher levels of education (i.e. university) is less likely to represent the digital divide than those with lower levels of education. Given that the study's participants were college students and no demographic data is provided any conclusions drawn about the Internet self efficacy and its role in the digital divide can be suggestive at best.

In the same year a study exploring the computer self-efficacy of African American high school students was undertaken by Foster (2001). Socio-economic studies of the digital divide suggest that African American's are more likely to represent the digital divide. The study's findings suggest that African American high school students have a lower computer self-efficacy than non African American students. Social and cultural factors unique to the study's participants suggest that the findings are not easily generalisable to the wider population.

Both studies expand current understanding of the psychological factors that impact upon a person's willingness to engage with information and communication technology. However because of the participants used (i.e. college students and African American high school students) the studies can shed only limited light onto the impact Internet self efficacy has on the digital divide within community.

### **Information Society, Information Ethics and the Digital Divide**

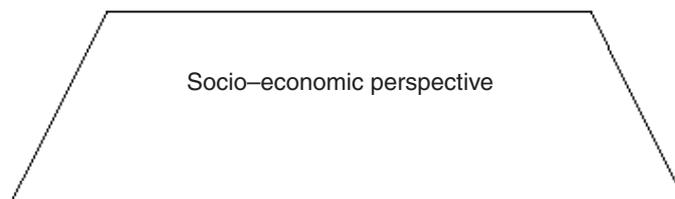
We live in a society where information is fundamental to the workings of everyday life. Everyone needs and uses information, whether buying a new car, opening a bank account, or writing a business report. We also live in a digital age where more and more information and communication is taking place in the digital or electronic environment. The Internet is the most public face of the emerging digital age. It is rapidly becoming the primary vehicle for information exchange and communications and is establishing itself as a vital and dynamic part of modern society. Governments at all levels use the Internet to disseminate information. Business and retail industries are flourishing on the Internet. The Internet provides a new and more flexible means of shopping for consumers. Learning and teaching is enhanced by the many resources and services offered via the Internet. The Internet also has a great impact on scholarly research and development. Sports fans can access up to the minute game results and view matches as they take place live in any part of the world. Keeping in touch with distant family and friends has become even easier with chat rooms and e-mail. As the Internet increasingly becomes a primary distribution vehicle for information exchange and communication, access to the Internet is no longer a luxury but a necessity for living in the current information age.

In 1998 Stichler and Hauptman asserted that the "information age has been widely acclaimed as a great benefit for humanity, but the massive global change it is producing brings new ethical dilemmas" (p. 1). In agreement is Luciano Floridi, who in a 2001 paper based on an invited address to the UNESCO World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) Luciano Floridi stated that "the information society...poses fundamental ethical problems whose complexity and global dimensions are rapidly evolving" (2001a, p. 1). Floridi argues that "how information and communication technologies can contribute to the sustainable development of an equitable society is one of the most crucial global issues of our time" (Floridi, 2001b, p. 2). Floridi points to the digital divide in particular as the source of many of the ethical problems emerging from the evolution of the information society. The digital divide "disempowers, discriminates and generates dependency. It can engender new forms of colonialism and apartheid that must be prevented, opposed and ultimately eradicated" (Floridi, 2001a, p.

3). Floridi concedes that on a global scale the issues of health, education and the acceptance of elementary human rights should be among "humanities foremost priorities" (2001a, p. 2), however, Floridi argues that "that underestimating the importance of the [digital divide], and hence letting it widen, means exacerbating these problems as well" (2001a, p. 2). Floridi concludes by announcing that "our challenge is to build an information society for all, and this is a "historical opportunity we cannot afford to miss" (Floridi, 2001a, 4).

### **Defining the Digital Divide Challenge**

The community is rapidly being divided into those who are information rich – the 'haves' and those who are information poor – the 'have-nots'. Steps must be taken to ensure that all members of community have access to and the ability to effectively utilize information and communication technology such as the Internet. By taking steps we will assist in preventing the creation of a digital divide, and ensure that all members of society have an equal chance of establishing and maintaining productive personal and professional lives. The digital divide is a complex phenomenon. Many studies to-date have taken the socio-economic perspective of the digital divide where income, employment and education are the primary factors influencing the development and growth of the digital divide. Whilst these studies provide a valid and important understanding of the phenomenon the studies represent only a single layer of understanding to digital inequality (See Figure 1).



**Figure 1. The single layered perspective to the digital inequality**

The psychological, social and cultural factors that may contribute to the digital divide are only now just beginning to be explored. Further studies exploring the psychological, social and cultural factors that prevent an individual from embracing technology into their lives would help in providing a more detailed understanding of the digital divide in society. Efforts must be made to more clearly understand the socio-psychological and cultural differences that contribute to the digital divide will ultimately ensure that all individuals have the opportunity to become active community citizens and allow organizations involved in establishing program and initiatives to do so with greater efficiency and effectiveness. If adequate steps are to be taken to bridge the growing information and technology gap a thorough understanding of the digital divide is vital. New layers of understanding need to be added to the current single layered perspective of digital inequality. The research project outlined in this paper will contribute to this challenge by shedding light on the psychological factors contributing to digital inequality within community. Figure 2 represents the multi-layered understanding of digital inequality that the current research (and others like it) will develop.

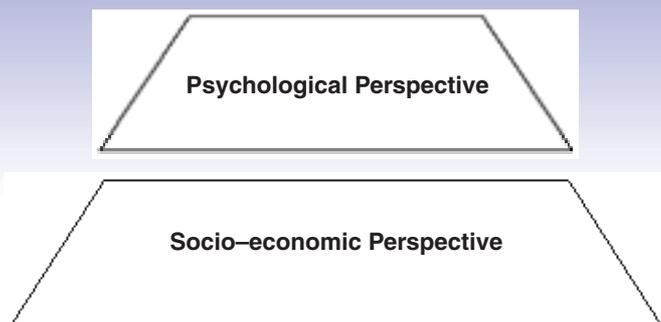


Figure 2: The multi-layered approach to digital inequality

## THE RESEARCH PROJECT

This section will provide a brief overview of the current research project. In particular the section will discuss Brisbane as a smart city and its focus on fostering a community of learning. The section will outline the research aims, method and data collection context and provide a brief discussion on the theoretical models guiding the study. The section will finish with a brief discussion of the expected outcomes and significance of the research project.

### Brisbane: The Smart City

Brisbane is the capital city of the state of Queensland. It is the third largest city in Australia covering an area approximately 1350km<sup>2</sup> and supporting a total population of 1, 601, 417. In the recently released planning document “Living in Brisbane 2010” the Brisbane City Council articulate its vision for Brisbane as a ‘smart city [that] actively embraces new technologies...Brisbane should seek to be a more open society where technology makes it easier for people to have their say, gain access to services and to stay in touch with what is happening around them, simply and cheaply. All residents will have access to the Internet, and the ability to use it.” (BCC, 2001) This statement clearly reveals that Brisbane city, like some many others around the world (i.e. Ballarat & Glasgow), is endeavouring to become a learning community. The European Lifelong Learning Initiative (ELLI) defines a learning community as “a city, town or region which goes beyond its statutory duty to provide education and training for those who require it and instead creates a vibrant, participative, culturally aware and economically buoyant human environment through the provision, justification and active promotion of learning opportunities to enhance the potential of all its citizens” (Cited in Longworth, 1999, p. 112). In striving to be a city of learning Longworth suggests that, cities like Brisbane, will need to also be come a “caring city” (Longworth, 1999, p. 115). Brisbane “will have to make special provision for the excluded” (Longworth, 1999, p. 115). Similarly, Best (2002) suggests that one of the major challenges to be faced in fostering a learning city is to lessen the growing divides – socio-economic, educational, regional, ethnic, digital, aboriginal/non-aboriginal. Unless this can occur Brisbane (and other cities like it) “will become a two-tiered society with a permanent underclass” (Best, 2002, para. 10). Grounded in their ambition to become a “smart city” Brisbane City Council has supported a research project aimed at meeting the challenge identified by Best. Details of this project are outlined below.

### The Research Aim

The research project explores the human dimension of digital inequality by examining the psychological factors that contribute

to digital divide. The research is focused by the basic question: are there internal forces causing members of community to choose not to integrate information and communication technology, such as the Internet, into their lives? The main aim of the research is to explore the notion of the Social Digital Divide proposed by Harper (n.d.) by examining the Internet self-efficacy of Internet users and non-users within community. This will be achieved by:

1. Measuring the Internet self-efficacy of Internet users and non-users.
2. Determining if there is a difference in Internet self-efficacy between:
  - Internet non-users users who represent the “*Socio-economic Digital Divide*” or as proposed by Harper (n.d.) the Access Digital Divide;
  - Internet non-users who do not represent the “*Socio-economic Digital Divide*” but who may represent the Social Digital Divide as proposed by Harper (n.d.);
  - Internet users who are not considered to be part of the digital divide.

### Theoretical Framework

The research design and data gathering techniques used in the current study developed as a direct result of the theory being explored. As such, developing an understanding of the theory being examined – the *what* – will help in understanding the research design and data gathering techniques – the *how* – being used within the current study. A brief outline of the theory used to form the framework for the current research will be provided.

### Social Cognitive Theory

This research will examine the internal or psychological forces that motivate an individual to refrain from integrating technology, such as the Internet, into their lives. To achieve this end the research will use the Social Cognitive Theory (SCT) developed by Albert Bandura (1986). This theory asserts that behaviour is best understood in terms of a *triadic reciprocity* (Bandura, 1986). Where behaviour, cognition and the environment exist in a reciprocal relationship and are thereby influenced or are determined to a by each other. According to Bandura individuals are actively involved in shaping their environments and not merely passive reactors to them (Bandura, 1986). This relationship is shown in Figure 3.

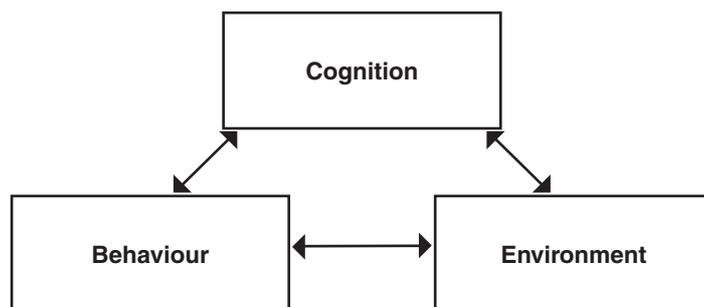


Figure 3: The Triadic Relationship (Bandura, 1986)

Self-Efficacy is a major component of the Social Cognitive Theory. Bandura (1986) describes self-efficacy as “people’s judgments of their capabilities to organise and execute courses of action required to attain designated types of performances” (p. 391). Or more simply stated self-efficacy is the belief a person

has about their capabilities to successfully perform a particular behaviour or task (Cassidy & Eachus, 2000, p. 1).

Self-efficacy has three dimensions: magnitude, strength and generality (Bandura, 1986). *Self-efficacy magnitude* refers to the level of difficulty a person believes they are capable of performing (Maddux, 1995). *Self-efficacy strength* refers to the level of conviction a person's has that they can perform a task or behaviour. *Self-efficacy generality* refers to the extent to which a persons success or failure in a task or behaviour will influence their self-efficacy in other tasks or behaviours.

## Research Approach

Self-Administered surveys will be used in data gathering. Participants are Internet users and non-users from Brisbane, Australia. The survey instrument will consist of three sections: The first section seeks information on *Demographic* details such as gender, age, employment status, income level and education level. The second section gathers data on the participants *Internet Use*. Data gathered included where they obtain access to the Internet, length of involvement with the Internet, self-perception of Internet skill and frequency of Internet use. The third section will gather data on the participant's level of *Internet Self-Efficacy*. Data collection will take commence in January 2005.

## The Sample Frame

Clearly identifying the desired sample frame is an important part of any research project. According to Harper (n.d) the socio economic studies of the digital divide have only developed a profile of the Access Digital Divide. As such, the current profile of who represents the digital divide is not complete. This study will help to expand the current profile of the digital divide by exploring the Social Digital Divide using the self efficacy construct. To achieve this it is important that the study uses participants who (i) represent the socio-economic view of the digital divide; and (ii) do not represent the socio-economic digital divide. By ensuring both types of participants are present the current study will be able to more fully develop a profile fo the gap between information 'haves' and 'have-nots'. More specifically, the research will be able to determine (i) if there are individuals who represent the Access Digital Divide but do not represent the Social Digital Divide; (ii) if there are individuals who represent both the Access Digital Divide and the Social Digital Divide; and (iii) if there are individuals who represent the Social Digital Divide but do not represent the Access Digital Divide.

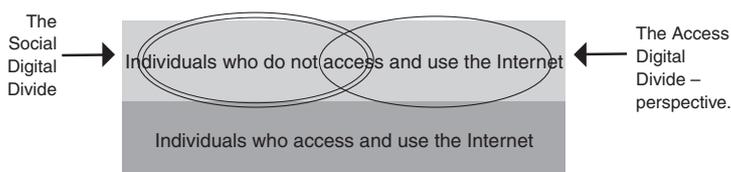


Figure 4: The study sample frame

## The Data Collection Context

Public library's in Australia have invested large amounts of time, money and energy into establishing programmes and activities that will assist in bridging the digital divide within community. There are over 1500 public library facilities in Australia located in rural, inner city, suburban and remote areas ABS, 2001). In

Australia the public library is the most visited cultural venue with 99.4 million visits during 1999–2000 (ABS, 2001). Almost 50% of the Australian populations are members of the public library network (ABS, 2001). The commitment demonstrated by the public library network in Australia in providing support to all members of community to access and use the information technology, such as the Internet, and the obvious support and use by members of the Australian community suggests that public library is a logical starting point to access study participants. To this end the Brisbane City (BCC) Public Library Service has agreed to act as the initial starting point for obtaining study participants. The BCC Library Service consists of 32 static branch libraries. It has a membership base of approximately 362,000 people. And serves a total population of 865, 000 spanning approximately 1350 km<sup>2</sup>. It circulates over 9 million items each year has over 4 million visitors during this time. The library service is a vital and active part of the community offering a wide range of services and resources including Internet access and training. Three branches of the library service will be used in this study – Inala, Indooroopilly and Garden City. The branches were selected based upon their potential to provide access to participants matching the desired profile.

It should be noted that whilst the BCC Public Library Service will be the initial point for data collection it will not be the only point. Other contacts have been made with community groups and businesses located in Brisbane as secondary data collection points. As data collection proceeds new data collection points will be introduced into the study to ensure that the entire sample frame is being met. It is important to note that this is also a QUT supported research project all data collection must comply with the university research ethics committee procedures.

## Expected Outcomes and Significance of the Research

This research is significant because it develops a new theoretical framework through which to view the division between information 'haves' and information 'have-nots' within society. The research will illustrate that the digital divide involves more than just the availability of resources and funds to access those resources. It incorporates the internal forces of an individual that motivates them to use or integrate technology into their lives. Using the Social Cognitive Theory by Bandura (1986) to examine these internal forces this research will add another layer of understanding to the digital divide pyramid. The findings of the study will provide support to the existence of the Social Digital Divide as proposed by Harper (n.d.).

This research is important because it expands current understanding of a phenomenon that has far reaching social and economic implications. The research will allow a more concise understanding of *what is* and *who represents* the digital inequality in society. Developing a clear and comprehensive picture of the forces behind the division in society between 'haves' and 'have-nots' is a vital step in bridging the gap. This research will allow organisations (such as the Brisbane City Council) involved in the digital divide solution, to develop and tailor services and programs to more accurately and effectively narrow the gap between information rich and information poor. As a consequence real steps can be made in bridging the gap between the 'haves' and the 'have-nots' in society. It will allow for all members of community to have an equal chance of establishing and

maintaining productive personal and professional lives in this rapidly emerging digital age.

## **FUTURE RESEARCH**

In 2001 Luciano Floridi argued that “information and communication technologies have put humanity in charge of the world. We are the masters of the universe...The problem is that our ethical development has been much slower than our technological development” (Floridi, 2001b, p. 4). The research project outlined in this paper will help humanity to take steps to re-align our ethical and technological developments. More studies exploring the psychological, social and cultural barriers to the digital divide are needed. If we are to meet Floridi’s challenge of developing an “information society for all” (2001a, 4) then we must more actively develop our understanding of the digital inequality within community. And this requires looking beyond the socio-economic explanation of digital equality. As suggested by Harper “we need to re-conceptualise the [digital divide]...away from a simple lack of access and toward the social, cognitive, and communicative factors that truly divide groups” (2003, par. 2).

## **CONCLUSION**

The digital divide is a complex phenomenon. Developing a more sophisticated understanding of this phenomenon will aid organisations such as the public library in developing programmes and resources that can more effectively bridge the gap between information and technology ‘haves’ and ‘havenots’. By examining the psychology of the digital divide using Bandura’s Social Cognitive Theory (1986) this study will expand our current understanding of the digital divide and lend support to the existence of the Social Digital Divide as proposed by Harper (n.d.).

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