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ICT literacy and the second digital divide: Understanding students' experiences with technology

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Abstract: This work in progress paper reports on a doctoral research study investigating the ICT literacy skills of contemporary learners across primary and high school settings, in order to understand the influence of their economic, social and cultural capital to explain their relationship with and use of ICTs. Data collection will comprise a background questionnaire, an ICT proficiency test followed by semi structured interviews and series of in-class activities that will focus on exploring students’ technology use and background. This paper is structured as follows: firstly a review of the related research is presented to describe the context for the study; the research design for the study is then explained, followed by a brief discussion of the studies significance and expected outcomes.

Introduction

Information and communication technologies (ICT) are of particular interest in the current educational context as both social commentators and academics assert that the lives of the current generation of learners are different from earlier generations due the pervasiveness of ICT. As a result, a generation of learners commonly referred to as the Net Generation (Tapscott, 1998), or Digital Natives (Prensky, 2001) have been assigned a number of skill-based attributes. Today’s learners are described as proficient in multitasking, active experiential learners, and dependent on communications technologies for accessing information and for interacting with others (Oblinger & Oblinger, 2005; Prensky, 2001; Tapscott, 1998). It is claimed that these attributes are based on the premise that constant exposure to technology since birth means young people have an in-depth grasp and almost intuitive knowledge of how to use technology (Combes, 2006).

While there is no doubt technology influences the way we live and has affected many aspects of our lives, there is an emerging body of research that rejects this stereotyping of an entire generation, questioning the seminal nature of the premise and arguing the need for rigorous empirical investigation (Bennett, Maton, Kervin, 2008; Combes, 2006).

Findings from Australia’s National Assessment Program for ICT literacy (MCEECYDA, 2007 & 2010) and the most recent International OECD PISA report (2010) highlight the significant influence of economic, social and cultural capital on students’ ICT literacy levels. These kinds of capital are creating an ICT literacy achievement divide, commonly referred to as the second digital divide, between those students who have or have access to learn necessary ICT skills and competencies and those who do not (OECD, 2010). Given that Australia’s national goals for schooling assert that schooling should be socially just, it seems imperative that consideration be given to how to best reduce this second digital divide. In order to do this we need to know what young people are doing with technology in order to cater for their educational and social needs in the new media landscape (Combes, 2009, p. 38). If our schools and teachers continue to accept that the digital native stereotype exists and cater for the tech savvy digital native student, without explicit and varying levels of ICT education, we risk isolating today’s students and further exacerbating the achievement divide. This is referred to in the latest OECD report as the ‘second digital divide’:

If teachers and schools fail to acknowledge the second digital divide, and act accordingly, they will reinforce its emergence. It is important to realize the fact that, because students appear to be ‘technologically savvy’ does not mean they have developed the skills and competencies that will make them responsible, critical and creative users of technology (OECD, 2010, p. 15)

A new research project described in this paper investigates primary and secondary students’ experiences with technology in terms of their economic, social and cultural capital in order to better understand student’s levels of ICT proficiency. It is anticipated that the findings of this study will provide rich empirical description of the variation in students ICT literacy and factors influencing achievement outside of the school
environment from the students’ perspective in order to contribute to the emerging body of knowledge and assist educators to more effectively integrate technology into the curriculum and address the emerging digital achievement divide. This paper is structured as follows: firstly a review of current literature and related research is presented to describe the context for the study; the research design for the study is then explained, followed by a discussion of the significance and expected outcomes.

**ICT literacy in the Australian school context**

Australian education authorities have charged the Performance Measurement and Reporting Taskforce (PMIRT) of MCEECDYA\(^1\) with responsibility for the National Assessment Program, which is designed to monitor the extent to which students are achieving national goals (MCEECDYA, 2010). The taskforce conducts annual numeracy and literacy assessments with the full population of Year 3, 5, 7 and 9 students. While sample surveys are conducted in ICT Literacy every three years, with Year 6 (upper primary) and Year 10 (secondary school) students (MCEECDYA, 2007). Within this context MCEECDYA define ICT literacy as “the ability of individuals to use ICT appropriately to access, manage, integrate and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society” (MCEECDYA, 2007, p.3).

The first national assessment of ICT Literacy was conducted in 2005 with a nationally representative sample of 7400 students from Year 6 and Year 10 in 519 schools (MCEEDYA, 2007). Findings from the first national report on ICT literacy state that 49% of Year 6 students reached or exceeded the Year 6 proficient standard and 61% of Year 10 students reached or exceeded their Year 10 proficiency standard. Significantly, and in direct contrast to Prensky’s notion of an entire generation of ‘techxperts’ (2001), the findings illuminate varying patterns of ICT literacy related to socioeconomic background, indigenous status and remote locations. Data analysis indicated ICT literacy was strongly associated with socioeconomic background, most significantly in terms of parental occupation, as an indicator of student ICT proficiency.

The second cycle of ICT literacy assessments were conducted in 2008, with the report of findings released in 2010. In terms of proficiency standards, 57% of Year 6 students reached or exceeded the Year 6 proficient standard in 2008 compared to 49% in 2005 (MCEECDYA, 2010). In this second cycle of assessment parental occupation was again highlighted as a significant indicator of ICT Literacy with the largest effects associated with socioeconomic background. When considering the significant role of ICTs on modern life students who do not develop ICT proficiency are likely to be limited in their participation in economic and social life. Therefore, understanding the impact of the students background upon their ICT proficiency seems imperative as educators and schools have the potential to bridge this emerging second digital divide for students who lack the capital that will allow them to benefit from digital media (OECD, 2010).

**Learners, their contexts & ICT**

Several key large scale international studies such as the OECD PISA report (2010), *UK Children Go Online* (UKCGO) (Livingstone, Bober & Helphrey, 2005), *American Pew and Internet & American Life Project* (Lenhart, Purcell, Smith & Zchuhr, 2010) and the Australian National ICT literacy assessment (MCEECDYA, 2005 & 2010) indicate that assumptions about the Net Generation are limited, lacking both empirical evidence and academic rigour. On the contrary, the emerging evidence depicts a more complex picture of students as technology users and highlights the variation in technology use amongst young people. Rather than having an in-depth grasp and almost intuitive knowledge of how to use technology Australian students are using ICT, in a relatively limited way. Varying patterns of ICT literacy that are closely linked to a student’s socio economic status, and capital becoming evident (MCEEDYA, 2010 & OECD, 2010), resulting in a divide in achievement, referred to as the new “second digital divide” (OECD, 2010, p.13). This second digital divide goes beyond the initial digital divide, which focused on differences in technology access, to the differences between those students who have or have access to learn the necessary ICT skills and competencies and those who do not (OECD, 2010). Significantly, there is a strong correlation between educational performance and frequency of computer use at home rather than at school (OECD, 2010). In the Australian component of this report, Thomson and DeBortoli (2007) asked students who had taught them how to use computers and the Internet. Almost half of the participating males and one third of females reported as being self-taught computer users while more than half of the males and 41% of the females identified as self-taught Internet users. This data raises questions

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\(^1\) Ministerial Council for Education, Early Childhood Development and Youth Affairs
about how a young person considers themselves to be ‘self taught’ and the role of their family and friends in this process. Significantly students from a lower socio economic background reported using computers less frequently than students from higher socio-economic backgrounds. Providing more evidence to suggest the need for greater support within the school environment for ICT literacy skills particularly for those students who lack access to social and cultural capital to address this emerging divide.

Key findings on education learning and literacy state that regardless of the stress placed on ICT education in policy many children are using the Internet without skills in evaluating online content (Livingstone & Bober, 2004; Livingstone et al, 2005). The UK Children Go Online project (Livingstone & Bober, 2004; Livingstone et al, 2005) investigated how children aged 9 to 19 years used the Internet over a 3-year period with over 1500 participating children and young people and 900 of their parents. Similarly to OECD and Australian MCEECDYA findings, Livingstone & Bober (2004) cite socio-economic status as a significant factor in explaining differences in access, online skill and self-efficacy of the use of technology. Access and expertise were found to be significant barriers that resulted in occasional and non-use of the Internet amongst participants. Interestingly, students from the lowest socioeconomic backgrounds reported more of a reliance on school for teaching them how to use the computer. However, approximately one third of participating students had received ‘no lessons at all’ on using the Internet. This finding is startling when considered with the emerging evidence suggesting socio-economic status as an indicator for ICT literacy achievement, as schools could be a place for addressing these inequalities.

In a major U.S study the behaviours and attitudes of the millennial generation have recently been investigated through a series of telephone survey studies (Lenhart et al, 2010). Findings suggest that frequency of adult Internet use is positively correlated with both educational attainment and household income, with an individual’s technological environment being a vital clue in understanding how that person uses the Internet, connects with others and accesses information (Lenhart et al, 2010). Although the study has limitations that make interpretation of the findings difficult (such as the lack of distinction made between adult and teenager participants for collecting comparative data), these findings are similar to UK Children Go Online Report (2004) and OECD millennial report (2010).

While these large scale quantitative studies (Lenhart et al, 2010; Livingstone & Bober, 2004; Livingstone et al, 2005; MCEECDYA, 2005 & 2010; OECD, 2010; Thomson & Debortoli, 2007) begin to provide a general picture about students’ use of ICT and the influence of their background context, there seems to be a lack of detailed understanding about how differences in technology experiences both inside and outside of school affect students’ ICT use and literacy levels.

An Australian PhD study (Thrupp, 2008) focused on this gap by investigating the ICT identities of primary aged school children with a focus on: the places in which, the purposes for which, and the people with whom students use ICT. Data was collected from two groups of Year 6 learners located in different schools within a provincial city in Queensland, Australia. Major findings from the study conclude that primary-aged learners engage with a limited range of ICT artefacts, ICT artefacts alone do not shape a students’ identity, but rather identities are shaped through social practices with ICT, and designing learning for the contemporary learner requires responsiveness to an increased diversity than in pre-ICT eras. The prevalence of ICT and use didn’t necessarily contribute to the identity of participants. Rather, home ICT practices of family or ICT capital played a significant role upon each learner’s ICT related identity. Therefore an understanding of students’ background contexts, access to capital and identity seems critical in addressing the emerging achievement divide.

It is argued that whilst schools are central to redressing the digital divide, the home is where young people gain the most in confidence, making inequalities in home use of continuing significance (Livingstone & Bober, 2004 & Thrupp, 2005). An understanding of how students’ backgrounds including the access to technology capital outside of the school setting is critical in addressing the growing achievement divide to ensure our students are active citizens of tomorrow. Whilst these large-scale studies begin to provide a general picture about varying patterns of ICT literacy linked to a young persons socio-economic background and the emergence of the second digital divide, there is a paucity of research taking a more detailed approach. The research study described in this paper seeks to address the gap in the literature by providing a detailed investigation to better understand the influence of primary and high school students backgrounds upon their level of engagement with and meaningful use of technologies (or otherwise), and more specifically their set of measurable ICT literacy skills.

Economic, Social & Cultural Capital = Technology Capital
Researchers have drawn on Bourdieu’s concept of habitus and different forms of capital to explain relationships to ICTs (Cranmer, 2006; North, Snyder & Bulfin, 2008). For example, a study by Cranmer (2006) discusses the emerging body of evidence suggesting that when ICTs enter the home they integrate with pre-existing structures, limiting families’ ability to benefit from ICTs equally. Another study investigated the digital tastes of twenty-five 15-16 year olds, drawing on Bourdieu’s habitus (North, Snyder & Bulfin, 2008). They argue that markers of class such as a parents’ occupation and level of education inform the habitus of young people, which in turn influences their digital tastes. The findings from these case studies suggested that cultural forms produced through technology-mediated communication practices were part of the young people’s habitus. The researchers concluded that social background is part of what helps form young people’s habitus and this, in turn, affects their approach, and interest in, ICT at home and in school.

Similarly, Selwyn (2004) draws on Bourdieu’s different forms of capital (Bourdieu & Passeron, 1977) in his theoretical analysis of the digital divide to explain contemporary learners’ relationships with ICTs, further conceptualising ‘technological capital’ as subset or extension of Bourdieu’s capital (2004, p.355). Selwyn suggests that economic resources play a central role in determining peoples’ capacity to own and have access to a technology; social resources (including personal time and commitment) determine the networks of ‘technological contacts’ as well as family, peers and more formal institutional contacts who become sources of advice; and cultural resources determine how people engage with and make meaningful use of that technology. This framework will allow the researchers to classify the differences between participating students’ family backgrounds and orientations to technologies in order to better understand the impact on their measurable ICT proficiency.

The Study

The purpose of this doctoral research study is to investigate the ICT literacy skills of contemporary learners across primary and high school settings, in order to understand the influence of their economic, social and cultural capital to explain their relationship with and use of ICTs. To date, a review of the literature has been conducted (the summary of this review has been presented above). Data collection and data analysis instruments are currently being developed. The data collection phase of the study will be implemented in 2011. The research design of this study is a collective case study comprising four cases: two Year 6 and two Year 10 classes from four different schools. A collective case study approach was chosen due to the ability to examine in detail students’ from four Year 6 and 10 family technology capital and understanding of and about technology use together with their measurable ICT proficiency while considering context.

The data collection methods for this study will involve a range of strategies across three phases - Phase 1: ICT proficiency task, Phase 2: post task semi-structured reflection interviews and Phase 3: student technology blog entries. Participants in this study will consist of both Year 6 primary students and Year 10 secondary school students from four school settings. All students will participate in an ICT proficiency task during Phase 1 as well as class blogging lessons during Phase 3 and complete class work that will be sent home for member checking before collection. Of these participants 4-5 students from within each case will be purposively selected (based on preliminary analysis of their ICT proficiency task) to participate in Phase 2-involving semi structured stimulated recall interviews. Students will be selected based on preliminary analysis of their ICT proficiency task in order to present multiple perspectives from individuals to illustrate the varying background complexities of students’ ICT proficiency, a maximum variation sampling strategy.

The in-class technology blogging activities are not intended to be an intervention, but a means of measurement that allows for multiple sources of evidence with least possible disruption to student and teacher in an authentic environment. More specifically, The ICT proficiency tasks will be captured and replayed as stimulus during semi structured post task interviews. Secondary supporting data sources will include anecdotal researcher observations and journal entries.

The first phase of data collection will comprise student questionnaires and an ICT proficiency task. Prior to participating in the ICT proficiency task students will complete a brief questionnaire to gather background information on age, gender, cultural background, socio-economic status in terms of parent’s occupation and education levels, as well as their personal use, engagement and familiarity with ICTs. Questionnaires will be completed by students then taken home to be reviewed by parents. Administering the questionnaire in this way will allow for data to be member checked for accuracy and reliability. Background data from the questionnaire will be used together with other data sources to build student technology profiles in order to better understand participating students’ technology use.
All students will participate in the designed ICT proficiency task that will be captured for analysis and further data collection. The proficiency task is designed to capture how students engage with computers, computer software and the Internet while negotiating through the six key processes of ICT literacy. The task will be conducted online during regular class time. The task itself will run in live web software accessible to all students, drawing from the Hybrid Assessment Modules used in the National Assessment Program of ICT literacy (MCEECDYA, 2005 & 2010). However, for the purposes of this study the task will be smaller in size with screen recording software (Camtasia) capturing all students’ actions during designated task period. The tasks will differ in focus, based on curriculum outcomes, and degree of difficulty for each group. Task difficulty for Year 6 and Year 10 students will correspond with MCEECDYAs (2010) bench marked progress levels for each group.

Phase two will consist of semi-structured student reflection interviews. Following the completion of the ICT proficiency task, students will be selected to voluntary participate in semi-structured interviews based on preliminary analysis focusing on variation in their performance across the six processes of ICT literacy. Focusing on variation in responses during preliminary analysis will allow the researcher to present multiple perspectives from individuals to illustrate the varying complexities of students’ ICT proficiency. This particular data collection phase builds on the methodology of a current doctoral study (Combes, 2009) using verbal think alouds to better understand the technology processes of tertiary students.

The phase three Technology Blog Lessons are designed around Australian Year 6 HSIE and Science & Technology syllabus outcomes and Year 10 English syllabus outcomes and vary in content between each group. Four formal blogging lessons will occur within Year 6 and Year 10 classrooms over a two-week period. The purpose of these lessons is to create a space where students will document their understandings and use of technologies, describe their home technology environment, as well as their technological contacts. The blog and class tasks have been framed by Bourdieu’s ‘thinking tools’ (Bourdieu & Passerson, 1977) and Selwyn’s (2004) further application of capital to technology use. This data will provide valuable information about participants habitus, field and ‘technology capital’ that will be analysed together with other data sources to build detailed student technology profiles in order to better understand participating students technology use.

Data will be analysed on two levels the first concerned with recorded proficiency tasks will be analysed against six key process of ICT literacy and organised into performance levels according to MCEECDYA. Data from the questionnaire, ICT proficiency task, SR interview transcripts and blog entries will be coded according to Selwyn’s (2004) adaptation of ‘Technology Capital’ and then combined to build technology profiles. Which will then allow comparison to be made between ICT proficiency, student background and research questions. This data will then be compared within and across cases for consistency or contradictions.

Conclusion

Contrary to the popular digital native rhetoric, current research evidence suggests there are significant differences in ICT literacy associated with socioeconomic background, indigenous status and remote geographic locations that need to be addressed in the Australian school context (MCEECDYA, 2010). As the emerging body of large scale studies focusing on students ICT literacy, performance and engagement, have begun to provide a generalised view about students use of ICT acknowledging the influence of socioeconomic background and access to capital upon achievement (MCEECDYA, 2005 & 2010; OECD, 2010), there is a paucity of detailed empirical understanding of this second digital divide. This study aims to address this gap and add to the emerging body of empirical evidence by investigating the complex nature of today’s learner and their relationship with technology. In particular the variations in students ICT literacy skills in relation to their background, and the access (or lack of access) students have outside of school to differing family technology capital (Selwyn, 2004).

Combes (2009) highlights the significance of the student voice as being crucial in providing an empirical understanding about what learners are doing with technology so that educators may better address the achievement divide. Understanding the variation in ICT literacy and factors influencing achievement outside of the school environment from the student perspective is a critical component of this research. It is expected that that rich description presented in the studies findings, rather than over-generalisation, will allow comparisons between the study context and other settings to be made. Contributing to the emerging field of knowledge as well as assisting educators to more effectively integrate technology into the curriculum as they begin to address the second digital divide.
References


