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Youth Internet Engagement and Inequality in Australian Society

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Abstract

Digital technologies add a new dimension to economic, social, and cultural participation in contemporary society, and differences in their use may influence young people's early experiences and trajectories within these domains. Having grown up in an era of widespread internet access, young people are often depicted as naturally competent and effective internet users, despite much evidence to the contrary (Buckingham, 2006). This thesis examines how and why young people vary in their engagement with the internet as they grow older and how these differences might impact on their developing life pathways. Research suggests that internet engagement is a process embedded within, and contributing to, broader processes of technological diffusion (Rogers, 2003; Compaine, 2001), social and cultural reproduction (Bourdieu, 1984; Hargittai, 2008) and individual reflexivity and adaptation (Giddens, 1984; Livingstone & Helsper, 2007). Accompanying each of these approaches are distinct ideas about what constitutes effective internet engagement and the types of factors differentiating young people in their internet use. In this thesis I develop a framework for explaining variation in youth internet engagement which attempts to reconcile key insights from existing approaches, whilst also addressing some of their limitations. I test this framework empirically using a mixed methods approach to illustrate different aspects of young people's development as internet users over time. For this analysis I use survey and interview data from a large and representative cohort of secondary school students in Queensland, Australia who participated in waves 1 to 3 of the Social Futures and Life Pathways ('Our Lives') Project. These data were collected at various points in time, beginning in 2006 when research participants were aged 12/13 years and most recently in 2011 when they were aged 17/18 years. First, I examine differences in online time use at the beginning of high school with the overall cohort (n=6,545), before focusing on a core, longitudinal cohort (2,060) to investigate the extent and nature of their internet engagement at the end of high school. Then, in a series of qualitative interviews, I follow up with strategically chosen respondents (n=20) in the year following high school to explore how

their perceptions and experiences of internet use vary. I reconcile findings from each of these approaches to identify three influential internet engagement pathways between adolescence and early adulthood, and the defining features of each: (1) a 'preservation' pathway, where mostly rural adolescents who experienced internet access barriers when they were younger became narrow and skeptical internet users; a 'productivity' pathway in which adolescents whose early use was subject to parental rules and regulation become narrow and disciplined internet users; and a 'personality' pathway, in which adolescents who experienced greater internet access and autonomy of use became broad, exploratory and confident internet users. I argue that each of these pathways contains features which can either help or hinder young people's chances of engaging with the internet effectively, and call for further research identifying the social correlates and consequences of these pathways. Finally, I reflect on the implications of these findings for the policy context surrounding youth internet engagement in Australian society.

Declaration by author

This thesis **is composed of my original work, and contains** no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted **to qualify for the award of any** other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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Publications during candidature

Book chapters

Smith, J. 2010. "Technology". In R. L. Jackson (ed.) *Encyclopedia of Identity: Volume 2*, pp. 819-822. London, UK: Sage Publications.

Journal articles

Smith, J., Skrbiš, Z. & Western, M. 2013. "Beneath the Digital Native Myth: Understanding Young Australians' Online Time Use." *Journal of Sociology*, 49(1): 97-118 (see Appendix D).

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J. Smith is responsible 100% of the conceptualisation of this paper, 80% of the analysis, and 80% of the writing and editing. Z. Skrbiš is responsible for 15% of the writing and editing. M. Western is responsible for 20% of the analysis and 5% of the writing and editing. Parts of this paper are included and further developed in Chapters 2 and 4 of this thesis.

Contributions by others to the thesis

Prof. Zlatko Skrbiš, in his role as principal advisor, assisted with the conceptual framing of this thesis during its early stages and provided written feedback on thesis drafts. He helped with developing the qualitative and mixed methods components of the research design and provided feedback on the co-authored paper for Chapter 4. He also made available for use in this thesis data from the ARC Discovery Project (DP 0878781) on which he is the Principal Chief Investigator.

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Digital divide, digital inequality, Digital Natives, social inequality, reflexivity, internet use, media use, young people, education, communication.

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List of Abbreviations used in the thesis

ABS	Australian Bureau of Statistics
ACMA	Australian Media and Communications Authority
ADSL	Asymmetric Digital Subscriber Line
CPCLA	Children's Participation in Culture and Leisure Activities survey
CPS	Current Population Survey
DC	Digital Connoisseurs
DE	Digital Explorers
DN	Digital Natives
DoI	Diffusion of Innovations
HUIT	Household Use of Information Technology
ICT	Information and Communication Technology
IJS	Internet Job Search
MSN	Microsoft Network (instant messaging client)
NAP-ICTL	National Assessment Program - Information and Communication Technology Literacy
QLD	Queensland
SBTC	Skill-Biased Technical Change
SNS	Social Networking Site
U&G	Uses and Gratifications

Chapter 1 - Introduction:
Young People, Digital Technologies, and Social Inequality

> People multi-task when they learn. It's not like you would just get a book and sit down and copy out notes these days. You're always going to be doing something else, whether it be listening to music, or texting your friends, organising stuff for later. That's just how our generation works.
>
> **Steve**

> I feel like everyone thinks our generation is really good with computers, but I'm not. I know how to access the internet - well, everything I need to do I can do, but if it's out of that I can't do it.
>
> **Sandra**

Sandra and Steve are similar in many ways. At age 18, both have just graduated from high school and recently started attending university in Queensland, Australia. They are both intelligent and career-driven individuals from middle-class, dual-income homes. Both grew up in regional and remote parts of Queensland, but have now moved out of home to further their studies. Each is experiencing independence for the first time, with all of its challenges and opportunities.

Despite these similarities, Steve and Sandra have different ideas about how young people are using digital media. Steve sees himself as part of a tech-savvy generation, one which embraces such media and sees in them limitless potential for production, consumption and interaction. Sandra, however, is reluctant to support this view. While noting that society expects young people like her to embrace digital technologies, she also struggles to live up to this expectation. When presented with new and unfamiliar uses of digital media, she often sees more risk than reward.

Digital technologies add a new dimension to economic, social, and cultural participation in contemporary society. When young people like Sandra and Steve approach these technologies differently, this can impact unevenly on their outcomes within these areas. In this thesis I research how and why young people differ in their engagement with digital media, such as the internet. I do so with a view to increasing our knowledge about the relationship between digital media use and social inequality during the transition from adolescence to adulthood.

In this chapter I provide the overall context for this research. First, I outline the rhetoric and policies surrounding youth internet engagement in Australia, and argue that issues of inequality have been overlooked. Next, I review evidence about the effects of internet use on young people's emerging life pathways in three areas: their cognitive and educational outcomes, their economic participation and career opportunities, as well as their relationships, leisure practices, and well-being. In the last section, I outline the main aim, contributions, and overall structure of my thesis.

Digital Natives: The Rhetoric and Policy Context of Youth Internet Engagement

Social researchers and policymakers regularly equate young people's generational distinctiveness with their use of digital technologies. These depictions are much closer to Steve's example than to Sandra's; young people are seen as having a 'natural affinity' for digital media which distinguishes them from preceding generations. This portrayal has spawned various labels over the years, such as the 'Net Generation' (Tapscott, 1998), the 'millenials' (Howe and Strauss, 2000), 'cyberkids' (Katz, 1996), and perhaps most famously, 'Digital Natives' (Prensky, 2001). In these accounts, young people are ostensibly altered by the experience of growing up in a media-saturated environment:

> Digital Natives are used to receiving information really fast. They like to parallel process and multi-task. They prefer their graphics before their text rather than the opposite. They prefer random access (like hypertext). They function best when networked. They thrive on instant gratification and frequent rewards. They prefer games to "serious" work.
>
> Prensky (2001: 2)

While such claims are based on little more than anecdotal evidence, they are influential in the rhetoric and political context surrounding young people's digital media use. Research in the sociology of youth has long documented how 'childhood' can serve as an important discursive site upon which ideological visions for the future are contested (James et al, 1998). For its part, the Digital Native rhetoric projects onto young people certain attributes and desired trajectories that are consistent with the ideas of 'Information Society' and 'Knowledge Economy' (Facer et al, 2001).

The concepts of Information Society and Knowledge Economy refer to changes underway in post-industrial societies which, it is claimed, privilege the exchange of information and services over manufactured products (Bell, 1973). While scholars still debate these claims (May, 2002), governments in most industrialised nations are orientating their social and economic policy platforms around them. Information and communication technologies (ICTs) are regarded as foundation for the Information Society, and as such, policymakers are increasingly focused on the continual expansion and improvement of access to ICT infrastructure. In the Australian context, this is the impetus behind the Federal Government's A$37.4 billion National Broadband Network (NBN), a politically contentious initiative aiming to provide high-speed fibre-to-the-home broadband access within the next decade (NBN Co, 2012: 10). The Government's National Digital Economy Strategy outlines eight 'goals' for leveraging the benefits of this investment: (1) increasing online participation by Australian households; (2) increasing online engagement by Australian businesses and not-for-profit organisations; (3) improved management of environment and infrastructure; (4) improved health and aged care; (5) expanded online education; (6) increased

teleworking; (7) improved online government service delivery and engagement; and (8) greater digital engagement in regional Australia (DBCDE, 2011). While the social and economic returns of such initiatives are difficult to predict, analysts note that they are likely to depend on the ICT skills and demands of the future users of this infrastructure (Dias, 2012).

This helps to explain the concerted push to integrate ICTs into the Australian education system in recent years. As evidenced in the Government's 'Digital Education Revolution' framework, this has had several access-orientated components: a 'National Secondary School Computer Fund' to provide every student with individual computer access at school; a 'One Laptop Per Child' project to provide children in remote communities with laptops and educational software; and the eventual integration of all schools into the NBN network (DEEWR, 2008). Educators now assess students on their ICT skill and literacy as part of the National Assessment Program (NAP-ICT). In the context of NAP-ICT, ICT literacy is defined by the Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEETYA) as follows:

> 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.
>
> MCEETYA, 2005

Every three years since 2005, Australian children in Grade 6 (aged 10-11) and Grade 10 (aged 15-16), have been examined and ranked on a scale based on these elements of digital literacy (ACARA, 2011). These results show that a number of student characteristics predicted higher ICT literacy scores: females scored higher than males; students whose parents were 'senior managers and professionals' fared better than those whose parents worked in 'unskilled manual, office, and sales' occupations; non-Indigenous students outperformed Indigenous students; and students from metropolitan areas surpassed those living in regional or remote areas. Despite these differences, the rhetoric surrounding adolescent internet use emphasises the invariable fluency with which they will embrace ICTs, provided that they are adequately immersed in their 'native' media ecology:

> The learners in our schools today - Digital Natives - are different from the learners of yesterday. Digital is their native language - a global language in which they are fluent. In contrast, for our education system and most teachers, digital is at best, a second language …
>
> Director-General of Education, State of Queensland (2004: 2)

The problem with this portrayal is that it ignores differences in how young people learn to engage with ICTs - a process which unfolds largely outside the context of formal education - and the various motives, resources, and skills which influence this process. Failure to acknowledge such variation may result in educational reforms which advantage some students at the expense of others.

Criticisms and implications for social inequality

As such, many scholars now reject this depiction of young people as invariably skilled and highly engaged internet users (Bennett et al, 2008). To be sure, internet access and use has spread rapidly amongst the youth population in advanced Western societies. By 2009, access rates stood at 86% in Australian households with children under the age of 15, compared to just 66% in childless households (ABS, 2009a). By the time they begin primary school (aged 5-8), over half of all Australian children have already been online, and when they enter high school (aged 12-14) nearly all have done so (ABS, 2009b). However, having grown up in an era of widespread access does not appear to have imbued young people with the shared orientation towards frequent, complex, and creative internet use suggested by the Digital Native rhetoric. Instead, research in the US (Hargittai, 2010), the UK (Helsper & Eynon, 2009) and Australia (Kennedy et al., 2008; Lovell & Baker, 2009) shows significant differences in the extent and nature of young people's ICT use.

Furthermore, Buckingham (2006: 10) disputes the idea that young people are creative, savvy and effective users, noting that most youth internet use amounts to 'mundane forms of communication and information retrieval'. Research shows that 94% of Australian children aged 12-14 use the internet for study and 60% use it to communicate with their friends, whereas only 24% create online content such as blogs or websites (ABS, 2009b). Even where these widespread social and academic activities are concerned, young people differ in the content production and evaluation skills which these require (Correa, 2010).

In light of such research, several authors have highlighted the paradoxical expectations placed upon young people by the discursive context surrounding their use, and the motives behind these expectations (Buckingham, 2006; Facer et al, 2001; Holmes, 2011). Facer et al (2001) argue that young people are constructed as competent consumers of digital technologies, but also as being unable to assess the significance of these technologies for themselves. For Buckingham (2006), the idea of a digital generation reflects the hopes that adults have about new technologies and social change, as well as their fears and anxieties. This is evidenced by media attention to online risks such as exposure to explicit or inappropriate content, unwanted contact from strangers, breaches of privacy, cyber bullying, and internet addiction (Livingstone & Haddon, 2009). Such concerns underpin the regulation of young people's use. For example, Education Queensland uses a 'Managed Internet Service' to restrict student access to 'high-risk' websites; these include sites involving illegal/pornographic activities, personal pages, entertainment sites like YouTube, and social networking sites like MySpace and Facebook (State of Queensland, 2010).

The portrayal of young people as vulnerable experts affords them internet access so long as they conform to adults' notions about what constitutes safe, effective and worthwhile internet use. Any deviation from this is construed as a basis for further restriction of young people's agency. Yet since young people vary in their internet use, they also differ in their exposure to online risks; and as with their expertise, research suggests that these risks have also been overstated (Holmes, 2009). These criticisms suggest three points of concern for theorists of social inequality. First, acceptable internet use by adolescents is being defined more by ideological imperatives than it is by evidence about the outcomes of their use (Helsper, 2012). Second, young people's agency in this process is undermined when their own ideas about the benefits and risks of internet use are discarded as irrelevant or unreliable. Finally, such a model may exacerbate social inequalities if it rewards those with the skills, resources, and perceptions needed conform whilst shutting others out of avenues of use which can potentially improve their life chances (Holmes, 2009; Livingstone & Haddon, 2009).

How might differences in internet engagement affect young people's life pathways?

Existing research suggests that differences in their internet use will impact on young people's emerging economic, social, cultural, and political participation, and on their mental and physical wellbeing, albeit in diverse and complex ways. This ambiguity arises because differences in use have not been conceptualised in enough detail to meaningfully distinguish between optimal and sub-optimal uses. In this thesis I propose and test a framework for explaining differences in internet engagement which aims to address this problem. This framework may help to clarify the impact internet use is having in three main areas of young people's lives: (1) their cognitive learning and broader educational outcomes; (2) their economic participation and career opportunities; and (3) their social relationships, leisure practices, and wellbeing.

Cognitive learning and broader educational outcomes

Whether they do so at home or at school, many adolescents first come into contact with ICTs in the context of education and learning (Kalmus et al, 2009). Consequently, investments in access to digital resources for young people are often motivated by arguments about the educational benefits of such access. However, the impact of ICT use on cognitive learning outcomes is unclear. Within the classroom context, various randomised experimental studies suggest that computers in school improve student performance by encouraging more active engagement, group participation, and interactive learning, but such effects are often mediated or negated by other factors, including: the ability of teachers to integrate these technologies into the curriculum; design limitations of the technologies themselves; or the disconnect between students' uses at home and school (see Angrist

and Lavy, 2002; Attewell & Battle, 1998; Barrow et al, 2008; Roschelle et al, 2000). Using a quasi-experimental design, Machin et al (2006) found a positive relationship between increased ICT funding for certain UK school districts between 1998 and 2002, and the improved English and Science (but not Maths) performance of students in those districts during this time. Various studies suggest that home ICT use is more important than school use for children's development of ICT skills and positive attitudes towards ICT use, thus potentially disadvantaging those who face barriers to such use (Levin & Arafeh, 2002; Mumtaz, 2001; Selwyn, 2006).

Given this apparent disjuncture between home and school ICT experiences, researchers have more recently turned their attention to the educational outcomes of home use. Drawing on cross-sectional and longitudinal data in the US, Fairlie and colleagues (2005; 2011) have shown that home computer use substantially increases the likelihood of high school enrolment, and of graduation amongst enrolled students; they argue that this is because computer use decreases involvement in truancy and crime, whilst making it easier to meet school assessment requirements. Conversely, Austin & Totaro (2011) find an association between intensive internet use and increased high school absenteeism - especially for females - which, they claim, may erode human capital formation and negatively affect students' future earnings. Using data from the Longitudinal Study of Australian Children (LSAC), Fiorini (2010) found that the cognitive performance of adolescents was increased during the period between the ages of 5 and 7 as a result of the time they spent using a home computer. Meanwhile, Fuchs and Woessmann (2004) observed an inverted U-shape relationship between computer use intensity and the Programme for International Student Assessment (PISA) Reading, Maths, and Science test scores of around 100,000 15-year old students in 31 countries (including Australia). After controlling for family background and school characteristics, this meant that students whose computer use was at the lower or upper extremes of the distribution performed more poorly than those who displayed a more optimal usage intensity. Other work suggests that some types of computer use (e.g. educational use) are more productive than others (e.g. recreational use) which may even negatively influence performance through increased distraction (Ponzo, 2010; Vigdor & Ladd, 2010). This underscores the need for further research that is sufficiently nuanced to ascertain differences in the type and intensity of young people's internet use, and the various factors which may influence this.

Overall, this literature on the educational outcomes of internet use suggests that children from lower socioeconomic status (SES) families could be disadvantaged by access-orientated initiatives which depend on certain optimal patterns of use for their desired impacts. If barriers prevent some young people from engaging in optimal use at home, this may cause them to fall

behind in the skills and dispositions needed to excel in ICT use at school, and later, in higher education or employment. Where poor ICT access at home typically involves cost barriers, varied patterns of use tend to be shaped by a more complex range of contextual factors (DiMaggio et al, 2004). For instance, excessive internet use may reflect ineffective parental regulation of children's usage practices (Vigdor & Ladd, 2010). The research for this thesis investigates such claims by examining the various contextual factors which may affect how young people use the internet.

Economic participation and career opportunities

Young people's engagement with ICTs also affects the social and human capital upon which they are able to draw as they enter into a labour market that is increasingly characterised by global uncertainty, flexible employment, and 'patchwork' careers (Blossfeld et al, 2006). On the periphery of the workforce, young people are amongst the likeliest groups to engage in precarious forms of employment, with less job security, lower wages, and fewer opportunities for career advancement. For some young workers, such employment can serve as a temporary 'stepping stone' towards permanent full-time work; however, those young people who experience 'bad entry' into the labour market may become entrapped in this position, and increasingly vulnerable to future unemployment (Blossfeld et al, 2006; Furlong & Cartmel, 2007). The inability to use ICTs effectively, both to find work that is well-matched to one's skills and qualifications, and to perform one's job, may further compound the disadvantages some young people experience during this time.

Research suggests that internet use is important for helping young people to seek out and find employment, both through formal channels (e.g. websites for job vacancies) and more informal online avenues. Fountain (2005) analysed longitudinal data from the US Current Population Survey (CPS) and found internet job searching (IJS) increased the chances of unemployed job seekers finding work, particularly when they used formal channels such as bulletin boards and job listing sites. However, using similar data, Stevenson (2008) found that IJS mainly helped those who were already employed to identify and pursue new opportunities for career advancement. She also observed that unemployed job seekers were more selective about the jobs to which they applied online, but how this affected the duration of their unemployment spells remained unclear.

By contrast, Kuhn and Skuterud (2004) analysed CPS data from 1998 and 2000 and found that IJS was associated with longer unemployment spells - a finding they attributed to the ineffectiveness of IJS, and to online job searchers potentially having lower motivation and poorer informal social networks than the broader population of job seekers. However, upon replicating this study a decade later, Kuhn and Mansour (2011) found the reverse was now the case; IJS accounted

for a 25% reduction in the duration of an unemployment spell. The authors note several possible explanations for the discrepancy between the two studies, including: the proliferation and improved functionality of IJS tools; the increased uptake of internet use and IJS within the broader population, and the expanded use of social media by job seekers to locate work openings through friends and relatives (Kuhn & Mansour, 2011). Such findings suggest that young people who keep pace with changes in digital media, such as the emergence of social networking, may be better served by their informal networks during the job search process than those who lag behind usage trends.

Additionally, the economics literature on Skill-Biased Technical Change (SBTC) suggests that, as new technologies are increasingly utilised in the Knowledge Economy, the skills needed to use such technologies effectively attract a higher wage premium at the expense of more traditional, working-class occupations where such skills are less relevant (e.g. manufacturing) (Autor et al, 1998; Katz, 2000). Although various studies show that workers who use computers and the internet earn more than those who don't (e.g. DiMaggio & Bonikowski, 2008; Krueger, 1993; Goss & Phillips, 2002), there remains debate as to the extent of these increases (Borghans & ter Weel, 2004) and whether they should be attributed directly to such use, or to other underlying factors, such as worker quality and experience (DiNardo & Pischke, 1997; Entorf et al, 1999). Since much of the evidence for SBTC is based on US data, it is also less clear how differences in young people's ICT skills will be valued in the Australian labour market. Nonetheless, combined with the research in the preceding section, a compelling picture of inequality begins to appear: one in which differences in ICT engagement during adolescence impact unevenly on young people's cognitive development, their human capital formation, and ultimately, their early career trajectories.

Social relationships, leisure practices, and well-being

More broadly, internet use increasingly mediates young people's interpersonal relationships, their civc and political engagement, their cultural and leisure practices, and their mental and physical well-being. Whether or not internet use has beneficial or deleterious effects for young people in these areas has long been a focal point for utopian and dystopian claims about the internet's role in social change. In the optimist camp, internet use was initially seen to usher in a new era of 'networked individualism' (Haythornwaite & Wellman, 2002), in which social interaction is relatively unconstrained by spatiotemporal boundaries and physical identity cues (Castells, 2000). This affords young people the flexibility to form new relationships and participate in online communities of shared interest, thereby arresting the generational decline of social capital (Katz & Rice, 2002; Mesch, 2001; Rheingold, 1993). Meanwhile, pessimists argued that internet use was displacing the time adolescents spent in more valuable and meaningful face-to-face

interaction with family and friends, leading to general increases social isolation and loneliness, and decreases in social capital and wellbeing (Kraut et al, 1998; Nie, 2001; Putnam, 2000).

Over the past decade, the gradual flourishing of online communication from an obscure, text-based medium, to a ubiquitous, interactive, and multimedia-intensive platform, has undermined such claims. Valkenburg & Peter (2009) observe that it is now difficult to characterise internet use as socially isolating when an adolescent's interpersonal networks and opportunities for social interaction are increasingly mediated by such use. Meanwhile, the embeddedness of online communication within this broader context of resources and relationships means that such interaction is in practice much less anonymous and unconstrained by social influence than previously thought (Zhao et al, 2008). Accordingly, researchers have shifted towards a view of adolescent internet use as a multi-dimensional phenomenon that is embedded in, and conditioned by, the social contexts in which it occurs (Chen & Wellman, 2005).

Once again, the research here suggests that the negative or positive consequences of internet use the extent to which young people engage in optimal use. In a longitudinal study of recent internet adopters in the US, Kraut et al (1998) initially reported that online time use was associated with lower levels of social participation and psychological well-being. However, when a follow-up study three years later showed a reversal of these effects, Kraut et al (2002) attributed this to the participants' optimisation of their use over time. Steinfield et al (2008) found that intensive use of the social networking site Facebook by US college students predicted an increase bridging social capital (i.e. "weak ties" or acquaintances which facilitate access to information, such as job opportunities) and found that the benefits were greater for users with low self-esteem than those with high self-esteem. Yet a later study by the same authors suggests that this benefit was the result of users' 'social information-seeking' in relation to people they knew in an offline context, and as such, it diminished when they engaged in arbitrary 'friend collecting' (Ellison et al, 2011). Other research indicates that young people's internet use is positively correlated with their interpersonal trust (Beaudoin, 2008) and civic and political engagement (Pasek et al, 2009; Vromen, 2007).

However, research in this area has lacked the longitudinal dimension needed to assess the causality of such relationships, and most of these studies identify mitigating factors which lead to varied outcomes within the population (Hargittai & Hsieh, 2012). For instance, in examining a group of young American adults' use of the internet to search for information about emergency contraceptives, Hargittai & Young (2012) found that many respondents lacked the ability to locate and critically evaluate such information in an effective manner, potentially affecting the reliability

of the information they obtained. Gradually, the earlier concerns about adolescent internet use have been replaced by a more empirical focus on explaining certain kinds of sub-optimal use, such as those uses deemed to be addictive, risky, or unproductive. This research, which has tended to focus on activities such as online gaming or social networking, highlights the potential for internet use under certain circumstances to negatively impact on young people's sleeping patterns (Cain & Gradisar, 2010; Van den Bulck, 2004), their physical health (Attewell et al, 2003); and their psychological wellbeing (Byun et al, 2009; Shen & Williams, 2010).

The main aims and research question for this thesis

The above-mentioned literatures indicate that differences in internet use during adolescence can impact on young Australians' emerging life pathways, potentially affecting their economic and educational participation, their social relationships and leisure practices, and their mental and physical well-being. They suggest that contrasting ideas about what constitutes 'optimal' internet use may produce varying conclusions about the relationship between internet use and broader inequalities these areas. This thesis aims to improve our knowledge of such inequalities by developing and testing a refined framework for explaining how and why differences in youth internet engagement arise. This framework incorporates several contrasting perspectives concerning the relationship between internet use and social inequality, which allows for their contrasting insights to be more fully integrated than has previously been the case. In order to accomplish this aim, I utilise the sample and data from the Social Futures and Life Pathways ('Our Lives') Project[1], which is a longitudinal study of young people living in Queensland, Australia. Initiated by researchers at The University of Queensland in 2006, the Our Lives Project is an infinite-life cohort study that has been examining stability and change in young people's attitudes, values, beliefs, and behaviours in a wide range of areas as they transition from adolescence to adulthood. There is a natural alignment between the broader context of the Our Lives Project and the guiding research question for this thesis, which is as follows:

> ***How and why do young people vary in their engagement with the internet between adolescence and early adulthood?***

I explore this question using survey and interview data from the large and representative cohort of young Queenslanders participating in the Our Lives Project. I examine differences in online time use at the beginning of high school with the overall cohort (n=6,545), before focusing on a core, longitudinal cohort (n=2,060) to investigate the extent of their internet engagement at the

[1] Further detail on the Our Lives Project is given in Chapter 3, as well as online at: http://www.uq.edu.au/ourlives

end of high school. Then, in a series of qualitative interviews, I follow up with strategically chosen respondents (n=20) in the year following high school to explore how their perceptions and experiences of internet use vary.

This research attempts to make several important contributions to the existing literature in this area. First, it tries to reconcile major and recent theoretical approaches for explaining the relationship between youth internet engagement and social inequality, thereby enabling the arguments of each to be evaluated alongside one another for the first time. Second, it addresses a well-documented dearth of both longitudinal and mixed methods research on internet use both in Australia and internationally (Helsper, 2012). As noted earlier, most longitudinal studies focused on the outcomes of internet use neglect to account for variation in the range and quality of such use, making it difficult to draw substantive conclusions about what constitutes effective internet use. Few longitudinal studies have focused on changes in internet use over time and the reasons for these (see Anderson (2005) and Burrell (2012) for two notable exceptions) and no such study has examined the reasons and consequences of such changes using mixed methods. Given the Our Lives sample size, as well as the quality and diversity of its data, this research will be one of the largest in-depth studies of youth internet engagement carried out in Australia.

Thirdly, this research heeds Livingstone & Haddon's (2009) call for a 'child-centred approach to children's experiences, perspectives, and actions in relation to the internet', situating these within the contextual influences which enable and constrain their use. This requires providing children with the opportunity to report on their own internet use experiences and outcomes, and ensuring that their worldviews are respected and incorporated into the research process. Young people are the primary participants in this research, and I examine their behaviours, experiences, and perspectives through surveys and qualitative interviews, allowing them to engage with and contest discourses about the value of their internet use. Finally, this thesis attempts to bridge the existing gap between research on the nature and consequences of internet use and young people's own perspectives about the benefits and risks of their use; by reconciling these different insights I am able to re-evaluate the policy context surrounding adolescent internet use and offer suggestions on how to minimise the potential for young people's digital exclusion.

The structure of this thesis

This thesis will proceed as follows. In the next chapter, I begin where the previous discussion about the consequences of youth internet engagement leaves off; that is, I describe the main ways researchers have conceptualised, measured, and explained those differences and their

relationship to broader social inequalities. Upon identifying three such approaches, I outline a conceptual framework for explaining youth internet engagement which reconciles key aspects from each approach. In Chapter 3, I describe the longitudinal, mixed methods research design used to investigate this framework, giving an overview of the triangulation approach used, the data and sample characteristics, and the qualitative and quantitative methods employed in the analysis. In Chapter 4, I undertake both cross-sectional and longitudinal analyses of the factors influencing young people's online time use for academic and social purposes at the beginning of high school, when they were aged 12/13 years, and at the end of high school, when they were aged 16/17. This is the first Australian study to undertake a multivariate analysis of online time use accounting for a range of socio-demographic, access-related, and behavioural factors. In Chapter 5, I test whether the earlier influences on respondents' online time use help to explain how they developed in terms of their internet self-efficacy, and the breadth and frequency of their use at the end of high school.

Then, in Chapter 6, I present the qualitative data for this thesis, exploring respondents' experiences and perceptions of internet use in the year following high school (aged 17/18). Consistent with my mixed methods design, these interviews are linked to the qualitative analysis via nested sampling typology used to recruit and compare interviewees with key characteristics. The results of this analysis are discussed and integrated with findings from the preceding chapters to illustrate key mechanisms shaping youth internet engagement and illuminate their potential outcomes. Finally, in Chapter 7, I reflect on the implications of these findings for existing theoretical frameworks, and for popular and political understandings of youth internet engagement in Australia and abroad, before discussing future directions for research in this area.

Chapter 2 -

Towards a Research Framework for Youth Internet Engagement

Introduction

In this chapter I outline the main theoretical perspectives and empirical research addressing the issue at the core of this thesis: differences in young people's internet use between adolescence and adulthood, and the reasons for these. Building on this research I develop an explanatory framework for understanding youth internet engagement and its relationship to social inequality.

This chapter is divided into three sections examining developments in these areas and proposing new research to build on this existing work. The first section outlines the 'Digital Natives' model of internet engagement, which is situated within the technology diffusion framework (Rogers, 2003) and emphasises the problem of uneven access to the technological infrastructure of the Information Society. The second section examines how the conceptualisation of internet engagement has been extended beyond physical internet access to account for the various norms, resources, motives and skills which shape internet use and its outcomes. In this section I review the literature concerning these different factors, before outlining the two main theoretical alternatives to the Digital Natives approach which account for these factors. The first of these, which I term the 'Digital Connoisseurs' model, frames youth internet engagement within Bourdieu's theory of social and cultural reproduction (Bourdieu, 1984; 1986), while the second approach, which I term the 'Digital Explorers' model, situates internet engagement within Giddens' theory of structuration (Giddens, 1984). In the third and final section, I describe the explanatory framework guiding the research for this thesis. This framework reconciles key insights from the models reviewed here whilst addressing some of their limitations.

Technology Diffusion & the 'Digital Natives' Approach

The first major approach to explaining differences in youth internet engagement has its basis in the portrayal of young people as technologically savvy Digital Natives. Having grown up in an era of widespread internet access and use, it is often claimed that younger generations have developed a shared orientation towards confident, prolific, and effective internet engagement which distinguishes them from preceding generations. This provides a simple explanation for differences in their use: adolescents with internet access from an earlier age will display sophisticated and beneficial internet use sooner than others, producing usage differences which last until all young people have access to the technological resources they need. Each explanatory approach examined in this chapter makes an argument about what constitutes effective internet use, and what influences

such use; in this case, the Digital Natives approach emphasises the importance of having physical access to ICTs, and using them, from an early age.

This argument relies on two broader claims about why such access is inherently beneficial. The first of these - the Information Society thesis - refers to the emergence of post-industrial knowledge economies which privilege the exchange of information and services over manufactured products (Bell, 1973). Such changes are seen to place a rising premium on the ability to access information and communication networks via ICTs (Castells, 2000; van Dijk, 2005). Second, the 'digital divide' thesis refers to the idea that there are inherent benefits that come with having access to ICT resources (i.e. computers, modems, internet service), and that the population is divisible into two camps: those with this beneficial access, and those without it (Gunkel, 2003). This links the Information Society thesis to the uneven social diffusion of internet access, by suggesting that any technological gap between those with and without access (NTIA, 1999) equates to a social gap between the 'information rich' and 'information poor' (Wresch, 1996; Bonfadelli, 2002). Such a link involves instrumentalist and determinist ideas about technology and its functions (Warschuer, 2003). It suggests that once they have internet access, young people learn to use it in similar ways and with similar outcomes, irrespective of their attributes and circumstances (Jung et al, 2001). This explains the uniform level of internet engagement attributed to them by the Digital Native rhetoric.

Another important feature of this argument about the salience of access is the discursive phenomenon of 'technology hype' which surrounds it. Technology hype refers to rhetoric about the potential benefits using a new technological innovation (and the disadvantages of missing out), mostly espoused by commercial and political stakeholders during the early stages of its social diffusion (Burrell, 2012). The network externalities accompanying internet adoption and use are such that this rhetoric can become self-fulfilling; as more people 'buy into' the hype, and the number of users increases, the actual effects of use and non-use increase exponentially (Mahler & Rogers, 1999). Thus, as more of one's friends, family and acquaintances integrate internet use into their daily communication routines, the potential social benefits of going online increase, as does the exclusionary potential of non-adoption.

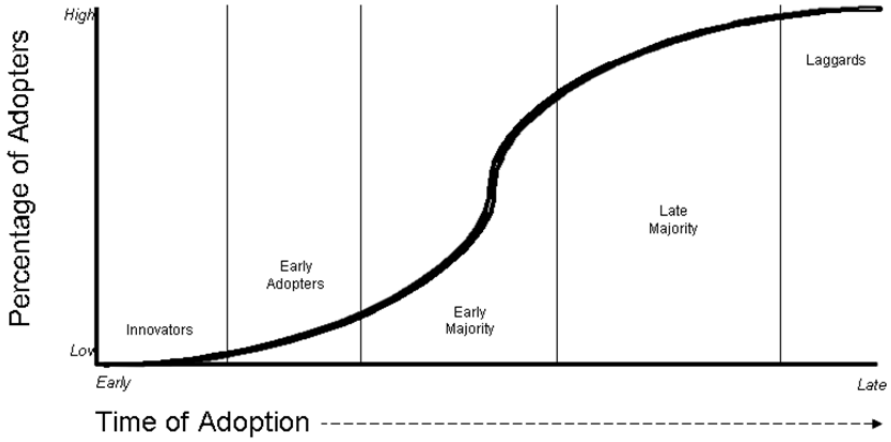
The Digital Natives rhetoric extends this technology hype discourse to young people in a somewhat contradictory manner. On the one hand, it positions young people symbolically as the vanguard of the future Information Society - destined to become enthusiastic, wide-ranging and productive consumers of new media. The perceived embrace of such technologies by future generations helps broaden narratives about social and technological progress to a more general audience, thereby accelerating the diffusion process. More importantly, however, the Digital Native

rhetoric also asserts that no such progress is guaranteed and that young people's enthusiasm for these technologies needs to be resourced and cultivated, or else this future vision will be placed in jeopardy (Facer & Furlong, 2001). This paves the way for a discussion about what youth internet engagement should look like, in various educational and everyday life contexts, which is informed primarily by ideological considerations (e.g. about the Information Society and Knowledge Economy) or by public concerns and media discourses about online safety. As argued in the introduction, neither framework for deciding what passes as *acceptable* adolescent internet use is well-grounded in empirical research about constitutes *effective* internet use. Instead, they rely on the key assumption of the Digital Natives approach: that having access to technological resources from an early age guarantees that young people will be uniformly exposed to certain outcomes.

Diffusion Theory and the Contours of the Digital Divide

Both the Digital Natives approach, and the digital divide concept more generally, attribute differences in internet use and its outcomes to disparities in internet access. Such disparities are primarily theorised within the well-established diffusion of innovations (DoI) framework. Developed by Everett Rogers over half a century ago, and extensively tested and refined over the years, the DoI model explains how new ideas, objects, and practices spread throughout society over time. This model has been interpreted as showing that inequalities in internet access, and in the consequences of access, are only a temporary feature of the diffusion process - as was the case with innovations such as television and home computing (Compaine, 2001; NTIA, 2000; Norris, 2001).

Figure 2.1: Roger's S-Curve Model of Innovation Diffusion



Source: Rogers (2003)

Since the adoption rate for a new innovation typically forms an uneven S-curve distribution (see Figure 2.1), this can be used to predict the population segments most likely to adopt the innovation at each stage in its diffusion. Diffusion tends to begin slowly as an innovation is initially adopted by a select group of 'innovators' (2.5% of the population) and then picked up by 'early adopters' (13.5%), before filtering outward to the 'early majority' (34%) at an increasing pace. The diffusion rate accelerates until half of the population has adopted, at which point demand for the innovation starts to become saturated and its spread begins to decelerate; its uptake by the remaining 'late majority' (34%) is driven by falling prices, by change agents who promote adoption, or by changes to the innovation itself which reduce perceived barriers to adoption. Finally, the innovation spreads most slowly amongst the remaining 'laggards' (16%) who, for various reasons, are the least willing or able to adopt.

The attributes of these adopter categories are pertinent to the timing of younger people's access to newly diffusing digital resources, because they may influence their parents' decisions about whether or not to adopt. Rogers (2003) notes that early adopters of new innovations tend to differ from late adopters in their personalities, communication behaviours, and socio-demographic profiles. Earlier adopters are likely to be of higher social status, better educated, and more upwardly mobile than later adopters; they tend to be opinion leaders, with larger and more diverse social networks in which they have increased contact with change agents and exposure to communication channels (Rogers, 2003: 288-290). They are also more rational, adaptable, and tolerant of uncertainty, and less fatalistic than later adopters (Rogers, 2003).

Since those who display these characteristics are more positively orientated towards new innovations, they may be quickest to find out about new modes of internet access and use, and to incorporate them into their everyday lives. Therefore, the initial distribution of internet users over-represents those with these characteristics. Since late adopters are slower to learn about the potential applications of internet access, and more skeptical about new innovations, it may take some time until the distribution of internet users normalises and becomes more representative of the entire population. This 'normalisation model' of diffusion provides a hypothetical scenario in which the outcomes of internet use are predicted to grow more evenly distributed over time so long as internet access becomes more universal. Coupled with the rhetoric of 'bridging the digital divide', the egalitarian logic of the normalisation model is influential in the research and policy context surrounding internet diffusion. As well as underpinning the policy objective of universal access provision, there has much research has been devoted to tracking progress towards this end.

This research is typified by the large-scale studies of computer and internet diffusion undertaken by the National Telecommunications and Information Administration (NTIA), using data from the US Census Bureau's Current Population Survey (CPS) (NTIA, 1995; 1998; 1999; 2000; 2002; 2004). Consistent with earlier technology diffusion research, these reports employ binary measures examining whether or not households have the apparatus needed for internet use. Along with similar studies at the time, the NTIA findings were at first consistent with diffusion theory and the normalisation model. They showed that internet adoption was more likely amongst certain groups: younger people, males, people of Caucasian or Asian/Pacific Islander descent, higher income earners, highly educated people, people living in urban areas, and dual parent homes with children (Bonfadelli, 2002; Bucy, 2000; Hoffman et al, 2001; Lenhart, 2003; Rogers, 2001).

In the Australian context, similar patterns of early adoption have been observed, but the role of geographic region has been especially prominent (Curtin, 2001; Gibson, 2010; Lloyd & Bill, 2004; Lloyd & Hellwig, 2000). Differences in internet access and use add another dimension to the broader social divisions between Australians living in urban, regional and remote areas, who are separated by larger geographic distances than in most nations (further information on geographic remoteness in Australia is provided in the subsequent chapter). Drawing on survey data from 700 Australian households, Lloyd & Hellwig (2000) used multivariate regression analysis to control for a range of potential influences on home internet access. Ultimately, they found that educational qualifications, followed by income, were the main drivers of access, explaining the significant influences of age, gender, occupation and geographic region. This led them to conclude that lower internet access amongst people living in non-metropolitan areas could be attributed to the higher median age and lower education and income levels of these individuals. In general, this research on internet diffusion illustrates the kinds of socio-demographic factors which may differentiate young Australians in their initial exposure to new modes of internet access and use during adolescence.

Access Trends over Time: Evaluating the Normalisation Model

However, the Digital Natives approach suggests that such factors are only relevant if they continue to differentiate young people's access over time. If the normalisation model is accurate, then these access disparities should be gradually eroding, enabling young people to display the competent internet use that has been attributed to them by the Digital Native rhetoric. The overall pace and trajectory of access diffusion gives an indication as to whether this is the case. Here, the NTIA reports show a steep increase in household internet access from under 20% in October 1997 to over 50% in September 2001. The ABS Household Use of Information Technology (HUIT)

survey provides similar data for the Australian context. This shows that, despite lagging slightly behind the US, Australia experienced an equally rapid take-off over a similar period, from 16% in 1998 to 42% in 2002 (ABS, 2002). However, after the burst of the 'dot-com bubble' in 2000 and the subsequent economic slowdown, the pace of US diffusion declined (NTIA, 2010). Between 2001 and 2009 internet penetration rose from 50% to 69% - an annual growth rate of just 2.5% per year compared to roughly 8% per year between 1997 and 2001. By 2009, when the vast majority of those with dial-up access had upgraded to broadband, around 30% of the population still remained without internet access of any kind. In the Australian context, there was a similar, but less pronounced, decline in annual growth rate from 6.5% to 4.3% across a similar period (ABS, 2011).

Unsurprisingly given this slowdown, many of the socio-demographic disparities identified earlier still persist today. In the US in 2009, broadband use was as high as 90% for those with a family income of $150,000 or more, and as low as 30% amongst those earning less than $15,000 (NTIA, 2010). Similarly, the usage rate was at 30% for those without a high school diploma, rising to 84% for those with a bachelor's degree or higher. Where 81% of young people aged 18-24 used broadband at home, this figure fell to 50% amongst Americans aged 55 or older. Other groups on the wrong side of this divide included unemployed people and those outside the labour force, those living in rural areas, non-Caucasian or Asian individuals, as well as single-parent families and households without children. The only factor no longer significantly influencing access was that of gender (Ono & Zavodny, 2003; NTIA, 2010). Consistent with this picture, most socio-demographic factors influencing internet adoption and use in Australia at the turn of the millennium still do so today (ABS, 2011; Holloway, 2005; Notley & Foth, 2008; Willis & Tranter, 2006).

Implications for Young People and the Digital Natives Approach

These findings count against the normalisation model and point towards longer-term access disparities which may differentiate young people in the timing of their early internet use. However, the fact that internet access and use rates are higher amongst young people than any other age group still supports the notion of a generational shift towards greater ICT engagement. There has been a clear trend towards increasing exposure of adolescents to new media over the past decade. Every three years since 2000, the ABS releases its report on Children's Participation in Cultural and Leisure Activities (CPCLA), which examines the involvement of children between the ages of 5 and 14 in a range of activities, including computer and internet use. The proportion of children within this age group who accessed the internet in the 12 months prior to the survey grew from 47% in 2000, to 65% in 2006, and 90% by 2012 (ABS, 2012a). By 2010-11, 93% of Australian

households with children under the age of 15 had internet access, compared to just 74% amongst those without children (ABS, 2011).

Yet a key claim of the Digital Natives approach is that young people are fairly homogenous in their internet access and use, comprising a distinct generational cohort with a shared orientation in this regard (Holmes, 2011). One does not need to delve deeply into the research on adolescent internet use to confirm that such uniformity is little more than a myth (Bennett et al, 2008). For instance, the aforementioned CPCLA data shows substantial variation in access amongst children of varying ages. Younger respondents aged 5-8 years were much less likely to have been online in the previous 12 months (79%) compared to older respondents aged 12-14 years, 98% of whom were using the internet by this age (ABS, 2012a). When it comes to the ownership of mobile phones - an increasingly common platform for accessing the internet - this age gradient grew even steeper. Almost no children aged 5-8 years had a mobile phone, but nearly three-quarters of all children owned one by the time they were aged between 12-14 years (ABS, 2012a). In their 2011 *EU Kids Online* study, Livingstone and colleagues found that 30% of children aged 9-10 years had internet access in their own bedroom, a figure which rose to 67% for those children aged 15-16 years (Livingstone et al, 2011). Thus, during their early teenage years and as they enter into secondary schooling, a young person's access profile changes considerably within a short space of time.

Since children rely to a large extent on their parents for home internet access, such changes are influenced by the socio-demographic factors which affect internet diffusion. In 2002, McLaren & Zappala undertook a large cross-sectional study of computer and internet use amongst 6,874 children in 3,404 financially disadvantaged Australian households. They reported that home use was much less common amongst this group than it was for the general population of Australian youth, and that most of these children instead relied on their schools for access. Consistent with Lloyd & Hellwig (2000), they observed that internet use was strongly correlated with parental education, followed by income, after controlling for a range of demographic variables. When and how young people access the internet at home involves complex interactions between factors like age, gender, and family SES. For instance, boys may be more likely than girls to have internet access in a multiple locations, including in the privacy of their own bedroom, especially if they are older and from a more affluent middle-class background (Livingstone & Helsper, 2007). An important theme in research on youth internet use and inequality is the idea that the limited capacity of disadvantaged families to invest in ICT resources for their children helps to reproduce these economic and educational inequalities across generations (Lee, 2008; North et al, 2008; Peter & Valkenburg, 2006; Tondeur et al, 2010). This research suggests that these processes impact on

young people not by partitioning them into internet 'haves' and 'have nots', but instead by influencing the quality of resources at their disposal, as well as when, where, and how they use them. Such work has emerged from critiques of the digital divide research over the past decade.

Limitations of the Digital Divide and Digital Native Approaches

Critics of the digital divide concept argue that its binary, technology-orientated focus may be appropriate for analysing and explaining differences in internet diffusion, but it is less suitable for research on the post-adoption consequences of internet use (Jung et al, 2001). The latter use involves several problematic assumptions: (1) that internet access alone is sufficient to explain the consequences of internet use; (2) that those with internet access automatically choose to make use of it; and (3) that such use is essentially homogenous in its nature and outcomes. Given its similar emphasis on the salience of internet access, these claims also underpin the Digital Natives approach.

Such claims ultimately reflect the technological determinism of the digital divide thesis. On this note, some scholars have observed that key lessons from earlier research on the social diffusion of information are often overlooked in the context of the digital divide. On the basis of decades of research showing the 'failure of mass publicity to inform the public at large', Tichenor et al (1970: 161) proposed the 'knowledge gap' hypothesis to explain why information is appropriated unevenly across different social groups. This hypothesis states that as mass media information permeates a social system, those with higher SES are better positioned to acquire this information at a faster rate than those of lower SES, leading to an expanding 'knowledge gap' between higher and lower social strata over time (Tichenor et al, 1970: 159). Another version of this hypothesis emphasises the role of topic-specific interest in accounting for knowledge gaps (Ettema & Kline, 1977). What these accounts demonstrate is that that access to a resource (e.g. information, or in the case of the digital divide, technology) is not sufficient to ensure its productive or beneficial use. To be sure, access is necessary for use, but other factors, such as SES and topic-specific interest, affect the nature and outcomes of use. Bonfadelli (2002) and DiMaggio et al (2004) stress that such findings are relevant in the case of the digital divide, where this distinction between access and use has been lacking.

For this reason, Wilson (2000) introduces the concept of 'effective access' to denote the extent to which an individual feels as though they can access the internet, if they choose to do so. He distinguishes this from 'theoretical access', which is the opportunity most individuals have in theory to go online (i.e. the formal provision or availability of internet access in various contexts). If the research objective is to measure access trends (i.e. in order to evaluate whether certain policy benchmarks have been reached), then a narrow focus on theoretical access may be warranted.

However, when assessing the consequences of uneven internet diffusion, and deciding which access benchmarks are needed, researchers should examine effective access from an individual standpoint and the contextual factors affecting this as well (such as a user's attitudes, needs, and skills).

Most scholars now interpret persisting access disparities as a sign that the normalisation model is not suitable for any account of diffusion which needs to distinguish between successive innovations, or increasingly demanding definitions of access. Over time, this has become the case with internet diffusion; by 2004, the NTIA employed a hierarchy of access definitions, ranging from household internet subscribership, to whether or not a person used the internet *at any location*, then whether they used the internet *at home*, and whether or not a person *used high-speed access at home* (NTIA, 2002; 2004). DiMaggio et al (2004) note that the interpretation of access trends and their consequences for inequality varies substantially depending on which type of access one looks at.

To illustrate why this is the case, Norris (2001) distinguishes between the normalisation model and one in which stratification takes place over the course of successive innovations. Using the example of broadband versus dial-up access, she notes how higher levels of social strata, which adopt earlier, may be better positioned to take advantage of subsequent innovations and thereby retain their initial advantage over time. This example heeds the knowledge gap lesson, suggesting that internet access and use is not inherently beneficial, because not all individuals are equally able or willing to capitalise on this technology. As the technology of the Information Society becomes increasingly varied, not all avenues of access and use will produce similar outcomes, and some may be better suited than others to a user's particular skills, needs and dispositions. This means that assumptions about the homogeneity of young people's internet use and its outcomes are largely mistaken. As such, Warschauer's (2002) observation that 'access exists in gradations, rather than bipolar opposition' may also be extended to the outcomes of internet use. Theorists now use terms like 'digital inequality' (Hargittai, 2008; Halford & Savage, 2010) or 'digital inclusion/exclusion' (Livingstone & Helsper, 2007) to denote the varying degrees of social advantage and disadvantage that correspond to differences in internet engagement.

Multi-dimensional Approaches to Explaining Youth Internet Engagement

In response to these critiques, more recent research has depicted internet engagement as having a multi-dimensional relationship to social inequality, consisting of multiple 'divides' or forms of 'access' (Helsper, 2012). A number of authors have distinguished between 'first-level' differences in terms of technological access - the main focus of internet diffusion research - and 'second-level' differences in terms of the quality and composition of internet use. While this work

still considers access disparities important to differences in use, it also emphasises the varying skills, literacies, motives, and resources required for different kinds of online participation (Attewell, 2001; Correa, 2010; Hargittai, 2002; Hargittai & Walejko, 2008). The table contained in Appendix A summarises several influential accounts of this nature. One early instance of such an account is provided by Kling (1998), who argues for a more 'contextual inquiry of information technology and social behavior' in which computer and internet use is seen as embedded within, and shaped by social relationships such as those within organisational settings. Accordingly, he differentiates 'technological access' from 'social access', using the later term in a broad sense to denote various resources and know-how ('a mix of professional knowledge, economic resources, and technical skills') required for beneficial internet use.

Following in this vein, researchers have built on the earlier digital divide research by placing greater emphasis on, and further defining, the role of social context in mediating internet use and its outcomes. Some theorists, such as DiMaggio et al (2004) and Hargittai (2008) adopt a more socially determinist or constructivist approach, where technologies and their uses are seen to be conditioned by wider political, economic and cultural processes (Bourdieu, 1984; MacKenzie & Wajcman, 1985). Others assign greater agency to users themselves, who may affect this relationship between technological and broader social processes as they become increasingly skilled and confident in their internet use (Giddens, 1984; Lievrouw & Livingstone, 2006). These accounts suggest that young people's internet use and its outcomes will vary depending on the user and their context. As shown in Appendix A, a range of factors may account for this variation. Aside from the economic, social, and cultural processes in which internet use is embedded, four sets of factors can be identified: (1) technological resources and autonomy of use; (2) user perceptions and intentions; (3) content preferences and media orientations; and (4) user skill and self-efficacy.

Technological resources and autonomy of use

Differences in access to technological resources remain a key focus in post-digital divide internet use research, but consistent with the aforementioned critiques, this focus has become broader and more nuanced. Each of the accounts shown in Appendix A acknowledges that the quality of one's internet connection and accompanying hardware/software helps explain variation in the nature and quality of one's use. For instance, individuals with broadband access spend more time online and undertake broader range of activities than those with dial-up connections (Anderson, 2008; Davison & Cotton 2003). Conversely, those with poor quality connections may be excluded from particular activities requiring greater bandwidth or download quota (Horrigan & Rainie, 2002; Robinson, 2009). Even if potential adopters are willing to pay more for higher quality

resources and services, the ratio of cost to quality is not the same for everyone (DiMaggio et al, 2004). Through a cycle of reduced supply and demand, rural areas tend to have more expensive, but lower quality, internet service than urban areas (Khatiwada & Pigg, 2010). Faced with higher entry costs, rural Australians have less awareness of the benefits of high-speed broadband, and remain less willing to pay for it; this reduced market demand reinforces poorer internet service provider (ISP) coverage, less competition, and continued higher pricing (Curtin, 2001; Whitacre, 2010). As such, the access barriers facing younger people living in rural and remote Australia may be more complex and systemic than those living in major cities (Valentine & Holloway, 2001).

Internet use is also influenced by the autonomy with which users can access the resources and services which are available to them (Bimber, 2000; DiMaggio & Hargittai, 2001). Autonomy of use refers to the freedom one has to engage in his or her preferred online activities. For young people, this depends to a large extent upon the location (e.g. home, school, or elsewhere) in which technological resources are located, and the norms and rules about use that apply in those settings. Internet access at home is typically less subject to restrictions and surveillance than at school, affording users the flexibility and privacy to undertake a wider range of online activities (Levin & Arafeh, 2002; Notley, 2008; Selwyn et al, 2008). On the one hand, this may allow young people to experiment with different types of use and develop online skills through informal learning; but at the same time, these opportunities may be accompanied by risks of distraction, exposure to inappropriate content, or unwanted contact from strangers (Buckingham, 2006; Livingstone & Helsper, 2008). How young people's internet access and use is physically situated and regulated within the domestic context is likely to affect this balance. For instance, children with exclusive access in their own bedrooms have more autonomy of use than if they have access in a communal space, where it is easily monitored by parents and may be shared with others (Haddon, 2004).

A 2007 report by the Australian Media and Communications Authority (ACMA) examined the different techniques parents used for limiting or restricting their children's internet use at home. It found that the main approaches parents employed were personal supervision (e.g. occasional monitoring) and having the screen in a visible location, retrospectively checking their child's search history, and preventative technical measures such as blocking websites or using filtering software. Such techniques tended to be situated within a broader regulatory approach at home. Findings from the same study (ACMA, 2007) show that the majority of parents had rules, understandings, or arrangements with their children about when they can use the internet (e.g. at which times of day, the duration of their use, whether to ask permission first, etc.) or what they can and cannot use it for (e.g. unapproved websites, sexual content, online interaction).

As they grow older, young people's autonomy of use increases, reflecting improvements in the quality of their access to resources and a relaxation of regulatory context surrounding their use. To some extent, this is driven by technological processes of innovation and diffusion which afford adolescents increasing autonomy and mobility in a range of contexts. This is facilitated by the increasing ubiquity of 'always on' mobile internet access and a widening array of portable devices, including laptops, tablet PCs, and smartphones (Lenhart et al, 2010). There has been little attempt thus far to contextualise such changes within the overall process by which young people assume independence from their parents and enter into roles they associate with adulthood. How children and parents negotiate issues around internet access and autonomy of use is likely to play a key role in this process - one that is mediated by each party's perceptions about internet use and its potential benefits and risks (Ito et al, 2010).

Perceptions and intentions relevant to internet use

The first step beyond a focus on access to technological resources has been to study the reasons individuals give for non-adoption and non-use (Vehovar, 2006; van Dijk, 2005). Such analysis is frequently undertaken in internet diffusion research to determine the level of unsatisfied demand for internet services, as well as to identify the main barriers individuals see as preventing them from adopting. However, the findings of this research vary depending on the reasons people are able to choose from. For instance, in 2010, the NTIA found that the main reasons given for non-adoption of broadband were its perceived irrelevance to one's needs/interests (45.6%) followed by its excessive cost (25.3%) and having no/inadequate computer hardware (14.2%) (NTIA, 2010). By contrast, a Federal Communications Commission report released the same year, which included a broader set of possible reasons, found that the main barrier was excessive cost (36%), followed by digital literacy (e.g. computer anxiety, concern about online hazards, etc.) (22%) and irrelevance to needs/interests (19%) (Horrigan, 2010).

To gain additional insight into the role of such factors, researchers have developed various typologies differentiating marginal internet users (i.e. non-users and low users) based on the extent of their non-engagement and its reasons (Selwyn, 2006). For instance, Wyatt et al (2002) identify four types of non-users: (1) the 'resisters', who haven't been online before and have no desire to do so; (2) the 'rejecters', who have used the internet but voluntarily discontinued their use for some reason (e.g. not worth the cost, lack of benefit or enjoyment); (3) the 'excluded', who have for various reasons been unable to get access or go online; and (4) the 'expelled', who have involuntarily discontinued their use for some reason (e.g. they could no longer afford it or lost access through a particular institution). On similar grounds, Lenhart et al (2003) differentiates the

'truly unconnected' from the 'evaders', 'drop-outs' and 'intermittent' users; and Murdock (2002) employs a tripartite distinction between 'core' users (who make continuous and comprehensive use of ICTs), 'peripheral' users (who make more spasmodic and limited use), and 'excluded' users (whose use is non-existent). Qualitative research in this area has helped to illustrate the complex interactions between individual agency and structural factors which shape internet adoption and use. A common theme emerging from this research is that non-use is sometimes better characterised as an active choice, and other times as a more necessary response to extrinsic constraints. In many cases, young people may choose not to go online, or to make limited use of the internet, because it is just not pragmatic or worthwhile for them to do so given their broader needs, resources, and circumstances (Selwyn, 2006; van Dijk, 2005).

Several broader theoretical frameworks address this relationship between an individual's intentions and beliefs, and their adoption and use of new innovations. These approaches distinguish between a technology's real and perceived characteristics - the assumption being that the behaviour of potential adopters and users more directly reflects the latter (Moore & Benbasat, 1991). As part of the broader DoI framework, Rogers (2003) identifies five perceived innovation characteristics which influence adoption: *relative advantage* - the degree to which an innovation is seen as better than that which came before it; *compatibility* - the sense that an innovation is consistent with one's existing values, experiences, and needs; *complexity* - the perceived difficulty of understanding and using an innovation; *trialability* - whether or not an innovation can be experimented with; and *observability* - whether or not the results of an innovation are visible to others (Rogers, 2003: 15-16). Similarly, Davis' (1989) Technology Acceptance Model (TAM) emphasises perceptions about a technology's *usefulness* - the belief that using the technology would enhance and task performance and *ease-of-use* - the belief that using the technology would be free of effort. Later iterations of these accounts include perceptions of *image* - whether using the technology is seen as enhancing one's image or status amongst others (Agarwal & Prasad, 1997); *voluntariness* - whether using the technology is seen as being of one's free will (Moore & Benbasat, 1991) and *subjective norm* -whether using the technology is seen as consistent with the expectations of others close or important to the individual (Ajzen, 1991).

Such perception-orientated frameworks have been applied extensively to research on the adoption of technologies including cable television and VCRs (Atkin, 1994; LaRose and Atkin, 1988), home computing (Steinfield et al, 1989; Venkatesh & Brown, 2001), computing systems in organisational settings (Venkatesh & Davis, 2000; Western et al, 2003), mobile phones (Leung &

Wei, 1999), internet use (Lederer et al, 2000; Zhu & He, 2002) and mobile internet use (Hong & Tam, 2006). Moreover, a number of studies have examined the perceived attributes of certain online activities, including banking (Saythe, 1999), gaming (Cheng et al, 2004), and obtaining news (Nguyen, 2008). For instance, Nguyen (2008) lists the relative advantages of online news over traditional news formats as its ease and affordability of access, its immediacy, its customisability, its multi-media content, and its participatory format.

Related to perceptions of compatibility and familiarity, the concept of 'technology clusters' also has particular utility for internet use researchers. A 'technology cluster' refers to 'one or more distinguishable elements of technology that are perceived as being interrelated' (Rogers, 2003: 249) and typically consists of functionally similar or related innovations (LaRose and Atkin, 1992). For instance, a range of technologies, including home computers, internet, home telephones, mobile phones, form a socially-orientated technology cluster which predicts the adoption of new media with similar functionalities (Boase et al, 2006; Licoppe, 2004). Clusters may also form when one technology (e.g. home computer) acts as 'trigger innovation' that encourages the adoption of subsequent technologies (e.g. internet use, online banking) (Rogers, 2003). How young people perceive the various digital media they encounter at home, school, and elsewhere as interrelated, may reflect the orientations they develop towards media in and across these different contexts.

Preferences and media orientations

Young people's perceptions and intentions regarding internet use are grounded in these more general preferences or orientations concerning media use. Some theorists have argued that a perceived lack of need or relevance for internet use may reflect the proliferation of online content which is specifically tailored to the preferences of a more homogenous population of early adopters (Servon, 2002). If the content provided online is seen as irrelevant or inaccessible to disenfranchised segments of the population, this may compound the other access barriers they already face (Warschauer, 2004; Wilson, 2004). A study by the Children's Partnership in 2000 identified four content-related barriers faced by low-income and underserved American adults and children: (1) lack of local information (e.g. about employment or educational opportunities); (2) lack of content for limited literacy users; (3) lack of content in multiple languages; and (4) lack of opportunities to create content and interact with it so as to promote cultural diversity and representativeness (Lazarus & Mora, 2000). While content access may not be as serious an issue for young people as it is for other groups without internet access entirely, it may help to explain narrow and infrequent use amongst those who are online (Dutton et al, 2005; Selwyn, 2006).

Other scholars have focused on the orientations individuals display towards different media and how these may be affected by their past experiences. Larose and Atkin (1992) hypothesise that, over time, individuals develop 'socially learned perceptions' of the positive or negative outcomes arising from certain technologies, which shape their future expectations of other technologies in the same cluster. Examining the adoption and use of Windows software in organisational settings, Karahanna et al (1999) distinguished between the role of pre-adoption and post-adoption beliefs: where pre-adoption attitudes were found to be based on the innovation characteristics of DoI theory, post-adoption beliefs were instead based only on perceptions about instrumentality (i.e. usefulness) and image enhancement that came with direct usage experience. Further illustrating the role of experience, Davis et al (1992) found that intrinsic motivation (i.e. enjoyment) was an important factor alongside extrinsic motivation (i.e. instrumentality/usefulness) in explaining computer usage intentions in the workplace. In a similar study, Teo et al (1999) show both intrinsic and extrinsic motivation were related to the frequency, breadth, and intensity of internet usage.

The idea that people learn to seek out and use media to gratify their needs and goals is a central tenet of Uses and Gratifications (U&G) research (Katz et al, 1974; McQuail, 1997). Developed to explain traditional media practices, such as newspaper reading and television viewing, this approach attributes a degree of self-awareness to an active and selective media audience; it assumes that individuals are conscious of their informational, social and leisure needs, and purposefully seek out media that will allow them to address these (Ruggiero, 2000). Subsequent iterations of U&G theory have differentiated between the gratifications audiences seek from media, and the gratifications they obtain; research shows the latter construct to be of greater explanatory value than the former, particularly as users learn to adjust their expectations in line with previous experiences (Palmgreen et al, 1981). Studies employing U&G theory have shown that internet users obtain various gratifications previously serviced by a wider range of media, including television, newspapers, and the telephone (Jansz et al, 2010; Quan-Haase & Young, 2010;). Some have suggested that such convergence, alongside other perceived characteristics of internet use, (i.e. its ubiquity, interactivity, communality, and anonymity) may be reconfiguring the types of gratifications young people seek out and obtain, with mixed social and psychological ramifications (Diddi & LaRose, 2006; Raacke & Bonds-Raacke, 2008; Song et al, 2004). However, these perspectives have been criticised as failing to adequately explain how internet users' (and non-users) varying perceptions, needs and motivations are related to their broader socio-structural context (Nguyen, 2008; McQuail, 1997; Williams et al, 1994). Nguyen (2008) addresses this criticism by integrating diffusion theory with a structural approach to media audience formation

(McQuail, 1997; Weibull, 1985). He employs the notion of 'media orientation' as a relatively stable 'affinity for certain media, specific preferences and interests, habits of use, and expectations of what the media are good for' (McQuail, 1997: 286) which mediates the relationship between online news use and its broader socio-structural correlates.

Differentiated user skill and self-efficacy

Another key feature of the approaches shown in Appendix A is a focus on how user skill and self-efficacy mediate the relationship between internet use and inequality. Although understandings of user efficacy differ widely within the literature, two distinct approaches can be identified. The first of these combines the U&G approach with social cognitive theory - utilising Bandura's (1986) concept of self-efficacy - to explain why people who can go online might lack the confidence or motivation to do so (Compeau & Higgins, 1995; Eastin and LaRose, 2000). Bandura defines self-efficacy in the following way:

> People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses.
>
> Bandura (1986: 391)

LaRose et al (2001: 398) describe 'internet self-efficacy' as an individual's beliefs 'about their capability in using the Internet to accomplish useful tasks'; similar to Compeau and Higgins' (1995) notion of computer self-efficacy, they distinguish between a user's technical skills (i.e. web browser use) and the expected outcomes the user believes will be accomplished if they apply these skills to a given task (e.g. finding information online). As with U&G theory, this socio-cognitive approach assumes that individuals have the capacity for self-evaluation and 'enactive learning': the tailoring of their own behaviours based on the past outcomes they experience. As individuals learn which positive and negative outcomes (e.g. monetary, social approval, sensory) can be expected from a particular behaviour in a given situation, these expectations serve as strong incentives and disincentives for enacting those behaviours in future. Outcome expectations encompass the U&G ideas of gratifications sought and gratifications obtained. As LaRose et al argue:

> Outcome expectations reflect current beliefs about the outcomes of prospective future behaviour but are predicated on comparisons between incentives expected and incentives obtained in the past.
>
> LaRose et al (2001: 399)

Unlike the U&G approach, socio-cognitive theory acknowledges how negative outcomes shape user behaviour, confidence, and effort. Those who experience such outcomes are less likely to judge themselves as capable of achieving their desired outcomes in future. This reinforces their

unwillingness to invest further time and effort into the given behaviour, making their desired outcomes even harder to attain and reinforcing their low self-efficacy (Oliver & Shapiro, 1993). Accordingly, Eastin and LaRose (2000) found internet self-efficacy was positively related to prior internet experience (i.e. number of years online), positive outcome expectancies, and intensity of internet use (i.e. time spent online), and negatively related to internet stress and self-disparagement. Consistent with the normalisation model of diffusion, the authors conclude that divides in internet use may disappear once late adopters have been exposed to the benefits of internet use for long enough to develop a foundation of positive expectations, skills and experience. Various studies, mostly focusing on young people, have examined the social correlates of internet self-efficacy either directly with established self-efficacy scales (Broos & Roe, 2006; Torkzadeh & van Dyke, 2001; Zhao et al, 2011) or indirectly through self-reported measures of internet skill, such as those commonly employed in the 'Digital Explorers' research discussed later in this chapter (Livingstone & Helsper, 2007; Hasebrink et al, 2009; Livingstone et al, 2010) (For further discussion of this research on internet self-efficacy, see Chapter 5). In this latter research, the subjective characterisation of self-efficacy invites a focus on how users perceive and respond to the benefits and costs accompanying their internet use. However, the validity of such measures has been called into question by comparative research showing substantial differences between internet users' actual and perceived levels of online ability (Hargittai & Shafer, 2006).

Other researchers, such as those adopting the 'Digital Connoisseurs' approach (also discussed later in this chapter) have accounted for online skills in a more objective manner, by observing them more directly. One such study was conducted by Hargittai (2002), who assigned online information-seeking tasks to a random sample of individuals and recorded their results in terms of efficiency and effectiveness. The study found that people who were younger, and who had more prior experience with the internet (e.g. more time spent online, no. of years since first use) completed tasks faster and more effectively than older and less experienced users. Since direct observation of online skill is difficult with larger populations, and because there has been a lack of consistency in online skill definitions, researchers generally measure online skill using survey-based self-report measures (thus, in effect, measuring self-efficacy) (Zhong, 2011).

At a minimum, most researchers examining online skill focus on what van Dijk terms 'operational skills', which refer to 'the skills used to operate computer and network hardware and software' (van Dijk, 2006: 73). As with physical access, operational skills are increasingly seen as insufficient to guarantee beneficial use (van Deursen & van Dijk, 2010). Several theorists have thus proposed multi-dimensional frameworks of internet skill or digital literacy (Eshet-Alkalai &

Amichai-Hamburger, 2004; van Dijk, 2005; van Deursen & van Dijk, 2010; Warschauer, 2004). These frameworks suggest that socio-demographic differences in skill explain usage differences and, by extension, unequal social outcomes. Warschauer (2004) argues that computer literacy, information literacy, multi-media literacy, and computer-mediated communication literacy, are required for effective use of ICTs to access, adapt and create knowledge. Similarly, Eshet-Alkalai & Amichai-Hamburger (2004) link effective use to photo-visual literacy, reproduction literacy (i.e. content creation and editing), branching literacy (i.e. navigation), information literacy and socio-emotional literacy (i.e. communication etiquette). Hargittai (2005; 2009) conceives digital literacy differently, in terms of general Web-orientated knowledge; having developed a scale testing familiarity with various internet-related terms, she found that this knowledge was a stronger predictor of actual online skill than previously used measures, including self-reported online ability.

Building on frameworks developed by Steyaert (2002) and van Dijk (2005), van Deursen and van Dijk (2010) distinguish between medium-related and content-related skills, identifying two aspects of each. In terms of medium-related skills, they emphasise operational skills (i.e. using browsers and search engines) and formal skills (i.e. navigating within and between websites). In terms of content-related skills, they focus on information skills (i.e. locating, selecting, and evaluating information) and strategic skills (i.e. developing, pursuing and attaining strategic goals using the internet). Several studies have used this framework to highlight socio-demographic disparities in online skill and their potential consequences in various fields of social participation (Gui & Argentin, 2011; van Deursen & van Dijk, 2010; van Deursen et al, 2011). More generally, research suggests that young people vary in their medium-related skills, knowledge and confidence - often lacking in content-related skills and socio-emotional literacies (Hargittai, 2010; Hargittai & Hsieh, 2011; Meneses & Momino, 2010; van Deursen et al, 2011).

As noted earlier, each of the main approaches for understanding variation in youth internet engagement contains an argument about what constitutes effective internet use, and what influences such use. Under the Digital Natives approach, internet use is assumed to impact on users in a uniform way, for instance, by taking time away from other activities (i.e. the ‘displacement’ hypothesis) or by saving them time (i.e. the ‘efficiency’ hypothesis). In this sense, the effects of internet use are seen to increase automatically with a user’s exposure to the technology itself, such as when they go online more frequently, or spend more time online. In expanding beyond the access-orientated focus of the digital divide, researchers have accounted for differences with respect to the four sets of factors identified above. This has resulted in two theoretical alternatives to the Digital Natives approach and its characterisation of effective internet use.

Social/Cultural Reproduction & the Digital Connoisseurs Approach

In the Digital Native approach, socio-demographic differences in internet use are seen to be a temporary - and thus ultimately irrelevant - feature of the diffusion process, ceasing to exist when all individuals have access (or alternatively, when all individuals have used the internet for long enough to tailor its use to their needs, or to form positive expectations about it). By contrast, the Digital Connoisseurs approach argues that technological change and young people's developing internet use trajectories help to reproduce social and cultural inequalities in contemporary society (DiMaggio et al, 2004; Hargittai, 2008). Far from being temporary, differences in internet use become established over time when the various resources, skills, and orientations required by such use, which are unevenly distributed to begin with, are made even more so through a process of cumulative advantage and disadvantage. This occurs because these mediators influence the nature and effectiveness of internet use, rendering some people's use more advantageous than others. Effective use enhances one's existing human, financial, social and cultural capital, whereas unskilled or misguided use 'may outright disadvantage the uninformed' (Hargittai, 2008: 940). Drawing on Bourdieu's (1984) ideas of 'distinction' and 'habitus', Hargittai and Hinnant (2008) argue that individuals are guided by their status-specific tastes to select those types of internet use which simultaneously reinforce their own social positions and differentiate them from others within the social hierarchy. The notion of habitus provides the explanatory mechanism linking a user's preferences and behaviours to the preservation of the social structure; as 'an embodied internalisation of objective social relations', habitus is a *socially learned* system of preferences and dispositions that generates practices across different contexts (Bourdieu, 1986; italics added). Accordingly, the Digital Connoisseurs approach suggests that young people develop extrinsic orientations towards particular types of internet use, meaning that they take into account the broader norms, rules, and values which are applied to such use by others around them.

Researchers who adopt this position tend to consider internet use which focuses selectively on activities such as accessing information and services, and to a lesser extent, social interaction, as having greater potential for effectiveness - understood in terms of capital enhancement. By contrast, recreational internet uses are seen as potentially unproductive and detrimental (Bonfadelli, 2002; Hargittai & Hinnant, 2008; Zillien & Hargittai, 2009; Peter & Valkenburg, 2006). This resembles the 'homology argument' in broader research on cultural consumption and social stratification, which implies a clear symmetry between processes of cultural and social stratification. In particular, individuals of higher social status are seen to consume 'high' or 'elite' culture, whereas individuals of lower social status prefer 'popular' or 'mass' culture (Chan & Goldthorpe, 2007a).

There are three problems with this Digital Connoisseurs model as it pertains to young people's internet use. First, there has been limited empirical support for the homology argument in other domains of cultural consumption both in Australia and abroad, such as music, the visual arts, or newspaper reading (Bennett et al, 1999; Chan & Goldthorpe, 2007a; 2007b; Emmison, 2003). More so than any of these practices, internet use typifies the decreasing utility of notions such as 'high-brow' and 'low-brow' taste in contemporary societies (Petersen, 1992), particularly when the lines between different genres of cultural consumption and participation are increasingly blurred in the online context. Second, given the lack of systematic, longitudinal research into the effects of internet use, the Digital Connoisseurs model relies on untested assumptions about these (Livingstone & Helsper, 2007). Such assumptions retain the instrumentalism of the Digital Natives approach by implying that internet use is value-neutral and has pre-determined outcomes which render certain uses more desirable than others (Halford & Savage, 2010). Finally, this approach attributes a high degree of causal efficacy to users' preferences, which are grounded so directly in the social structure as to render individual agency virtually absent from the decision-making process (Elster, 2007; Helsper, 2012). This produces a static view of internet use pathways that only admit users with certain resources, skills and preferences, and of users who have no choice but to engage in those uses which reinforce their socio-structural locations.

Structuration & the Digital Explorers Approach

Another set of researchers have addressed the deficit of individual agency in the Digital Connoisseurs approach by acknowledging how users learn to tailor their internet use over time. Livingstone and Helsper (2007) characterise adolescent internet use as presenting opportunities and risks or costs, which are context-specific and thus difficult for researchers to generalise about. What distinguishes their account from the Digital Connoisseurs approach is its emphasis on enactive learning, rather than social learning; users are seen as rational actors who learn to choose more wisely from the set of actions open to them after a variety of constraints (i.e. logical, physical, economic, social, etc.) are taken into consideration. Drawing on Giddens' (1984) concept of 'structuration', Kalmus et al. (2009: 71) identify how 'rules and resources' structure young people's opportunities for internet use, such as parental restrictions on use, material resources at home and school, and the availability of time. Yet users' choices may, over time, restrict, modify or expand the opportunities they face. Using data from the UK Children Go Online project, Livingstone and Helsper (2007) analysed the extent to which 1,263 young people aged between 9 and 19 engaged in a diverse range of online activities, while controlling for socio-demographic and contextual factors.

They found that ‘going online is a staged process, with systematic differences between those who take up more, and those who take up fewer opportunities’ (Livingstone and Helsper, 2007: 683).

In their study, Livingstone and Helsper (2007: 683-684) identify four kinds of users, based on the online opportunities they pursued. ‘Basic’ users (16% of the population) focused narrowly on information-seeking use. ‘Moderate’ users (29% of the population), supplemented this with communication and entertainment, such as email and online games. ‘Broad’ users, (27% of the population), added in more ‘resource-bound’ activities such as downloading music and watching movies, as well as peer-to-peer engagement through instant messaging. Finally, ‘all-rounders’ (27% of the population) did all these activities as well as more interactive or creative forms of use, such as website creation, forum discussions, or taking part in online polls. Each stage of use coincided with more frequent use. Older adolescents were typically more advanced users; having been users for longer meant they had the experience needed to take up more online opportunities. This Digital Explorers account argues that users experiment with those avenues of use that remain open to them once structural factors have taken effect. Those who become familiar with a wider range of online activities, weighing up the benefits and costs of each, may be better positioned to tailor their use in ways that meet their needs whilst avoiding risks. This suggests that young people develop intrinsic orientations towards different types of use, which form the basis for their rational decision-making.

However, the Digital Explorers account has several weaknesses of its own. First, this approach can be interpreted as replacing the homology argument with a version of what is often referred as the ‘individualisation’ thesis. This argument suggests that the influence of social structure on the formation of tastes and preferences is either in decline or at least is being reconfigured by social changes which afford individuals greater choice over their identities and lifestyles practices (Beck, 1992; Giddens, 1991). While this view resonates with anecdotal claims about the emergence of post-modern identities and relationships online (Haythornwaite & Wellman, 2002; Zhao et al, 2008), more recent empirical research suggests that such exploratory internet use may only be possible for those already privileged with better access and more autonomy of use (Robinson, 2009). As such, the enactive learning required for effective internet use may end up reinforcing young people’s existing advantages and disadvantages in a similar way to the social learning hypothesised by the Digital Connoisseur approach. The ‘omnivore-univore’ argument, which retains aspects of both the homology and individualisation theses, may offer a more solid foundation for the Digital Explorers approach. This argument suggests that higher status uses are increasingly differentiated from those of lower status by the breadth, rather than the selectiveness, of their consumption preferences (Chan & Goldthorpe, 2007a; 2007b; Warde et al, 2000).

Another problem for the Digital Explorers approach is its assumption that when young people optimise their use based on past experience, this will automatically produce outcomes which are increasingly beneficial. This fails to distinguish between the nature of those outcomes and how they are perceived by different stakeholders - most notably children themselves. Diverse experience may lead some adolescents to gravitate towards activities which they find enjoyable in the short-term but which pose risks to them in the longer term. Enactive learning might enable these users to better identify and circumvent obstacles these activities. Nonetheless, research suggests that most of the potential dangers researchers and policymakers see in certain types of use have either been overstated, or at the very least are routinely dismissed by young people as 'minor costs of doing business' (Holmes, 2011). These are areas where qualitative research, such as the studies by Ito et al (2010) discussed in Chapter 6, can help illustrate the links between young people's internet use experiences and what they see as the benefits and costs of going online.

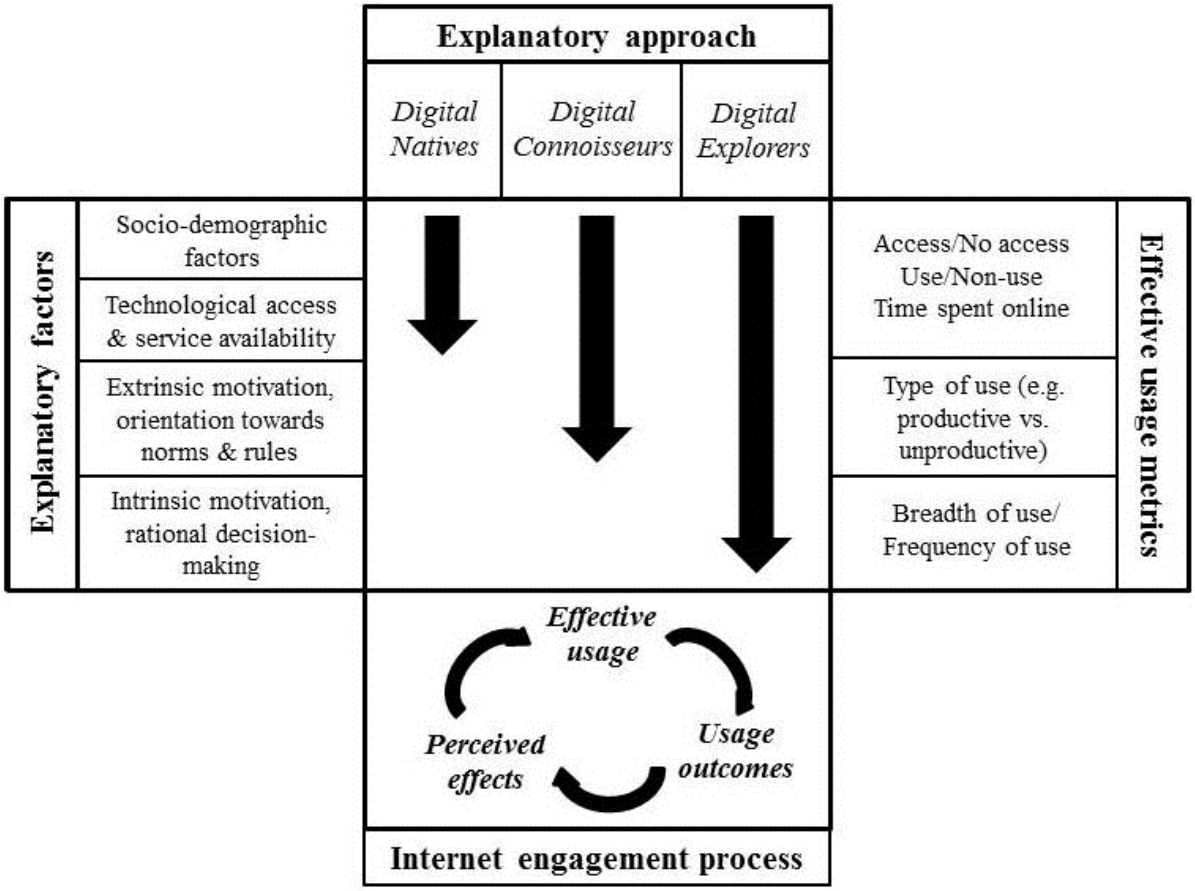
Proposed Framework for Explaining Youth Internet Engagement

In this chapter I have reviewed three important approaches to explaining youth internet engagement and how these may be related to social inequality. The Digital Natives model links differences in young people's use to early access disparities, suggesting that these will normalise over time as internet access and use becomes more widespread. Both the Digital Connoisseur and Digital Explorer models note that while most young people may, in theory, have considerable access to ICTs, in practice they differ widely in the quality of their access and autonomy, their perceptions and preferences concerning internet use, and the skill and confidence with which they engage in such use. These are all factors which may differentiate young people in their capacity to effectively access and use the internet. Inevitably, with this broadening explanatory focus there have been diverging views about what constitutes effective internet use, and which of these factors are relevant for explaining such use. The Digital Connoisseurs approach explains differences in young people's internet use in terms of their role in the broader reproduction of social and cultural hierarchies. This emphasis on the preservation of existing advantages and disadvantages is accompanied by a focus on the norms, rules, and values which help to cultivate young people's ideas about which types of use are acceptable and worthwhile, and which should be avoided. By contrast, the Digital Explorers approach conceptualises differences in internet use more as an important part of the process by which young people learn to optimise the broader opportunities and constraints they face on a daily basis. Within this account, intrinsic curiosity and experimentation is more important than compliance with established norms or rules, because this allows young people to amass the diverse experience needed to tailor their use as their needs and circumstances change.

Internet Engagement Framework

The three explanatory approaches identified here can be used to address the thesis aim posed in Chapter 1, that is, to better understand how and why young people vary in their internet usage between adolescence and early adulthood. To ensure this aim is met, I employ the principles of analytical sociology, which explains important social facts, such as network structures, cultural tastes, or common ways of acting, 'by detailing in clear and precise ways the mechanisms through which the social facts under consideration are brought about' (Hedstrom & Bearman, 2009: 3-4). Much previous research on internet use has related one social fact - patterns of internet access or use - to other facts about the social locations and characteristics of adopters or non-adopters. This describes diffusion patterns without explaining why they occur or their implications for inequality (van Dijk, 2005). To address this I employ an approach known as 'structural individualism', which treats individuals as embedded within the social structure and explains social facts as the intended or unintended outcomes of their actions (Hedstrom & Bearman, 2009: 4). Explaining differences in internet use requires outlining each aspect of this 'parts-to-whole' relationship, and detailing how the 'parts', working together, produce the 'whole'. This informs the explanatory framework shown in Figure 2.2, and the research design used to investigate this framework (see next chapter).

Figure 2.2: Proposed Framework for Explaining Youth Internet Engagement



The top of the diagram shows the three main approaches for conceptualising and explaining youth internet engagement, as outlined in the literature review. Each approach contains an argument about what constitutes effective internet use, and this is represented in the effective usage metrics shown on the right hand side of the diagram. Moreover, each approach argues that effective use depends on particular explanatory factors, which are displayed on the left hand side of the diagram. Finally, the centre arrows indicate which of these key factors and metrics are considered sufficient by these approaches for explaining differences in internet engagement and their implications for inequality. Socio-demographic variation in internet use is acknowledged by all three approaches. Under the Digital Native approach, effective use is the same thing as having internet access and using it; the outcomes of such use do not vary across contexts but they increase in intensity with time spent online. Thus, differences are largely explained by one's level of access to technological resources. For the Digital Connoisseur approach, effective internet use instead means learning to use the internet for certain capital-enhancing purposes. As such an additional factor is needed to explain socio-demographic differences in use - one's extrinsic motivations and orientations towards the broader norms, rules and values which apply in a given context. Finally, the Digital Explorer approach equates effective use with broad and frequent use. This suggests that socio-demographic variation can be explained by the intrinsic motivation and rational decision-making needed for experimentation with different types of use.

The bottom panel depicts the internet engagement process which these approaches attempt to explain. I argue that is a cyclical process in which effective usage and its outcomes - both real and perceived - reinforce one another. According to the Digital Natives approach this process is one of normalisation, in which differences in use are eroding over time, resulting in a more equitable distribution of usage outcomes and more similar perceptions about what the internet can be used for. The Digital Connoisseur approach indicates that this is a process of stratification, in which differences in use are widening over time, producing an increasingly unequal distribution of usage outcomes, and diverging views about what the internet can be used for. Lastly, the Digital Explorer approach suggests that this is a process of reflexivity, where differences in use are growing more complex and individualised, where usage outcomes are becoming more diverse and uncertain, and where it is getting harder to anticipate what will come from one's use.

Conclusion

In this chapter I reviewed key literature pertaining to the relationship between youth internet engagement and social inequality. I have outlined three distinct arguments about what constitutes effective internet use, and which factors differentiate young people with respect to such use. These arguments involve claims about what adolescent internet use *should* look like, and by extension, about the kinds of internet users young people ought to be: Digital Natives, Digital Connoisseurs, or Digital Explorers. These accounts identify processes of diffusion, stratification, and reflexivity which, by themselves, provide important, yet incomplete explanations of how and why young people vary in their use. The proposed framework enables me to evaluate the contribution that each approach makes to explaining youth internet engagement, and on this basis, to suggest possibilities for further synthesis of these perspectives going forward. In the next chapter, I describe the research design that will be used to investigate this framework empirically.

Chapter 3 - Research Design and Approach

Introduction

In the previous chapter I conceptualised youth internet engagement as a parts-to-whole relationship where individuals, engaging with the internet in the ways that they do, bring about the trends in internet use we see at an aggregate level. In this chapter I describe how my longitudinal, mixed methods research design enables me to explain differences in this complex relationship and their implications for young people as they transition from adolescence to adulthood.

The main determinants of youth internet engagement, identified in the literature review, can be situated on a continuum, with individual-specific influences at one end, population-wide influences at the other, and a range of contextual influences, from the local to the more general, spanning in between. In this thesis I employ qualitative and quantitative methods to examine influences operating at different points along this continuum. I then combine the insights from these approaches to produce an account of youth internet engagement that is richer and more informative than the sum of its parts (Bryman, 2006; Kelle, 2001; Yin, 2006). This complementary application of mixed methods is known as 'triangulation' (Greene et al, 1989).

It should be noted that a mixed methods approach has been questioned in some instances. Occasionally triangulation is taken to imply the use of one type of research method in order to corroborate or validate data from a different method (Gorard & Taylor, 2004). The use of triangulation for cross-validation of data can be problematic when it treats as equivalent the insights provided by methods which emphasise different aspects of social phenomena. Such insights tend to support different styles of inference-making. For example, interpretivist approaches emphasising individual perceptions of internet use are too specific in scope to reject or confirm hypotheses about population-wide internet use trends. However, having knowledge about what individuals see as the benefits of internet use can help researchers to interpret such trends in a more plausible way, and to develop new hypotheses (Heinz et al, 1998). Statistical analysis of trends in a given sample may support inferences about the broader population, but they cast little light on the inner lives of specific individuals. Expanding the range of data collection techniques at my disposal and integrating the unique insights they provide allows me to investigate internet use in a way that reconciles the intersecting influences of social structure and individual agency. This approach has been used in life course research to show how societal processes and personal decision-making together intersect to produce different behavioural pathways and outcomes (Kelle, 2001).

Longitudinal, Mixed Methods Research Design

The study has a sequential, nested mixed methods design in which quantitative analysis of survey data from high school students participating in the longitudinal 'Our Lives' research project is followed by qualitative interviews with these participants in the year after they completed school. The advantage of this approach is that it adds a longitudinal dimension to the triangulation approach described above. This allows me to investigate the development of young people's internet use between adolescence and early adulthood, in accordance with the thesis aims and research question outlined in Chapter 1. By observing individuals in different ways and at multiple points in the transition to adulthood, I examine how their backgrounds, priorities, and circumstances affect their internet use choices, experiences and trajectories during this time.

To ensure the effectiveness of this approach, I build this longitudinal dimension into every phase of this project. In the quantitative phases, I analyse three waves of survey data from Our Lives respondents to identify early socio-structural determinants of youth internet engagement, and to ascertain how these structure young people's development as internet users during high school. Then, in the qualitative phase, I conduct interviews with Our Lives respondents whose internet use differed substantially at the beginning of high school. By interviewing them in the year after high school, I can determine whether their experiences of using the internet during school have led them to form different perceptions about internet use and its place in their lives. In doing so, I supplement my statistical understanding of how various factors structure young people's opportunities for internet use, with an interpretivist account of young people's own views on these opportunities. This reflects the complementary roles of social structure and individual agency in explaining young people's development as internet users between adolescence and adulthood.

To maximise the value of my mixed methods approach, I tie these qualitative and quantitative strands together as much as possible across each stage of my research design. This helps to avoid a situation in which separate studies are conducted in parallel to one another. Mixed method researchers are primarily guided by their research questions, pragmatically selecting and combining methods in ways that draw on complementary strengths and non-overlapping weaknesses to address these questions (Teddlie & Tashakkori, 2010). To this end, I outline research questions that are shaped by my literature review and research purpose, and which dictate the structure of my research design. Then, in the following sections, I describe in more detail how the qualitative and quantitative components of this design inform one another throughout my research.

Research Questions

This thesis addresses the question of how and why young people vary in their internet usage between adolescence and early adulthood. To align my data collection, analysis, and reporting of results with proposed explanatory framework, I divide this main question into three sub-questions:

RQ1: What factors are important in accounting for differences in the time young people spend online at the start of high school, and are these influences temporary or longer-lasting?

RQ2: What factors are important in accounting for differences in the breadth and frequency of young people's engagement with the internet at the end of high school?

RQ3: How do young people's internet use experiences during school affect their perceptions of the benefits and costs/risks of internet use after leaving school?

RQ 1 and 2 are mainly addressed using quantitative research techniques. They focus on population-wide variability in youth internet engagement, in terms of its breadth and intensity. The approaches discussed in the previous chapter suggest that where an individual's internet use falls on these metrics is likely to correlate with the benefits and risks to which they are exposed. For this reason, I model these characteristics on key explanatory factors identified in the literature. These include a range of demographic and contextual influences, forming the basis for a more 'top-down' perspective of internet use in the youth population as a whole (Teddlie & Tashakkori, 2010). RQ 3 is addressed using an interpetivist approach emphasising individual-specific perceptions and experiences of internet use. This is important because, in deciding how to use the internet, young people make meaningful subjective assessments about the benefits and risks of use. I identify and explore various factors which may influence this process through semi-structured interviews with young internet users. This affords me a more 'bottom up' view of the contexts in which these assessments and decisions about internet use are made, through the eyes of particular respondents.

These approaches and the contrasting insights they provide are integrated in four ways. First, the interview sample for RQ 3 is drawn from (and thus nested within) the broader sample of high school students used to address RQ 1 and 2. Secondly, the dimensions of time use examined in RQ 1 (academic and social time use) form the basis for the sampling typology used to recruit interviewees for RQ 3, providing a bridge between the qualitative and quantitative analyses. Thirdly, the temporal sequencing of RQ 1 and 2 prior to RQ 3 allows me to respond to unexpected or unexplained findings raised in the quantitative analyses by exploring them further in qualitative interviews. Finally, in addressing the main research question I draw on a mixture of qualitative and quantitative data to support and clarify my interpretation of results.

The Our Lives Project

The data for my thesis come from the Our Lives Project, which is a longitudinal study of young people in Queensland, Australia. Conducted by researchers at The University of Queensland, the Our Lives Project is an infinite-life cohort study that examines young people's attitudes, values, beliefs, and behaviours as they undergo the transition from adolescence to adulthood. The study examines the role of traditional structures and institutions, such as class and religion, in shaping how young people experience this transition and its implications for their longer-term pathways through work, education and family life. It assesses theoretical claims that these influences are reconfigured or even lessened due to the rising uncertainty associated with globalisation. According to some, these are changes which cut across traditional social distinctions, invariably placing greater emphasis on individual choice, more diverse social networks, and increasingly differentiated and unpredictable life pathways (Beck & Beck-Gernsheim, 2001; Castells, 1996; Giddens, 1991). For others, the changes associated with globalisation cascade through the social structure unevenly, exposing those in privileged positions to more opportunities and expanded autonomy while those already in marginalised positions absorb the increased risks created by this uncertainty (Blossfeld et al., 2005; Kohli, 2007). The theoretical and empirical aims of the Our Lives Project converge with those of this thesis, as young people's engagement with ICTs may help determine their exposure to the opportunities and risks accompanying global change and uncertainty.

Quantitative Sampling and Data Collection

To assess these different claims, the Our Lives project asks young people about their life goals, values, and interests, their educational and occupational aspirations, their social networks, their participation in various social, cultural and academic activities, and their use of information and communication technologies. The study takes a survey-based approach, where inferences about the overall population of young people are made on the basis of standardised questionnaires undertaken by a large, representative sample of that population (Babbie, 2007). Consistent with a focus on individual trajectories in the context of globalisation, the study employs a longitudinal cohort design where respondents participate in the survey every two years, and their repeated observations on key measures are used to provide a more accurate assessment of change over time (Singer & Willett, 2003). Data was first collected in 2006 when participants were in the first year of secondary school (Grade 8, aged 12/13), then again in 2008 when they were in Grade 10 (aged 14/15), and most recently in 2010 when they were in Grade 12 (aged 16/17).

I use this data in three ways. Firstly, I address RQ 1 by analysing Our Lives respondents' online time use at the beginning of high school. This cross-sectional analysis uses the original cohort sample and data from wave 1 of the project only. Secondly, the analysis for RQ 2 examines the level of internet engagement respondents have acquired by the end of high school. This longitudinal analysis uses data from respondents who have participated in all three survey waves to assess how various factors measured over the course of their secondary schooling affect this outcome measure. I also use this same longitudinal sample to expand on the online time use analysis for RQ1. Finally, I include in my qualitative sampling typology for RQ 3 respondents who have participated in all three waves. This allows me to form an overview of interviewees' internet use pathways based on their survey data, helping to contextualise their interview data. I will now describe in greater detail the sampling and data collection for each wave of the Our Lives Project.

Wave 1 – 2006 (Grade 8, aged 12-13)

Respondents were sampled using a two-stage cluster sampling approach (de Vaus, 1995). Under this approach, students were treated as nested within schools and an attempt was made to sample all high schools in the state of Queensland, Australia, and then all Grade 8 students within those schools. During the first sampling stage, the research team identified 457 secondary and primary/secondary schools in Queensland which contained Grade 8 students. Ethical clearance was sought from the relevant governing bodies to approach these schools, as well as from the University of Queensland Behavioural and Social Sciences Ethical Review Committee. Access was refused to 71 schools mainly due to their involvement in other research projects. Of the remaining 386 schools, 213 agreed to participate in the project (a school-level response rate of 55 percent). This school sample was representative of all schooling sectors (i.e. State, Independent and Catholic schools) and all geographic regions across the state.

Table 3.1: Wave 1 Data Collection

Schools	
All QLD schools	457
Excluded	71
Approached	386
Participating	**198**
School Response %	***51%***
Students	
All QLD Grade 8 students	57,203
Approached	25,806
Participating	**7,031**
Student Response % (avg. within schools)	***34%***

Schools followed active consent procedures and surveys were administered in class by teachers. Undertaking surveys in a school setting does potentially introduce a social desirability bias for students whose responses are easily influenced by the proximity of their peers and teachers; however, this may also encourage greater attentiveness to question wording (Christensen & James, 1999). The survey was offered in hard copy format and online, but since most schools opted for the hard copy approach most responses (n=6,455, 92 percent) were in this format. The final wave 1 sample contained 7,031 students, with an average response rate of 34 percent amongst students in each participating school. An overview of wave 1 data collection is shown in Table 3.1.

Wave 2 – 2008 (Grade 10, aged 14-15)

For wave 2, ethical clearance was obtained for a passive consent approach where parents of participating students were contacted directly using the information provided during the previous wave. Under this approach - designed to reduce recruitment dependency on schools and socialise respondents into the project - all those who provided usable contact information were approached to participate in wave 2. Insufficient contact information led to the exclusion of 10 percent (n=733) of the original sample from wave 2 data collection. As with wave 1, a multi-mode approach was taken with 73 percent (n=2,680) of respondents completing in hard copy and 27 percent (n=973) completing online. The final sample achieved for wave 2 contained 3,649 students, which was a response rate of 58 percent amongst those with valid contact information (n=6,298).

Wave 3 – 2010 (Grade 12, aged 16-17)

To address the high rate of attrition between waves 1 and 2, an aggressive attempt was made during wave 3 to recruit all respondents regardless of whether or not they had completed wave 2. To minimise barriers to their participation, a number of wave 2 non-completers (n=509) and respondents reluctant to undertake the full survey (n=264) were able to complete a shortened version of the questionnaire (n=772) which contained only those ‘core’ longitudinal items featured in every wave. The majority of continuing respondents completed the full version of the survey (n=2,436). To minimise costs and capitalise on high rates of computer and internet access amongst this age group, incentives were offered for early completion of the survey online. This approach was successful with a majority of respondents using this mode of completion (n=2,223). To ensure those unable to complete online were not excluded, hard copies of the survey were mailed to all remaining respondents, though a smaller number (n=565) completed this way. Finally, a phase of computer-assisted telephone interviewing was conducted (n=326) to maximise response after these other avenues were exhausted. Amongst those with valid contact information (n=5,470), an overall response rate of 58% (n=3,209) of the original wave 1 cohort was achieved.

Table 3.2: Sample Representativeness and Overall Retention Rate

	QLD Population^ (at Wave 1)		Wave 1 Sample		Wave 2 Sample		Wave 3 Sample	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Gender (Grade 8)								
Male	29,439	51%	2,989	43%	1,365	37%	1208	38%
Female	27,764	49%	4,014	57%	2,284	63%	1999	62%
School sector (Grade 8)								
State	36,560	64%	3,569	51%	1,619	47%	1401	47%
Catholic	10,687	19%	1,309	19%	629	18%	556	19%
Independent	9,956	17%	2,153	31%	1,166	34%	1032	35%
ABS Remoteness Area								
Major City	31,907	57%	4,043	58%	2,036	60%	1868	62%
Inner Regional	13,582	24%	1,679	24%	823	24%	733	24%
Outer Regional	9,015	16%	1,027	15%	448	13%	349	12%
Remote/Very Remote	1,908	3%	282	4%	101	3%	66	2%
Total N	57,203	100%	7,031	100%	3,649	100%	3,209	100%
Original Sample Retained %	**–**	**–**	–	**100%**	–	**52%**		**47%**

^ Total number of Grade 8 students enrolled in QLD schools in 2006 (ABS, 2012)

Sample Representativeness and Attrition

The results of data collection and key indicators of sample representativeness are shown in Table 3.2. On the whole, the patterns of attrition for this project and their implications for the representativeness of its student sample are consistent with other longitudinal surveys of Australian youth of similar age (Dwyer & Wyn, 2001; Rothman, 2009). Furthermore, where other studies have experienced a sharp second wave decline in participation followed by gradual attrition over subsequent waves, participation in this project remained relatively steady between waves 2 and 3 (Rothman, 2009). This can partly be attributed to panel maintenance activities undertaken during this period. These activities promoted the updating of contact details online to recapture lost sample members, to track existing sample members who change address, and to reduce further attrition.

Of the wave 1 sample, 2,989 (43 percent) were male and 4,014 (57 percent) were female. This meant that females were slightly overrepresented in the first wave sample when compared to the total population of Grade 8 students from which this sample was drawn (ABS, 2012b). As well as being more likely to respond to the first wave of the survey, females were also less likely to miss a follow-up survey waves. The percentage of responding females increased to 63 percent (n=2,284) at wave 2 then decreased slightly to 62 percent (n=1,964) at wave 3; the percentage of males decreased to 37 percent (n=1,365) at wave 2, then rose slightly to 38 percent (n=1,188) at wave 3.

In the original wave 1 cohort, the majority of respondents (n=3,353, 51 percent) attended a State school; 31 percent attended an Independent school (n=2,169); and 19 percent attended a Catholic school (n=1,309). In terms of actual enrolments by sector, this over-represents Independent school students and under-represents State and Catholic school students (ABS, 2012b). This response pattern continued in wave 2, with Independent school students less likely to drop out of the project. Accordingly, the percentage of State school students in wave 2 decreased to 47 percent (n=1,619), and while the response rate for Catholic students stayed constant at 19 percent (n=629), the rate amongst Independent school students rose to 34 percent (n=1,166). However, these participation rates remained largely unchanged during wave 3.

To determine the geographic region in which a student lived, the location of a participants' school was coded according to the Australian Standard Geographical Location Remoteness Area codes (ABS, 2001). Most students were from a major city area (n=4,043, 58 percent); 24 percent lived in an inner regional area (n=1,679); 15 percent lived in an outer regional area (n=1,027); and 4 percent lived in a remote or very remote area (n=282). This was strongly representative of the regional distribution of young people in this age group (ABS, 2006b). Although remoteness had little effect on respondents' initial participation in the survey, it had some effect on whether they kept responding in subsequent waves. While the response rate for those in a major city increased to 60 percent (n=2,036) in wave 2 and 62 percent (n=1,868) in wave 3, for those in outer regional or remote/very remote areas it declined. For outer regional areas, it decreased to 13 percent (n=349) in wave 2 and to 12 percent by wave 3; and for those in remote or very remote areas it decreased to 3 percent (n=101) in wave 2 and 2 percent (n=66) in wave 3. However, the participation rate for those living outer regional in inner regional areas remained steady at 24 percent in wave 2 (n=823) and wave 3 (n=733). Thus, over time, the sample attrition has tended to over-represent those living closer to a major city at the expense of those living in outer regional or remote/very remote areas.

Although consistent with other studies of this nature, these trends do nonetheless have implications for my analysis. If those who did not participate in the project initially or dropped out of the sample over time have similar characteristics, this can produce attrition bias and undermine the validity of findings. In Chapter 5 I explore the use of weighting procedures to address this issue.

Table 3.3: Analytic Sampling Overview

	Full sample	Core sample
Original wave 1 cohort	7031	7031
Omitted from analytic sample		
Wave 1 only	–	2873
Wave 1 & 2 only	–	949
Wave 1 & 3 only	–	509
All waves, but shortened wave 3 questionnaire	–	264
Excluded due to missing data on key analytic variables	486	376
Total analytic sample size	**6545**	**2060**

Quantitative Analytic Sample

Since the quantitative component of this thesis employs a mixture of cross-sectional and longitudinal analyses, I construct the analytic sample for these in two different ways. My approach for RQ 1 begins with a cross-sectional analysis of online time use at wave 1, in which I build an explanatory model for youth internet engagement. This analysis is conducted with an analytic sample based on the full wave 1 cohort. I refer to this group as the 'full sample'. Then, in subsequent analyses for RQ 1 and RQ 2, I test the extent to which the explanatory model predicts later outcomes in terms of online time use and breadth of use. This longitudinal analysis uses data from waves 2 and 3 of the project, so for this approach my analytic sample is restricted to those who have participated in all three survey waves. I refer to this group as the 'core sample'.

Table 3.3 provides an overview of these two samples. The full sample contains 6,545 of the 7,031 respondents who participated in wave 1. Respondents were excluded from this sample if they were missing data on either on the gender variable (n=28), on any of the access measures (n=176), any of the time use measures (n=324), or on a combination of these. The core sample contains 2060 of the 2,700 students who participated in all three survey waves. Of the original cohort of 7,031, there were 3,823 respondents who could not be included because they missed either one or two survey waves. A further 264 respondents who completed the shortened version of the survey in wave 3 were excluded because this questionnaire did not contain the item set relating to their breadth of use. Of the remaining 2,436 respondents, 376 were then excluded for the following reasons: they had already been excluded from the full sample due to missing data (n=180); they were missing data on social or academic online time use at wave 2 (n=20), or wave 3 (n=6); internet self-efficacy at wave 3 (n=99), breadth (n=309) and frequency of use at wave 3 (n=40); or school

identifying measures for wave 2 (n=129) and wave 3 (n=120). Of those excluded, 38% (n=144) were missing data on one analytic variable, 40% (n=150) were missing on 2-4 analytic variables, and the remaining 22% (n=82) were missing data on more than 5 analytic variables. Otherwise, if respondents were missing data on any other variable in the analysis, this was accounted for using dummy variables (this technique is described in the explanatory variables section.)

In the next section I describe all the analytic variables used in my analyses. Unless explicitly stated otherwise, I focus on the characteristics of the full sample. However, as noted previously, the loss of sample members due to attrition and missing data could be problematic if the two analytic samples differ substantially on these variables. For this reason, where possible, I provide tables for each set of variables which compare the distributions for both samples.

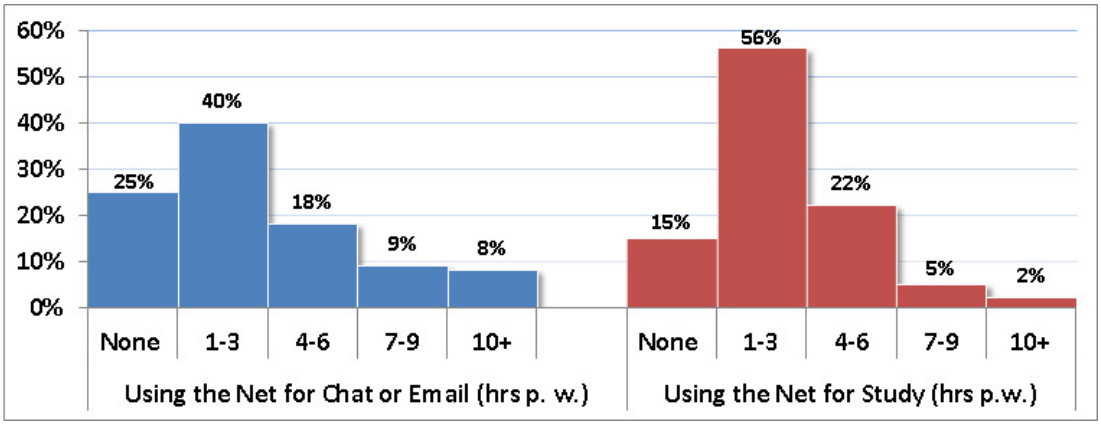
Dependent Variables

Consistent with the objectives of RQs 1 and 2, the dependent variables for this analysis reflect the key metrics researchers have used to measure differences in internet engagement and their broader implications: online time use, usage purpose, and breadth/frequency of use.

Online Time Use for Academic and Social Purposes

RQ 1 examines differences in young people's online time use at the start of high school, undertaking cross-sectional analysis with the sample and then longitudinal analysis with the core sample. In particular, I focus on the time young people spend using the internet for academic and social purposes. I examine online time use, and these specific types of use, for several reasons.

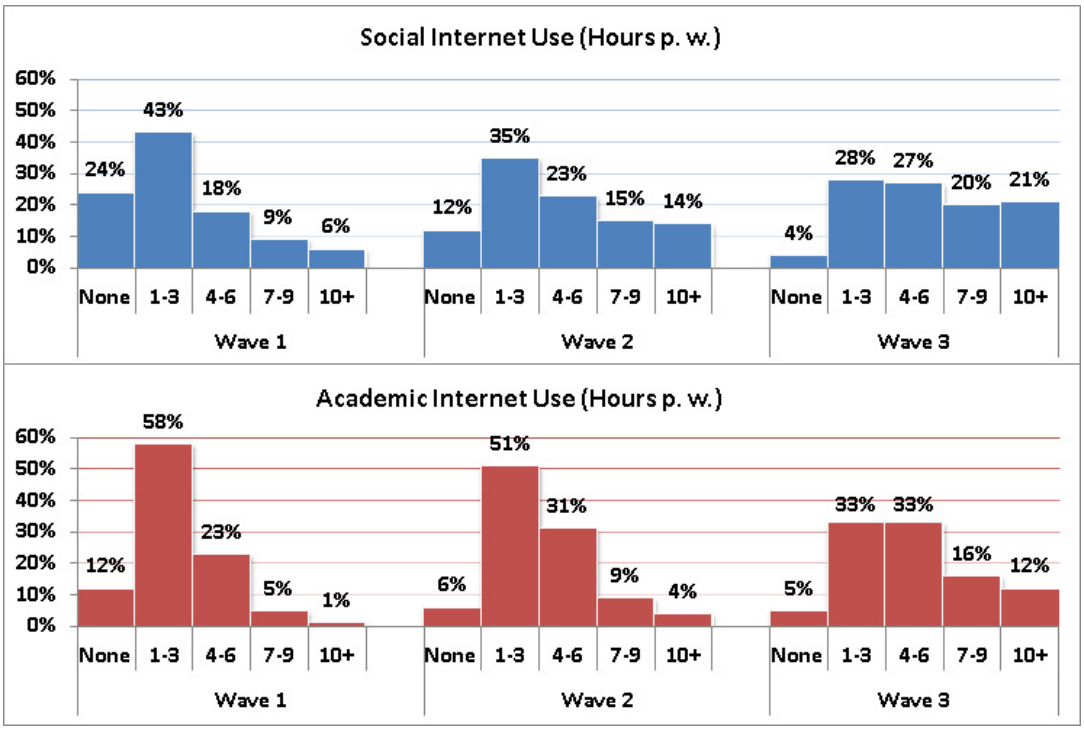
Figure 3.1: Distribution on both online time use variables for full sample at wave 1



Firstly, ABS (2006a) data indicate that using the internet for 'school or educational' activities, followed by 'emailing or messaging', were the two most popular activities amongst young Australians aged 12-14 years in 2006. By focusing on widely diffused online practices I am able to identify groups whose participation in internet use differs from that of mainstream society and find reasons for this. Secondly, the ABS does not measure the actual amount of time people spend on these different types of use; collecting this information allows me to investigate the intensity with which young people engage in these forms of use and how this interacts with other time uses. Thirdly, social and academic internet use is viewed by some theorists as precursors to more creative, resource-intensive and potentially rewarding forms of use (Livingstone & Helsper, 2007). Understanding early influences on these activities can help illustrate the mechanisms which structure young people's longer-term internet use trajectories and outcomes. Finally, these activities have been construed as contrasting 'status-specific' types of use, with varying implications for the reproduction of social inequality (DiMaggio et al, 2004). By examining not only online time use, but also exploring contrasting types of use, this analysis reconciles the different usage metrics employed by the Digital Natives and Digital Connoisseur approaches (see Figure 2.2 earlier).

The measures used for online time use were included in all three waves of the survey. I develop a framework for explaining variation in time use at wave 1, before examining its continued capacity predict differences at waves 2 and 3. Figure 3.1 shows the full sample distribution on these measures at wave 1 and Figure 3.2 shows the core sample distributions across all waves.

Figure 3.2: Core sample distribution on online time use variables across all waves



These variables were part of a set of time use items in which students answered the question: “How many HOURS PER WEEK, on average, do you spend doing the following?” The two items focused on here are “Using the Internet to email or chat with friends” and “Using the Internet to help with your homework”. The wording for these measures closely resembles that of the ABS internet use categories described above. Respondents selected from five response categories: 1 = “None”; 2 = “1-3 hours”; 3 = “4-6 hours”; 4 = “7-9 hours”; and 5 = “10 or more hours”. These categories were used to minimise the recall error that can arise when respondents are asked to place a specific numeric value on their time use.

Although a more detailed examination of these measures is undertaken in the next chapter, it is worth noting that only minor differences exist between the full sample and core sample distributions for online time use at wave 1. Overall, the time use of students in the core sample tended more toward the most popular category of use (e.g. “1-3 hours”); for social use there were fewer intensive users (i.e. respondents in the “10+ hours” category) in the core sample, whereas for academic use there were less non-users (i.e. respondents in the “None” category). Further information on these measures is contained in Appendix B.

There are also several limitations to these measures which should be noted. Since time is a finite quantity, engaging in any activity online incurs a time cost to individuals because they are unable to spend that time on other activities. However, undertaking an activity online can also deliver users a time benefit if it provides them with a more efficient way of accomplishing a given task - for instance, by allowing it to be done concurrently with other activities. Decisions about online time use are likely to depend on what users perceive, in their own experience, to be the time costs and benefits of using the internet. This also raises questions about how much time online is too much, because the person misses out on valuable offline activities (Nie, 2001); how much is too little, because the person misses out on valuable online activities (Davison & Cotten, 2003); and how individuals learn to optimise their time use in the context of their everyday lives (Corrin et al, 2010). While the measures employed here allow for analysis of broader patterns of online time use, and the influences on these, they are not particularly well-suited for an examination of these context-sensitive questions. Since these issues require finer-grained detail about perceptions, experiences, and decisions concerning internet use, I explore them in my qualitative interviews.

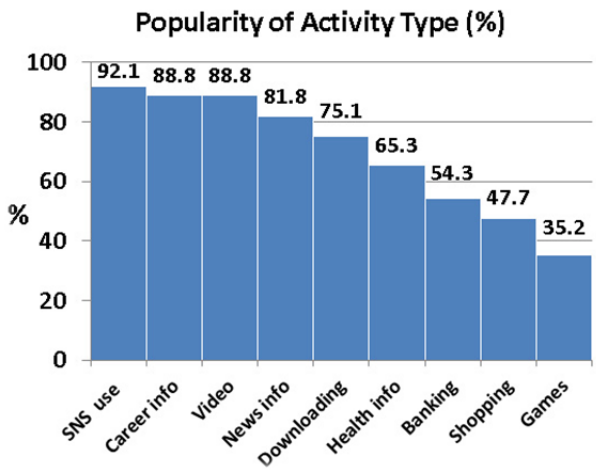
Other limitations of these measures became apparent during qualitative interviews. For instance, respondents noted that the time they spent doing certain activities online varied substantially depending on the time of year (e.g. if they were on school holidays, or during semester). However, the wording of these survey measures did not distinguish between these

periods and thus did not capture this variation. Yet even within such periods interviewees' weekly time use varied (such as during the semester when their academic workload changed). Only time diaries, which allow respondents to document the amount of time they spend doing various activities online each day, would allow the precision needed to address these concerns. In this instance, a time diary approach would have been too expensive and logistically complicated given the sample, and the fact that time use was only one of a range of issues under investigation. I compensate for this limitation in the qualitative interviews by acknowledging and exploring how respondents' understandings of online time use deviate from that contained in the Our Lives survey.

Breadth and Frequency of Internet Engagement

RQ 2 examines differences in the extent of young people's internet engagement at the end of high school, in analysis undertaken with the longitudinal sample. For this analysis, I generated a composite measure which accounts for both the breadth and frequency of respondents' internet engagement. This builds on the analysis for RQ 1: as with time use, breadth and frequency of use key metrics used to determine how exposed young people are to potential benefits and risks as a result of their engagement with the internet. These metrics are emphasised under Digital Explorer approach which, as outlined in Chapter 2, suggests that online skill develops through a process of enactive learning, where users who have more diverse and frequent experience of usage outcomes are better able to optimise their use based on past experience. Factors which enable or constrain young people's internet use may affect the online skills they develop during school, and which they can draw on during the transition to work, tertiary education, and social life more generally.

Figure 3.3: Participation in selected online activities at wave 3
Figure 3.4: Distribution breadth of use variable at wave 3



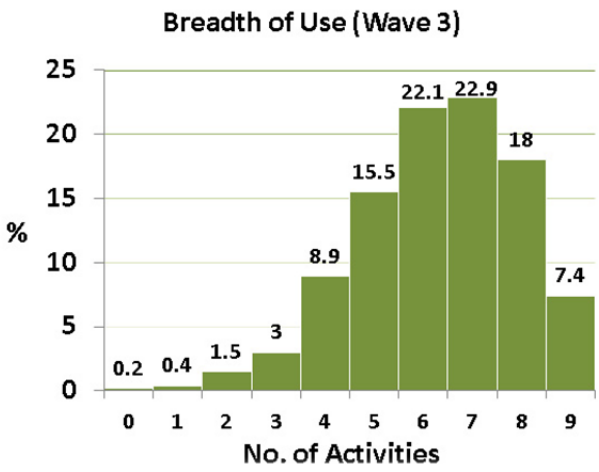
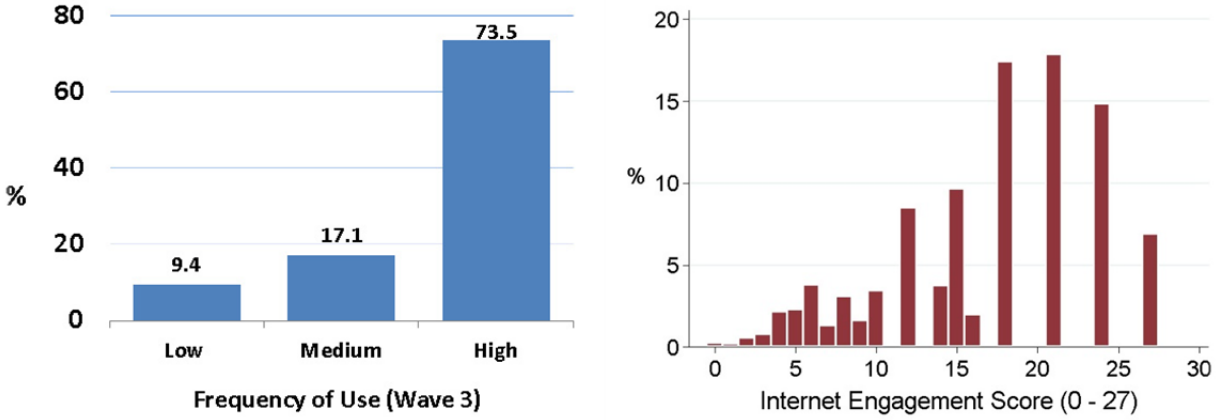


Figure 3.5: Distribution on frequency of use variable at wave 3

Figure 3.6: Distribution internet engagement variable at wave 3



Breadth of use (or diversity/multimodality of use) is an increasingly common measure of the degree of one's internet engagement (Wei, 2012). In the same way that internet use occupies a spectrum ranging from brief to time-intensive use, it also ranges from narrow to broad in terms of what it is used for. By conceptualising and measuring internet use in a non-dichotomous way this thesis builds on earlier digital divide research, because it allows for a more nuanced understanding of differences in internet engagement and their implications for young people. The Digital Explorer approach suggests that broader use is a prerequisite for more beneficial use, provided that users learn to effectively negotiate its accompanying risks (Kalmus et al., 2009; Livingstone & Helsper, 2007). Alternatively, the Digital Connoisseur approach maintains that narrower use is more beneficial, provided that users learn to excel in areas which are considered more productive or rewarding, such as informational use (Zillien & Hargittai, 2009). In wave 3 of the Our Lives survey, respondents were asked "Thinking about the different ways you use the Internet, do you ever…?" and answered "Yes" or "No" to the first nine online activities shown in Figure 3.3. A breadth of use variable ranging from 0 to 9 was then generated by counting the number of activities in which a respondent engaged. The core sample distribution on this measure is shown in Figure 3.4, and further descriptive information is contained in Appendix C and in Chapter 5.

Measuring breadth of use in this way focuses on a user's longer-term habits or preferences for different kinds of use. However, an individual's internet use can be considered narrow in the short-term if the number of activities they undertake during a usage session is small and broad if the number is large. Breadth of use as it relates to specific occasions or intervals of use is relevant to the issue of multi-tasking and its effects, for instance, on broader time use (Robinson, 2011). To assess how online skill and confidence develops, it is necessary to account for both short-term and long-

term breadth of use. Users may not branch out towards more creative and advanced uses of the internet if, on each occasion they go online, they only engage in, or are restricted to, a limited number of activities. Alternatively, if those with longer-term preferences for certain activities focus more attention on these activities each time they go online, they may learn to do them more effectively. To explore these ideas, I include short-term breadth of use in my research. However, since it is difficult to accurately gauge the number of activities a user does in a typical usage session using survey research, I instead explore this in the qualitative component of my thesis.

Another important, general indicator of one's exposure to online benefits and risks is frequency of use. Usage frequency is distinct from the online time use measures examined here because does not differentiate between the types of activities users engage in or the amount of time they spend on them; rather, it examines the regularity with which they turn to the internet for any reason whatsoever. For this reason I incorporate frequency of use alongside usage breadth in the composite measure of internet engagement analysed in Chapter 5. In wave 3, students were asked "How often do you use the internet (anywhere)? The following response categories were listed: 1= "Several times a day"; 2="About once a day"; 3="Several times a week"; 4="About once a week"; 5="Less often"; 6="Never"; and 7="Don't know". This measure was adapted from the *UK Children Go Online – Child Questionnaire* (Livingstone & Bober, 2004); due to a low number of responses in categories 4-6 (2.1%, n=43), these were merged with category 3 to form "Several times a week or less". The small number of respondents who answered "Don't know" (n=11) were coded as missing data on this variable and excluded from the analysis. The core sample distribution on this measure is shown in Figure 3.5, while more detail is given in Appendix C and in Chapter 5.

Research indicates that as individuals start using the internet more often, the activities they undertake online grow more numerous and diverse, which in turn leads to even more frequent use. Given that these measures appear to be fundamentally interrelated and mutually reinforcing, for the main analysis in Chapter 5 I generated a composite measure which combines both breadth and frequency of use. For each respondent, an internet engagement score was calculated by multiplying their breadth of use score (0-9) by their frequency of use (1-3), which gave a score ranging from 0-27. Combining these two measures in such a way reflects the assumption that the underlying concept (i.e. internet engagement) is a product of both broad and frequent use. Thus an individual will receive a lower score if they are only broad but infrequent users, or narrow yet frequent users, and a higher score if they display both broad and frequent use simultaneously. The core sample distribution on this measure is shown in Figure 3.6 and further information is shown in Appendix C. Given that the internet engagement distribution was negatively skewed - that is, respondents'

engagement scores tended more towards the upper end of this measure - a transformation was applied to this variable in order to conduct OLS regression analysis in Chapter 6 without violating the assumptions of normality. More detail on this transformation procedure is contained in the methods section of that chapter.

Intervening Measures

One of the advantages of the longitudinal design for this study is that it enables a focus on how young people's internet use develops during high school. This is implied in the sequencing of the research questions: how is online time use at the start of high school (RQ 1) related one's internet engagement at the end of high school (RQ 2), and to one's perceptions of the benefits and risks of internet use following high school (RQ 3)? In the quantitative analysis, this is investigated by assuming that certain factors are indicative of a user's development over time, and as such will intervene in, and help to explain, this process. The included measures were a respondent's level of internet self-efficacy in wave 3, and the trajectory their online time use between wave 1 and wave 3. Given the importance of these measures I analyse them separately in Chapter 5 before incorporating them into the main analysis for breadth and frequency of internet engagement. Table 3.4 displays the distributions on these two intervening variables.

Table 3.4: Distribution on intervening variables for core sample

	n	**%**
Internet Self-Efficacy		
Beginner or intermediate	463	22.5%
Advanced	1207	58.6%
Expert (Ref.)^	390	18.9%
Online Time Use Trajectory (Academic)		
Non-user/Drop-out (Ref.)	106	5.2%
Late adopter	217	10.5%
Moderate user	439	21.3%
Upgrader	709	34.4%
Downgrader	135	6.6%
Heavy user	454	22.0%
Online Time Use Trajectory (Social)		
Non-user/Drop-out (Ref.)	90	4.4%
Late adopter	451	21.9%
Moderate user	251	12.2%
Upgrader	595	28.9%
Downgrader	143	6.9%
Heavy user	530	25.7%
	2060	**100%**

^Ref= Reference category

Internet Self-Efficacy

As individuals use the internet more extensively, they are also likely to acquire more experience and confidence in themselves as internet users. As outlined Chapter 2, previous research suggests that this has implications for the kinds of activities they undertake online, as well as for their attitude towards the medium itself and the outcomes they expect to derive from using it. As such, one intervening variable in this analysis is a measure of young people's internet self-efficacy (Eastin & LaRose, 2000). Adapted from the *UK Children Go Online – Child Questionnaire* (Livingstone & Bober, 2004), this measure was explicitly used as a subjective assessment of one's own skill rather than an objective skill indicator. In wave 3, respondents were asked "How good are you at using the internet? Do you think you are…" and were able to select from the following categories: 1="Beginner"; 2="Intermediate"; 3="Advanced"; 4= "Expert"; and 5= "Don't Know. Since only a small number of students answered "Beginner" (1%, n=34), this category was merged with intermediate. Responses of "Don't know" (2%, n=69) were treated as missing and omitted from the analysis. The dummy variables for each category of this measure are shown in Table 3.4.

Online Time Use Trajectory

Another useful indicator of young people's development as internet users is the type of trajectory their online time use took during high school. Such trajectories reflect their changing academic and social priorities during this time, and their ideas about the internet's compatibility with these. Based on the online time use variables examined for RQ 1 in Chapter 4, dummy variables were generated to account for several possible transitions respondents' could have made in terms of their internet use between wave 1 and wave 3. This approach is similar to one employed by Anderson (2005) in a study examining the transitions in and out of broadband access. In this analysis, several categories were used to indicate which respondents displayed the same level of use at wave 3 as they did at wave 1: 'non-users' spent no time online at wave 1 or wave 3; 'moderate' spent 1-3 hours per week online at wave 1 and still did so at wave 3; and 'heavy' users spent 4+ hours online per week at wave 1 and wave 3. Meanwhile, other categories were used to show which respondents underwent change in use: 'drop-outs' who were spending any amount of time online at wave 1 and were no longer doing so at wave 3; 'late adopters' who only began spending any amount of time online after wave 1; 'upgraders' who were spending 1-3 hours online per week in wave 1 and upgraded to 4+ hours per week; and 'downgraders' who made the opposite transition. These sets of dummy categories were created for both academic and social internet use. Since there were few 'non-users' and 'drop-outs', these categories were merged to form a reference category against which other categories were compared. Table 3.4 shows the distributions on these measures.

Table 3.5: Distribution on wave 1 socio-demographic variables for both analytic samples*

	Full Sample (n=6545)		*Core Sample (n=2060)*			*Full Sample (n=6545)*		*Core Sample (n=2060)*	
	n	**%**	**n**	**%**		**n**	**%**	**n**	**%**
Gender					***Parental occupational prestige***				
Male (Ref.)^	3373	51.5%	748	36.3%	ANU4 score (0-100)	6193	50.5	1803	58.4
Female	3175	48.5%	1312	63.7%	Missing data	1455	5.4%	51	2.5%
School sector									
State school (Ref.)	4199	64.1%	939	45.6%	***Parental employment status***				
Independent school	1141	17.4%	740	35.9%	Both parents employed (Ref.)	3550	54.2%	1223	59.4%
Catholic school	1208	18.5%	381	18.5%	One parent employed	2149	32.8%	672	32.6%
Geographic region					Neither parent employed	428	6.5%	99	4.8%
Major city (Ref.)	3581	54.7%	1265	61.4%	Don’t know/missing data	421	6.4%	66	3.2%
Inner regional	1514	23.1%	483	23.5%					
Outer regional	1127	17.2%	254	12.3%	***Parental education level***				
Remote or very remote	326	5.0%	58	2.8%	Postgraduate degree (Ref.)	602	9.2%	179	8.7%
Family living arrangement					Bachelor's degree	1439	22.0%	389	18.9%
Lives w/ both parents (Ref.)	4547	69.4%	1656	80.4%	Trade qual. or certificate	1128	17.2%	351	17.0%
Lives w/ one parent	989	15.1%	166	8.1%	Grade 12	1179	18.0%	591	28.7%
Other living arrangement	891	13.6%	211	10.2%	Less than Grade 12	838	12.8%	264	12.8%
Missing data	122	1.9%	27	1.3%	Unknown or missing data	1362	20.8%	286	13.9%

*Distributions weighted on gender and school sector
^Ref= Reference category

Explanatory Variables

The explanatory variables included in my analysis are based on the literature review presented in the previous chapter, and the resulting conceptual framework for investigating youth internet engagement. Three types of factors are used to investigate this framework in the quantitative analysis for RQs 1 and 2: (1) socio-demographic factors; (2) access context; and (3) user orientation/preferences. In this section I describe the measures I use to account for these.

Socio-demographic factors

The socio-demographic variables in this analysis help to map the composition of youth internet engagement within the Australian population. Previous research suggests that respondents' internet use will vary depending on a range of socio-demographic characteristics. Distributions on the measures included in this analysis are shown in Table 3.5, for the full sample (after weighting on gender and school sector) and the core sample (which is unweighted). With the exception of the continuous measure for parental occupational prestige, each measure is categorical. To examine the effects of specific categories for each measure I use dummy variables coded "1" if a respondent belongs to that category and "0" if he or she does not. This allows me to compare the coefficient for each category against a 'base' or 'reference' category which is omitted from the analysis.

While gender disparities in terms of internet access have diminished, there is much evidence to suggest that boys and girls differ what they use the internet for, the time they spend using it, and the skill and confidence with which they do so (Gross, 2004; Hargittai & Shafer, 2006; Ono & Zavodny, 2003). In this analysis gender is controlled for using a dummy variable for females and with males comprising the reference category. After weighting, the full sample distribution for gender reflects the characteristics of the QLD Grade 8 population in 2006. The core sample distribution is unweighted, and is more indicative of those Our Lives respondents who have participated in survey waves 1 to 3. Compared to the full sample, where boys slightly outnumber girls, in the core sample there are more females than males. This trend mirrors changes in actual student population. By 2010, the proportion of females (51%) enrolled in Grade 12 in QLD was greater than that of males (49%). However, for the core sample this gap was further widened by the higher response rate amongst females. I explore what bearing, if any, this widening has on the relationship between gender and youth internet use, by replicating my analysis for RQ 1 with both the full and core samples at wave 1 and comparing the results. More generally, this is the procedure I use to test for substantive differences between the two samples on variables used the analysis.

The educational sector to which a student's school belongs is also likely to account for some of the differences in how they use the internet. In the Australian context, research shows that schooling sector has traditionally been associated with socioeconomic background, such that children who have wealthier and better educated parents are more likely to attend a private school than a State school (Le & Miller, 2003). In part, this is because of the higher costs of private school attendance: the aforementioned association is strongest for those attending Independent private schools and weaker for those enrolled in the Catholic private school sector, which typically charges lower fees (Dearden et al, 2011). However, it also reflects an important intergenerational dimension to school choice, with parents who attended Independent or Catholic schools more likely to send their children to the same type of school (Graetz, 1990). Moreover, Fullarton (2002) notes that Independent schools place a much stronger emphasis on extracurricular activities - thereby inviting greater involvement of parents in their children's education outside of school hours. This all suggests that children who attend different schooling sectors are likely to have different levels of access to technological resources, different opportunities to use them, and different expectations from parents and teachers about how they use them.

In light of these considerations, school sector is controlled for in the analysis using three categories, with State as the reference category, and both Independent and Catholic as dummy variables**.** As with gender, the weighting applied to the full sample means its distributions on school sector reflect those of the QLD Grade 8 population in 2006. By contrast, the core sample contains twice as many Independent school students, fewer State school students, and roughly the same proportion of Catholic school students. Some of this difference reflects the expansion of private schooling in recent years (Dearden et al, 2011). Accordingly, the proportion of QLD Grade 12 students in enrolled in State schools in 2010 had declined to 59%, while the proportions for Independent and Catholic schools had risen to 21% and 20%, respectively (ABS, 2012b). Still, the remaining difference most likely arises because Independent school students were more likely than State school students to participate in every survey wave - a fact which I account for in my analysis.

Geographic remoteness is another important factor shaping young people's internet use, particularly in the Australian context, where the distance between urban and rural centres is often very large. Yet although disparities in internet access between individuals living in these different areas are well-documented (Curtin, 2001; Gibson, 2003), and much politicised in the context of infrastructure initiatives such as the NBN, it remains unclear how these affect young people's development as internet users, and their life opportunities more generally. In my analysis, a student's region is based on their school's location and coded using the Australian Standard

Geographic Classification (AGSC) (ABS, 2001)**.** The original AGSC classification scheme contains 5 main remoteness areas: “Major Cities of Australia”, “Inner Regional Australia”, “Outer Regional Australia”, “Remote Australia”, and “Very Remote Australia”. Given that the number of students in the “Very remote” category was low (n=38) this was combined with the “Remote” category. Those living in a major city served as the reference group against which the effects of the other categories were compared. Compared to the full sample, the core sample contained a higher proportion of students from urban areas and fewer students from outer regional, remote or very remote areas.

Parents and caregivers mediate young people’s internet use in a variety of ways, particularly at an earlier age. They often decide on and purchase equipment and software for their children, assist and encourage them in learning to complete online tasks, as well as regulating and monitoring their use **(**Livingstone & Helsper, 2008**)**. A student’s family living arrangement conveys information about the parental support and socioeconomic resources to which they have daily access, by indicating the presence of parents within the home. Children who live in non-traditional arrangements (e.g. with a single parent, or parent and step-parent) may have less parental encouragement and assistance with their schoolwork, poorer communication with their parents, resulting in greater likelihood of experiencing a range of poorer academic and social outcomes (Astone & McLanahan, 1991). Yet few studies have examined whether family structure and living arrangement has any influence on how young people engage with the internet. Family composition is included in my analysis with “Living with one parent” and “Other living arrangement” as dummy variables and “Living with both parents” as the reference group. Table 3.5 shows that, compared to the full sample, the core sample contains a higher proportion of students living with both parents.

As outlined in Chapter 2, respondents with different socioeconomic backgrounds are expected to engage with the internet in contrasting ways, because they differ in the resources, orientations, preferences, and skills required for such use. In addition to such proxy measures as schooling sector and family living arrangement, this analysis compiles a diverse picture of each respondent’s socioeconomic background by accounting for parental occupation, employment status, and education. For each of these measures a variable was generated based on the highest response for either parent or carer; as well as reducing the overall number of predictors in each model, this meant that responses could be imputed in cases where data was supplied for one parent but missing for another. Responses to an open-ended question asking about parental occupation were coded according to the Australian Standard Classification of Occupations (ASCO) and then assigned scores ranging from 0 to 100 on the ANU4 occupational prestige scale (Jones & McMillan, 2001). Missing data on parental occupation is controlled for by scoring these as 0 on the ANU4 scale and

flagging them with a dummy variable. Parental employment status is controlled for with dummy categories indicating whether both, one, or neither parent is employed, as well as a flag for "Don't know/missing". In this case, "Both parents employed" serves as the reference category. Finally, parental education is controlled for with dummy variables of 1 = "Grade 12 or less", 2 = "Grade 12", 3 = "Trade/ certificate", 4 = Bachelor's degree, 5 = "Postgraduate degree" (reference category), and a flag for "Don't know/missing". Those students included in the core sample had a mean parental occupational prestige score that was 8 points higher than those students in the full sample, whilst the proportion of unknown or missing occupational data was lower in the core sample. Students were more likely to be remaining in the core sample after three waves if both their parents were employed, and if they could supply information about their parent's education.

Access context

The particular contexts in which young people access the internet also influence the breadth and intensity of their use. For the purposes of this thesis my definition of access context encompasses the technological resources an individual requires to access and use the internet, the physical environments in which they do so, and any norms or discourses operating within those environments which may constrain or encourage their online behaviour. It should be clear from this definition that the access context for any given respondent reflects a convergence of quantitatively measurable factors, such as the household diffusion of internet access, and qualitatively measurable factors, including the process by which an individual determines what constitutes appropriate internet use in a given setting. The quantitative analyses for RQs 1 and 2 I employ a 'top-down' view of access context which relies on survey measures of access to technological resources.

Table 3.6: Distribution on access context variables for both analytic samples*

	Full sample (n=6545)		*Core sample (n=2060)*	
	n	**%**	**n**	**%**
Home internet connection type				
Broadband / ADSL (Ref.)^	4222	64.5%	1453	70.5%
Dial-up	1689	25.8%	518	25.2%
No net access	638	9.7%	89	4.3%
Home computer access				
Shared access (Ref.)	5186	79.2%	1677	81.4%
Exclusive access	1142	17.4%	368	17.9%
No access	221	3.4%	15	0.7%
Mobile phone ownership				
Owns mobile phone (Ref.)	4983	76.1%	1521	73.8%
Doesn't own mobile phone	1566	23.9%	539	26.2%

*Distributions weighted on gender and school sector
^Ref= Reference category

Table 3.6 shows the quantitative access context measures included in this analysis. The type of internet connection a respondent has at home is likely to influence online time use and breadth of use, as faster connection speeds allow users to do online activities more quickly, to do multiple activities simultaneously, and to undertake more resource-intensive activities, such as downloading media (Anderson, 2008). Home internet connection type is controlled with dummy variables for dial-up access and no internet access, and broadband access as the reference category. Whether a respondent had exclusive access to a home computer during wave 1, or shared with others is also accounted for, because this is likely to affect the time a person can spend using the internet and the privacy with which they do so (Hargittai, 2008; Hassani, 2006; Zhao, 2011). Mobile phone ownership at wave 1 provides an additional indicator of technological access and usage autonomy.

Comparing the distribution on the wave 1 access context measures for both samples shows that students who were without a home computer or internet connection at wave 1 were less likely to have qualified for inclusion in the core sample by participating in every survey wave. By contrast, those who were included in the core sample were more likely to have had broadband access at wave 1. However, they were also more likely to have shared their home internet access with others, and less likely to have owned a mobile phone.

Time Use Orientation

Theorists emphasise the need to situate users' decisions about how to engage with the internet within the context of everyday life. The final group of measures address this need by accounting for the respondents' orientations towards a range of common daily activities, as indicated by the amount of time per week they spent engaging in them. In the same question set asking them about the number of hours per week they spent using the internet socially and academically, respondents were also asked about the time they spent on the following activities: "Using the internet for other things"; "Doing homework"; "Playing sport"; "Doing chores at home"; "Hanging out with friends outside of school"; "Watching TV"; "Listening to music"; and "Reading books for fun". As with the online time use measures, the response categories for these items were "None", "1-3 hours", "4-6 hours", "7-9 hours" and "10+ hours". These categories were recoded in order to distinguish between the effects of weaker and stronger preferences for the activities in questions. Accordingly, dummy variables were included in the analysis for "1-3 hours" (indicating a more moderate orientation) and "4+ hours" (indicating a more intensive orientation), whilst "None" was the reference category, indicating little to no orientation at all. Table 3.7 displays the distributions on these measures for both analytic samples.

Table 3.7: Distribution on time orientation measures for both analytic samples*

	Full sample		*Core sample*			*Full sample*		*Core sample*	
	n	**%**	**n**	**%**		**n**	**%**	**n**	**%**
Time spent doing homework					***Time spent watching TV***				
None (Ref.)^	383	5.9%	62	3.0%	None (Ref.)	237	3.6%	81	3.9%
Moderate (1-3 hours)	3505	53.5%	921	44.7%	Moderate (1-3 hours)	2173	33.2%	645	31.3%
Intensive (4+ hours)	2661	40.6%	1077	52.3%	Intensive (4+ hours)	4139	63.2%	1334	64.8%
Time spent playing sport					***Time spent reading books***				
None (Ref.)	531	8.1%	169	8.2%	None (Ref.)	2673	40.8%	602	29.2%
Moderate (1-3 hours)	2260	34.5%	722	35.1%	Moderate (1-3 hours)	2342	35.8%	758	36.8%
Intensive (4+ hours)	3757	57.4%	1169	56.8%	Intensive (4+ hours)	1534	23.4%	700	34.0%
Time spent doing chores at home					***Time spent listening to music***				
None (Ref.)	667	10.2%	197	9.6%	None (Ref.)	514	7.9%	187	9.1%
Moderate (1-3 hours)	4082	62.3%	1370	66.5%	Moderate (1-3 hours)	2833	43.3%	885	43.0%
Intensive (4+ hours)	1800	27.5%	493	23.9%	Intensive (4+ hours)	3201	48.9%	988	48.0%
Time spent hanging out w/ friends									
None (Ref.)	838	12.8%	295	14.3%					
Moderate (1-3 hours)	2530	38.6%	950	46.1%					
Intensive (4+ hours)	3181	48.6%	815	39.6%					

*Distributions weighted on gender and school sector
^Ref= Reference category

The two analytic samples differed most in the time they spent doing homework, doing chores, hanging out with friends outside school, and reading books for fun at wave 1. Compared to those in the full sample, students in the core sample spent more time doing homework and reading books, but less time doing chores and hanging out with friends outside school.

Qualitative Sampling and Data Collection

Since the aim of RQ 3 is to investigate respondents' perceptions and experiences of internet use and its role in their lives, this question is best addressed using qualitative interviews (Mason, 2002). This also allows me to supplement the measures contained in the survey by examining how respondents themselves construct their own usage practices and other key concepts to which the survey measures refer. At various stages during the Our Lives Project, interviews were conducted with respondents on issues related to youth, individualisation, and the life course. These have explored topics such as financial literacy and financial planning, expectations of marriage and divorce, and attitudes towards asylum-seekers and immigration. The qualitative interviews for this thesis follow on from this existing interview program and were conducted in the second half of 2011 with interviewees now aged 17/18 years. While I conducted interviews with respondents personally and focused exclusively on internet use, my affiliation with the Our Lives Project meant I was able to draw on existing resources, approved consent procedures and proven recruitment strategies, as well as the expertise of interviewers already familiar with the sample in question.

As indicated earlier, it is important for mixed methods design studies to be integrated (Bryman, 2006). Thus I drew the sample for my qualitative research from the quantitative analytic sample identified in the previous section. This nested approach means that participants in the qualitative study were a subset of those involved in the quantitative analysis for RQs 1 and 2. Furthermore, potential participants for qualitative interviews were identified using an extreme case typology to sample respondents who are outliers in terms of the time they spent using the internet for academic and social purposes at wave 1 (Teddlie & Yu, 2007: 81).

I included participants in this sampling typology that met the following criteria: a) they participated in all three waves of the Our Lives survey; b) they were included in the analytic samples for the quantitative analysis; and c) if the time they spent using the internet for chat/email and for homework at wave 1 was at the higher or lower extremes of the time use spectrum. For this last criterion I determined respondents to be at the lower end of the spectrum if they answered "None" on either online time use variable and at the higher end if they answered "7-9 hours" or "10+ hours". As shown in Figure 6.1 in Chapter 6, the resulting four cell typology contains

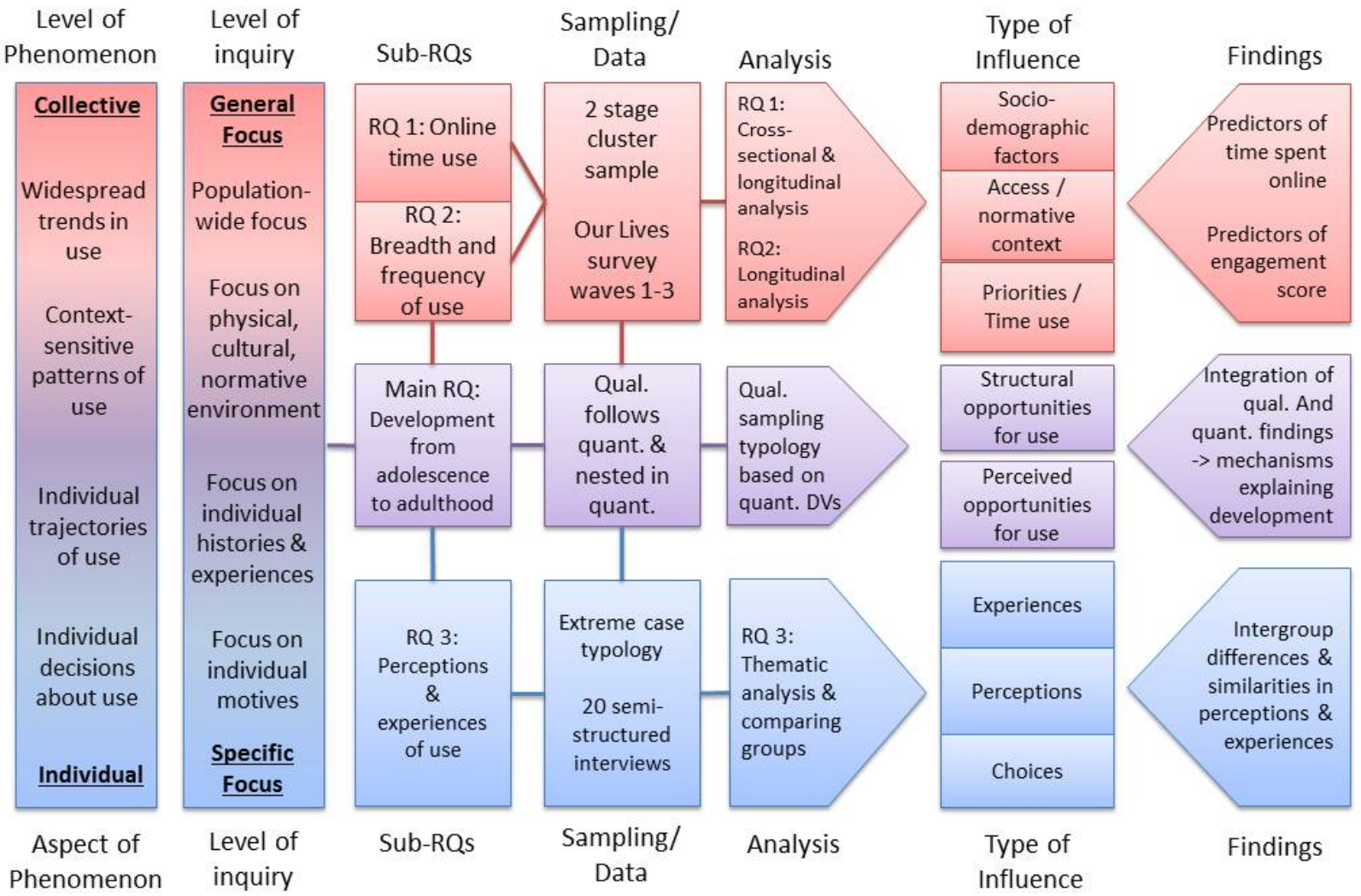
respondents who, at wave 1, were: 1) both low social and low academic (n=130); 2) low social but high academic (n=14); 3) high social but low academic (n=29); and 4) both high social and high academic (n=52). Interviewees were sampled as randomly as possible from these four groups. However, due to travel constraints I was unable to interview several respondents who resided outside the South-East Queensland area. By focusing on extreme cases I am able to compare the perceptions and experiences of respondents who were initially located at the higher and lower ends of the time use spectrum (Collins, 2010). Interviewing this subset of respondents five years (and three survey waves) after they first participated in the Our Lives Project also allows me not only to compare the trajectories of respondents who differed markedly at wave 1, but also to identify reasons why individual trajectories vary over time.

I recruited interview participants by first sending a letter to respondents (or the parents of respondents who were still under the age of 18) advising them about the interviews. I then contacted respondents, or their parents, by phone and asked whether they agreed to participate; as a reward for their participation I offered respondents a $20 gift card. If they agreed to participate, we arranged a time and place for the interview, and I collected the relevant consent forms prior to commencing the interview. Although interviews were usually held in participants' homes, some participants preferred to be interviewed at universities which they now attended. I conducted interviews individually with respondents and these usually lasted between 45 minutes and 1 hour 15 minutes. All interviews were recorded and, due to time constraints, I opted to have these transcribed using a third-party transcription service. I conducted interviews with 5 participants from each typology group, resulting in a total sample of 20 interviewees. More information about the interview recruitment process and the demographic characteristics of respondents is provided in Chapter 6.

Interview Topics

The interviews were semi-structured enabling me to keep interviews focused, but also to allow respondents to raise topics relevant to them. The interviews were organised around a set of 4 themes that were theoretically and empirically driven. The theoretical themes I examined focused on: (1) respondents' perceptions about the characteristics of their own internet use (e.g. the time they spend online, the risks and benefits associated with their use, multi-tasking etc.); (2) the everyday life context of their use, including their current circumstances, priorities and needs, and broader time use practices; (3) perceived features of access context impacting on use (e.g. rules, norms and discourses which respondents take into consideration); (4) respondents' own accounts of changes in their use during high school and the reasons for this (e.g. changes in aspirations, needs, access context, time use commitments etc.)

Figure 3.7: Mixed Methods Research Design



The empirical themes followed up on unexplained or unexpected findings from the quantitative analyses, and which could be explored further within these areas of focus. Furthermore, in each of these areas I was able to use more individual-specific information about interviewees' backgrounds, access contexts, and usage to contextualise their survey responses and to enrich my interpretation of broader statistical trends. An outline of the rough interview schedule used for these interviews is included in the appendices, and more detail on each topic area is given in Chapter 6.

Analytic Approach

Figure 3.7 gives an overview of the mixed methods research design for this study. Each column in the diagram illustrates a particular step in the research process. The first column indicates the levels or aspects of internet use with which my analysis is concerned, while the second column indicates the levels of inquiry needed in order to learn about these different aspects. When explaining collective variation in internet use, this requires a more general focus on the population as a whole; but explaining why a particular person chooses to engage in internet use requires a focus on that individual's rationale for doing so. I represent this as a continuum which ranges from the collective/general (coloured red) to the individual/specific (coloured blue). However, as a continuum it is possible to adopt more nuanced perspectives about the structure of internet use which fall somewhere in the purple area between these extremes. These involve questions such as why internet use varies in diverse settings or under different circumstances, or why over time it varies for a particular person.

Not all these aspects of internet use are observable from a single level of inquiry, and the influence of any given factor is unlikely to be confined to whichever level I focus on. To account for this, my sub-research questions allow me to diversify my research activities (e.g. sampling/data collection, analysis, and reporting of results) towards different levels of inquiry, and my main research question allows me to reconcile the contrasting insights from each of these levels. Accordingly, the analytic approach I take in this thesis is divided into three distinct phases. Each phases addresses a particular sub-research question and is presented in a separate empirical chapter.

Phase 1 – Online Time Use

Phase 1 of the analysis addresses RQ 1 by identifying factors which account for variation in the amount of time young people spend using the internet at the beginning of high school. In this phase I investigate whether students' academic and social internet use varies according to their socio-demographic characteristics, access context, and time use orientation. To do this I perform interval regression analysis with the full cross-sectional sample at wave 1. This enables me to

investigate how students' entries into these popular forms of use - and their opportunities to acquire skills and experience - are differentiated by these explanatory variables. I then examine whether wave 1 predictors of online time use continue to account for differences in the amount of time respondents spent using the internet at waves 2 and 3. I accomplish this by replicating the initial analysis with the longitudinal sample, and modelling their time use separately for waves 1, 2, and 3. Crucially, this enables me to interrogate theoretical claims about processes of cumulative advantage and disadvantage in youth internet engagement over time. Another way I explore the implications of early differences in online time use is by investigating the impact such variation has on young people's perceptions and experiences of internet use later in life. To this end, I use wave 1 online time use as a basis for the qualitative sampling typology employed in phase three. For both quantitative phases, any unexpected correlations were explored further in qualitative interviews.

Phase 2 –Level of Internet Engagement

Phase 2 of the analysis addresses RQ 2, by accounting for differences in the level of internet engagement young people display at the end of high school. All analyses for this phase are undertaken with the longitudinal sample. First, I focus on the two key intervening variables in respondents' development as internet users: their degree of internet self-efficacy and the online time use trajectories they take during school. Using ordered logistic regression techniques, I analyse differences on these measures using the same set of wave 1 predictors employed in the earlier time use analysis. . In this way, the analysis for phase two builds on the earlier online time use analysis, allowing me to determine whether influences on internet use in earlier in adolescence continue to structure their ongoing development as internet users later in life. For the second part of this chapter I focus specifically on respondents' level of internet engagement at wave 3. Since the composite internet engagement is an index ranging from 0-100 I employ OLS regression to model the effects of each set of covariates. In addition to the wave 1 explanatory variables used in all prior analyses, these covariates also include the intervening self-efficacy and online time use trajectory measures. This comprehensive model allows me to determine which of these factors are most salient in determining how young people's internet use develops over the course of high school.

Phase 3 – Perceptions and Experiences of Use

Lastly, phase 3 of the analysis addresses RQ 3 by exploring how young people perceive and experience internet use after they leave high school. For this phase I employ an interpretivist approach to better understand individual's decisions about internet use by exploring the meanings which internet use can have for different individuals (Silverman, 2001). In particular, I compare the

perceptions of interviewees who differed dramatically in terms of their online time use at wave 1, and who are therefore likely to base these perceptions on contrasting experiences of using the internet. Interview transcripts were coded and analysed using computer-assisted data analysis software (NVivo). Although the coding frame was predominantly structured according to the pre-defined topic areas outlined above, I also used 'free nodes' during the coding process to identify unstructured, empirically-driven themes that might be of relevance to RQ 1 & 2 (Richards, 1998). Once coded, I searched for similarities and differences between the various typology groups with respect to the first three theoretically-driven thematic areas: perceived characteristics of use, everyday life context and time commitments, and access/normative context. I then explore the fourth topic area - change in use - by drawing on data from surveys and interviews with respondents to illustrate a range of internet use trajectories from adolescence to early adulthood.

In phases 1 and 2 I examine the population-wide influences on youth internet use, which enable and constrain young people's broader opportunities for participation by defining the scope, purpose, and intensity of that use. In phase 3, I turn my focus to the perceptions and experiences of individuals belonging to different user groups. I examine how these frame the choices these young people make about how to engage with the internet in their everyday lives. Then, in Chapter 7, I integrate the findings from these three phases to address my main question about how and why youth internet engagement varies between adolescence and early adulthood.

Conclusion

In this chapter I outlined the longitudinal, mixed methods research design I employ in my thesis. I argued that this approach was necessary to investigate the framework I proposed in Chapter 2 for explaining differences in youth internet engagement between adolescence and early adulthood. This framework emphasises a 'parts-to-whole' relationship involving a range of population-wide, context-sensitive, and individual-specific influences: how do individuals, engaging with the internet in the ways that they do, bring about the trends we see at an aggregate level? And what causes them to act in these ways? In the chapters which follow I present the three phases of my analysis which, by reconciling insights about how internet use is structured at different levels of inquiry over time, will allow me to address these questions.

Chapter 4 - Where'd the Time Go?

Online Time Use throughout High School

Introduction

In this chapter I examine the reasons why young people vary in their online time use at the beginning of high school, and the trajectories these differences took as they progressed through high school. The amount of time young people spend using the internet is likely to affect their exposure to online benefits and risks, their development of online skills and self-efficacy, and their attitudes and values towards the internet's role in their everyday lives; yet the extent of their online time use and its implications for their overall engagement with the internet, remains underexplored. My investigation of these issues begins with a focus on the following research question:

> **RQ1: What factors are important in accounting for differences in the time young people spend online at the start of high school, and are these influences temporary or longer-lasting?**

I will examine how socio-demographic characteristics, access context, and time use orientation affect the online time use of young Australians who were in their first year of high school in 2006 (Grade 8 - aged 12-13). I also assess whether these influences were still evident when they were in the middle of high school (Grade 10 - aged 14/15) or at the end of high school (Grade 12 - aged 16/17). Then, in Chapters 5 and 6, I undertake a broader exploration of respondents' development as internet users, to establish how these earlier influences shaped the breadth of their internet use and their perceptions of its role in their lives after leaving school.

Background

In 2007, the Australian Communications and Media Authority conducted a time diary study of 1,003 Australian young people aged 8-17 years (ACMA, 2007). Data from the study showed that children aged 12-14 years (i.e. the same age cohort as respondents in the Our Lives sample) spent on average 10.5 hours each week using computers and the internet. Consistent with ABS (2009b) findings, the main online activities on which they spent their time were chatting or emailing friends (2 hours and 10 minutes per week) and doing homework (1 hour and 12 minutes per week). The amount of time spent online was found to increase with age, as been shown in Europe (Hasebrink et al, 2009) and the U.S. (Kaiser Family Foundation, 2009). Patterns with respect to gender were also consistent with international trends; while boys and girl were found to be similar in their overall online time use, girls spent longer on social and educational uses while boys spent more time recreational uses such as gaming (ACMA, 2007). Although socioeconomic status does not appear to

influence the overall amount of time a child spends online, children from wealthier, better educated families tend to have had access to the computers and the internet at an earlier age (Ching et al, 2005); to be more confident users (Vekiri, 2010); to have less leisure-orientated and more school-orientated use (Peter & Valkenburg, 2006); and to experience increased parental mediation of their use (Hasebrink et al, 2009). Moreover, existing research suggests that children living in rural areas are likely to have slower, less exclusive access than those in urban areas, and fewer parental restrictions on how they use that access (ABS, 2009a; ACMA, 2007). Beyond these general trends, the social processes influencing how adolescents spent their time online remain under-investigated; in particular, there has been no longitudinal exploration of trends in online time use and their implications for young people's development as internet users.

However, scholars have proposed a number of mechanisms linking time spent online to social outcomes more generally; these can be combined with the three explanatory approaches outlined in Chapter 3 to help predict why students will differ in their online time use, and what these differences will mean for young people's overall engagement with the internet. Three types of mechanisms have been identified: (1) time displacement/enhancement; (2) 'rich get richer'/'poor get richer'; and (3) multitasking/user decision-making.

The Digital Natives Approach: Time displacement, efficiency and enhancement

Time displacement refers to the idea that when an individual devotes time towards a certain activity, this detracts from the time he or she could be spending on other activities. This assumes that time allocation is a zero-sum process (i.e. since there is a finite amount of time in each day, engaging in any activity entails a temporal cost that can be measured). Early studies of computer and internet use explored the relationship between time spent online and on other activities, with mixed results. On the one hand, several prominent studies found that internet use displaced time spent watching television, but was similar to television use in terms of its negative implications for social interaction and other forms of traditional media use (Kraut et al, 1998; Nie, 2001). These findings provided support for the hypothesis that people spend less time on a given activity when they adopt a new technology or practice which fulfils a similar function as that activity. However, similar studies found that internet users actually spent more time reading print media, and were not significantly less likely to watch television or to socialise (Gershuny, 2003; Robinson et al, 2002). While the internet - a more complex, multi-dimensional medium than television - may not cohere with the functional equivalence hypothesis (DiMaggio et al, 2001; Robinson & DeHaan, 2006), concerns remain about the negative displacement effects of time spent online for adolescents' social

support and well-being (Subrahmanyam & Lin, 2007), sleeping patterns (Cain & Gradisar, 2010), academic attendance and achievement (Austin and Totaro, 2011; Vidgdor & Ladd, 2010), and mental health (Byun, 2009).

A counterpoint to this is the suggestion that the internet allows its users to undertake a range of tasks more efficiently, thereby saving time (Franzen, 2000). For instance, shopping online at home rather than travelling to the store may create a surplus of time for users to spend on other activities (Gershuny, 2003); similarly, college students may save time accessing academic resources online instead of going to the library (Mokhtari et al, 2009). Another possibility is that internet use expands the number of ways in which users to engage in a particular type of activity, such as socialising with friends, without necessarily increasing or decreasing the overall amount of overall time they dedicate to that type of activity (Wellman et al, 2001). Finally, certain uses of the internet may improve the quality of various outcomes in other ways that compensate for its displacement effects, for instance, by allowing users to strengthen their offline relationships (Gross, 2004).

These scenarios suggest that internet use has time costs and benefits which are universal, which occur whenever a person accesses the internet, and which intensify as the person spends longer online. Conversely, these mechanisms imply that those who lack access, or spend less time online, will be exempt from or less exposed to these costs and benefits. Of the three approaches to explaining youth internet engagement outlined in Chapter 2, these mechanisms are consistent with the Digital Native approach, with its basis in diffusion theory (Rogers, 2001). According to this theory, young people who are earlier adopters of internet use will experience its effects exclusively, until such use becomes more universally diffused. At that point, any relative advantage (or disadvantage) experienced by early adopters, in terms of displacement or enhancement, will disappear. As such, differences in online time use arising from socio-demographic disparities in access or use should only affect young people for the finite duration of the diffusion process. This hypothesis can be broken down into three parts:

> ***(1) Digital Natives (DN) approach**: After internet access and use diffuses, all students will experience the same costs and benefits (in terms of displacement, efficiency, and enhancement) from online time use.*
>
> ***DN (1a):** Online time use will positively correlate with access to technological resources.*
>
> ***DN (1b):** As access to technological resources becomes more widespread, socio-demographic differences in online time use will diminish.*
>
> ***DN (1c):** As particular modes of use become more widespread, socio-demographic differences in online time use will diminish.*

The Digital Connoisseurs Approach: 'Rich get richer' versus 'poor get richer'

A more refined approach suggests that the mechanisms outlined above produce time costs and benefits which depend on users' attributes even after diffusion occurs. Having initially found that online time use was associated with lower levels of social participation and psychological well-being amongst a group of new internet users, a follow-up study by Kraut et al (2002) three years later found a reversal of these effects. The authors identified a 'rich get richer' effect, where extraverted users with more social resources at their disposal experienced better outcomes from their use than introverted users who had less of these resources. They also concluded that during this period these users may have become more discriminating, in both how they spent their time online, and in the offline activities they sacrificed in order to spend time online. In other words, the consequences of online time use are not inherently detrimental or beneficial; rather, this may depend on how a user's existing attributes affect their use. The Kraut et al findings are consistent with the notion of internet engagement as a process of stratification - a central tenet of the Digital Connoisseurs approach, as grounded in Bourdieu's (1986) ideas of social and cultural reproduction. Users with existing advantages (in terms of the required skills, resources and preferences) may spend their time online more efficiently, and in more capital-enhancing ways, thereby extending these advantages (DiMaggio et al, 2004; Hargittai, 2008). By contrast, already at-risk individuals may spend their time online inefficiently, or engage in problematic uses that compound their vulnerabilities (e.g. the 'poor-get-poorer' effect) (Selfhout, 2008). This suggests that processes of displacement and enhancement help reinforce existing inequalities, by making the time costs and benefits of internet use more favourable for higher status users and less so for lower status users.

Whilst sharing this emphasis on a user's existing situation, the compensation hypothesis states that precisely the opposite is the case; individuals who are disadvantaged have the least to lose and the most to gain from the time they spend using the internet - the 'poor get richer' effect (Gross et al, 2002). Most evidence for this hypothesis concerns social internet use, with researchers finding that those who are lonely, have low self-self-esteem, and less social capital, benefit more from the time they spent on activities such as social networking (Ellison et al, 2007) and instant messaging (Mesch 2001). However, support for the 'rich-get-richer' and compensation hypotheses may be contingent on the type of internet use in question. Selfhout et al (2008) found that for adolescents with low perceived friendship quality, time spent on online communication tended to ameliorate depression and social anxiety, whereas engaging in non-communicative activities, such as browsing, exacerbated these conditions. As such, this analysis distinguishes between different dimensions of internet use and accounts for a user's orientation towards each.

Where differences in young people's online time use are consistent with the 'rich-get-richer' hypothesis, it may be that the longer such differences persist, the more likely they are to become entrenched, as advantaged and disadvantaged groups assume diverging trajectories in terms of their broader development as users. Conversely, if such differences are consistent with the compensation hypothesis, then the longer these endure, the more plausible it would be for at-risk youth to develop internet-related skills, attitudes, and practices which counteract other barriers they may face in everyday life. These claims can be stated as follows:

> ***(2) Digital Connoisseurs (DC) approach:*** *Even after internet use is diffused, its time costs and benefits will remain more favorable for students with existing advantages (stratification), or with existing disadvantages (compensation).*
>
> ***DC (2a):*** *Students who are more strongly orientated towards academic or social activities offline (e.g. doing homework or hanging out with friends) will spend more time doing these things online (e.g. stratification), or;*
>
> ***DC (2b):*** *Students who are less strongly orientated towards academic or social activities offline (e.g. doing homework or hanging out with friends) will spend more time doing these things online (e.g. compensation).*
>
> ***DC (2c):*** *This relationship will mediate socio-demographic influences on students' internet use, even after the type of use in question is widely diffused.*

The Digital Explorers Approach: Multi-tasking and user decision-making

The fact that time allocation is not strictly a zero-sum process - that people often combine two or more activities in the same time period - further complicates the dynamics of online time use and its effects (Kenyon, 2008). Multitasking may occur as a response to perceived time demands (Floro & Miles, 2001) to alleviate boredom (Baron, 2005), to increase productivity (Hungerford, 2001), or to project the image of 'busyness' associated with a higher status lifestyle (Gershuny, 2005). Internet use, with its diverse range of applications, support for multiple, concurrent tasks, and task-switching functionality, is conducive to multitasking (Judd & Kennedy, 2011). The concept of 'media multitasking' refers to the parallel use of multiple digital technologies - a phenomenon which is thought to be especially prevalent amongst young people who own more of these technologies and use them more frequently (Foehr, 2006). Despite research showing that most people undertake other activities while they use the internet, the time use implications of this have not been widely explored (Kenyon, 2008). This may reflect the inherent measurement difficulties which arise when users have difficulty keeping track of time spent on multiple activities.

Kenyon (2008) argues that the conduciveness of an activity to multitasking depends on the extent of its need for physical co-presence and uninterrupted engagement, as well as its cognitive demands. Baron (2005) found that young people consciously took such factors into account when

combining instant messaging with other activities; mindful of social norms and etiquette, users avoided engaging in more conversations than they could manage, and confined themselves to activities which did not interfere with their communication, such as listening to music and browsing. Meanwhile, research has found students' academic performance to be impaired by their concurrent use of instant messaging and that those who engaged in such use were more prone to impulsiveness and distraction (Bowman et al, 2010; Fox et al, 2009). Adolescents' media multitasking increases with age and socioeconomic status (Devis-Devis et al, 2009), autonomy of use, and with the strength of one's sensation-seeking disposition (Jeong & Fishbein, 2007).

The task-dependent and context-sensitive nature of multitasking would suggest that those who engage in this practice need to continuously evaluate their time costs and benefits attached to their use. Some users may be able to coordinate their offline and online activities so as to enhance their time use and minimise negative displacement effects; others may struggle to achieve such a balance. This is consistent with the Digital Explorers approach to youth internet engagement, influenced by Giddens' (1984) theory of structuration: while structural constraints may limit the choices they have about how to spend time online, young people still have scope to make decisions about their use based on past experience. This approach implies that differences in online time use will not only correspond to socio-demographic differences in access (i.e. the Digital Natives approach) or orientation (i.e. the Digital Connoisseurs approach), but they will also be explained by other activities on which users spend their time and how conducive these are to multitasking. Young people can be expected to tailor their patterns of time use during high school to avoid clashes between offline and online activities. This multi-tasking hypothesis is summarised as follows:

> ***(3)Digital Explorers (DE) approach****: The costs and benefits of online time use will vary depending on a student's combined time use practices and how each student reconciles their internet use with these practices.*
>
> ***DE (3a):*** *Activities which are compatible with a mode of internet use will be positively correlated with that mode of use, while activities which clash will be negatively correlated.*
>
> ***DE (3b):*** *Students' time use behaviours will change over time in ways that reduce clashes and increase compatibility between their offline and online practices.*

Methods

Measures

The descriptive statistics for all variables in this analysis are shown in Tables 3.5-3.7. As outlined in Chapter 3, the dependent variables in this analysis are time spent using the internet for chat or email (i.e. social internet use) and time spent using the internet to help with homework (i.e. academic internet use).

Interval regression analysis

The dependent variables are constructed in ordered intervals with upper and lower thresholds. Values are 'censored' in that they fall within known ranges (i.e. 1-3 hours, 4-6 hours and 7-9 hours) or beyond a known threshold (i.e. 10 or more hours). I therefore employ a form of censored regression known as 'interval regression', which uses Maximum Likelihood Estimation (MLE) based on the known thresholds in which values can fall to provide more robust parameter estimates than would be obtained by ordinary least squares regression (Wooldridge, 2003). This analysis was performed in Stata (version 11) using the INTREG command. Interval regression coefficients are interpreted in the same way as OLS coefficients. In this case, 1 unit of the dependent variable is equal to 1 hour per week. The effect of each variable is also displayed in minutes by multiplying its coefficient by 60. To allow for the possibility of within-school clustering - arising from the two-tiered nature of the sampling process - I specify that the estimation of standard errors for all models take into account this intragroup correlation. While this option does not impact the coefficient estimates, it does allow for more robust tests of significance.

Analytic Strategy

The analysis and presentation of results proceeds in two stages; in the first stage I undertake a cross-sectional analysis of online time use at wave 1, and in the second stage I conduct a longitudinal analysis of change in online time use over the three waves of the Our Lives Project. The first stage of the analysis has two steps. First, I undertake descriptive analysis of the two dependent variables. This initially focuses on the time students in the full analytic sample spent using the internet socially and academically at wave 1 (Figure 4.1), before examining how this varied from waves 1 to 3 for members of the core analytic sample (Figure 4.2). Following this, a series of interval regression models were estimated. Presented in Tables 4.1 and 4.3, these analyses investigate how online time use at wave 1 varies according to the three variable sets (i.e. socio-demographic factors, access context, and time use orientations) outlined above. Each variable set is added sequentially to build up the full explanatory model for these two dependent variables. This analysis is conducted with the full analytic sample (n=6,545).

The second stage of the analysis examines whether significant predictors of online time use (in Grade 8) remain influential across subsequent waves (Grades 10 and 12). To this end, I use the same explanatory model developed in the cross-sectional analysis to estimate the online time use of students at waves 1, 2 and 3. These analyses are performed with the core analytic sample (n=2,060). For both dependent variables, three separate interval regression models were conducted (one for

each wave) and the results for covariates that were significant predictors in the cross-sectional analysis are shown in Tables 4.2 and 4.4. All models were tested and cleared for multicollinearity.[2]

Sample Weighting

As outlined in Chapter 3, the first wave Our Lives sample is non-representative with respect to gender and school sector, when compared to the Grade 8 student population in 2006 when data were collected. Given that both these factors are expected to influence young people's internet use, the fact that females and students attending Independent schools were disproportionately more likely to respond to the initial Our Lives survey must be taken into consideration. If ignored, this may introduce sample selection bias into the analysis and undermine the external validity of its findings. To test whether this would be the case, a post-stratification weight was used to correct the joint sample distribution on these two variables using actual population data. This weight was then applied to both the descriptive and multivariate analyses with the full sample to test whether accounting for the sample's initial non-representativeness had any effect on the results.

When the weight was applied to the descriptive analysis of the two dependent variables, there were minor differences between the weighted and unweighted distributions on these measures. These are explored further in the results section. However, when the weight was applied to the cross-sectional analysis, where all explanatory variables were included, the coefficients for both social and academic use remained largely unchanged. This indicates that any impact weighting may have had becomes negligible once the full set of covariates is taken into account. Since all of the quantitative analyses for this thesis include these covariates, weighting is unlikely to affect the results of these subsequent analyses. While the weighted cross-sectional models have been included in Appendices D and E, for the remaining analyses in this thesis weighting is not applied.

Accounting for non-response and attrition

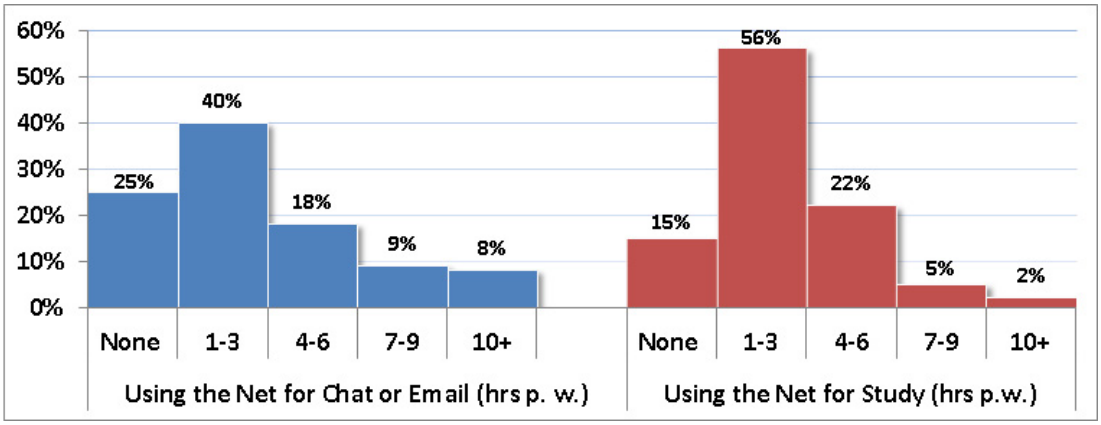
In theory, if inclusion in the core sample was a perfectly random process, this sample would generally become less diverse in its characteristics than the full sample. In the core sample analysis this reduced variability would not affect the size of regression coefficients, but it would produce larger standard errors, thus entailing significance tests which tend to underestimate an effect's actual significance. However, it is more likely that the reduction in size from the full sample to the core sample is a non-random process, as respondents needed to satisfy specific inclusion criteria. Wherever potential observations are excluded from a sample on a non-random basis there is a risk

[2] Models were run using OLS regression and checked for a Variance Inflation Factor (VIF) larger than 10 (Baun, 2006).

of sample selection bias (Berk, 1983). For this analysis, respondents were excluded from the core sample if they did not participate in all survey waves and did not answer all required survey questions. Thus, if a student's increased responsiveness is correlated with their use of the internet, this may produce biased estimates for the core sample analysis. Such bias would undermine my capacity to form valid conclusions about the full sample - and by extension, the broader population - based on this subset. However, since the same wave 1 data is available for both these groups, it is possible to replicate the analysis for respondents who were omitted from the core sample, and to account for differences in the online time use of core and non-core respondents.

Firstly, descriptive analysis comparing core and non-core sample members was conducted. This found minor differences in online time use between the two groups, which are detailed in the results section. Next, an interaction test was used to identify how the multivariate results differed for core and non-core sample members. The final cross-sectional model for online time use at wave 1 was rerun, this time including a dummy variable indicating whether or not a respondent was included in the core sample. This dummy variable was then interacted with all other variables in the model, so that each interaction coefficient indicated whether the effect varied significantly between core sample members and non-core sample members. This test, which was repeated for both online time use measures, found significant interactions for only a few predictors in each case. After removing all non-significant interactions from the model, a likelihood ratio test found that the respecified models delivered a significantly improved fit over the earlier model containing no interaction terms. This interaction model is presented as Model 4 in Tables 4.1 and 4.3. Since it is not possible to estimate the sample selection bias arising from unmeasured factors, this model helps to define the role of bias as clearly as possible within the known parameters of this study.

Figure 4.1: Distribution on both online time use variables for full sample at wave 1

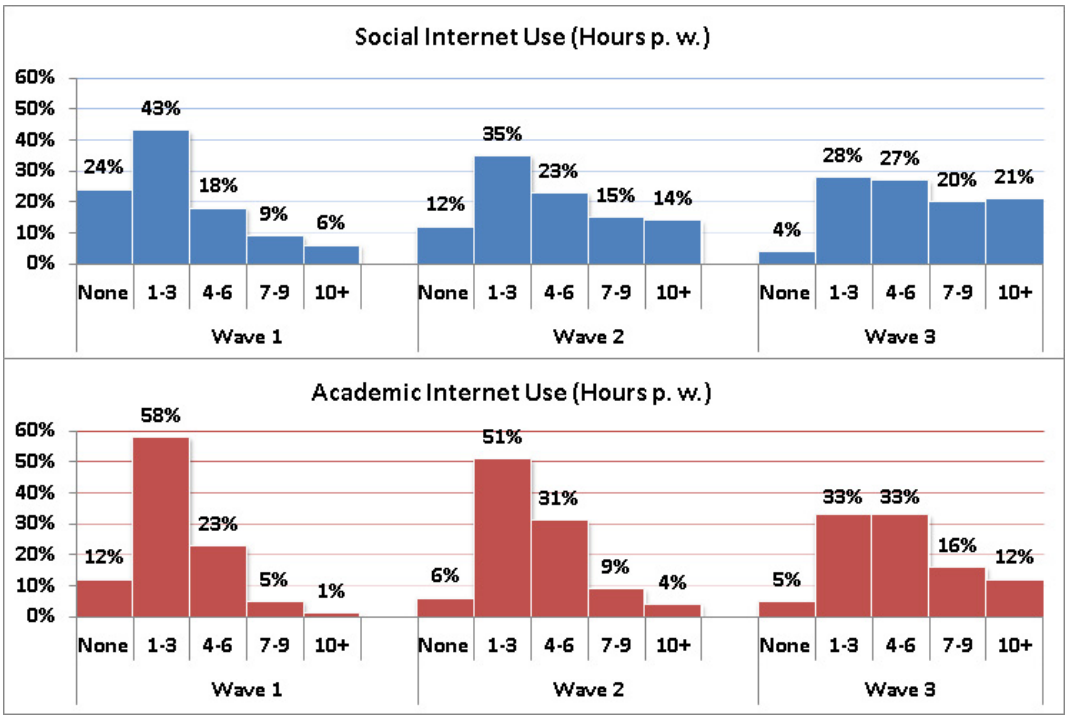


Results

Time spent using the internet at wave 1

Figure 4.1 shows the time students in the full analytic sample spent using the internet for chat or email, and for homework, at wave 1. This snapshot indicates that there were more students engaged in academic internet use than social internet use at the start of high school i.e. at wave 1 there were fewer students in the "None" category for academic use (15%) than for social use (25%). However, social internet use was the more time-intensive of the two activities, with more users contained in the heavier use categories of "7-9 hours" or "10+ hours". This is confirmed by the mean amount of time students spent on these two activities. On average, students spent 3 hours and 19 minutes per week chatting or emailing online, and 2 hours and 51 minutes per week studying online. Since these figures are higher than those reported in the ACMA time diary study cited earlier, they could indicate students' overestimation of their actual use. However, research comparing time diary and survey measures of internet use has shown that although such survey measures are consistently higher than diary measures, the two are significantly correlated with one another (Greenberg et al, 2005). Although "1-3 hours" was the most popular category for both activities, the differences between students were greater for social use than they were for academic use. In the latter case, over half of the sample (56%) was concentrated in the "1-3 hours" bracket.

Figure 4.2: Core sample distribution on both online time use variables across all waves



To assess potential sampling bias, the effects of non-representativeness in terms of gender and sector, and of exclusion from the core sample, were also examined. When weighting on gender and sector was applied, respondents' online time use was slightly lower on both measures. For social use, this difference (5 minutes per week) was not significant, but for academic use there was a significant reduction of 9 minutes per week. The higher wave 1 response rate for females and Independent school students suggests that the average time spent studying online was higher than it would have been if males and State and Catholic school students had been better represented.

When core and non-core sample members were compared, the non-core students were found to spend significantly longer on social internet use (16 minutes per week) than core students, while on academic use the two groups did not significantly differ. Core sample members, who over time proved to be more reliable survey respondents, spent less time chatting or emailing in Grade 8. Moreover, on both online time use measures there were fewer differences between core sample members than there were between full sample members. This is consistent with the expectation that the core sample represents a less diverse subset of the student population than the full sample.

Progression from Wave 1 to 3

Figure 4.2 displays the core sample members' online time use from waves 1 to 3. As expected, the popularity of both activities grew as students got older. Yet students' time use continued to vary depending on the type of use in question. In terms of the number of students spending any amount of time online, social use lagged behind academic use at wave 1, and continued to do so at wave 2. From wave 1 to wave 2, for both activities there was a 50% reduction in non-use. This decline continued for social use between waves 2 and 3, but for academic use it had bottomed out at wave 2. By wave 3, over 95% of students were engaging in both types of use, compared to wave 1, where 76% had engaged in social use and 88% had engaged in academic use.

For social use, this influx of new users was paralleled by intensifying time use amongst existing users. On average, students' weekly social use increased from 3 hours and 8 minutes at wave 1, to 4 hours and 37 minutes at wave 2, and then to 5 hours and 50 minutes at wave 3. Thus, by Grade 12 students spent 86% longer on this activity than they did in Grade 8. Furthermore, as social use diffused throughout the student population, the sample as a whole became more diverse in terms of the time they spent on this activity. By wave 3, when social use was virtually universal, the students' time use was more evenly distributed across all categories other than "None".

Table 4.1: Time Spent Chatting/Emailing at Wave 1 - Interval Regression w/ Full Sample

	Model 1			Model 2			Model 3			Model 4		
	b	SE	Mins	b	SE	Mins	b	SE	Mins	b	SE	Mins
Non-core sample member	–	–	–	–	–	–	–	–	–	*.70*	*.40*	*+42*
Socio-demographic												
Female	.80***	.08	+48	.74***	.08	+44	.64***	.09	+38	.66***	.09	+39
School sector												
State school (Ref.)#	–	–	–	–	–	–	–	–	–	–	–	–
Independent School	-.14	.13	-8	-.37**	.12	-22	-.20	.12	-12	-.45***	.13	-27
*Non-core*indep. school*	–	–	–	–	–	–	–	–	–	*.38***	*.14*	*+23*
Catholic School	-.35*	.15	-21	-.46***	.12	-28	-.34**	.11	-20	-.35**	.11	-21
Geographic region												
Major city (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Inner regional	-.30*	.14	-18	-.07	.12	-4	-.12	.11	-7	-.13	.11	-8
Outer regional	-.49**	.17	-29	-.12	.19	-7	-.17	.20	-10	-.18	.20	-11
Remote or very remote	-.90**	.28	-54	-.46**	.16	-28	-.45**	.17	-27	-.46**	.17	-28
Family living arrangement												
Lives with both parents (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Lives with one parent	.18	.13	+11	.28*	.12	+17	.21	.11	+12	.18	.11	+11
Other living arrangement	-.00	.12	-0	-.00	.11	-0	-.06	.10	-3	-.08	.10	-5
Parental occupational prestige												
ANU4 score (0-100)	.00	.00	+0	.00	.00	+0	.00	.00	+0	.00	.00	+0
Parental employment status												
Both parents employed (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
One parent employed	-.16	.09	-10	-.02	.08	-1	-.01	.08	-1	-.02	.08	-1
Neither parent employed	-.38	.21	-23	-.01	.21	-1	.07	.19	+4	.06	.19	+4
Parental education status												
Postgraduate degree (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Bachelor's degree	-.19	.15	-12	-.09	.14	-6	-.10	.14	-6	-.11	.13	-6
Trade qual. or certificate	-.32*	.16	-19	-.16	.15	-10	-.19	.14	-12	-.22	.14	-13
Grade 12	-.26	.16	-16	-.11	.15	-6	-.08	.14	-5	-.10	.14	-6
Less than Grade 12	-.16	.19	-9	.08	.18	+5	.02	.17	+1	.00	.17	+ 0
Unknown or missing data	-.36*	.17	-22	-.03	.16	-2	-.09	.16	-6	-.12	.15	-7
Access context												
Internet connection at home												
Broadband or ADSL (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Dial-up access	–	–	–	-1.07***	.10	-64	-.92***	.09	-55	-.91***	.09	-55
No net access	–	–	–	-2.90***	.13	-174	-2.75***	.13	-165	-	.14	-165

Computer access at home												
Shared access (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Exclusive computer access	–	–	–	.92***	.11	+55	.75***	.11	+45	.74***	.11	+44
No computer access	–	–	–	.20	.22	+12	.15	.23	+9	.12	.23	+7
Mobile phone ownership												
Owns mobile phone (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Doesn't own mobile phone	–	–	–	-.75***	.11	-45	-.38***	.10	-23	-.38***	.10	-23
Time use (None = Ref.)												
Doing homework												
Moderate (1-3 hours)	–	–	–	–	–	–	-.20	.22	-12	-.19	.22	-11
Intensive (4+ hours)	–	–	–	–	–	–	.00	.24	+0	.02	.24	+1
Hanging out with friends												
Moderate (1-3 hours)	–	–	–	–	–	–	.45***	.10	+27	.45***	.10	+27
Intensive (4+ hours)	–	–	–	–	–	–	1.31***	.10	+78	1.28***	.10	+77
Playing sport												
Moderate (1-3 hours)	–	–	–	–	–	–	-.13	.17	-8	-.14	.17	-9
Intensive (4+ hours)	–	–	–	–	–	–	.02	.16	+1	.01	.16	+1
Doing household chores												
Moderate (1-3 hours)	–	–	–	–	–	–	-.48***	.14	-29	-.47***	.14	-28
Intensive (4+ hours)	–	–	–	–	–	–	-.59***	.16	-35	-.60***	.16	-36
Watching TV												
Moderate (1-3 hours)	–	–	–	–	–	–	-.39	.23	-24	.14	.36	+8
*Non-core*Moderate*	–	–	–	–	–	–	–	–	–	*-.79*	*.41*	*-47*
Intensive (4+ hours)	–	–	–	–	–	–	.15	.24	+9	.73*	.37	+44
*Non-core*Intensive*	–	–	–	–	–	–	–	–	–	*-.86**	*.40*	*-52*
Listening to music												
Moderate (1-3 hours)	–	–	–	–	–	–	.47***	.12	+28	.47***	.12	+28
Intensive (4+ hours)	–	–	–	–	–	–	1.82***	.14	+109	1.51***	.17	+90
*Non-core*Intensive*	–	–	–	–	–	–	–	–	–	*.46***	*.17*	*+28*
Reading books												
Moderate (1-3 hours)	–	–	–	–	–	–	-.54***	.10	-32	-.53***	.10	-32
Intensive (4+ hours)	–	–	–	–	–	–	-.65***	.12	-39	-.61***	.12	-37
Constant	3.21***	.20	+19	3.65***	.20	+21	2.66***	.39	+160	2.18***	.49	+131
No. of obs.	6545			6545			6545			6545		
Pseudo R2	.021			.102			.192			.194		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^ Pseudo-R2 measure of variance explained in latent interval regression variable

Ref. = Omitted reference category

While the uptake of academic use by students appears to precede that of social use (i.e. its diffusion amongst students was more advanced at the beginning of high school, and had peaked by wave 2), the results also show that students never became quite as varied in their academic use as they did in their social use. The intensification of online time use during high school was also less pronounced for academic use than for social use. On average, a student's weekly academic use rose from 2 hours and 52 minutes at wave 1, to 3 hours and 42 minutes at wave 2, and then to 4 hours and 56 minutes at wave 3. Respondents were spending around 72% longer studying online in Grade 12 than they were in Grade 8, compared to the 86% increase in social use across the same period.

Social Internet Use at the Beginning of High School

Model 1 (Table 4.1) regresses time spent using the internet for chat or email at wave 1 on the socio-demographic characteristics of respondents in the full sample. McKelvey and Zavoina's R-squared shows how much variation in time use is explained by each model. For Model 1 it indicates that the socio-demographic variables explain 2.1% of the variation in social internet use, with gender and geographic region displaying the strongest associations, net of other factors. Females spent longer (48 minutes, $p<0.001$) chatting or emailing per week than males. In general, students living in regional and remote areas spent less time on this activity than their urban counterparts. Those who lived in an inner regional area spent an average of 18 minutes less than those in major cities, while those in outer regional and remote areas spent 29 minutes less and 54 minutes less per week respectively. Students attending a Catholic school spent 21 minutes less on this activity than those attending a State school. Most family and parental background measures were uncorrelated with social use. Yet students whose parents had a postgraduate degree spent longer on social use than those whose parents' highest education level was a trade qualification, and those who didn't know their parents' education or were missing data on this.

Including access context measures in Model 2 raises the total variance explained to 10.2%. Connection type, exclusivity of access, and mobile phone ownership all strongly predicted time spent using the internet socially. Unsurprisingly, students with slower, dial-up access averaged 1 hour and 4 minutes less per week on chat or email than those with broadband or ADSL access, while having no home access predicted a 2 hour and 54 minute decrease. Students who had exclusive access to a home computer spent 55 minutes longer per week than those who shared their access with others. Being without a mobile phone in wave 1 also predicted significantly less time chatting or emailing than having one. When these access factors are included, the net effect of living in an inner or outer regional area is accounted for, and the effect of living in a remote or very remote area is halved. The negative effects of attending an Independent or Catholic school are both

increased. While the earlier association between parental education and social use is explained, living with one parent, rather than both, now predicts a small, significant increase in social use.

In Model 3, the social orientation variable (time spent hanging out with friends) increased the total variance explained to 13.7% (R^2 not shown), before the inclusion of all other time use variables increased it to 19.2%. The model shows that both listening to music and hanging out with friends outside of school are both positively associated with social internet use, whereas doing chores and reading books display negative associations. Compared with students who didn't hang out with friends outside of school, those who hung out with their friends for 1-3 hours per week spent 27 minutes longer each week chatting or emailing online, while those who did so more intensively (4+ hours) spent an hour and 18 minutes longer. A similar pattern exists for students who listened to music: while moderate listeners used the internet socially for 28 minutes per week more than non-listeners, this figure rose to an hour and 49 minutes for more intensive listeners. For those activities which reduced the amount of time spent using the internet socially, the intensity with which respondents engaged in these made little difference to their internet use. Students who read books for 1-3 hours and 4+ hours per week spent 32 minutes and 39 minutes longer online, respectively, than non-readers. Likewise, there were comparable decreases in social use for those who spent 1-3 hours or 4+ hours each week doing household chores. Introducing the time use orientation variables accounted for the negative effect of attending an Independent school and the positive effect of living with one parent. It halved the negative effect of not owning a mobile phone.

Lastly, Model 4 accounts for key differences between respondents who were in the core sample and those who were not. A variable flagging non-core sample members was included in this model, along with any significant interactions found between this variable and the other covariates. These measures, shown in italics, increased the total variance explained to 19.4%. While the descriptive results showed that non-core sample members spent longer using the internet socially, this increase was no longer significant in the full regression model with all other measures controlled for. The included interactions show that the effects for attending an Independent school, watching TV, and listening to music varied significantly between the two samples. Non-core sample members who attended an Independent school spent significantly longer chatting or emailing than core sample members who also attended an Independent school. Students who watched TV moderately or intensively and were not included in the core sample spent less time on social use than those who were included. Finally, the positive association between social use and listening to music for 4+ hours per week was stronger for core sample members than it was for non-core sample members.

Table 4.2: Time Spent Chatting/Emailing at Waves 1 to 3 - Core Sample (mins)

	Wave 1 (Grade 8)			Wave 2 (Grade 10)			Wave 3 (Grade 12)		
	b	SE	Mins	b	SE	Mins	b	SE	Mins
Socio-demographic									
Female	.71***	.14	+42	.40	.22	+24	-.28	.20	-17
School sector									
State school (Ref.)#	–	–	–	–	–	–	–	–	–
Independent School	-.48***	.15	-29	-.11	.24	-7	-.12	.27	-7
Catholic School	-.51**	.17	-31	-.38	.23	-23	.06	.25	+3
Geographic region									
Major city (Ref.)	–	–	–	–	–	–	–	–	–
Inner regional	-.08	.13	-5	-.83***	.22	-50	-.67**	.24	-40
Outer regional	-.13	.22	-8	-.93**	.32	-56	-1.43***	.33	-86
Remote or very remote	-.55	.34	-33	-2.05***	.45	-123	-1.60***	.47	-96
Access context									
Internet connection at home									
Broadband or ADSL (Ref.)	–	–	–	–	–	–	–	–	–
Dial-up access	-.86***	.13	-52	-.64***	.19	-38	-.23	.19	-14
No net access	-2.70***	.20	-162	-1.04*	.47	-62	-.68	.52	-41
Computer access at home									
Shared access (Ref.)	–	–	–	–	–	–	–	–	–
Exclusive computer access	.80***	.18	+48	.87***	.22	+52	.84**	.26	+50
Mobile phone ownership									
Owns mobile phone (Ref.)	–	–	–	–	–	–	–	–	–
Doesn't own mobile phone	-.47**	.16	-28	-.42*	.19	-25	-.33	.23	-20
Time use (None = Ref.)									
Hanging out with friends									
Moderate (1-3 hours)	.23	.19	+14	.56*	.28	+34	.34	.29	+20
Intensive (4+ hours)	1.23***	.21	+74	1.10***	.30	+66	.26	.28	+16
Doing household chores									
Moderate (1-3 hours)	-.85***	.24	-51	-1.04**	.32	-62	-.31	.31	-19
Intensive (4+ hours)	-.99***	.29	-59	-1.28***	.36	-77	-.38	.36	-23
Watching TV									
Intensive (4+ hours)	.83*	.40	+50	.69	.36	+41	1.24**	.46	+74
Listening to music									
Moderate (1-3 hours)	.36	.20	+22	.42	.27	+25	1.02***	.30	+61
Intensive (4+ hours)	1.39***	.22	+84	.92**	.28	+55	1.40***	.31	+84
Reading books									
Moderate (1-3 hours)	-.60***	.17	-36	-.62**	.21	-37	-.55*	.22	-33
Intensive (4+ hours)	-.71***	.17	-43	-.56**	.21	-34	-.38	.23	-23
Constant	2.76***	.66	+165	4.27***	.76	+256	4.60***	.93	+276
No. of obs.	2060			2060			2060		
Pseudo R2	.192			.087			.053		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^ Pseudo-R2 measure of variance explained in latent interval regression variable

Ref. = Omitted reference category

Social Internet Use throughout High School

Table 4.2 shows the results for social internet use when the full set of wave 1 explanatory variables (i.e. Model 3 from Table 4.1) is used to predict time use at waves 1, 2 and 3 for the core sample. Results are only shown for variables which were significant predictors of time use in the cross-sectional model. Although the cross-sectional model accounts for the main differences between core and non-core respondents, there are still minor differences between the wave 1 coefficients for the full sample (Model 4 in Table 4.1) and the core sample (first column of Table 4.2). For several predictors (e.g. living in a remote/very remote area, time spent hanging out with friends, and time spent listening to music) there were reductions to the significance of the observed effects. This is likely due to the overall decrease in sample size and the general inflation of standard errors arising from this. Otherwise, the full wave 1 results for both samples are largely comparable.

Columns 1 to 3 show that the explanatory model accounts for a decreasing amount of the variation in social internet use across survey waves. The model went from explaining 19.2% of the variation at wave 1, to 8.7% at wave 2, and then 5.3% at wave 3. Some of this decrease is likely due to the increased variability of respondents' online time use as they progressed through high school; it may also reflect the fact that respondents underwent contemporaneous changes on many of variables in the model between waves 1 to 3. While this analysis examines how a student's starting points on each of the covariates shaped their internet use over time when compared to other students, it does not account for individual-specific change on the covariates over time. For this reason, I supplement my interpretation of the results by examining trends over time in each predictor; this allows me to assess whether the sample's changing circumstances between waves 1 to 3 might help explain the observed relationships.

By the time they were in Grade 12, the influence of socio-demographic factors which had strongly shaped respondents' social use in Grade 8 appeared to diminish. For instance, at wave 2 time spent on social use was no longer significantly associated with being female. By wave 3, this association had reversed its direction; though still non-significant, it indicated that girls possibly spent less time chatting or emailing online than boys once they reached Grade 12. Similarly, by wave 2 the strong negative effect of attending an Independent or Catholic school at wave 1 was reduced and no longer significant. The proportion of students who moved school and changed to a different schooling sector between waves 1 and 3 was low enough (approximately 3%) to eliminate this as a possible explanation for the reduction.

At the same time, however, the influence of certain factors persisted over time, and in some cases became more pronounced. The case of geographic region provides an example of this. Like school sector, the region of a student's school remained constant between waves 1 to 3, as only 2% of respondents moved to schools in another area. In the cross-sectional model, the negative association between online time use and living in a regional or remote area was largely explained by differences in a student's access context. Yet at wave 2, the geographic remoteness of a student's school in wave 1 once again had a strong negative association with social use; in fact, the magnitude of this association was even greater than in the original baseline model before access variables were controlled for. The wave 2 time use of students living in an inner regional area at wave 1 was 50 minutes less per week on average than students living in major cities, a gap which reduced to around 40 minutes less at wave 3. By contrast, the wave 2 time use of those living in an outer regional area was 56 minutes less than their urban counter-parts, a gap which extended to 86 minutes by wave 3. Most strikingly, respondents living in a remote or very remote area at wave 1 were spending over 2 hours less per week chatting or emailing online at wave 2 than if they had been living in a major city; this decrease narrowed to an hour and a half by wave 3.

For social internet use, the cross-sectional analysis indicates that access context measures remained salient predictors of students' online time use at wave 1 after all other factors were accounted for. The longitudinal analysis shows the negative effect of lacking a fast home internet connection at wave 1 was still discernible at wave 2. That is, the wave 2 time use of students who only had dial-up access at wave 1 remained 38 minutes lower than it would have been if they'd had a broadband or ADSL connection at wave 1. This figure rose to an hour for those who during wave 1 had no internet access at all. Interestingly, the effects of poorer internet access persisted in spite of the fact that, by wave 2, three-quarters of all students who lacked broadband or ADSL in wave 1 reported having this connection installed at home. During wave 3, respondents were also asked if they were able to access the internet on their mobile phones. It was found that mobile internet access was more widely diffused amongst those who had dial-up access in previous waves than those who had broadband or ADSL, suggesting that this mobile access may be a substitute for the latter type of connection. As more respondents transitioned to broadband/ADSL and mobile internet, by wave 3 the negative effects of poorer internet access in wave 1 became non-significant .

By contrast, students who had exclusive access to a home computer at wave 1 still spent longer chatting or emailing at waves 2 and 3 than those who had been sharing their access with others. Unlike the transition to broadband or ADSL between waves 1 and 2, which was uni-directional in the sense that most students upgraded while very few downgraded, the transition

between shared and exclusive access went both ways. One-third of those who had been sharing in Grade 8 had acquired exclusive access by Grade 10, but around one-fifth of those who had exclusive access to begin with now shared with others by Grade 10. Similar to exclusivity of access, the difference in time use associated with not owning a mobile phone at wave 1 remained at wave 2, even though three-quarters of those without a phone at wave 1 had acquired one by wave 2. It took until wave 3, when mobile phone ownership was virtually universal, for the effects of lacking a phone at wave 1 to disappear.

This mixture of effect trajectories, with some diminishing and others persisting, was also observed for the time use orientation measures. Of all the time use activities, listening to music was the strongest predictor of social internet use at wave 1. Listening to music for 4+ hours a week during Grade 8 still predicted the same increase in time spent chatting and emailing (1 hour and 24 minutes) in Grade 12, relative to non-listeners. Meanwhile, those who spent just 1-3 hours a week on this activity in Grade 8 were online for an hour longer than non-listeners in Grade 12. Another positive influence on social use was the time a student spent hanging out with friends outside of school. This effect, which was more pronounced at wave 1 for those who socialised for 4+ hours a week, remained more or less unchanged at wave 2, but had diminished entirely by wave 3. The cross-sectional analysis had also shown that students who read books and did household chores spent less time chatting or emailing online than those who didn't do these activities. Interestingly, the effect of reading books for 1-3 hours per week at wave 1 persisted across waves, but the effect of reading for 4+ hours per week diminished. The magnitude of the effects for time spent doing chores in Grade 8 were increased slightly at wave 2, before they eventually dissipated. Across all waves, those who reported watching TV for 4+ hours a week at wave 1 spent longer online.

Viewing these trends against the backdrop of students' changing time use preferences helps to further illustrate the internet's growing role in their everyday lives during school. Respondents' broader time use tended to develop in ways that were conducive to social internet use. For instance, hanging out with friends became a more widespread activity. One-third of all students moved up at least one category on this variable whereas 16% moved down a category. Most of those who moved upwards were in 'None' category originally, while most who moved downwards had been in the '4+ hours' category. As the students who initially differed most in their social orientation became more similar over time, social orientation had a declining influence on the time they spent chatting or emailing online.

Table 4.3: Time Spent Studying Online at Wave 1 - Interval Regression w/ Full Sample

	Model 1			Model 2			Model 3			Model 4		
	b	SE	Mins	b	SE	Mins	b	SE	Mins	b	SE	Mins
Non-core sample member	–	–	–	–	–	–	–	–	–	.27***	.07	+16
Socio-demographic												
Female	.52***	.07	+31	.50***	.06	+30	.30***	.06	+18	.32***	.06	+19
School sector												
State school (Ref.)#	–	–	–	–	–	–	–	–	–	–	–	–
Independent School	.62***	.18	+37	.52**	.17	+31	.21	.15	+12	.20	.15	+12
Catholic School	.29*	.12	+18	.24	.12	+15	.07	.12	+4	.07	.12	+4
Geographic region												
Major city (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Inner regional	-.18	.16	-11	-.10	.15	-6	-.04	.13	-2	-.04	.13	-3
Outer regional	-.12	.19	-7	.02	.21	+1	.03	.19	+2	.02	.20	+1
Remote or very remote	.05	.19	+3	.25	.15	+15	.33*	.15	+20	.30*	.15	+18
Family living arrangement												
Lives with both parents (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Lives with one parent	-.24**	.09	-14	-.17	.09	-10	-.07	.08	-4	-.11	.09	-6
Other living arrangement	-.12	.09	-7	-.10	.09	-6	-.10	.09	-6	.20	.15	+12
*Non-core*Other liv. arr.*	–	–	–	–	–	–	–	–	–	*-.42***	*.16*	*-25*
Parental occupational prestige												
ANU4 score (0-100)	.00*	.00	+0	.00	.00	+0	-.00	.00	-0	-.00	.00	-0
Parental employment status												
Both parents employed (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
One parent employed	-.11	.06	-6	-.04	.06	-3	-.03	.06	-2	-.03	.06	-2
Neither parent employed	-.15	.13	-9	.01	.12	+1	.12	.12	+7	.11	.12	+7
Parental education status												
Postgraduate degree (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Bachelor's degree	-.26**	.10	-16	-.22*	.10	-13	-.13	.10	-8	-.13	.09	-8
Trade qual. or certificate	-.29**	.11	-18	-.22	.11	-13	-.16	.10	-10	-.17	.10	-10
Grade 12	-.51***	.11	-31	-.43***	.11	-26	-.26*	.10	-16	-.48***	.12	-29
*Non-core*Grade 12*	–	–	–	–	–	–	–	–	–	*.30**	*.14*	*+18*
Less than Grade 12	-.56***	.12	-33	-.43***	.12	-26	-.23*	0.1	-14	-.24*	.11	-15
Unknown or missing	-.44***	.11	-26	-.28**	.10	-17	-.06	.10	-4	-.08	.10	-5
Access context												
Internet connection at home												
Broadband or ADSL (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–

Dial-up access	–	–	–	-.35***	.07	-21	-.33***	.07	-20	-.11	.10	-7
*Non-core*Dial-up access*	–	–	–							-.*31***	*.12*	*-19*
No net access	–	–	–	-1.37***	.13	-82	-1.33***	.13	-80	-1.35***	.13	-81
Computer access at home												
Shared access (Ref.)	–	–	–	–	–	–	–	–	–	–	–	–
Exclusive access	–	–	–	.55***	.10	+33	.42***	.09	+25	.41***	.09	+25
No access	–	–	–	-0.12	.25	-7	-.12	.24	-7	-.15	.24	-9
Mobile phone ownership												
Owns mobile phone (Ref.)	–	–	–									
Doesn't own mobile phone	–	–	–	-.16*	.06	-10	-.17**	.06	-10	-.16**	.06	-10
Time use (None = Ref.)												
Doing homework												
Moderate (1-3 hours)	–	–	–	–	–	–	.83***	.11	+50	.83***	.11	+50
Intensive (4+ hours)	–	–	–	–	–	–	2.13***	.13	+128	2.14***	.13	+128
Hanging out with friends												
Moderate (1-3 hours)	–	–	–	–	–	–	.14	.08	+8	.14	.08	+8
Intensive (4+ hours)	–	–	–	–	–	–	.36***	.09	+22	.34***	.09	+20
Playing sport												
Moderate (1-3 hours)	–	–	–	–	–	–	-.00	.09	-0	-.02	.09	-1
Intensive (4+ hours)	–	–	–	–	–	–	.21*	.10	+12	.19	.10	+12
Doing household chores												
Moderate (1-3 hours)	–	–	–	–	–	–	.09	.08	+6	.09	.08	+6
Intensive (4+ hours)	–	–	–	–	–	–	.53***	.10	+32	.52***	.10	+31
Watching TV												
Moderate (1-3 hours)	–	–	–	–	–	–	-.07	.17	-4	-.08	.17	-5
Intensive (4+ hours)	–	–	–	–	–	–	-.02	.17	-1	-.01	.16	-1
Listening to music												
Moderate (1-3 hours)	–	–	–	–	–	–	.23*	.09	+14	.21*	.09	+13
Intensive (4+ hours)	–	–	–	–	–	–	.49***	.10	+29	.47***	.10	+28
Reading books												
Moderate (1-3 hours)	–	–	–	–	–	–	.14*	.06	+9	.15*	.06	+9
Intensive (4+ hours)	–	–	–	–	–	–	.35***	.09	+21	.38***	.09	+23
Constant	2.59***	.16	+156	2.70***	.17	+162	.58*	.27	+35	.42	.27	+25
No. of obs.	6545			6545			6545			6545		
Pseudo R2	.047			.085			.217			.221		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^ Pseudo-R2 measure of variance explained in latent interval regression variable

Ref. = Omitted reference category

Listening to music - the activity which most predicted social use - also became more widespread between waves 1 and 3. In this case, though, the proportion of students moving up at least one category (37%) was even greater than those who went down a category (10%). This meant that the relationship between social use and listening to music was mutually evolving; it persevered for those who started out as intensive listeners and became significant for moderate listeners who, over time, became more intensive listeners. Watching TV also predicted social use in wave 1, but this activity became less widespread as time went on. While 14% of all students moved up at least one category for this measure, one-third moved down a category. Yet around half of those who in either the 'None' category or the '4+ hours' category at wave 1 were still there at wave 3, which may explain why these two groups still differed significantly in their social internet use.

Meanwhile, the two activities negatively correlated with social use also became less popular during high school. There were fewer students doing chores at home or reading books for fun at the end of high school than there were at the beginning. On both measures, the students who moved down a category during school outnumbered those moving up a category. During wave 1, the effect for both these measures had reflected whether or not a student did these activities at all, rather than the amount of time they spent on them. Thus, the negative coefficient for doing chores may have diminished because most of those who had spent no time at all on this activity were spending at least some time on it by wave 3. Similarly, many non-readers also began reading books for fun by wave 3. However, moderate readers took diverging paths over time (32% became non-readers and 23% became intensive readers); as a result, any changes in this group's social internet use over time were most likely balanced out, allowing the original effect to persist.

Academic Internet Use at the Beginning of High School

Model 1 (Table 4.3) regresses time spent using the internet for homework at wave 1 on the socio-demographic variables. It accounts for 4.7% of the total variation in time use, with gender, school sector, family living arrangement, and parental education all displaying strong associations. Females study online for an average of 31 minutes per week longer than males. Compared with students in State schools, Independent and Catholic school students report studying online for 37 minutes and 18 minutes longer per week respectively. A student living with one parent averages 14 minutes less per week studying online than if they lived with both parents. Each 10 point increase in father's occupational prestige meant a student spent 3 minutes longer studying online. Having a parent with a postgraduate degree meant that a student spent longer online than if their parent had any education level; the increase was 17 minutes for children of parents with post-school education, rising to half an hour for children whose parents' education had not progressed beyond Grade 12.

Model 2 includes measures of access context and the total variance explained rises to 8.5%. Though strong, the effects for connection type, exclusivity of access and mobile ownership, are not as influential as they were for social use. Relative to those with broadband or ADSL access, students with dial-up spent 21 minutes per week less studying online, and those with no home access spent an hour and 22 minutes per week less. Having exclusive rather than shared access means students spend 33 minutes more studying online per week, and those without a mobile phone spent 10 minutes less per week than those who owned one. Including access measures accounts for the effects for attending a Catholic school, living with one parent, and parental occupation, whilst reducing some of the effects for parental education.

The time use measures explain more of the variance for academic use than they did for social use. In Model 3, the academic orientation variable (time spent doing homework) increased the total variance explained to 19% (R^2 not shown) and with the inclusion of all other time use measures it rose slightly to 21.7%. The more intensively a student does homework offline, the more time they also spent studying online. In contrast to students who spent no time studying offline, those who spent a moderate amount of time studying offline spent 50 minutes longer using the internet for homework, whilst those who studied more intensively spent 2 hours and 8 minutes longer. Academic use also rose as the student spent more time reading books or listening to music. Surprisingly, students who hung out with friends outside of school also spent longer studying online than those who didn't, as did those who were spent 4+ hours helping with chores. Controlling for these time use measures negated the effects of school sector and reduced the effect of being female. The positive coefficient for living in a remote area, and not a major city, also became significant.

When the significant interactions with non-core sample membership are included in Model 4, the overall variance accounted for increases to 22.1%. The descriptive analysis showed that core and non-core respondents spent the same amount of time studying online; once all explanatory variables and significant interactions have been added to the cross-sectional analysis, the results show that students included in the core sample actually averaged 16 minutes less studying online per week than those not included. Several effects also varied significantly depending on whether or not the respondent was part of the core analytic sample. Non-core sample members in the 'Other living arrangement' category spent less time studying online student living with both parents, whereas core sample members did not experience this decrease. Similarly, the negative effect of having dial-up rather than broadband at wave 1 only applied to non-core sample students. Finally, the negative correlation between academic use and having parents' with a Grade 12 level of education was much stronger for respondents included the core sample than those not included.

Table 4.4: Time Spent Studying Online at Waves 1 to 3 - Core Sample (mins)

	Wave 1 (Grade 8)			Wave 2 (Grade 10)			Wave 3 (Grade 12)		
	b	SE	Mins	b	SE	Mins	b	SE	Mins
Socio-demographic									
Female	.28**	.09	+17	.62***	.14	+37	.84***	.18	+50
School sector									
State school (Ref.)#	–	–	–	–	–	–	–	–	–
Independent School	.17	.17	+10	.44*	.21	+26	.79***	.24	+48
Catholic School	-.04	.14	-3	.30	.19	+18	.79**	.26	+48
Parental education status									
Postgraduate degree (Ref.)	–	–	–	–	–	–	–	–	–
Grade 12	-.56***	.16	-34	.02	.21	+1	.14	.28	+8
Access context									
Internet connection at home									
Broadband or ADSL (Ref.)	–	–	–	–	–	–	–	–	–
No net access	-1.39***	.24	-83	-.05	.31	-3	-.03	.36	-2
Computer access at home									
Shared access (Ref.)	–	–	–	–	–	–	–	–	–
Exclusive computer access	.59***	.14	+35	.56***	.16	+33	.24	.19	+15
Mobile phone ownership									
Owns mobile phone (Ref.)	–	–	–	–	–	–	–	–	–
Doesn't own mobile phone	-.26**	.10	-16	-.12	.11	-7	-.14	.17	-9
Time use (None = Ref.)									
Doing homework									
Moderate (1-3 hours)	.67***	.19	+40	.85***	.24	+51	.58	.35	+35
Intensive (4+ hours)	1.88***	.20	+113	1.63***	.25	+98	1.70***	.36	+102
Hanging out with friends									
Intensive (4+ hours)	.29*	.14	+17	-.07	.17	-4	-.01	.25	-1
Doing household chores									
Intensive (4+ hours)	.65***	.16	+39	.43	.22	+26	.61*	.26	+36
Listening to music									
Moderate (1-3 hours)	.30*	.15	+18	.09	0.1	+6	.05	.28	+3
Intensive (4+ hours)	.46**	.16	+27	.10	.20	+6	.13	.29	+8
Reading books									
Moderate (1-3 hours)	.14	.12	+8	.31*	.14	+19	.26	.17	+16
Intensive (4+ hours)	.32**	.12	+19	.56***	.13	+34	.60***	.16	+36
Constant	.71	.50	+43	.65	.60	+39	1.26	.75	+75
No. of obs.	2060			2060			2060		
Pseudo R2	.219			.120			.107		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^ Pseudo-R2 measure of variance explained in latent interval regression variable

Ref. = Omitted reference category

Academic Internet Use throughout High School

Table 4.4 displays the influence of key predictors of academic internet use for the core sample at waves 1, 2 and 3. While most differences between core and non-core respondents were addressed in the cross-sectional analysis, the wave 1 coefficients for the full sample (Model 4 in Table 4.3) and the core sample (the first column of Table 4.2) still vary slightly. With the decrease in sample size from full sample to the core sample, several marginally significant effects (e.g. living in a remote area, parental education at less than Grade 12 level, and reading for 1-3 hours per week) became non-significant. Apart from this, the two samples displayed very similar results for wave 1.

For waves 2 and 3, the full explanatory model (Model 3) continues to account for more of the total variation in academic internet use than it did for social use during these waves. At wave 2 it explained 12% of the variation, and by wave 3 it still accounted for 10.7%. This may reflect the fact that, over time, the total variation in students' academic use did not increase as much as the total variation in their social use. As was the case with social use, some of the wave 1 effects observed in the cross-sectional model declined in subsequent waves, whilst others appeared to persist or even strengthen. Yet unlike social use, where the effects for gender and school sector diminished over time, for academic use these increased in later waves. Net of all other factors at wave 1, girls spent 16 minutes longer per week studying online than boys; by wave 2, this figure had risen to 37 minutes per week, and by wave 3 girls were now spending 50 minutes longer per week online than boys.

In the cross-sectional analysis, attending an Independent or Catholic school, rather than a State school, increased the average time a student spent using the internet for homework. However, this effect was explained when other time use measures - in particular, the time a student spent studying offline - were taken into account. As noted previously, school sector remained largely constant across waves 1 and 3. During this time, the positive influence of private schooling resurfaced. Having attended an Independent school, rather than a State school, predicts a moderately significant increase in a student's academic internet use at wave 2. Yet by wave 3, attending either an Independent and Catholic school meant a student spent even longer studying online (around 50 minutes per week) than those attending State schools.

In wave 1, a student's access context had more of an effect on their social internet use than it did on their academic use. The longitudinal analysis shows that a student's home internet connection type and their mobile phone ownership at wave 1 had no impact on the time they spent studying online beyond wave 1. Having a mobile phone and a faster internet connection ahead of

one's peers did not mean that a student spent any more time on academic use in later waves, compared to those peers. Students who had exclusive access to a home computer at wave 1 continued to spend longer using the internet for academic purposes at wave 2 than if they had been sharing that access, but by wave 3 this effect had also diminished. These trends may be attributed to the improvements in access highlighted earlier; yet the effects of initial disparities on these measures were much quicker to recede for academic use than they were for social use.

The measure which impacted most on academic internet use in the cross-sectional model was the time a student spent studying offline. Compared with users who didn't study at all, those who studied intensively at wave 1 were still using the internet academically for over an hour and a half per week longer per week at waves 2 and 3. Studying moderately, rather than not at all, at wave 1 also meant that a student's academic internet use was 51 minutes higher at wave 2; however, it made no significant difference to their time use at wave 3. Reading books and doing chores during wave 1 both predicted time spent studying online in later waves, while the positive effects of hanging out with friends and listening to music diminished in subsequent waves. The proportion of students who spent any amount of time doing homework decreased slightly during high school, but those who kept doing their homework over time spent an increasing amount of time on this activity. Overall, 26% of all students moved up at least one category of this variable, and 15% moved down a category. Where the majority of the increase was amongst those who were in the 'None' group in wave 1, the decrease was mostly amongst the '1-3 hours' group. As such, the effect for this more moderate group diminished, while the effect for the more intensive group was preserved.

Changes in respondents' other time use preferences were less conducive to academic use than they were to social use. As noted previously, students generally spent decreasing amounts of time reading books for fun and doing household - two activities that were positively correlated with online study in Grade 8. Unlike their effects for social internet use, the effects these activities had on academic use grew stronger as a student spent more time on them. This meant that even though the overall amount of time spent reading books and doing chores decreased, the effects of being in the more intensive category for these activities in wave 1 were preserved. Finally, even though listening to music and hanging out with friends both took up more of a student's time as they got older, the relationship between these activities and academic use ceased after wave 1. For the latter activity, this is consistent with the finding that, over time, students became more similar in the amount of time they spent hanging out with friends. In the case of listening to music, the original effects for this measure largely reflected a contrast between listeners and non-listeners. Very few students spent no time at all listening to music after wave 2, which is when this effect disappeared.

Discussion

The analysis presented in this chapter focuses on my first research question:

RQ1: What factors are important in accounting for differences in the time young people spend online at the start of high school, and are these influences temporary or longer-lasting?

The results show that, as they began Grade 8, more students engaged in academic internet use (i.e. homework) than social use (i.e. chat or email). By the end of school, participation in both social and academic use was near universal. Having begun earlier, the diffusion of academic use peaked during Grade 10, whereas for social use it took until Grade 12 to reach this point. This finding, consistent with national data for this age group, supports the view that school-sanctioned internet use spreads amongst adolescents ahead of other forms of use (Kalmus et al, 2009). Yet from Grade 8 through until Grade 12, students spent more time each week using the internet socially than they did academically. The finding that social use is more time-intensive illustrates the open-ended nature of social users' engagement with the internet. For even the most academically-driven student, using the internet for homework remains, by contrast, a more finite and task-orientated activity. Earlier I outlined three sets of hypotheses explaining why young people differ in the time they spend on these activities. I now review the support for each of these in turn.

(1) Digital Natives hypotheses

DN (1a): *Online time use will positively correlate with access to technological resources.*

There was support for the first premise of the Digital Natives approach. Having fast, exclusive internet access at home was positively correlated with both online activities. However, it impacted more on the time students spent chatting or emailing than the time they spent studying. When using the internet to communicate with friends, students required more time and greater privacy than when they used it to search for information. If students lack the means to engage in academic internet use at home they are likely able to do so at school; yet school restrictions on non-academic internet use impede those who want to engage in social use but lack the resources and autonomy to do so at home (Notley, 2009). Possessing a mobile phone in Grade 8 was also more strongly associated with social use than academic use. As with the other access measures, mobile phone ownership is contingent on a negotiation process between parents and their children over the allocation and use of such resources (Ling & Yttri, 2006). On the one hand, it signals parents' approval - tacit or otherwise - of their child's communication behaviours. On the other, it indicates the child's propensity to actively seek out and use such technology, and if needed, to articulate a case for better access and fewer restrictions on their use. While parental strictness regarding

technological resources potentially constrains young people in their social internet use, this may be offset if they can demonstrate that such access is needed for educational purposes, or in the case of mobile phones, so that they can be contacted by their parents (Horst, 2010). The technological expertise of children relative to their parents, and how each party perceives the risks and benefits of internet use, is likely to affect the allocation and use of technological resources within the household (Haddon, 2004). For instance, parents with more experience using the internet usually take on a more active role in mediating their children's use (Livingstone & Bober, 2006). While the measures employed here provide an overview of access-related barriers facing young people, the qualitative analysis in Chapter 6 explores these dynamics in more detail.

> ***DN (1b):*** *As access to technological resources becomes more widespread, socio-demographic differences in online time use will diminish.*

Unsurprisingly, given the more access-intensive nature of social internet use, students from regional and remote areas with poorer access spent less time on this activity. The Digital Natives approach conceptualises these differences as temporary, predicting that they will disappear once access disparities are resolved (Compaine, 2001; Rogers, 2001). However, the results show the negative effects of access-related barriers in general were still evident for social use for some time after most students had actually overcome such barriers. This suggests that earlier adopters, who experience a period of greater access and autonomy than their peers, develop attributes during this time which differentiate them from later adopters in the longer-run. For instance, earlier social users may be more likely to expand and intensify their use over time, having learnt to manage the increased time costs and benefits of this more open-ended form of use.

Contrary to the Digital Natives approach, the social internet use of students from regional and remote areas remained consistently lower than those in major cities, even after internet access and its use for chat and email was widely diffused. In part, access gaps between urban and rural Australia reflect supply-side factors such as poorer availability and affordability of internet services (Curtin, 2001). Yet these are compounded by demand-side factors, ranging from the demographic composition of regional and remote areas, to parents' unfamiliarity with internet use, and children's disinterest in prosecuting the case for their access (ACMA, 2007; Whitacre, 2010). One result of these barriers was that, in terms of their social use, regional and remote students left high school much further behind their urban counterparts then when they began six years earlier.

> ***DN (1c):*** *As particular modes of use become more widespread, socio-demographic differences in online time use will diminish.*

There was mixed support for the Digital Natives approach as it pertains to particular forms of use. In Grade 8, when social internet use was less widely diffused, females and State school students were spending longer than males and private school students on this activity. By Grade 12, all but a small minority of students were spending time chatting and emailing online. As predicted, these socio-demographic differences had diminished by this later stage of diffusion. It is possible that students in these groups underwent changes on other measures in the analysis which were not controlled for in later waves, which account for these diminishing effects. None of the other factors in the explanatory model were able to explain these effects during wave 1, and most socio-demographic measures remained relatively constant across waves.

The case of academic internet use provided less support for this hypothesis. As noted earlier, it only took until Grade 10 for most students to have begun using the internet academically. While initial differences with respect to parent's education had disappeared by this stage, there was an intensification, rather than a reduction, in the effects for gender and school sector over time. Since these differences were associated with a user's academic orientation during wave 1, this has implications for the Digital Connoisseurs hypotheses which are examined in the next section.

(2) Digital Connoisseurs hypotheses

> ***DC (2a):*** *Students who are more strongly orientated towards academic or social activities offline (e.g. doing homework or hanging out with friends) will spend more time doing these things online (e.g. stratification), or;*
>
> ***DC (2b):*** *Students who are less strongly orientated towards academic or social activities offline (e.g. doing homework or hanging out with friends) will spend more time doing these things online (e.g. compensation).*

On this note, the findings were more consistent with (2a) rather than with (2b). Academic internet use required less of students in terms of their time and their access to technological resources, but it was more dependent on their academic motivation. One reason for this might be that more scholarly students were able to make efficient and productive use of the time they spent studying online, and experienced a more tangible benefit as a result. It may also be that participation in this activity demonstrates a status-specific preference which attracts broader social and cultural rewards (Bourdieu, 1986; Hargittai, 2008). These are factors which may tip the time costs and benefits of online study in favor of academically-orientated students, reinforcing their perceptions of its value and of their own self-efficacy.

Using the internet for chat and email was influenced by a student's broader social orientation, but to a much lesser degree. If particular norms encouraged students to view academic use as an educational necessity, it is unclear whether an equivalent mechanism compels young

people towards social use. Although young people's personal relationships are largely in formation at this age, the positive relationship between face-to-face interaction and social internet use suggest that peer networks, and the value they place on maintaining social ties, may play a role. Nonetheless, a student's social use was shaped more by their access to technological resources than their engagement with peers. Therefore, while academic use in Grade 8 may be seen as an educational necessity, social use in Grade 8 may be driven less by a user's intrinsic social motivation and more by their propensity to use technology - an openness to 'messing around' with its various applications, and a willingness to find the time and resources needed for this experimentation (Horst, 2010). To the extent that this technological orientation encourages social internet use amongst students who were not particularly social to begin with, this would be more consistent with the compensation hypothesis. The role of norms surrounding internet use during adolescence is examined further in the qualitative analysis for Chapter 6.

> ***DC (2c):*** *This relationship will mediate socio-demographic influences on students' internet use, even after the type of use in question is widely diffused.*

In line with the Digital Connoisseurs approach, students' preferences for academic use were clearly aligned with their parents' highest level of education. Parent's values about education, and the extent to which these are validated by teachers and the schooling system more generally, may therefore affect the messages students receive about which kinds of internet use are appropriate (Cranmer, 2006). Having a stronger academic orientation was also the main reason why Independent and Catholic school students spent longer than State school students using the internet for study, and it partially explained why female students spent longer in online study each week than male students. These students may be uniquely positioned to benefit from academic internet use as a result of their cultural resources and dispositions. Trends in academic use over time appeared to support this view, showing that differences of gender and school sector became more entrenched over the course of high school. State school students, and to a lesser extent male students, displayed a weaker academic motivation during Grade 8; as they progressed through school, their academic use fell further behind that of female students and those who attended Independent or Catholic schools.

(3) Digital Explorers hypotheses

> ***DE (3a):*** *Activities which can be combined with a mode of internet use will be positively correlated with that mode of use, while activities which clash will be negatively correlated.*

There was no sign that students struggled to integrate their academic use with any of the other activities examined. In fact, the more they studied online, the more they socialised outside of

school, helped out with chores at home, and consumed culture by listening to music and reading books for fun. Yet with the exception of listening to music, these activities are not easy to combine with online study. Rather, the positive correlations for these activities suggest that students who spent time on this more finite, task-dependent activity were actively involved in diverse spheres of everyday life in Grade 8. This is less consistent with the multitasking predicted in (3a), and more indicative of higher social and cultural capital, in line with the Digital Connoisseurs approach.

By comparison, social use was an open-ended activity that conflicted more with a students' time use preferences. This was especially the case if an activity could not be easily done concurrently with chat or email. For instance, students who socialised online were less likely to spend time reading books or doing chores at home, but more likely to listen to music. The time-intensive nature of social use means that it competes for more of a student's time each day, thereby creating more of an incentive to multitask. One consequence of this may be that social users, more so than academic users, need to continuously evaluate the time costs and benefits associated with their use. For social use, activities which take students away from their computers, or which interrupt the flow of an online conversation, have a higher time cost; activities which do not share these characteristics and which can be combined easily with social use, have a greater benefit in terms of time saved (Kenyon, 2008). This is consistent with the Digital Explorers approach and the rational evaluation of costs and benefits to which the idea of structuration refers (Giddens, 1984).

> ***DE (3b):*** *Students time use behaviours will change in ways that reduce clashes and increase compatibility between offline and online activities.*

As their social internet use increased, it pressed students to find the extra time it required; this amplified the benefits of doing things that were compatible with such use, as well as the costs of incompatible activities. Consistent with (3b), students' broader time use practices changed in ways that reduced the costs and increased the benefits of social use. With the exception of watching television, if social use was positively associated with an activity, the average time students spent on that activity increased during school; but if the activity clashed with social use, then students generally left school spending less time on that activity than when they began. Positive influences on social use in Grade 8, such as listening to music, watching TV and hanging out with friends, all continued to predict with higher use in Grade 12, whereas the impact of negatively correlated practices, like doing chores and reading books, faded over time.

Factor analysis shows how the overall composition of students' time use practices changed. In wave 1, there tended to be three groups of students: (A1) those who studied, read books for fun

and did chores; (A2) those who hung out with friends, listened to music and watched TV; and (A3) those who played sport, but also did a mixture of other activities. By wave 3, these activities grouped together differently: there were those who (B1) listened to music, read books, and did chores; (B2) those who either studied on the one hand, or socialised and watched TV on the other; and (B3) those who still combined various activities with sport. As students got older and spent more time studying and socialising, these two activities became distinct from the other things going on in students' lives, but also more inconsistent with one another. The fact that students increasingly used the internet for both of these purposes during school may have been one way for students to resolve this tension. Throughout school, there was a small but positive correlation between academic and social internet use; while it became more unrealistic for students to both study and hang out with their friends offline, online it was still possible for them to do so.

If a student's social internet use was exclusively motivated by a desire to connect with their friends, such a possibility might not have existed - the costs of study time interfering with social interaction might have outweighed the benefits. However, as noted earlier, social use was more heavily influenced by a propensity to use technology, than by social orientation. Social users needed to find the time and resources to engage in internet use. Activities that could be combined with online chat and email, like listening to music, became more popular, whereas activities which clashed became less popular; but if students could not do away with incompatible activities, like doing homework, they could at least do them online. Doing homework was the only predictor of online study that students spent more time on as they got older, and its influence persisted strongly throughout school. As the physical separation between students' social and academic pursuits disappeared online, it may be that students relied on more on their intrinsic academic motivation to ensure the time they spent studying was uncontaminated by competing time uses.

Conclusion

This chapter has investigated differences in the time students spent on social and academic internet use during high school, and the reasons for these. There was limited support for the Digital Natives approach, which suggests that as internet access and use becomes widespread, variation in terms of online time use and its general effects would decrease (Compaine, 2001; Rogers, 2001). Nonetheless, the role of access remained prominent for students from regional and remote areas. These individuals were insulated from the effects of social internet use by their poorer access: this meant that they were unlikely to experience the same displacement effects as social users living in urban areas, yet it also meant they lacked this avenue for social interaction outside of school. Without experiencing such effects it may be difficult for these students to integrate internet use into

their lives in a broader, more open-ended manner, and to develop strategies, such as multitasking, to assist in this process.

There was stronger support for the Digital Connoisseurs approach, which suggests that the time costs and benefits of internet use remain more favorable for those with existing advantages, even after internet access and use is widely diffused (Bourdieu, 1986; Hargittai, 2008). In particular, females, private school students, and those with better educated parents spent longer studying online during high school, at least in part because of their stronger academic motivation. This suggests time spent on academic use may be more capital-enhancing for these students, either because it is used more efficiently, or because it conforms to status-specific tastes that attract broader social and cultural rewards. Yet if children only learn to comply with approved academic use, this may disadvantage them in circumstances where different norms apply, and their usual patterns of use attract new risks and rewards.

Finally, social internet use was more consistent with the Digital Explorers approach, which suggests that the costs and benefits of online time use vary depending on a one's broader time use commitments (Giddens, 1986; Kenyon, 2008). As they got older, social users who engaged in this more open-ended activity required more autonomy of use, and greater flexibility in how they spent their overall time. This may have contributed to improvements in their access situation and changes in their broader time use which were more conducive to social internet use. Social users have more incentive to capitalise on the multitasking potential of internet use; yet to do so effectively, they need an awareness of which offline and online activities are compatible, and which are not. Some students were constrained in their choices about how to spend time online - as evidenced by the effect of poorer access for online chat and email, and weaker academic orientation for online study. Nonetheless, most students gradually learned to use the internet to more reflexively manage their competing academic and social commitments.

In the next chapter, I build on the findings highlighted here by examining how differences in online time use impacted on respondents' broader development as internet users, in terms of their confidence as users, and the overall breadth and frequency of their engagement with the internet. Then, in Chapter 6 I explore how they influence outcomes of a more qualitative nature; focusing on users who varied greatly on these two dimensions of use at the start of high school, I explore differences in how they perceive internet use in the year after school.

Chapter 5 - Class Dismissed:

Internet Engagement at the End of High School

Introduction

In this chapter I examine differences in young people's engagement with the internet at the end of high school and the reasons for these. The final year of compulsory schooling is a period in which young people face major decisions about their future pathways through employment, tertiary education, social relationships and family life. For some students, internet use can be a source of empowerment during the post-school transition, enabling them to make more informed career decisions, to form new relationships and to maintain existing ones, to better manage their finances, to keep up with news and to cultivate interests and hobbies. Yet such benefits are likely to depend on how deeply and broadly internet use is embedded in their daily routines. It may well be that those without the resources, skills, and orientations needed for this integration may be disadvantaged as a result. The analysis for this chapter focuses on the following research question:

RQ2: What factors are important in accounting for differences in the breadth and frequency of young people's engagement with the internet at the end of high school?

To address this question, I analyse how the socio-demographic characteristics, access contexts, and time use orientations of students in their first year of high school (Grade 8, aged 12-13) influence the confidence and extent of their internet engagement prior to leaving high school (Grade 12, aged 16/17). Additionally, this analysis will build on the previous chapter by examining whether developments in students' online time use between Grade 8 and Grade 12 affect their chances of becoming confident and highly engaged internet users during the post-school transition.

Table 5.1: Persons aged 15-17, activities performed on the internet at home - in the previous 12 months, 2010-11

Activity	%
Social networking and online gaming	88
Research, news and general browsing	85
Listening to music or watching videos or movies online	83
Emailing	79
Educational purposes	78
Downloading videos, movies or music	65
Creating online content	54
Buying or selling goods or services	24
Accessing government services	23
Voice or video calls over the internet	22
Paying bills online or online banking	15

Source: ABS, 2011.

Background

The ABS data presented in Table 5.1 ranks various common internet uses in order of their popularity with young Australians who were aged 15-17 in 2010-11. It shows that basic social, informational, and recreational uses were the most popular activities, whilst shopping and banking online, accessing government services, and making voice or video calls were the least widespread. This is consistent with Livingstone and Helsper's (2007) portrayal of the staged process by which young people go online. They identify information-seeking, games, and email as activities which most adolescents do online when they first start using the internet; then, as users grow older and more experienced, they branch out into more sophisticated, interactive, and frequent forms of use.

These data suggest that the least widely diffused activities have certain barriers to entry. For instance, the main reasons users in this age group gave for not purchasing goods and services online were that they had no need, did not have a credit card, or could not afford it (ABS, 2011). In other words, participation in online shopping emphasises aspects of a user's orientation (e.g. their need to purchase a product or service online) and access to resources (e.g. financial resources), which even the most savvy young internet users may lack until they are older and more financially independent. Other less widespread uses, such as making voice or video calls online, may be distinguished from activities with similar functions (e.g. social networking or email), by their increased requirements in terms of bandwidth, autonomy (from parental restrictions), and experience (in reducing exposure to unwanted contact), as well as the spatio-temporal obligations of having to schedule an interaction and be physically present for its duration.

In Chapter 2, I outlined research suggesting that broad and frequent internet users experience a wider range of online opportunities and risks. These users consistently demonstrate (i.e. on a daily basis) their capacity to engage in online activities which have a broader range of requirements in terms of resources, orientations and skills. The available evidence suggests that this capacity to engage in diverse and frequent use is unevenly distributed, both within the broader population and amongst young people. For instance, men have been found to make broader and more frequent use of the internet than women (Livingstone & Helsper, 2010; Ono & Zavodny, 2003; Wei, 2012), though such gender differences are also closely related to age. Livingstone and Helsper (2007) find that boys use the internet more narrowly than girls at a younger age (9-15 years), but become broader users than girls by an older age (16-19 years). Examining the breadth of use across the life course, Helsper (2010) finds that these gender differences were smallest for the adolescents aged 14-17 (the youngest age group examined) and that these widened with age; meanwhile, a curvilinear relationship was found to exist between breadth of use and life stage, with

the average number of online activities not reaching its highest point until users were aged 25-34. This suggests that internet use becomes more fully embedded in an individual's lifestyle as they themselves become more active participants in the economic, social, cultural spheres of social life. Consistent with this, Lee (2008) reported that young people from higher socio-economic groups used the internet daily for both schoolwork and leisure, whereas those in lower socioeconomic groups used it only weekly during their IT class. Witte and Mannon (2010) explored the relationship between internet use and class position by examining participation in online activities for the purposes of information/communication and production/consumption. They found that American adults' participation on each of these dimensions rose with education and family income level, with the largest increases for activities that focused on consumption and information (e.g. product research, online shopping), as well as productive uses such as using the internet for work, and communication uses such as email. Amongst adolescents in the UK there is evidence that those from working class backgrounds were more likely to be non-users or occasional users, attributing their low use to lack of interest or difficulties of access, whereas the broadest and most regular users were predominantly from middle-class homes with better quality access (Livingstone & Helsper, 2007). In the Australian context, Newman et al (2010) has found that people in low-income and disadvantaged groups often have access to ICTs but make limited and infrequent use of them, because they had no reason or opportunity to do so.

Two intervening factors in particular may help to account for such differences in youth internet engagement at the end of school: a user's self-efficacy (Eastin & LaRose, 2000; Livingstone & Helsper, 2010; Zhao et al, 2011) and changes in their patterns of online time use (see Chapter 4). Using the explanatory approaches reviewed in Chapter 2, and insights gained from the previous chapter, I now propose several hypotheses for explaining why differences in internet engagement arise: (1) technology-driven engagement; (2) legitimate and capital-enhancing engagement; and (3) reflexive and exploratory engagement.

The Digital Natives Approach: Technology-Driven Engagement

During the diffusion process, the perceptions individuals have about a technology's attributes help to explain their acceptance and continued use of that technology. Perceptions about a technology's complexity and its relative advantages over preceding innovations (Rogers, 2003), or according to Davis (1989), its usefulness and ease-of-use, may be critical during this time. Users with positive expectations about internet use and prior internet use experience have higher levels of confidence in their online abilities (Eastin & LaRose, 2000); confident users, in turn, are also broader and more frequent users (Livingstone & Helsper, 2010).

Yet contrary to their portrayal as tech-savvy 'digital natives' (Prensky, 2001), young people vary in their online skills and self-efficacy. Female users tend to rate their online abilities less favorably than male users, despite mixed evidence as to whether they differ from males in their actual skill level (Hargittai & Shafer, 2006; van Deursen et al, 2011). Children from lower SES families also have lower confidence in their skills (Vekiri, 2010; Zhong, 2010), less parental mediation of their internet use, and increased exposure to online risks (Hasebrink et al, 2009). There is evidence to suggest that these socio-demographic differences in internet self-efficacy may ultimately be a function of how long a person has had internet access and the quality of that access. If so, this would suggest that as internet access becomes increasingly commonplace, variation in internet self-efficacy will decrease over time; as a result young people will generally differ less in the breadth and frequency of their internet use. Since internet self-efficacy and engagement are only measured in wave 3 of the Our Lives study, it is not possible to assess whether variation in these measures does diminish over time; however, by examining prior influences on these outcomes, this analysis tests a key component of the Digital Natives approach. Students who have already had access to high quality technological resources when they began high school should be more confident and highly engaged users at the end of school than those who had poorer access at that stage. The Digital Natives hypotheses can be summarised as follows:

> ***(1) Digital Natives (DN):*** *Young people's level of internet engagement will depend on how long they have had access to technological resources and the quality of that access.*
>
> ***DN (1a):*** *Students with better access in wave 1 will end up more confident and highly engaged users in wave 3.*
>
> ***DN (1b):*** *Controlling for differences in access context will help explain socio-demographic differences in internet self-efficacy and overall internet engagement score.*

The Digital Connoisseurs Approach: Legitimate and Capital-Enhancing Engagement

As young people begin to engage in internet use, the initial perceptions and experiences they have of what the internet can be used may be critical in shaping the trajectory of their use over time. Yet contrary to diffusion theory, the Digital Connoisseurs approach suggests that users of varying social position are not neutral in their orientation towards that technology to begin with. During this time, those with prior advantages will prefer to use the internet in ways that reproduce these advantages (Bourdieu, 1986; Hargittai, 2008); since their initial experiences of internet use are more rewarding, this helps them to develop the confidence required for broader and more frequent use.

Accordingly, the Digital Connoisseurs approach predicts that young people who are already more active participants in the economic, social and cultural spheres of everyday life may be more

favorably disposed towards internet use, because of its capacity to enhance and extend their participation in various ways. As argued in the previous chapter, internet use can displace time spent on other activities, but if managed effectively, it may also allow users to save time. The same logic can be applied to the other inputs involved in an individual's internet use, to explain why users undertaking the same online activity might experience differing outcomes, and why they might form contrasting perceptions of that activity, and of internet use more generally. Users can be expected to display tastes for online activities with the clearest potential to maximise the economic, social, and cultural capital to which they already have access (Zillien & Hargittai, 2009).

Better educated and higher status users tend to engage more in informational uses such online news and political information, economic or financial information and research about products, as well as travel information (Zillien & Hargittai, 2009; Witte & Mannon, 2010). Consistent with the knowledge gap hypothesis, Bonfadelli (2002) argues that this is because they have the prior topic-specific interest and cognitive frames needed to benefit from such use. Males and higher income users engage in more online banking and shopping, activities which require both financial resources and a higher level of comfort in using the internet (Lambrect & Seim, 2006; Witte & Mannon, 2010; van Dijk, 2006). Meanwhile, lower status users are thought to be distinguished from higher status users by their propensity to engage in recreational uses which require a surplus of leisure time and have less clear potential for capital enhancement (Goldfarb & Prince, 2008; López-Sintas et al, 2012). There is also evidence that certain uses are more gendered than others. For instance, females tend to invest more time in maintaining social ties through communication, and accordingly may experience more of a benefit in terms of bonding social capital from activities like social networking (Boneva et al, 2001; Hargittai & Hsieh, 2010). Women are also more likely to use the internet for health information (Dobransky & Hargittai, 2011). Entertainment-orientated uses, such as watching videos and playing games, are more popular with by young males (Peter & Valkenburg, 2006).

This analysis focuses on the role of two activities - using the internet to help with homework, and to email and chat with friends - in the process of youth internet engagement. Examined in the previous chapter, these were the two most popular activities undertaken by young people beginning high school in 2006 (ACMA, 2007); as such, participation in these activities is likely to influence respondents initial experiences of internet use, thereby affecting their confidence and overall engagement with the internet in later years. Female users and more academically motivated private school students spend more time on educational use; consistent with the Digital Connoisseurs approach, these users are more likely to benefit from such use in terms of academic

achievement (Thiessen & Looker, 2007). Accordingly, those who prefer academic use ahead of other forms of use at an early age may be rewarded in ways which encourage greater self-efficacy and engagement with this medium. By contrast, social internet use entails a greater time cost, and is more likely to conflict with academic use and with parental and school-based norms encouraging such use. Moreover, the relationship between social status and chat or email is more ambiguous than it is for academic use. This suggests that a preference for social internet use is less likely to be rewarded in ways that engender users' confidence and willingness to broaden their use over time. This Digital Connoisseurs hypothesis can be stated as follows:

> ***(2) Digital Connoisseurs (DC) approach**: Young people with existing advantages will make more effective and capital-enhancing use of the internet early on, enabling them to develop the confidence needed for broader and more frequent use.*
>
> ***(DC - 2a):** Time spent on school-sanctioned (i.e. academic) internet use during school will be more strongly correlated with internet self-efficacy and engagement than time spent on non-school-sanctioned (i.e. social) use.*
>
> ***(DC - 2b):** Controlling for students' academic time use trajectories (as well as their access context and time use orientations) will help account for socio-demographic differences in internet self-efficacy and engagement.*

Digital Explorers approach: Reflexive and exploratory engagement

Finally, proponents of the Digital Explorers approach acknowledge that young people experience barriers to internet engagement such as those described above. However, consistent with Giddens' theory of structuration (1984), they also stress that these are by no means all-encompassing; young people make decisions about internet use in response to their individual needs and circumstances, resulting in courses of action which do not necessarily reproduce existing advantages and disadvantages (Kalmus et al, 2009). The internet's conduciveness to multi-tasking compounds this ambiguity by enabling task-switching between concurrent activities (Kenyon, 2008). Perceptions of the boundaries between modes of use (i.e. informational, social, and recreational) vary from user to user, as many online activities encompass a range of functions simultaneously. Since users cannot always discriminate in practice between uses according to their status-specific tastes, the cultivation of effective use depends less on taste judgments and more on experimentation and exploration (Horst, 2010). Without denying differences in the extent of their social, economic and cultural participation, the weakening nexus between taste and practice creates a space for internet use which does not directly reflect users' social positions and motivations. Whether on purpose or by accident, when people experience the benefits and costs of a new type of use they will be able to form clearer perceptions about that use. This may help them to decide how to tailor their internet use to better suit their circumstances.

This internet-enabled autonomy is likely to increase with the breadth and frequency of one's use. Young people who learn to use the internet only narrowly - even for the more intuitively 'capital-enhancing' financial activities described above - may therefore benefit in some ways at the expense of others. Financial users may have their economic advantages rewarded whilst missing out in other areas, for instance, because they lack the technical skills and creative dispositions needed for online content creation, or the time, confidence, and social skills needed for communication. In her study of internet use by economically disadvantaged American teenagers, Robinson (2009) found that those with a low level of internet access and autonomy of use enacted a 'taste for the necessary', rationing their use so that task-orientated school work were given priority, while other activities were perceived as unnecessary and wasteful. Meanwhile, those with a higher level of access and autonomy engaged in what she describes as 'serious play', characterised by more open-ended browsing. Of these two orientations, which she describes as opposing forms of 'information habitus', Robinson (2009) argues that the former is counterproductive in terms of young people's longer-term development as internet users. This is consistent with Livingstone and Helsper (2007) and Kalmus et al (2009) who show that basic social and recreational activities are critical in the process by which adolescent users branch out from school-sanctioned activities, towards more advanced, resource-intensive, and rewarding internet use.

The results from Chapter 4 indicate that using the internet for homework is a finite, task-orientated form of use, and using the internet for email or chat with friends is a more open-ended, time-intensive and resource-intensive form of use. The Digital Explorers approach suggests that students who restrict themselves to task-orientated academic use during school will end up less confident and less engaged users at the end of school. However, those who supplement academic use with more open-ended social use during school may develop into more confident and highly engaged users in Grade 12. The Digital Explorers hypothesis can be summarised as follows:

> ***(3) Digital Explorers (DE):*** *Although socio-structural factors constrain young people in the decisions they make about internet use, diverse and frequent users learn to engage with the internet in ways which circumvent these constraints and expand their individual autonomy.*
>
> ***(DE - 3a):*** *Time spent on more exploratory (i.e. social) internet use during school will be more strongly correlated with internet self-efficacy and engagement than time spent on more task-orientated (i.e. academic) use.*
>
> ***(DE - 3b)*** *Controlling for both students' academic and social time use trajectories (as well as their access context and time use orientations) will help account for socio-demographic differences in internet self-efficacy and engagement.*

Methods

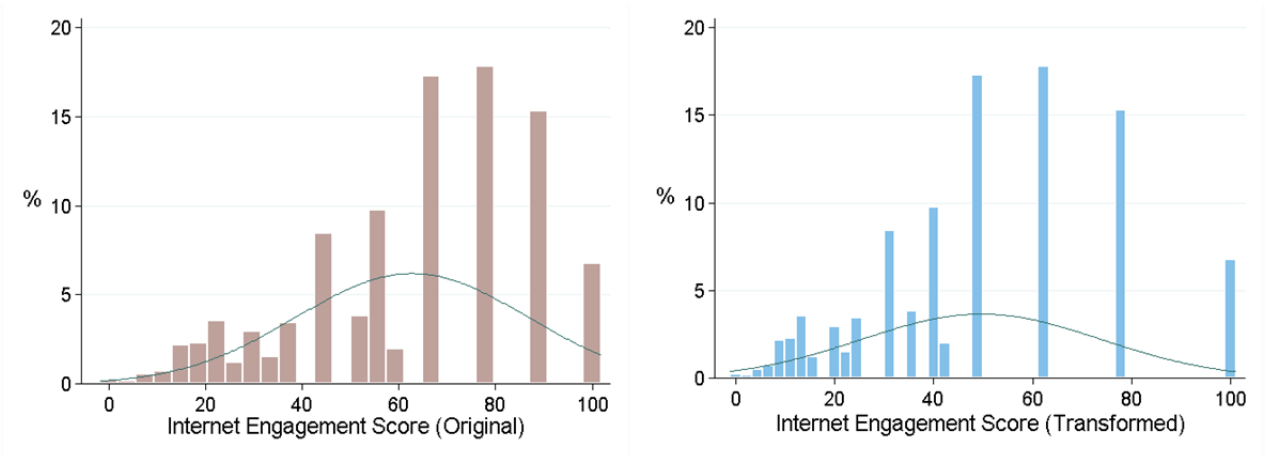
Measures

The descriptive statistics for all variables contained in this analysis are presented in Tables 3.4-3.7. As outlined in Chapter 3, the dependent variable for this analysis is a respondent's internet engagement score - a composite measure based on the breadth and frequency of their internet use in at the end of school, in Grade 12. Two intervening variables are also incorporated in this analysis. The first - internet self-efficacy - is a self-assessed measure of online skill which captures a respondent's level of experience and confidence in their abilities as an internet user in Grade 12 (Eastin & LaRose, 2000). The second set of intervening variables is based on the online time use analysis in the previous chapter. These measures capture the type of trajectory a student's online time use (for academic and social purposes) took during school, between Grades 8 and 12. Finally, the independent variables are the same wave 1 measures of a user's socio-demographic attributes, access context, and time use orientation used in the previous chapter.

Ordinal regression analysis

One of the key intervening variables for this analysis, internet self-efficacy, is ordinal in nature. It has three categories arranged in ascending order of self-reported expertise (i.e. 1=Beginner/ Intermediate; 2="Advanced"; and 3="Expert"). I use ordinal logistic regression to estimate the effects of the independent variables on this measure. This approach uses cumulative probabilities, which reflect the ordering of the response categories, to determine what effect each covariate has on the likelihood of being in a higher response category rather than a lower one (Agresti & Finlay 1997). This analysis was performed in Stata (version 11) using the OLOGIT command. The coefficients for these models are cumulative probabilities which have been converted into odds ratios through exponentiation. These can be interpreted as the change in odds associated with a unit increase or decrease in the predictor variable, net of all other variables in the model. One assumption of this approach is that the covariates have uniform effects across each category of the outcome measure. This 'proportional odds' assumption was tested for all models (using a BRANT test) and it was found to be upheld in each case. Within-school clustering was addressed by specifying that all models factor this intra-group correlation into the estimation of standard errors for each coefficient, thereby providing more robust tests of significance.

Figure 5.1: Original versus transformed internet engagement variable at wave 3



OLS regression analysis

The main dependent variable for this analysis is a continuous measure of internet engagement, ranging from 0 to 27, which reflects the breadth and frequency of a student's internet use at wave 3. In Chapter 3, I described the construction of this measure in further detail. I employ ordinary least squares (OLS) regression to estimate the effects of the independent and intervening variables on this measure. Since internet engagement measure has negatively skewed distribution, a root transformation was applied to this variable in order to correct this and meet the standard assumption of normality required by OLS regression. This transformation was applied by first reflecting the distribution, applying the transformation, and reflecting it to its original direction; then, to make interpreting regression coefficients easier, the both the original and transformed variables were rescaled so that each ranged from 0 to 100. Each regression coefficient represents the expected increase or decrease in a respondent's engagement score (as a percentage) associated with every unit increase or decrease in the predictor variable, net of all other covariates in the model.

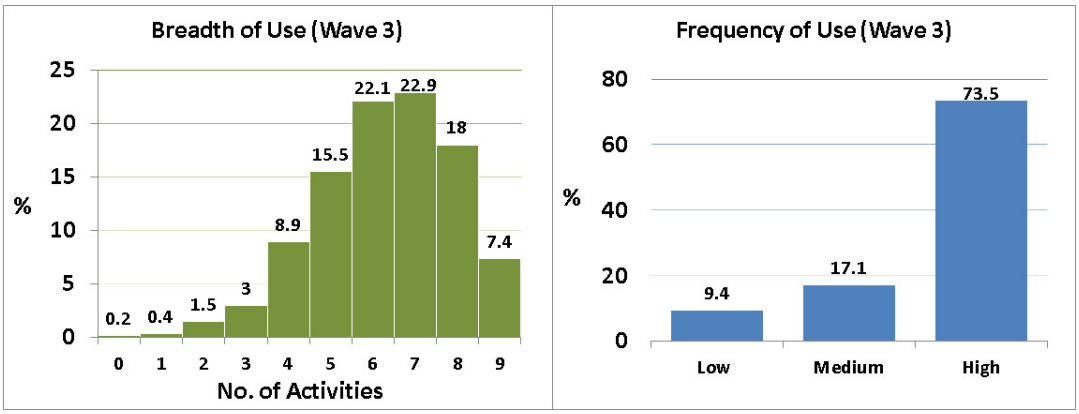
Figure 5.1 shows histograms of the internet engagement measure, before and after it has been transformed. The full OLS regression models were run using both the original and transformed variables and the results are presented in Appendix F. Several larger coefficients for the original variable were reduced in size for the transformed variable, as a result of the more normal distribution; otherwise, there were no major differences in significance between the two models. However, given that the transformed variable better satisfied the normality requirements for OLS regression, the analysis in this chapter uses this measure. Like the ordinal logit approach described above, this analysis accounts for within-school clustering when estimating standard errors.

Analytic Strategy

The analysis and presentation of results is structured in two parts. The first part contains three stages of descriptive analysis. I begin by analysing the relationship between the breadth and frequency of students' internet use - the two measures comprising their internet engagement score. I then investigate how each intervening variable for this analysis - a user's self-efficacy, and the change in their online time use for academic and social purposes - are related to their overall degree of internet engagement. Finally, the online activities used to determine the breadth of a student's internet use are examined in further detail; I consider how widely diffused these activities are within the student population, and whether they vary according to internet engagement and self-efficacy.

The second part of the analysis contains two stages of regression analysis. The first of these, presented in Table 5.4, explores differences in internet self-efficacy using the ordinal logistic approach described above. Model 1 for this analysis takes into account the full wave 1 explanatory model developed in Chapter 4. Then, the subsequent models adds in students' online time use trajectories between wave 1 and wave 3, first for academic use (Model 2), and then for social use (Model 3). This shows how possible changes in students' online time use during school, examined in the last chapter, may alter the confidence they have in their online skill by the end of school. The final regression analysis, presented in Table 5.5, examines variation in internet engagement at the end of school using OLS regression. Model 1 controls for the wave 1 explanatory measures; Model 2 adds in the internet self-efficacy measure; and Models 3 and 4 include the trajectory measures for academic and social use, respectively. This allows me to examine how becoming a confident internet user, and the investments of time, resources, and motivation this involves, impacts on the internet's overall role in a student's life. All analyses for this chapter are conducted with the core analytic sample (n=2,060), and have been tested and cleared for multicollinearity.[3]

Figure 5.2: Distribution on breadth of use variable at wave 3
Figure 5.3: Distribution on frequency of use variable at wave 3



[3] Models were run using OLS regression and checked for a Variance Inflation Factor (VIF) larger than 10 (Baun, 2006).

Results

Breadth and Frequency of Internet Engagement

Figure 5.2 displays the number of online activities undertaken by core sample members during wave 3 (Grade 12). It shows that students were distributed more towards the upper end of the breadth of use measure, which suggests that participation in the activities included in this measure was fairly widespread at the end of high school. Students were in the bottom quartile if they engaged in 5 or less of the 9 activities examined, and in the top quartile if they took part in at least 8 of the activities. The mean number of activities was 6.3, with a standard deviation of 1.65. Figure 5.3 shows students self-reported frequency of internet use during Grade 12. Nearly three quarters of all students reported using the internet several times a day or more (the most frequent category of use). One-sixth of the student population were moderate users, going online at least once a day, while one in every 10 students used the internet only occasionally each week.

In Figure 5.4 below, the distribution on the breadth of use measure is shown separately for each category of the frequency category, as well as for the sample as a whole. As expected, the more frequently a student used the internet, the more online activities they reported doing; this is demonstrated by the distribution for each category of use shifting further to the right than the one before it. The distribution for low frequency users peaks earlier than the overall sample and the other categories. For medium frequency users it plateaus at around 5 or 6 activities, rising slightly at 7 activities before declining; and for high frequency users it peaks slightly above the sample average and remains across the upper end of the breadth scale.

Figure 5.4: Breadth of use distribution, by frequency of use at wave 3

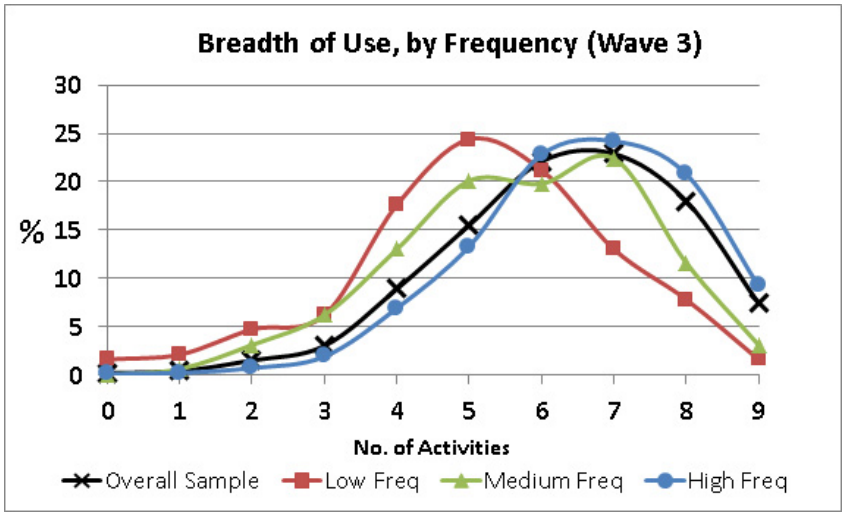


Table 5.2: Internet Engagement Score (0-100) by Internet Self-Efficacy

	Mean	Std. Dev.	Freq.	t
Expert	60.3	24.2	390	–
Advanced	50.5	22.8	1207	9.7***
Beginner/Intermediate (Ref.)	38.4	22.7	463	18.8***
Total	**49.6**	**24.1**	**2060**	

The distribution for high frequency users resembles that of overall sample because of the large proportion of students in this category. Compared to the sample average of 6.3 activities, low and medium frequency users averaged 5.2 activities and 5.7 activities, respectively, whereas high frequency users averaged 6.6 activities. This suggests that, in terms of the breadth and frequency of their internet use measured here, the sample has a high level of engagement with this medium in their everyday lives. As noted earlier, the internet engagement variable derived from these two measures has been transformed to correct for this negative skew. After rescaling, the internet engagement score ranges from 0 to 100, with a mean of 49.6 and a standard deviation of 24.1.

Mediating Influences on Internet Engagement

Above, Table 5.2 displays the positive association between a student's internet engagement score and the confidence they have in their ability to use the internet. Users who rated their online abilities as 'Beginner' or 'Intermediate' had an average engagement score that was 12 points lower than those who rated their abilities as 'Advanced' and 22 points lower than those who considered themselves 'Expert'. The t-statistic indicates that these bivariate effects were significant. Table 5.3 shows the bivariate relationships between internet engagement and the trajectory measures for time spent chatting/emailing and time spent studying online. The first column suggests that a student's average engagement score is related to the trajectory of their social use between waves 1 and 3.

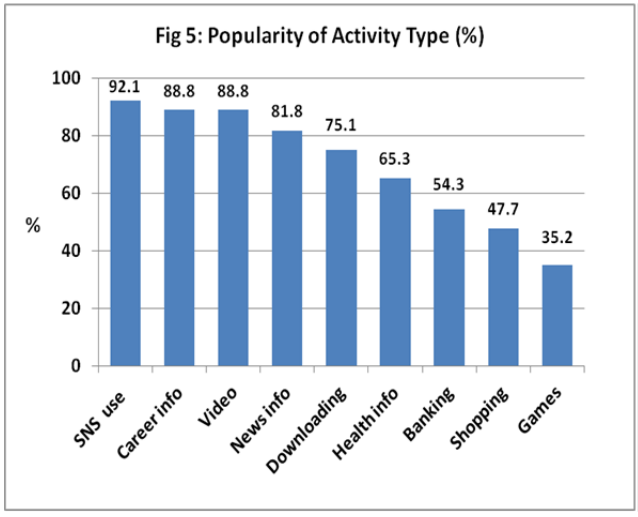
Table 5.3: Internet Engagement Score (0-100) by Online Time Use Trajectory

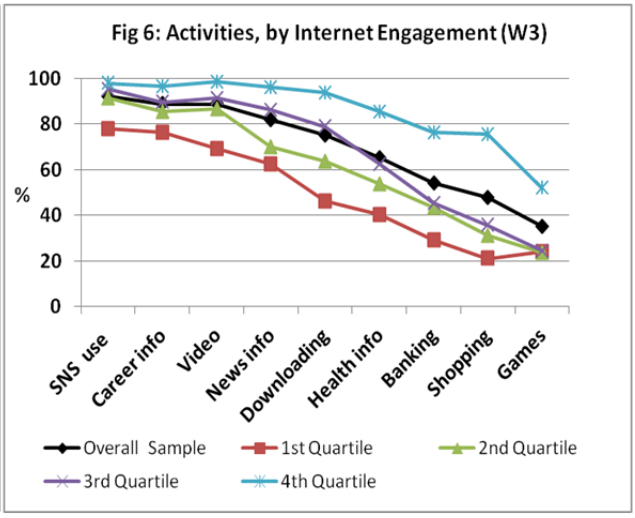
	Chat/Email (W1 -> W3)				Online Study (W1 -> W3)			
	Mean	Std. Dev.	N	t	Mean	Std. Dev.	N	t
Non-user/Drop-out (Ref.)	26.9	21.2	90	–	37.8	23.6	106	–
Late adopter	42.9	22.2	451	6.3***	42.2	24.6	217	1.5
Moderate user	43.2	24.0	251	5.7***	46.6	23.6	439	3.4***
Upgrader	54.0	23.4	595	10.4***	51.8	23.7	709	9.2***
Downgrader	43.9	22.6	143	11.2***	52.8	25.8	135	4.7***
Heavy user	58.8	22.1	530	12.7***	54.5	22.7	454	6.8***
Overall sample	**49.6**	**24.1**	**2060**		**49.6**	**24.1**	**2060**	

Students who only began using the internet socially during school (late adopters) had an engagement score that was 16 points higher than those who spent no time at all using the internet for chat or email during school (non-users), or who stopped spending time on this activity by the end of school (i.e. drop-outs). There were similar sized increases those whose social use remained constant at 1-3 hours per week by the end of high school (i.e. moderate users) and those who scaled back use back from 4+ hours to 1-3 hours (downgraders). By contrast, students who spent 4+ hours at the beginning and end of high school (heavy users) scored 32 points higher on the engagement measure than non-users and drop-outs, while students who upgraded to this level during school scored 27 points higher. The t-statistic shows that these differences were statistically significant.

The second column indicates that a student's level of internet engagement is also related to their academic use trajectory during school, but not as strongly as it was to their social use. Being a social non-user or drop-out had much more of an impact on one's engagement score than being an academic non-user or drop-out. Interestingly, there was no statistically significant difference in score between, on the one hand, those who adopted academic use during school, and on the other, those who stopped using it during that time, or who never engaged in it to begin with. Moderate users scored 9 points higher than academic non-users and dropouts, whilst students scored around 15 points higher if they upgraded from, or downgraded to, this moderate level of use during school. Students whose academic use was heavy throughout school scored 17 points higher academic non users and drop-outs, an increase which was only half that observed for heavy social users.

Figure 5.5: Participation in online activities at wave 3
Figure 5.6: Participation in online activities, by internet engagement score at wave 3





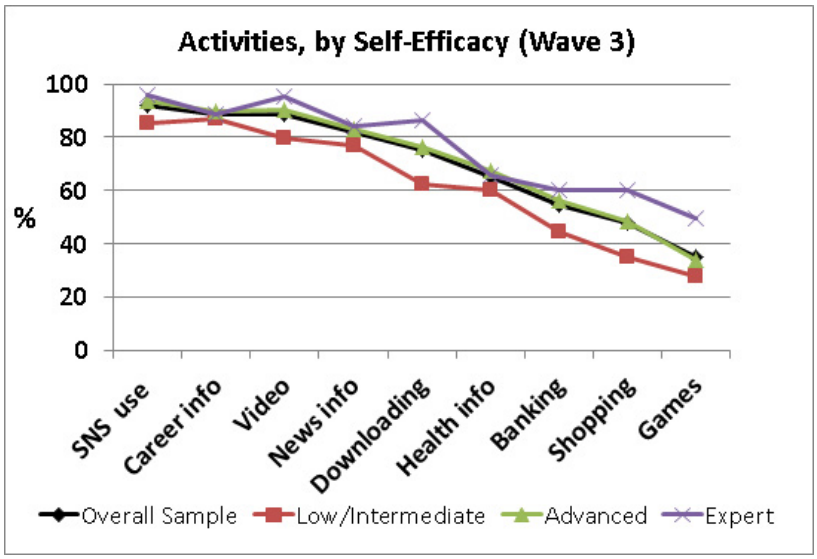
Breakdown of Online Activity Participation

Figure 5.5 displays the participation rates for each of the 9 activities included in the breadth of use measure, ranging from the most popular to the least popular. It shows that social networking was the most widely diffused application by Grade 12, undertaken by 92% of the sample. This was followed closely by searching for information about TAFE, university, or a traineeship, and watching online videos on a video-sharing site. At the other end of the spectrum, playing online games was the least popular activity, with only 35% of the sample reporting this to be something they used the internet for. Finance-related uses such as online shopping and banking were also less common than the other activities examined.

Figure 5.6 shows how the popularity of these activities varies according to respondents' level of internet engagement. Overall, differences in participation between the top and bottom quartiles of the engagement measure were largest for activities which were less popular with the sample as a whole. In other words, the less widespread an activity is amongst the student population, the more participation in that activity may be affected by one's overall level of internet engagement. Online gaming was one exception to this trend; despite being the least popular activity, the likelihood of playing games online was equal for students in the first three quartiles on the engagement measure. Even for the most highly engaged students, who were twice as likely to participate in this activity, this still only meant that one in every two of these students engaged in this activity, compared to one in four for the rest of the sample. This is consistent with research suggesting that the young people's use of the internet for gaming decreases with age (ABS, 2012a).

While the most popular type of use, using social networking sites (SNS), was almost universally diffused amongst the top three quartiles of the engagement measure, students in the bottom quartile were still less likely to participate in this activity. With the exception of online gaming, they were less likely to participate in all of the activities examined. Students in the second quartile were similar to the overall sample in their use of the internet for the three most popular activities (SNS use, career info, and online video) but their participation activities beyond this point dropped below the sample average. Meanwhile, those in the third quartile stayed representative of the sample in terms of their participation in the first six activities, before converging with the second quartile for banking and shopping, and the first quartile for online gaming. Participation in the first four activities was almost universal amongst the most highly engaged users, and continued to rise further above the sample average for all but the least popular activity of online gaming.

Figure 5.7: Participation in online activities by level of internet self-efficacy



Lastly, Figure 5.7 displays how participation in these activities corresponds to different levels of internet self-efficacy. Overall, the confidence a user placed in their online abilities was important for some activities more than others. Compared to less confident users, and to the sample as a whole, those who considered themselves experts were more likely to watch videos online, to download media, to bank and shop online, and to play online games. By contrast, for all the informational activities examined (e.g. educational information, online news, health information), internet self-efficacy was less important for participation. Meanwhile, the participation rates of those who considered themselves advanced users were generally on par with the sample as a whole.

Internet Self-Efficacy at the End of High School

The descriptive analysis indicates that participation in online activities other than information-seeking is influenced by the degree of confidence a student has in their ability to use the internet. Such confidence was a characteristic which differentiated broad and frequent users from narrow and more infrequent users at the end of school. The following analysis explores the reasons why students varied in their self-efficacy as internet users.

Model 1 (Table 5.4) regresses internet self-efficacy at wave 3 on the wave 1 explanatory model from the previous chapter. The pseudo R-squared measure shows how much of the variance is explained by each model. It shows that the model explains 5.2% of the total variance, with gender and access context displaying the strongest associations. Girls displayed lower self-efficacy than boys, who were 46% more likely to describe themselves as being at a higher skill level. Students living in outer regional areas were also less confident users than those living in major city areas.

Table 5.4: Wave 3 Internet Self-Efficacy - Ordinal Logistic Regression w/ Core Sample (*1 = "Beginner/Intermediate"; 2 = "Advanced"; 3 = "Expert"*)

	Model 1		Model 2		Model 3	
	O.R.>	se	O.R.	se	O.R.	se
Socio-demographic						
Female	.54***	.05	.52***	.05	.49***	.05
School sector						
State school (Ref.)#	–	–	–	–	–	–
Independent School	.87	.11	.83	.10	.86	.10
Catholic School	.94	0.11	.91	.11	.94	.11
Geographic region						
Major city (Ref.)	–	–	–	–	–	–
Inner regional	.94	.10	.95	.10	.96	.10
Outer regional	.71*	.11	.71*	.11	.76	.11
Remote or very remote	.86	.29	.86	.29	.97	.32
Family living arrangement						
Lives with both parents (Ref.)	–	–	–	–	–	–
Lives with one parent	1.21	.19	1.25	.19	1.19	.19
Other living arrangement	1.01	.13	.99	.14	1.01	.14
Parental occupational prestige						
ANU4 score (0-100)	1.00	.00	1.00	.00	1.00	.00
Parental employment status						
Both parents employed (Ref.)	–	–	–	–	–	–
One parent employed	.95	.09	.95	.10	.97	.10
Neither parent employed	.99	.20	.97	.20	.99	.21
Parental education status						
Postgraduate degree (Ref.)	–	–	–	–	–	–
Bachelor's degree	1.10	.15	1.13	.15	1.11	.15
Trade qual. or certificate	1.05	.18	1.08	.19	1.07	.18
Grade 12	1.13	.17	1.18	.18	1.18	.18
Less than Grade 12	.92	.20	.94	.21	.90	.20
Access context						
Internet connection at home						
Broadband or ADSL (Ref.)	–	–	–	–	–	–
Dial-up access	.83	.09	.83	.09	.89	.10
No net access	.36***	.09	.39***	.10	.51**	.13
Computer access at home						
Shared access (Ref.)	–	–	–	–	–	–
Exclusive computer access	1.54***	.18	1.50***	.17	1.41**	.17
No computer access	.43	.32	.42	.33	.35	.28
Mobile phone ownership						
Owns mobile phone (Ref.)	–	–	–	–	–	–
Doesn't own mobile phone	.70**	.09	.71**	.09	.74*	.09
Time use (None = Ref.)						
Doing homework						
Moderate (1-3 hours)	1.05	.16	1.02	.15	.99	.15
Intensive (4+ hours)	1.06	.17	1.02	.16	.93	.15
Hanging out with friends						
Moderate (1-3 hours)	1.53	.37	1.45	.35	1.54	.38
Intensive (4+ hours)	1.61*	.37	1.34	.31	1.44	.34
Playing sport						
Moderate (1-3 hours)	.97	.16	.96	.16	.93	.16
Intensive (4+ hours)	.75	.11	.74*	.11	.71*	.11

Doing household chores						
Moderate (1-3 hours)	.86	.14	.83	.14	.89	.14
Intensive (4+ hours)	.76	.13	.71*	.12	.79	.13
Watching TV						
Moderate (1-3 hours)	1.08	.28	1.05	.27	.95	.24
Intensive (4+ hours)	1.20	.33	1.18	.32	1.03	.27
Listening to music						
Moderate (1-3 hours)	1.12	.19	1.07	.18	.99	.17
Intensive (4+ hours)	1.53*	.27	1.46*	.25	1.28	.23
Reading books						
Moderate (1-3 hours)	.82	.10	.80	.09	.84	.10
Intensive (4+ hours)	.94	.10	.90	.09	.95	.10
Online Time Use (W1->W3)						
Use net to help with homework						
Non-user/Drop-out (Ref.)	–	–	–	–	–	–
Late adopter	–	–	.75	.16	.74	.17
Moderate user	–	–	.79	.17	.71	.16
Upgrader	–	–	1.11	.23	.95	.21
Downgrader	–	–	1.02	.27	.85	.22
Heavy user	–	–	1.43	.32	1.18	.27
Use net to email/chat with friends						
Non-user/Drop-out (Ref.)	–	–	–	–	–	–
Late adopter	–	–	–	–	1.82*	.47
Moderate user	–	–	–	–	1.96*	.55
Upgrader	–	–	–	–	3.03***	.78
Downgrader	–	–	–	–	2.45**	.68
Heavy user	–	–	–	–	3.69***	.92
No. of obs.	2060		2060		2060	
Pseudo R2#	.052		.059		.081	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^ Odds ratios obtained by exponentiating ordered logit coefficients

Pseudo R2 measure is equal to square of the correlation between actual and predicted values

Lacking access to technological resources during wave 1 predicted lower levels of user confidence five years later. Having been without internet access during wave 1 meant a student's chances of rating themselves as a better user were 64% lower than if she or he had been able to access a broadband or ADSL connection at home. If a student had exclusive, rather than shared, access to a home computer in Grade 8, he or she was also 54% more likely to report having a higher level of expertise. Owning a mobile phone in Grade 8 was also associated with higher self-efficacy in Grade 12, as was participation in activities like hanging out with friends and listening to music in Grade 8. Compared to students who spent no time socialising outside of school, students who spent 4+ hours each week hanging out with friends were 61% more likely to categorise themselves at a higher expertise level. Students who had spent 4+ hours listening to music during wave 1 were also 53% more likely than non-listeners to report a higher degree of self-efficacy.

When Model 2 controls for the set of possible trajectories which the students' academic internet use could have taken between waves 1 and 3, this only increases the amount of variance explained to 5.9%. Interestingly, academic non-users and drop-outs displayed higher user self-efficacy than moderate users who spent 1-3 hours a week studying online at the start and end of high school, and late adopters who began studying online during high school. Consistently heavy academic users and those whose use intensified during school were also more confident users; however, none of these effects were statistically significant at the 95% level. After the academic use trajectory measures were included, the negative effects for playing sports and doing household chores for 4+ hours a week in wave 1 became marginally significant, while the positive effect of hanging out with friends was accounted for.

Finally, Model 3 accounts for the same set of trajectories with respect to the time students emailing and chatting with friends during school. Including these measures raised the total variance explained to 8.1%. How students' social internet use - more so than their academic use - developed during school had important implications for their overall confidence as internet users. Net of all other factors in the model, being a social non-user or having discontinued one's social use during high school was the strongest predictor of low user self-efficacy. Students who began spending time on chat and email during school were 82% more likely to describe themselves as being at a higher skill level than if they had remained non-users. Those who were already moderate social users in Grade 8 and still spent 1-3 hours per week chatting and emailing in Grade 12 were 96% more likely than non-users to display a higher level of confidence. However, the strongest associations were observed for respondents who engaged in more intensive social use during high school. Most notably, students who had spent 4+ hours emailing or chatting online in Grade 8, and were still doing so in Grade 12, were 3.7 times more likely than non-users to display a higher degree of self-efficacy. While not as confident as consistently intensive users, students who upgraded from moderate to heavy social use during school were still 3 times likelier than non-users to categorise their expertise more favourably. Even students who began high school as intensive social users and downgraded to a more moderate level by Grade 12 were still 2.5 times more likely than non-users to show a higher level of confidence. Incorporating these measures explained the positive effect for listening to music and the negative effect of doing household chores.

Table 5.5: Wave 3 Internet Engagement Score (0-100) - OLS Regression w/ Core Sample

	Model 1		Model 2		Model 3		Model 4	
	b	se	b	se	b	se	b	se
Socio-demographic(W1)								
Female	-4.20***	1.24	-2.43*	1.12	-3.46**	1.11	-4.30***	1.14
School sector								
State school (Ref.)#	–	–	–	–	–	–	–	–
Independent School	3.22*	1.40	3.68**	1.37	2.96*	1.36	3.57*	1.47
Catholic School	.31	1.50	.47	1.34	-.10	1.27	.59	1.30
Geographic region								
Major city (Ref.)	–	–	–	–	–	–	–	–
Inner regional	-.67	1.40	-.52	1.36	-.46	1.34	.14	1.40
Outer regional	-2.91	1.82	-1.87	1.68	-1.59	1.64	-.46	1.67
Remote or very remote	-2.77	3.21	-2.37	2.77	-2.83	2.72	-1.22	2.81
Family living arrangement								
Lives w/ both parents (Ref.)	–	–	–	–	–	–	–	–
Lives with one parent	.63	1.86	.09	1.79	.66	1.73	-.33	1.70
Other living arrangement	-.04	1.65	-.05	1.64	-.24	1.63	-.25	1.58
Parental occ. prestige								
ANU4 score (0-100)	-.00	0.03	-.00	0.02	-.00	.02	-.01	.02
Parental employment status								
Both parents employed (Ref.)	–	–	–	–	–	–	–	–
One parent employed	.31	1.27	.48	1.23	.31	1.24	.71	1.25
Neither parent employed	1.57	2.50	1.69	2.49	1.50	2.48	1.92	2.33
Parental education status								
Postgraduate degree (Ref.)	–	–	–	–	–	–	–	–
Bachelor's degree	4.43**	1.54	4.17**	1.50	4.11**	1.54	3.86**	1.45
Trade qual. or certificate	2.44	2.00	2.27	1.95	2.55	1.91	2.35	1.81
Grade 12	2.84	2.12	2.47	2.01	2.78	2.02	2.75	1.90
Less than Grade 12	2.33	2.38	2.62	2.23	2.60	2.20	1.80	2.12
Access context (W1)								
Net connection at home								
Broadband or ADSL (Ref.)	–	–	–	–	–	–	–	–
Dial-up access	-3.48**	1.29	-2.86*	1.31	-2.82*	1.29	-1.84	1.25
No net access	-11.50***	2.50	-8.37**	2.52	-6.71**	2.44	-3.35	2.44
Computer access at home								
Shared access (Ref.)	–	–	–	–	–	–	–	–
Exclusive computer access	4.97***	1.47	3.73**	1.37	3.44*	1.37	2.30	1.34
No computer access	-5.95	5.56	-3.68	6.20	-1.96	6.14	-3.80	5.64
Mobile phone ownership								
Owns mobile phone (Ref.)	–	–	–	–	–	–	–	–
Doesn't own mobile phone	-5.34***	1.23	-4.26***	1.09	-3.98***	1.10	-3.61***	1.08
Time use (None = Ref.)(W1)								
Doing homework								
Moderate (1-3 hours)	2.94	1.68	2.74	1.59	2.25	1.55	1.67	1.50
Intensive (4+ hours)	5.52**	1.71	5.28**	1.62	4.87**	1.57	3.45*	1.52
Hanging out with friends								
Moderate (1-3 hours)	8.07**	3.07	6.86*	3.08	5.83	3.05	6.36*	2.90
Intensive (4+ hours)	8.54**	3.21	7.15*	3.22	4.65	3.23	5.16	3.09
Playing sport								
Moderate (1-3 hours)	1.52	2.12	1.60	2.06	1.42	2.02	1.31	1.92
Intensive (4+ hours)	.33	2.08	1.20	2.03	0.81	2.02	.64	1.98
Doing household chores								

Moderate (1-3 hours)	3.72*	1.79	4.20*	1.73	3.74*	1.78	4.68*	1.81
Intensive (4+ hours)	-.25	2.01	.65	1.99	.00	2.00	1.18	2.00
Watching TV								
Moderate (1-3 hours)	1.29	2.71	1.09	2.76	.41	2.78	-0.71	2.67
Intensive (4+ hours)	3.61	2.88	3.03	2.91	2.36	2.91	.83	2.83
Listening to music								
Moderate (1-3 hours)	2.73	1.85	2.38	1.80	1.85	1.76	.30	1.74
Intensive (4+ hours)	4.78**	1.82	3.54	1.84	2.98	1.84	.83	1.79
Reading books								
Moderate (1-3 hours)	.01	1.29	.60	1.23	.03	1.21	.94	1.18
Intensive (4+ hours)	1.99	1.47	2.19	1.36	1.44	1.37	2.48	1.32
User Self-Efficacy (W3)								
Expert (Ref.)	–	–	–	–	–	–	–	–
Advanced	–	–	-8.46***	1.32	-8.33***	1.29	-7.56***	1.26
Beginner/Intermediate	–	–	-18.79***	1.57	-18.15***	1.52	-15.57***	1.51
Online Time Use (W1->W3)								
Online study								
Non-user/Drop-out (Ref.)	–	–	–	–	–	–	–	–
Late adopter	–	–	–	–	6.36*	2.55	5.93*	2.34
Moderate user	–	–	–	–	7.51***	2.25	5.92**	2.09
Upgrader	–	–	–	–	11.98***	2.34	8.98***	2.17
Downgrader	–	–	–	–	12.29***	2.82	9.73***	2.65
Heavy user	–	–	–	–	12.99***	2.42	9.68***	2.25
Chat/Email								
Non-user/Drop-out (Ref.)	–	–	–	–	–	–	–	–
Late adopter	–	–	–	–	–	–	13.43***	2.16
Moderate user	–	–	–	–	–	–	12.03***	2.43
Upgrader	–	–	–	–	–	–	20.54***	2.38
Downgrader	–	–	–	–	–	–	11.48***	2.77
Heavy user	–	–	–	–	–	–	24.53***	2.36
Constant	29.72***	5.09	38.33***	5.12	33.41***	5.35	18.90***	5.42
No. of obs.	2060		2060		2060		2060	
R2	.074		.133		.148		.203	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Internet Engagement at the End of High School

The descriptive results suggest that the extent to which students engage with the internet in their everyday lives is shaped not only by their confidence in using this medium, but also by the different trajectories their online time use took during school. Moreover, the preceding analysis indicates that gender, access context, and developments in respondents' social internet use were most important for their internet self-efficacy. I now examine why students varied in their level of internet engagement (e.g. the breadth and frequency of their use) at the end of high school.

Model 1 (Table 5.5) regresses internet engagement on the wave 1 explanatory model. Controlling for these measures accounted for 7.4% of the total variation in students' internet engagement scores. Amongst the socio-demographic measures included in the model, gender, schooling sector, and parental education status displayed the strongest associations. On average,

girls scored 4.2 percentage points lower than boys on the engagement measure. Interestingly, students whose parents held a bachelor's degree in wave 1 had an engagement score 4.4 points higher than those whose parents had a postgraduate degree. Students who were attending an Independent school in Grade 8 were also slightly more engaged than their State school counterparts.

A student's access to technological resources during wave 1 also correlated with their level of internet engagement five years later. The engagement scores of students with broadband or ADSL access in Grade 8 were 3.5 points higher than they would have been if they'd only had dial-up access, and 11.5 points higher than if they'd had no internet access at all. Users with exclusive computer access in Grade 8 scored 5 points higher than those who shared a computer with others, and having a mobile phone in Grade 8 meant a 5.3 point increase in a student's engagement score. Several time use orientation measures were also correlated with internet engagement, the most influential being the time a student spent hanging out with friends in wave 1. Those who had spent any amount of time on this activity scored around 8 points higher than those who had spent no time at all socialising outside of school. Students who, during Grade 8, spent 4+ hours each week on activities such as doing homework and listening to music also scored higher than those who spent no time on these activities, as did students who spent 1-3 hours a week doing household chores.

After including the first intervening measure of internet self-efficacy in Model 2, the total variation explained rises to 13.3%. Consistent with the descriptive findings, the confidence students had in their online abilities displayed a strong, positive relationship with their level of internet engagement. Compared to those who considered themselves experts, students who rated their abilities as 'Advanced' scored 8.5 points lower on the engagement measure, while students who described themselves as 'Beginner' or 'Intermediate' scored 18.8 points lower. Controlling for user self-efficacy reduces the coefficients for gender, access context, and time spent hanging out with friends, whilst fully explaining the effect of time spent listening to music. Earlier, these measures were seen to have independent effects on a user's self-efficacy; these reductions may indicate the impact of those effects on a user's overall level of internet engagement.

Model 3 incorporates the trajectory measures of students' online time use for academic purposes during school. This raises the overall variance explained slightly to 14.8%. In general, academic non-users and those who discontinued their use during school were much significantly less engaged than those who were still spent any amount of time on this activity in Grade 12. Although the actual amount of time a student spent using the internet for homework influenced their engagement score, whether or not they sustained a particular level of time use between waves 1 and

3 had little bearing on the effect. For instance, consistently moderate users those who spent 1-3 hours chatting or emailing in both Grade 8 and Grade 12 scored 7.5 points higher than non-users, whereas late adopters who only began spending time on this activity during school still scored 6 points more than non-users. Students who reported studying online for 4+ hours at wave 1 or wave 3 also experienced a similar increase of between 12 and 13 points over non-users irrespective of whether they upgraded to, downgraded from, or maintained this level of time use. Adding in the measures of academic use trajectory reduced the negative effect of having lacked internet access, and the positive effect of attending an Independent school. It also explained the increased engagement of students who hung out with friends in Grade 8. However, including these measures also restored some of the negative effect associated with being female.

Lastly, Model 4 accounts for students' social use trajectories during school, taking the total variation explained to 20.3%. As with online study, students who didn't use the internet at all for chat or email, or who discontinued such use, were significantly less engaged than those who still spent any amount of time on this activity in Grade 12. Yet in this case, the amount of time they spent chatting or emailing, and the stability of their use, had an impact on their level of engagement. For example, consistently moderate users who spent 1-3 hours chatting or emailing online in Grade 8, and were still doing so in Grade 12, scored 12 points higher than non-users on the engagement measure. Yet late adopters who only began using the internet socially during high school experienced a larger increase - scoring around 13.5 points higher than non-users. This reflects the fact that the majority of late adopters (over 60%) were 'late bloomers', transitioning into the more intensive 4+ category of social use at the end of school. By contrast, only around 46% of academic late adopters made a similar transition. Heavy social users from Grade 8 who maintained this level of time use in Grade 12 experienced the largest increase in their internet engagement score. These students were an entire quartile (i.e. 25 points) higher on the engagement measure than non-users. Respondents who upgraded from moderate to more intensive use did not experience quite so large an increase. Their engagement score was around 20 points higher than non-users. Meanwhile, much of the positive influence of heavy social use in Grade 8 disappeared if a student downgraded to a more moderate level of use by the end of school. In fact, the results show that downgraders ended up with an even lower engagement score than students who were moderate users to begin with and remained that way in Grade 12.

When the social use trajectory measures were added to the model, there were notable reductions in the effects for academic use trajectory and user self-efficacy. This suggests that some of the positive associations shown for these latter measures can ultimately be attributed to changes

in social use during school. Similarly, the effects of internet connection type and exclusivity of access on internet engagement are explained when the social trajectory measures are included. Access barriers may differentiate students in their level of engagement by affecting their development into confident internet users, and influencing the amount of time they spend socialising online during school. Finally, the positive effects for being male, attending an Independent school, and hanging out with friends in Grade 8 were also increased when these measures were included. After controlling for differences in students' academic use, user self-efficacy, orientations, resources, and socio-demographic attributes, changes in the time students spent chatting and emailing during school were more beneficial for the engagement scores of students in these groups.

Discussion

The analysis for this chapter addresses my second research question:

RQ2: What factors are important in accounting for differences in the breadth and frequency of young people's engagement with the internet at the end of high school?

The results show that respondents used the internet for a wide range of purposes, with the majority doing so on a daily basis. Several basic assumptions about the nature of young people's overall internet engagement were confirmed. First, in agreement with Livingstone and Helsper (2007), there was a strong relationship between the breadth and frequency of respondents' internet use; intuitively, as users branch out and do more things online they also use the internet more regularly. Second, a user's confidence in their own online abilities also increased in conjunction with the breadth and frequency of their use. Finally, time spent on social internet use during high school - more so than academic use - positively influenced internet self-efficacy and engagement. This illustrates the importance of computer and internet use outside the context of formal education for young people's development as internet users.

Previous data from the ABS's (2009b) *Children's Participation in Cultural and Leisure Activities (CPCLA)* study shows that, with the exception of playing online games, children's involvement in the online activities examined here increases with age. Children aged 5-8 years tend to use the internet more narrowly for educational activities and gaming; between the ages of 9-11 years these activities remain the most popular, but they are complemented by other activities such as general browsing, email and chat with friends, watching videos and listening to music (ABS, 2009b). By the time they are entering high school (aged 12-14 years), activities such as social networking and online content creation spread rapidly amongst respondents in the CPCLA study,

while online gaming began to decrease in popularity. As noted earlier, the ABS's (2011) *Household Use of Information Technology (HUIT)* survey data presented in Table 5.1 indicates that, by the time they are leaving high school (aged 15-17), the three most popular activities amongst young people are: 'social networking and online gaming', 'research, news, and general browsing', and 'listening to music or watching videos or movies online' (ABS, 2011).

The activities examined in this analysis differ somewhat from these ABS studies, but the sample for this research is from a similar age and year cohort as the 2011 HUIT study. Moreover, participation rates in the online activities analysed here resemble those found in the HUIT data presented in Table 5.1. Basic social, informational, and recreational uses (e.g. social networking, searching for educational career information, and watching online videos) form the core of respondents' internet use when they finished high school in 2010. This is consistent the findings of other studies which suggest school-sanctioned informational use is amongst the first things young people do online, followed by basic social and recreational forms of use (Kalmus et al, 2009; Notley, 2008). Unlike the 2011 HUIT data, this analysis distinguishes between social networking and online gaming. The results show a continuation of the diverging trajectories which emerged for these two activities in the 2009 CPCLA study; while social networking had become the most popular activity by Grade 12, online gaming had by this stage become the least popular activity. This further illustrates the relationship, examined in the previous chapter, between respondents' increased time pressures during school and the composition of their internet use. As their academic and social commitments increase, and students began to spend more time studying and socialising online, it may be that students who engaged in gaming found it harder to justify this time-intensive activity, both to their parents and to themselves.

Another factor influencing participation in these activities was the level of confidence respondents' displayed in their online abilities. Livingstone and Helsper (2007) suggest that young people can be expected to engage in more advanced (and less widely diffused) activities as their level of internet self-efficacy increases. While the results mostly support this claim, there were also several exceptions. Of the three core activities identified earlier, social networking and watching videos online were related to user self-efficacy, but searching for educational career information was not. Confident users were also more likely to engage in more advanced recreational activities such as online gaming and downloading media, as well as capital-intensive financial activities such as online banking and shopping; yet when it came to more uncommon informational activities, like keeping up with news and current affairs, or finding information about health and fitness, internet self-efficacy still did not influence participation in these activities. One possible explanation for this

is that the skill requirements (e.g. the ability to assess the reliability of information sources) involved in these activities are less specific to internet use and more closely related to respondents' broader information-seeking practices in everyday life. By contrast, other online activities place more emphasis on skills which could only be developed through use; activities which require technical knowledge (e.g. understanding of terminology, settings etc.) and technological resources (e.g. better hardware or greater bandwidth) are thus associated with a higher level of internet self-efficacy. It is important to note, then, that a student's level of internet self-efficacy does not indicate their confidence with respect to other competencies which mediate the outcomes of their use, such as their informational or financial literacy (van Dijk, 2006), or their sensitivity to social etiquette and conventions (Hseih, 2012). Moreover, there were signs that participation in higher-level activities depended on the financial and technological resources respondents had at their disposal. Consistent with previous research, access-intensive activities requiring greater bandwidth and exclusivity of access (e.g. downloading media and playing games) were less widely diffused; so too were resource-intensive activities such as shopping and banking online, which require greater financial independence and internet self-efficacy on the part of users.

This evidence suggests that highly engaged users may be uniquely positioned to experience the widest range of benefits and costs or risks associated with internet use, because of their resources, skills, dispositions, and time use practices. There was evidence that these factors influenced the breadth and frequency of young people's engagement with the internet, mediating broader socio-demographic influences. Even after all factors were accounted for, male students and those attending Independent school students were found to have a higher engagement score than females and State school students. Furthermore, female students displayed a significantly lower level of internet self-efficacy than male students (despite their higher performance on NAP-ICT Literacy assessment discussed in Chapter 1), as did those living in outer regional areas when compared to those in urban areas. To help explain these findings and better understand why differences in internet engagement arise, I will now review the evidence for each of the hypotheses outlined earlier, beginning with the Digital Natives approach.

> ***DN (1a):*** *Students with better access in wave 1 will end up more confident and highly engaged users in wave 3.*

There was support for the first premise of the Digital Natives hypothesis. After controlling for their socio-demographic characteristics and their time use practices in wave 1, students who already had better access to technological resources at the beginning of high school ended up more confident and highly engaged internet users by the end of school. This is consistent with the notion

that earlier adopters with more experience of internet access have longer to familiarise themselves with the benefits and costs of internet use in their everyday lives. According to this approach, these affordances are more or less intrinsic to the medium itself (Rogers, 2003). Users who are exposed to them for long enough will therefore have a better understanding of what the internet can be used for, and thus higher levels of confidence in their online abilities (Eastin & LaRose, 2000). However, the fact that earlier adopters were more confident users only accounted for some of the relationship between access context and internet engagement. Owning a mobile phone and having fast, exclusive internet access in wave 1 still predicted broader and more frequent internet use even after user self-efficacy was accounted for. In other words, earlier adopters ended up more confident users, but this did not explain why they also ended up more highly engaged users. The effects of access context in wave 1 on engagement in wave 3 was only fully explained once a student's academic and social internet use trajectories were taken into account. Having better access earlier than their peers increased students' engagement scores because it positively influenced the time they spent on social, and to a lesser extent, academic internet use between Grades 8 and 12.

> ***DN (1b):*** *Controlling for differences in access context will help explain socio-demographic differences in internet self-efficacy and overall internet engagement score.*

There was more limited support for the second premise of the Digital Natives approach, which predicts that socio-demographic variation in self-efficacy and engagement can be attributed to internet access disparities. To test this hypothesis more directly, the first model in both regression analyses was rerun, this time adding in the socio-demographic measures, followed separately by the access context measures. This did not explain the lower self-efficacy of female students and those living in outer regional areas. However, prior to controlling for access, students in outer regional areas were also found to be significantly less engaged than those living in major cities. This effect was explained when access measures were included (as were similar, but non-significant effects for students in inner regional and remote areas). This suggests that, to some extent, a student's engagement with the internet is technology-driven. If students in regional and remote areas had experienced the same quality of access to ICT resources as urban students, from as far back as Grade 8, then their internet use may been broader and more frequent in Grade 12 than it was. Still, the results also show that, even if they had been identical in their access to technological resources in Grade 8, male students and those attending Independent schools would have higher levels of engagement in Grade 12 than females and State school students. These students most likely vary in the breadth and frequency of their internet use for reasons other than the quality and duration of their access to technological resources.

> ***DC (2a):*** *Time spent on school-sanctioned (i.e. academic) internet use during school will be more strongly correlated with internet self-efficacy and engagement than time spent on non-school-sanctioned (i.e. social) use.*
>
> ***DE (3a):*** *Time spent on exploratory (i.e. social) internet use during school will be more strongly correlated with internet self-efficacy and engagement than time spent on more task-orientated (i.e. academic) use.*

The results supported (3a) more than they did (2a), lending weight to the Digital Explorers hypothesis rather than the Digital Connoisseurs hypothesis. Contrary to the latter approach, using the internet to help with homework during high school did not significantly influence a student's internet self-efficacy in Grade 12. Those who spent time on this activity throughout high school did not rate their expertise any more highly than those who discontinued such use during this time, or never took it up at all. Instead, it was students' social internet use trajectory during high school which more strongly predicted their internet self-efficacy and engagement in Grade 12. This is consistent with claims that young people do not become confident and highly engaged internet users if they are restricted to school-sanctioned forms of use. The fact that such use depends on a students' prior academic motivation and their parent's level of education (see Chapter 4) suggests that students regard this activity as a necessary extension of their broader educational practices, with clearly defined benefits and costs within this context. This could help to explain the finding that students with parents who held a post-graduate degree were less engaged than those whose parents held a bachelor's degree: these students might prioritise academic use ahead of social use to the point that it counteracts the strong influence of social use on their overall level of engagement. Generally speaking, young people have little discretion as to whether or not they engage in academic use; if they want to complete their given homework tasks, and to cultivate the information-seeking skills needed in this context, such use is bound to be regarded as necessary.

Yet there are reasons why an adolescent may not view social internet use as having similar necessity. For instance, the size and composition of young people's communication networks, and the diffusion of information and communication technologies within these networks is likely to mediate their online communication needs (Mahler & Rogers, 1999). In the absence of peer norms encouraging exploratory, time-intensive social use, then parents' and teachers' emphasis on narrower, task-orientated educational use may discourage young people from experimenting with new avenue of use and forming their own views as to their costs and benefits. As previous research has shown (Robinson, 2009), the access constraints and opportunities young people face mediate this process in important ways; individuals with low levels of internet access and less autonomy of

use are more likely to exhibit this 'taste for the necessary', prioritising academic use ahead of other social and recreational forms of use which they perceive as irrelevant and wasteful by comparison.

The results did support the idea that young people with a taste for 'serious play' were advantaged in their development as internet users, as predicted by the Digital Explorer hypothesis. However, the advantage of spending time on both social and academic use was evident only for their overall level of internet engagement, and not for their internet self-efficacy, which depended more exclusively on social use. The effects of academic use trajectory on internet engagement were somewhat reduced when the social use measures were accounted for, whereas if these variables were added in reverse order, there was no such reduction for social use. This suggests that part of the increase in internet engagement resulting from academic use depended on a student's social internet use trajectory; yet a student's academic use trajectory made comparatively little difference to the strong effect of social use on their level of engagement. Thus, when students combined these two forms of use those who put more emphasis on the 'play' than on the 'serious' left high school as more confident and highly engaged internet users.

These effects for academic or social use were not contingent on how long a student had been engaging in the type of use in question. Thus, students who only began using the internet socially after Grade 8 did not appear to be overly disadvantaged by their late adoption; in fact, they displayed a slightly higher overall level of engagement than students who engaged in moderate social use (e.g. 1-3 hours each week) throughout high school. This can be explained by the fact that many of those who adopted social use were 'late bloomers', spending 4 or more hours per week on it by Grade 12. This provides evidence against the idea of technology-driven engagement; being an early adopter of a particular mode of use was less important for an adolescent's confidence and engagement than the actual amount of time they spent online and what they spent that time doing.

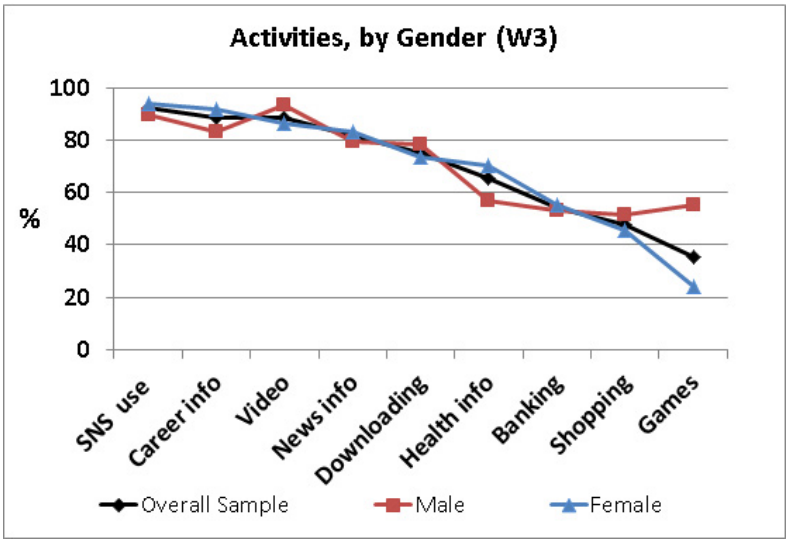
> ***DC (2b):*** *Controlling for students' academic online time use (as well as their access context and time use orientations) will help account for socio-demographic differences in internet self-efficacy and engagement.*
>
> ***DE (3b):*** *Controlling for students' academic and social time use (as well as their access context and time use orientations) will help account for socio-demographic differences in internet self-efficacy and engagement.*

The results supported (3b) more than (2b), once again lending further weight to the Digital Explorers hypothesis. Students living in an outer regional area were found to have lower internet self-efficacy than students living in a major city area, and this was explained after controlling for the time they spent on social use during high school. As noted in Chapter 4, these students began

Grade 8 with poorer access than their urban counterparts, and as a result lagged behind in their social use throughout high school. This in turn meant that they ended up with a lower level of internet self-efficacy upon leaving high school. Moreover, the findings from (1b) also show that these students ended up less engaged internet users as a result of their poorer access to technological resources in Grade 8. Combined, these findings suggest a multi-faceted process of cumulative disadvantage by which the barriers to internet access and use faced by students in regional and remote areas impede their longer-term development as internet users.

Meanwhile, girls also displayed less confidence in their online abilities than boys, even after their academic and social use trajectories were accounted for. As noted earlier, there is mixed evidence as to whether this difference in self-perceived online skill has any basis in actual skill differences (Hargittai & Shafer, 2006). While this analysis does not address this question directly, varying participation rates of males and females in the online activities examined here may help to explain this difference in self-efficacy. The additional descriptive analysis in Figure 5.8 shows that in Grade 12, males engage more in activities associated with higher internet self-efficacy, such as watching videos, downloading media, shopping, and playing games. By contrast, females engaged more in social networking and information-seeking which require topic-specific interest and skills less specific to the medium itself, such as an awareness of source reliability and sensitivity to social etiquette. Thus, while males may excel on the operational skill dimension required for broader and more frequent internet use, the capabilities of female users may negate this advantage if it allows them to integrating their use more effectively into their academic and social lives.

Figure 5.8: Participation in online activities, by gender



Although the expected relationship between a respondents' socioeconomic background and their internet self-efficacy was not found, there are several limitations which may account for this. For instance, the analysis does not account for change in the parental socioeconomic status between waves 1 and 3, or in respondents' own occupational situation during this time. Part-time and casual employment during school may provide students with the financial resources needed to fund technological resources that their parents are unable or unwilling to provide, thereby extending the autonomy they have over how those resources are used. Another limitation, noted above, is that the measure of internet self-efficacy is does not capture actual differences in skill; nor is it able to account for how confident young people are with respect to broader social and informational abilities needed for effective internet use.

Conclusion

This chapter has examined several approaches to explaining why it is that young people vary in the breadth and frequency with which they use the internet. It shows that elements of each of these approaches are critical for understanding why these differences arise. As predicted by the Digital Natives model, unequal access to technological resources early on appears to impede young people's development as internet users (Eastin & LaRose, 2000; Rogers, 2003). Better access may enable such broader and more exploratory use but it by no means guarantees it. In this regard, the Digital Connoisseurs model rightly notes that the time, resources, and capabilities users have at their disposal, as well as their broader orientations, are critical in differentiating young people in what they do online and what they are likely to get out of their use (Bourdieu, 1986; Zillien & Hargittai, 2009). However, the reproduction of inequalities through internet use does not adhere perfectly to the logic of 'capital enhancement' and approved taste judgments; rather, the online context is a space in which the conceptual distinction between status-specific modes of use is increasingly difficult to maintain in practice, particularly as multi-tasking becomes more prevalent. Within this space, a taste for the unexpected pays a higher dividend than a taste for the necessary, since internet use can enhance an individual's autonomy only as far as the individual is able and willing to broaden their horizons online. Consistent with the Digital Explorers model (Giddens, 1984; Robinson, 2009), cultivating this taste for exploration has its own high cost, in terms of access and autonomy, which suggests that traditional processes of stratification constrain young people in new ways as they engage with the internet in their everyday lives.

Chapter 6 - Permission to Explore:

Perceived Rewards and Risks of Internet Use Between Adolescence and Adulthood

In this chapter I explore young people's own accounts of changes in their internet use during high school, and how they see the internet fitting into their lives after leaving school. This analysis complements and extends the quantitative analysis presented in Chapters 4 and 5. Findings from those chapters suggest that, during the transition from adolescence to adulthood, various factors make it easier for some and more difficult for others to develop into confident and highly engaged internet users. How young people ultimately learn to evaluate the possibilities of internet use in their daily lives is likely to mediate its impact on economic, social, and cultural participation. As such, this chapter focuses on the following research question:

> **RQ3: How do young people's internet use experiences during school affect their perceptions of the benefits and costs/risks of internet use after leaving school?**

To address this question, I analyse the data from interviews that were conducted with a small, strategically chosen group of respondents in the year after they completed high school (aged 17/18). The interviews focused on a range of issues including respondents' everyday life contexts and time use commitments, their internet access and autonomy of use, their internet use priorities, and the perceived benefits and costs of certain types of use. In accordance with the triangulation approach outlined in Chapter 3, the qualitative analysis in this chapter complements and extends the quantitative analysis in two important ways: by illustrating how respondents' context-specific experiences of key explanatory factors and processes examined previously; and by eliciting respondents' own views about the outcomes of their use.

Background

The theoretical approaches examined thus far help to explain how young people's perceptions about internet use develop over time. The Digital Natives approach implies that these are based on the technological affordances of internet use, and thus driven by innovation processes which spawn new varieties of access and use (Prensky, 2001; Rogers, 2003). The Digital Connoisseur approach suggests that they are conditioned by broader norms, rules and expectations regarding how young people should behave with digital media as they grow older (Bourdieu, 1986; Hargittai, 2008). Finally, the Digital Explorer approach emphasises the processes of enactive learning through which young people make their own judgments about which internet uses work for them, based on past experiences (Giddens, 1984; Livingstone & Helsper, 2007).

The Digital Natives approach: Access & a priori affordances

The Digital Natives approach assumes that young people's ideas about the benefits and costs of using the internet are based on the inherent features of the medium itself. This relies on the instrumentalist idea that the 'function' of a particular internet use is an *a priori* feature of the technology itself, rather than a product of its use in a particular situation (Feenberg, 1991). As outlined in Chapter 2, this premise is assumed in the diffusion of innovations (DoI) and information systems research traditions, including in the digital divide literature. Such work contends that perceptions about the attributes of a new technological innovation or system (e.g. concerning its relative advantages, compatibility, complexity, usefulness, image, voluntariness, and subjective norm) explain adoption decisions and trends (Davis, 1989; Rogers, 2003). DoI theory suggests that potential adopters form increasingly accurate perceptions about these attributes as they progress through the 'innovation-decision process', in which they (1) gain knowledge of the innovation; (2) form an attitude about it; (3) decision about whether to adopt it; (4) implement it once adopted; (5) and either confirm or reject the decision to adopt (Rogers, 2003).

Their portrayal as Digital Natives implies young people are endowed with characteristics that situate them at the forefront of this process; for instance, they are presumed to be more innovative, cosmopolitan, tolerant of uncertainty, adaptable to change, and highly exposed to communication channels (Prensky, 2001; Rogers, 2003). Yet although the DoI approach has been used to explain the adoption of a wide range of ICTs (Steinfield et al, 1989) and particular online activities (Nguyen, 2008), less clear is the extent to which it pertains to post-adoption trajectories of use (Jung, 2001). Some research suggests that following adoption, perceptions about instrumentality (i.e. usefulness), enjoyment, and image become increasingly important (Davis, 1989; Karahanna et al, 1999, Teo et al, 1999). Others suggest that Rogers' innovation decision process itself may be more complex and varied than previously thought, particularly when applied to specific types of use. For instance, Burrell (2012) suggests that three types of innovation decision pathways are possible over time: *intensification*, where individuals engage in the same activities with increasing frequency and efficacy; *reorientation*, where individuals tailor their use as their ideas about the technology and its possibilities evolve; and *discontinuance*, where individuals abandon certain types of use they no longer find beneficial (Burrell, 2012). If this is the case, further attention is needed to young people's broader motivations for using technologies, the changing expectations they have of them, and the experiences these are based on. Nonetheless, the DoI approach still implies that young people's developing ideas about the possibilities of internet use will mirror changes in the medium itself, and its a *priori* affordances, since they began using it.

The Digital Connoisseurs approach: Norms, rules, and expectations

The Digital Connoisseur approach suggests young people's views about the benefits and costs of internet use depend on the norms, rules, and expectations that apply to their use during adolescence. This approach rejects the instrumentalist view of technology, instead postulating that that the 'function' of internet use is constructed within key social and cultural discourses surrounding adolescent internet use. Parents, teachers, and schools often construe academic internet use as legitimate, desirable, and appropriate via a range of informal means (e.g. norms and expectations) and formal means (i.e. explicit rules and regulation). At the same time, this characterisation may be reproduced or contested within a user's peer group, family context, or by users themselves as they seek to legitimise social and recreational uses they find meaningful and worthwhile. Perceptions about usefulness, image, voluntariness, and subjective norm are thus important for shaping how a young person's internet use develops. These characteristics have less to do with the technology itself and more with what its use signals about an individual and their position within the social hierarchy.

This approach implies that young people are not neutral in their orientation towards internet use to begin with, but rather their perceptions about the benefits and costs of different types of use vary in ways which may reproduce social inequalities (Bourdieu, 1986; DiMaggio et al, 2004; Hargittai, 2008). This reproduction of inequality involves three related processes: (1) young people internalise status-specific evaluations about what constitutes beneficial and worthwhile use from others around them (e.g. parents, siblings, teachers, and peers); (2) this internalisation is reinforced by mechanisms (e.g. norms, rules and expectations) which reward certain uses, and marginalise others, that take place within a given context; and as a result, (3) young people are further differentiated in their access to the economic, social, cultural, and technological resources needed to comply with the internet use expected of them within this context. Accordingly, the Digital Connoisseurs approach suggests that this process of cumulative advantage interacts with, and compounds, broader inequalities in young people's pathways through education, work, and family/social life as they transition to adulthood.

Existing research suggests that when adolescents first engage in internet use, this largely occurs within a discourse of academic necessity where narrow, task-orientated use (e.g. school-based information-seeking) is encouraged (Kalmus et al, 2009; Livingstone and Helsper, 2007). Angus et al's (2004) qualitative exploration of young Australians' ICT use at home and school found that this academic orientation was reinforced by the close ties which existed between parents with higher economic or cultural capital, and their children's schools. Consistent with Coleman's

(1988) idea of 'intergenerational closure', these ties ensured that parents and staff remained on the same page with respect to the kinds of online behaviour they expected of children, and the appropriate means of regulating such behaviour. In spite of this, most qualitative research suggests a vast discrepancy between the quality of access provision and the autonomy of use young people experienced at home and at school. Where most schools employed restrictions, surveillance, and other measures designed to promote academic use, parents' use of such measures at home was much more varied (Livingstone & Helsper, 2008). While some students view this surrendering of autonomy as necessary in the context of their broader education, others see it as an unwelcome obstacle to engaging in social and recreational uses they are familiar with and which are recognised by their peers. This approach suggests that Digital Connoisseurs learn to engage with the internet selectively based on their perceived audience; some will gravitate toward a school-orientated engagement in compliance with their parents' and teachers' rules and expectations, whereas others gravitate towards more social/recreational uses that are rewarded by the approval of their peers.

The Digital Explorers approach: Enactive learning and rational decision-making

Finally, the Digital Explorers approach suggests that young people learn to evaluate the benefits and costs of internet use by experimenting with different uses and experiencing their outcomes in varying contexts. This implies that the ubiquitous nature of internet access, and its potential to be used for any number of purposes, creates endless ambiguity about the benefits and costs of use in relation to any given discourse. As a result, the 'function' of internet use can only be meaningfully understood in relation to the individual - or more precisely, to the experiences he or she draws on to evaluat the outcomes of such use. Livingstone & Helsper (2007) argue that broad and frequent internet users are able to draw on a wider range of experiences to more accurately evaluate these outcomes. Consistent with Giddens' (1984) idea of structuration, they are well placed to tailor their use to their changing needs and circumstances (Livingstone & Helpser, 2007).

Several qualitative studies have examined how young people's changing internet access, autonomy of use, and usage priorities shape their individual orientations towards internet use over the longer-term. In her study of internet use amongst economically disadvantaged American teenagers, Robinson (2009) found that young people learned to enact different 'strategies of action', which reflected the kinds of internet uses that were possible in their particular circumstances. Accordingly, those with less access and autonomy of use enacted a 'taste for the necessary', rationing their use to give task-orientated schoolwork priority, while other activities were perceived as unnecessary and wasteful. Meanwhile, those with a higher level of access and autonomy engaged in what she describes as 'serious play', characterised by more open-ended browsing.

Similarly, Ito et al (2010) reconcile findings from a range of ethnographic case studies comprising the 'Digital Youth' project to understand how American youth incorporated media into their everyday lives. They identified three 'genres of participation' to encapsulate the sets of new media skills, objectives, and practices they observed: (1) *Hanging out* - a friendship-driven form of engagement focused on maintaining offline ties online, sharing links, music, games, and organising gatherings and social contact; (2) *Messing around* - a transitional phase between friendship-driven and interest-driven forms of engagement, which coincided with more intensive use, internet in exploring and customising different technologies and their uses, editing and producing content; and (3) *Geeking out* - an interest-driven form of engagement which emphasised specialised knowledge and expertise, frequent use of diverse media, alternative models of status, and a willingness to challenge established rules and norms. This approach suggests that Digital Explorers experiment with school- and peer-orientated activities that they perceive as having a low risk, and which can therefore be easily abandoned, before progressing towards more expansive and rewarding use once they are confident and skilled enough to mitigate the higher risks attached to these activities.

As per the explanatory framework outlined in Chapter 2, I use these perspectives to help illustrate potential links between young people's early internet use experiences and their perceptions about the benefits and costs of internet use. The object of this chapter is not to evaluate which of these accounts is best supported by the interview data. Rather, consistent with my triangulation approach I draw on these perspectives, and on my earlier findings, to provide a richer interpretation of this data than would otherwise be the case. I contribute to the research highlighted above by displaying the utility, in this particular context, of the concepts and processes to which they refer.

Figure 6.1: Interview Sample Typology

Group 1: *Less engaged* n=5 Low social (0-3 hrs p/w) Low academic (7+ hrs p/w)	Group 2: *Academically-orientated* n=5 Low social (0-3 hrs p/w) High academic (7+ hrs p/w)
Group 3: *Socially-orientated* n=5 High social (7+ hrs p/w) Low academic (0-3 hrs p/w)	Group 4: *All-rounders* n=5 High social (7+ hrs p/w) High academic (7+ hrs. p/w)

Methods

Interview Sample Typology and Characteristics

Details about the sample selection, recruitment, and interview processes are contained in Chapter 3. As outlined there, this qualitative research is integrated with the quantitative analysis via the nested sampling typology shown in Figure 6.1. Participants were chosen to represent ideal types in terms of their social and academic internet use during wave 1. After selection criteria were applied, I used the resulting recruitment typology (n=281) to select five interviewees from each of the groups shown in Figure 6.1: (1) 'Less Engaged' users who spent little or no time on either activity during wave 1; (2) 'Academically-Orientated' users who spent much time studying online and little or no time on social use; (3) 'Socially-Orientated' users who spent much time socialising online but little or no time on academic use; and (4) 'All-Rounders' who spent much time on both activities.

Table 6.1 also shows that both the recruitment typology and the interview sample represented a broad cross-section of the original sample, containing a mixture of males and females from different schools and regions. In the quantitative analyses, gender, schooling sector, and geographic region were important predictors of young people's internet engagement. Accordingly, such diversity makes it possible to identify potential longer-term consequences arising from these influences; for instance, these factors influence typology group membership in ways that are consistent with the findings of Chapter 4 (i.e. regional participants are overrepresented amongst 'Less Engaged' users, while females are more likely to be 'All-rounders').

Table 6.1: Qualitative Sampling Characteristics

	Full Sample (Wave 1)		Recruitment Typology		Interview Sample	
	n	**%**	**n**	**%**	**n**	**%**
Gender (Grade 8)						
Male	2,989	43%	122	43%	11	55%
Female	4,014	57%	159	57%	9	45%
School sector (Grade 8)						
State	3,569	51%	153	54%	12	60%
Catholic	1,309	19%	84	16%	7	35%
Independent	2,153	31%	44	30%	1	5%
ABS Remoteness Area (Aged 12 years)						
Major City	4,043	58%	153	54%	14	70%
Inner Regional	1,679	24%	68	24%	6	30%
Outer Regional	1,027	15%	53	19%	-	-
Remote or Very Remote	282	4%	7	2%	-	-

Key interview topics

The interviews for this research were designed to elicit respondents' own accounts of how and why their internet use had changed over the years, and their current views about its role in their lives. The interview schedule (see Appendix G) was structured loosely around four key topic areas.

Everyday Life Context & Time Commitments

Respondents' needs, motivations, and preferences for media use in their everyday lives are likely to affect what they see as the benefits and costs of going online. To better understand the interviewees' life contexts, I asked about their experiences of the transition from school to work or tertiary education, their career aspirations, and the activities (e.g. study, work, social, and leisure) on which they currently spent their time. This information was then combined with respondents' survey data to provide a more comprehensive overview of their backgrounds and time use practices. A summary of this information for each participant is included in Appendix H.

Changes in Use Priorities

A key aim for this research is to allow respondents to provide their own narrative accounts of how and why their internet use had changed during high school. Interviewees were asked to describe the key events and experiences which first led them to become internet users, and which shaped their views about the risks and benefits of internet use over time. They were encouraged to reflect on what their changes in internet engagement had meant for their broader aspirations and time commitments during high school. Lastly, I invited interviewees to comment on changes in their access to digital resources and the extent to which these influenced what they did online.

Access and Norms/Rules Regarding Use

Previous research suggests that different characteristics of the access context influence how young people perceive and engage in internet use. Respondents were uniquely positioned to describe the various rules, norms and discourses which they felt applied in certain settings, and whether these enabled or constrained them in their internet use. In particular, I explored how interviewees' parents, teachers, and peers, as well as interviewees themselves, sanctioned or reprimanded certain types of internet use. I also examined interviewees' experiences of those access context factors already measured quantitatively, such as different forms of internet access, varying connection speeds, and the exclusivity/location of their access (i.e. whether they had their own computer, where it was located etc.).

Perceived Benefits & Risks of Use

Finally, respondents' ideas about the benefits and costs of different online activities are likely to shape how their internet use develops over time. I discussed with interviewees what they currently used the internet for and how much time they typically spent online; this enabled me to ask them about the advantages and disadvantages of those activities which they explicitly mentioned doing, and to seek their views on other major forms of use which they did not mention. In doing so I was able to supplement the survey measures for time use with interviewees' own accounts of the time they spent online and the circumstances in which this varied. In contrast to the measures available in the survey, the interviews provided a deeper insight into the kinds of challenges and opportunities respondents had encountered whilst online, as well as any strategies they employed for managing these and the extent to which they felt that these worked.

Analysis

As outlined in Chapter 3, in conducting the research for this chapter I employed an interpretivist approach to better understand the different meanings internet use can be given (Silverman, 2001). Although the qualitative coding and analysis of interview data[4] was structured around the four topic areas described above, 'free nodes' were used during the coding process to identify unstructured, empirically-driven themes that might be of relevance (Richards, 1998). The analysis proceeded in three stages. First, respondents' accounts of their internet use during school were examined for key patterns and themes. During this process, several patterns relating to changing access, autonomy of use, and use priorities were found. Further, two contrasting themes about the role of internet use during the transition to adulthood were identified using free nodes. In the second stage, respondents' ideas of the benefits and risks of internet use were analysed, and three discourses were identified. Finally, respondents in different typology groups were compared on these findings, so as to illustrate key similarities and differences between them.

Results

The results of this analysis are presented as follows. The first section explores interviewees' initial experiences of internet use, and the second section follows their development as users during high school. Throughout these sections, I identify two distinct ideas about where internet use fits into the transition to adulthood, and their implications for respondents' internet engagement: the discourse of 'technological maturity' sees internet use almost as an end in itself, a way to signal one's identity, specialised knowledge and interests, and situate oneself in relation to one's peers;

[4] Data was coded and analysed in using nVivo (version 10)

whereas the discourse of 'academic maturity' sees the internet more as a tool to be used in ways that contribute to one's future educational and occupational career. Changes in respondents' access and autonomy of use affected how they navigated the tension between these discourses, and these are explored in the third section. Finally, the last section examines how interviewees perceive the benefits and costs of internet use in their lives after school; it suggests that their earlier experiences, and this interplay between competing discourses about maturity, continue to shape the possibilities they see for incorporating internet use into their lives going forward.

Starting out: Participants' first experiences of internet use

When asked about their first memories of using the internet, most interviewees described first going online around the middle of primary school (e.g. Grades 4-6, aged 8-11 years). The earliest to do so recalled using the internet in Grade 1 (aged 5 years), whereas several interviewees had only begun using the internet around when they were entering high school in Grade 8 (aged 12-13 years). Many remembered going online in the course of doing research for a school project or assignment, often noting that it was a parent or teacher who prompted them to do so. One example of this was provided by Adrian:

> Yes, it was in Year 3 and I needed to find out something for school so Mum thought it would be a good time to introduce me sort of thing to the internet, even though you could go make a cup of tea by the time the page had loaded, just to find out something about insects.
>
> **Adrian** (Academically-Orientated)

Underscoring the role of norms valuing schoolwork, this experience led Adrian to view his use of the internet for academic reasons as consistent with his mother's expectations, which in turn agreed with those of his school. The timing and nature of this type of engagement also depended on when, and to what extent, such use was integrated into the school curriculum. Another interviewee, Amy, noted that she didn't begin using these technologies until high school, because her primary school preferred students to research 'out of books' and for assignments to be handwritten:

> In Grade 8 we had assignments - all your assignments had to be typed. A lot of the research you did online. The school - you had to go into the school webpage to get the assignments and get information and check your emails. It was the school that really started me using it.
>
> **Amy** (Academically-Orientated)

Thus, despite having had computer and internet access at home for some time, Amy didn't go online until her new school made it a requirement. Since she could only access assignments and other school-related information through the school website, internet use was now mandatory if she wanted to keep up with her work. Her transition to high school was made more disruptive when she

had to learn to integrate these technologies into her academic routine, but her adjustment was supported by the digital resources to which she already had access at home, and as will be shown later, her mother's strict rules about academic use. The experiences of Adrian, Amy, and other Academically-Orientated users show school-based uses becoming popular in early adolescence because they were driven by extrinsic motivations and the collective encouragement of parents, teachers, and the schooling system (Kalmus et al, 2009). That many interviewees only went online when prompted to do so, or their schools left them little choice, runs counter to the idea of intrinsically savvy Digital Natives who are instinctively aware of the benefits of internet use.

Nonetheless, there were other instances where early internet use was driven more by the intrinsic enjoyment, and existing leisure practices, of children themselves. Examples of this kind of engagement arose when interviewees were already playing a computer game offline and went online for reasons relating to this. For instance, Michelle, who was in the Socially-Orientated group, recalled playing a Barbie game where she had to go online to access downloadable content. Once online she began using a kids' search engine called 'Yahooligans' to look for games and jokes. Olly, who was from the same group, began using the internet with the goal of updating a computer game he was playing, before his use expanded into other areas:

> **Olly**: Well first I went out from using games to - because I had to go onto the internet to find the updates to those games. Then I saw that there were also gaming news websites that had some interesting articles. It just branched out from there. Now I use all sorts of things.
>
> **JS**: What else, apart from gaming news or things like that?
>
> **Olly**: Well sometimes I look at the ABC News. I also tend to get a lot of my TV shows on the internet, through free-to-air, their catch-up programs.

Where Adrian and Amy remained narrower and more task-orientated in their use as they progressed through high school, Olly's use grew broader and more interest-orientated, reflecting the intrinsic curiosity and self-directed exploration with which his engagement began. Other respondents initially undertook what Hasebrink et al (2009) considers 'edutainment' uses: informative activities which students perceive as fun and interesting, and which reinforce skills and dispositions that are rewarded in the academic context, such as information-seeking. Steve, another member of the Socially-Orientated group, described his initial use as 'Googling stuff… a little bit of assignments, but mostly just playing around', while John recalled browsing online encyclopedias and looking up recipes. Such activities defused any potential tension between respondents' own needs for enjoyment and the academic expectations placed on them, affording them a mixture of skills and experiences on which to draw once such tensions became unavoidable.

Growing up: Participants' changing internet use priorities during high school

As they grew older, changes in the interviewees' circumstances and priorities shaped the internet's developing role in their daily lives and presented them with significant choices about use. In particular, when interviewees began to lead more active social lives during high school, they found that online activities uses such as email, instant messaging, and social networking, became increasingly useful for maintaining interpersonal relationships and social interaction. For respondents like John, who until this point had only engaged in academic use, receiving his own computer and being able to participate in these activities marked the beginning of a more personal trajectory of internet engagement - one which paralleled developments in the medium itself and his level of access:

> Yeah I didn't use the internet for anything personal until the invention of - when I got my email address. I think in Grade 8 I got my first Hotmail address, which led to MSN Messenger, which was kind of the basis of social networking in that it's live chat. Then Windows Live through your own Hotmail and stuff like that. They actually made a 'spaces' kind of thing before MySpace and Facebook. So I had one of those in Grade 9 and that's just kind of where it all started. I didn't use the internet for anything personal until probably about the same time that I got my own computer really.
>
> **John** (Less Engaged)

For others who were already engaging in recreational activities such as online gaming, increasing academic and social commitments meant that they needed to discontinue such use to make time for these new social activities. Sarah, who was one of the few female interviewees still playing games during high school, recalled how the need to keep up with schoolwork and trends in social media use left little time for gaming:

> Probably going into high school I guess is when I started studying more and things like that. I probably would have been around Grade 10. I was spending a lot of time on assignments and things like that, so I guess that's when I stopped playing games probably just because I'd run out of time for it. Then it was kind of like - and then everybody got Facebook. I didn't get Facebook straight away. I didn't want it at all and then it kind of got to the point where I was like let's get Facebook, everybody's on Facebook. So then I got that and I guess that's why I use it now yeah.
>
> **Sarah** (All-Rounders)

Sarah was reluctant to adopt Facebook, but since so many of her friends were using the site to organise events, she risked being unintentionally excluded if she did not join. Highlighting the role of peer network externalities, the growing popularity of social networking had made non-engagement increasingly problematic for her. John and Sarah's accounts illustrate the perceived importance of keeping up with the social use of one's peers. As well as the pragmatic need to remain socially engaged, interviewees assigned symbolic importance to the timely adoption of new social uses. Respondents used timelines as narrative devices to situate their development as internet

users in relation to that of their peers, and to highlight the obstacles preventing them from meeting what they perceived to be key developmental milestones. For instance, Bernard described how his timely entry into social use was impeded by his parents' access restrictions:

> Well, the first foray into that thing would have been MSN, which I think I only got that in Grade 8 or 9 or so. Other people had it sort of like Grade 6 or 7. I don't know. I think my parents had some stupid excuse like we didn't have a fast enough internet or something like that. I would go over to a friend's place and they were there and I always thought this is the greatest thing of all time… Yeah, back then it was MSN. Then it turned into - like, either we would have had them on MySpace and all that sort of stuff. But, yeah, MSN was really where it all started.
>
> **Bernard** (Academically-Orientated)

Others - typically those who had experienced better access and autonomy growing up - situated themselves as earlier adopters on this timeline, influential in shaping the behaviour of their more underdeveloped peers. Steve, who was from the 'Socially-Orientated' group, described how he was the first amongst his friends to start downloading pirated movies. Through his early adoption of this practice he elevated himself above his peers by virtue of his expertise, which he subsequently 'passed down the chain so now everybody has the knowledge and skill to do that sort of stuff.' For Steve, keeping pace with technological change in this way was an integral part of growing up:

> The whole thing is, you sort of develop with the internet, you know? It was - the internet wasn't always like that. As you grow up, you assimilate new things into your - I suppose your computing experience. Like Facebook - that hasn't always been around. YouTube hasn't always been around. You haven't always been able to open a few tabs at once. So I suppose as technology has developed, I've assimilated those things into my use of it.
>
> **Steve** (Socially-Orientated)

In Steve's view, developments in technology form a symbiotic relationship with his own emerging needs and priorities during adolescence; failing to keep pace with the normal timeline of engagement signals technological immaturity relative to one's peers, whereas technological innovation and leadership is evidence of one's sophistication and status. This was in contrast to more 'Academically orientated' users, for whom internet use was something to be co-opted selectively into their longer-term plans, as a mark of individual responsibility and refined tastes.

Underpinning these contrasting approaches were two distinct ideas about the legitimate pathway to adulthood. The discourse of academic maturity rewarded scholastic excellence, the surpassing of curricular requirements, and performance under pressure. It framed events such as final examinations, university entrance, and getting one's first job, as key milestones for displaying fitness for the future roles and responsibilities of the adult world. Meanwhile, the discourse of

technological maturity kept this future at a distance, grounding interviewees in the present. It afforded a reprieve from academic pressures, only to replace these with peer-based norms and expectations, such as those of the social use timeline. During school, interviewees' trajectories of internet engagement oscillated between these competing obligations. For instance, Rachel described how she took up Facebook because she had 'outgrown' MSN. In this way, she had once gauged her individual development by her progression along the social use timeline of her peers. Yet as her schoolwork grew in the later years of high school, meeting her academic expectations became a new benchmark for maturity, and her social obligations became a source of distraction:

> I think with Grade 11 and 12 I realised okay, I need to start focusing more on assignments and everything rather than social stuff and then I kind of realised that that's a big distraction when you've got it constantly flashing whenever someone's talking and things like that.
>
> **Rachel** (Socially-Orientated)

When Rachel reoriented her use in response to her changing priorities, she didn't discontinue her social use entirely. Instead, she began using Tumblr, a microblogging service which allowed her to share pictures of her art and other content with people who shared her creative interests. This gave Rachel a platform for self-expression which she found more interest-orientated than Facebook, and which had less onerous social and temporal obligations than MSN chat. Having experienced the pros and cons of these different types of use, Rachel was able to bridge the distance between her academic and social priorities, finding a niche in which to explore her own interests.

Obstacles & opportunities: Participants' changing access and autonomy of use

Changes in respondents' access to technological resources, and the autonomy with which they used them, were critical in shaping their internet use trajectories during high school. From as far back as when they first began using the internet, some interviewees recalled access barriers limiting what they could do online. Those who shared poor quality internet access with other family members were constrained in the amount of time they spent online and how that time was spent. This was often the case for Less Engaged users, who were predominantly from regional areas, and for those with multiple siblings. Harriet was from a lower SES family and had shared a single desktop PC with her mother and three younger siblings. For her, the scarcity of online time meant she had prioritised schoolwork ahead of other possible uses:

> Yeah, we had to share between - I've got three siblings. So trying to find time to, you know, fit homework in and all that was difficult. That's why I ended up getting my own laptop because I didn't want to have to wait to do assignments and everything because Mum was doing her work on there as well. So, yeah, it was mainly just a time thing.
>
> **Harriet** (Less Engaged)

Even though Harriet eventually used income from part-time employment to buy her own laptop, for her and others who encountered access barriers, these experiences taught them to dismiss certain activities, such as chatting online or playing games, as wasteful and unnecessary. This highlights a difference between the usage motivations of Less Engaged' and Academically-Orientated users: for the latter group, school-based use was seen as discriminating use of available resources, whereas for the former group it was viewed as an efficient use of limited resources. As such, parental restrictions on those with poor access emphasised rationing of limited time and bandwidth. This explains why Brad, a Less Engaged user who grew up in a regional area with dial-up access, was not allowed to engage in the same recreational uses as his friends:

> **JS**: Back when you had a computer and you had dial up earlier on, did your parents have any sort of ground rules about how you used the internet?
>
> **Brad**: Yeah, don't download videos. I think that slowed it up even more. Don't play games.
>
> **JS**: Did they want you to focus on school work?
>
> **Brad**: Yeah well they wanted that and they wanted for us to both have a fair share of it.

Accordingly, school-based use carried more symbolic weight for Academically-Orientated users, because it demonstrated their capacity for self-restraint and taste, than for Less Engaged users, who had less choice about such use. In describing her mother's approach to regulating internet use at home, Amy drew an explicit contrast between her approved use for schoolwork and her younger brother's problematic online gaming:

> **JS**: Did your Mum keep an eye on you when you started using the computer in your own room?
>
> **Amy**: No because she knew that I never used it for anything I didn't - Mum knew that I only used it for schoolwork really. She's always felt she hasn't had to keep an eye on me and my younger brother, she has always had to keep an eye on him. She hasn't wanted to put a computer in his room because she knows that she needs to keep an eye on him.

By demonstrating taste judgments that were consistent with a discourse of academic maturity, as reflected in parents' rules about appropriate internet use, many interviewees were able to earn the trust of their parents and negotiate better access with fewer restrictions as they grew older. When parents set explicit rules about use, this encouraged respondents to distinguish more rigidly between more approved (e.g. academic) uses, which signaled the legitimacy of their claims for better access and more time online, and less non-approved (e.g. social and recreational uses), which undermined this legitimacy and left them exposed to greater scrutiny.

In addition to explicit rules, interviewees' parents employed other strategies to mediate their children's use. One such approach was to by denying or delaying their requests for upgraded

internet connections, better hardware, and more generous download quotas. Yet such restrictions became difficult to maintain as demand for internet use increased amongst other members of the household, including parents themselves. Thus, more commonly, access improvements were made conditional on respondents' age, grades, or other milestones within the discourse of academic maturity. During major transitions in a respondent's life, such as when they entered senior year, graduated high school, moved away from home, or attended university, there was a shared consensus between interviewees and their parents about the need for individual access and expanded autonomy of use. Accordingly, these were times when parents invested in better access (e.g. new laptops) for their children, and lifted restrictions (e.g. allowing them bedroom access).

Prior to this, a less formal way parents mediated their children's use was by maintaining a physical presence in spaces in which their use took place. Study dens, offices, and family rooms became shared spaces in which all family members had access to computers and the internet. This involved a degree of compromise on the part of children and their parents; children were allowed personal access to their own computer, but they allowed parents - in theory - to monitor how that access was used. In practice, this shared space approach was only effective when parents combined clear guidelines about use with active monitoring and enforcement. In less academically orientated families, respondents with personal access and no such guidelines became accustomed to a wider range of usage choices. When these users did encounter barriers to their use, or situations which called for self-restraint, they felt a sense of confinement and took steps to restore their autonomy. This was evident in the case of Mike, an All-Rounder from a low SES background, who for some time used his own computer in the lounge room with his parents and two younger siblings:

> **JS**: Were there many sort of rules about what you did at home?
>
> **Mike**: No, it was pretty much just use it. It used to be out in the living room so that - there wasn't any set rules. It was just common sense. You're not going to randomly go on a porn site or something in front of your whole family. So that's a little bit weird. Then I ended up just having my laptop and just got to go to whatever I wanted.

Mike acknowledges that the presence of his family prevented him from engaging in certain uses. Yet he indicates that activities like looking at pornography are inappropriate *because* his family is nearby, and not because of anything intrinsically inappropriate about the activities in themselves. Amy's priorities were firmly grounded in her academic orientation, whilst Brad and Harriet's were based on what was technologically feasible. By contrast, Mike held a more fluid understanding of how he should behave online which depended on the context of use and the norms which applied in that context. Mike grew sensitive to limitations on his autonomy of use, and he

decided on a course of action - purchasing a laptop with money from his part-time job - which allowed him to circumvent these limitations. Although Harriet took a similar course of action, she had done so to overcome a basic access barrier, and remained tentative about social and recreational uses afterwards. In Mike's case, such a purchase was explicitly motivated by the need for personal space and privacy; his access requirements had become closely tied to his sense of autonomy.

Although respondents differed widely in terms of the autonomy of use they experienced during high school, once accustomed to this freedom they were reluctant to give it up. As an only child, Steve had always had access to his own computer and no rules about his internet use. Upon moving from home to attend university, his parents had bought him a laptop; for him, the idea of using 'generic' library computers at university was now unfathomable:

> **JS**: Was it ever an option to try and use the library computers?
>
> **Steve**: I don't know. I think there's a big stigma attached with using library computers. Everyone wants to have their own computer, because they have their own stuff attached to it. They've got it set up the way they want. It's easy like that. No one wants to go and sit in a library with 50 other people using a generic computer. It's just - I don't know - that's how I feel about it.

Steve was amongst a handful of interviewees who had gone to school in a regional or remote area, and who subsequently left home to continue their education in a major city or regional centre. Like Steve, each of these respondents had gotten a laptop around the time of their relocation. However, these interviewees had also experienced much poorer and more heavily restricted access growing up, and had not developed Steve's need to keep pace with technological change. For example, having missed out on online gaming when he was younger, Brad was now content for the social use timeline to pass him by:

> I was seeing mates on Facebook and they go oh it's just a lot of crap written in there. I don't really, I don't know, I'm not really keen on talking about nothing. I suppose I prefer talking to one person at a time rather than a group. It's not really very secure either from what I understand.
>
> **Brad** (Less Engaged)

Even though Steve and Brad both had exclusive, high-speed internet access during a similar post-schooling transition, Brad still rejected as meaningless, risky, and unnecessary the popular activities which Steve felt it was necessary to assimilate into his 'computing experience'. Brad's skepticism towards social and recreational uses persisted long beyond the access barriers which first encouraged this mindset; by contrast, Steve's enthusiasm preceded the future innovations in access and use he was already to prepared to embrace.

Sandra was a nursing student from the Academically-Orientated group who also grew up in a remote area. In her case, Sandra's family didn't have internet access at home until she was in Grade 8, but by this stage she had left home to attend a private boarding school in a regional city. Sandra had only ever engaged with the internet in the academic context, first in primary school where she used it for 'basic Google', and then in high school, where internet access and non-academic use was heavily restricted for boarders. After two years at the boarding school in which these constraints made even doing her homework difficult, Sandra described how getting a laptop changed her situation:

> It changed it so much because just - up in the boarding house they had 260 girls and there was three computers, otherwise you had to go down to school and use the library. The library wasn't open during the weekends. So any computer work, any assignments you had to do, you had to do them during the week because there was just never - one of the three computers was never spare.
>
> So it was very difficult because I was new to boarding school and that was a big life change for me. I found it very difficult to settle in and get used to it. It would have made it very hard - it did make it very hard to not have the computer access as easily. As soon as I got my computer, it was great because I could just work on it in the boarding house and I wouldn't have to worry about going down to the learning centre. I could work at night time...
>
> **Sandra** (Academically-Orientated)

The cases of Steve, Brad, and Sandra illustrate the importance of changes in access - not only for increasing interviewees' autonomy of use - but also for the skills and orientations required by this autonomy. In each case, there had been a perceived discrepancy between expectations of academic and technological maturity, which the respondent felt obliged to meet, and the access and autonomy needed for them to do so. Resolving this discrepancy meant either acquiring the resources, skills, and dispositions needed for internet use, or by dismissing the expectation altogether. Less Engaged users, like Brad, learned early on to dismiss notions of technological maturity and the need to keep up with the social and recreational uses of one's peers. Yet Sandra was unable to ignore the schoolwork expected of her, because this would have been contrary to importance she placed on academic maturity. For her, this tension was resolved when she obtained a laptop that provided her with sufficient access and autonomy for this narrow, task-orientated use. However, her school's strict internet filtering and rules about use negated any opportunity for her to develop a broader sense of autonomy and technological maturity. Five years on, her laptop was now experiencing numerous breakdowns and technical issues. However, she was reluctant to accept her Mum's offer to buy her a new one 'because everything will change - all my folders will change and I just can't handle that'. Rather than embracing technology change, her inclination was to preserve a particular device ('I'm happy with it - it does what I need') that had served her well in the past, and to confine herself to internet uses well within her comfort zone:

> I feel like everyone thinks our generation is really good with computers, but I'm not. I know how to access the internet - well, everything I need to do I can do, but if it's out of that I can't do it.
>
> **Sandra** (Academically-Orientated)

These sentiments expressed by Sandra resemble what Robinson (2009) refers to as a 'taste for the necessary' - where actions which were once not possible because of extrinsic constraints (i.e. social uses and recreational uses banned at school) are constructed as unnecessary, too risky and a drain on limited time and resources - even when they become more feasible or acceptable. Directly contrasting with Sandra, Steve embraced the notion that his generation were meant to seamlessly assimilate internet use into all aspects of daily life:

> People multi-task when they learn. It's not like you would just get a book and sit down and copy out notes these days. You're always going to be doing something else, whether it be listening to music, or texting your friends, organising stuff for later. That's just how our generation works.
>
> **Steve** (Socially-Orientated)

Steve was confident in his own level of skill ('probably a 10 out of 10') and saw no reason why any member of his generation might not be capable of the technological maturity needed for broad and exploratory internet use. While other interviewees from the 'Socially-Orientated' and 'All-Rounder' groups displayed this broad, open-ended stance towards internet use, this was tempered by their parents' mediation of their use in line with the discourse of academic maturity. The trajectories of internet engagement detailed thus far provided respondents with vastly different experiences upon which to evaluate and optimise the benefits and costs of internet use.

Perceived benefits and costs of internet engagement

Interviewees viewed the role of internet use in their current lives differently based on their experiences during high school, and their related ideas about academic and technological maturity. This was evident in three discourses which emerged about the benefits and costs of internet use. The first of these ('easy to reach') emphasised task-orientated internet use and recognised the convenience of access to necessary information, goods and services. The second discourse ('reaching out') focused on socially-oriented uses, acknowledging the internet's role in facilitating social connectivity and interaction. The final discourse ('always within reach') coincided with more interest-orientated use, and a deepening engagement with the internet as a means of maintaining a continuous contact with various domains of everyday life.

Easy to reach

Internet use was perceived as convenient when it made accessing information or services easier, faster, and more affordable. Activities were perceived as convenient if they involved few potential risks and substantial temporal or financial benefits. The clearest example of this arose when respondents used the internet to find information for academic purposes. Since most respondents were in the first year of university when they were interviewed, such use was widespread. However, for those who had been exposed mainly to a discourse of academic maturity during school, it formed the core of their use and was perceived its most beneficial aspect. University-based information-seeking took two main forms. The first of these involved accessing lecture slides and recordings, assignments, and course-related resources provided by the university. For Amy, who was now studying medicine in an accelerated program with a more intensive workload, being able to access lecture notes online enhanced the time she spent in lectures:

> One of my lecturers won't put up his slides and I know that - I personally - spend the whole time writing down frantically what is on the lecture slides not what he says. Which I think if you had the lecture slides you'd be able to get more - you'd have more info to study, because you'd have the lecture slides plus what they say because you can take notes...
>
> **Amy** (Academically-Orientated)

In her case, Amy used this online content in a supplementary way so that she could improve her focus and engage more thoroughly with the lecture. Respondents also went online to research for assignments, either by accessing library catalogues and databases, or by using search engines such as Google and Wikipedia. For Rachel, who had a long commute to and from university, doing research online was convenient because it meant she didn't need to travel to the library. This in turn enabled her to assimilate online study more easily into her broader study routine at home:

> With everything else that I have to do I can multi-task with it, so I can be going on there and researching and I can be writing down, taking all my notes, typing out my assignment, doing it all, looking back at research I have in my books, looking at other textbooks I've got without carrying it all to the library.
>
> **Rachel** (Socially-Orientated)

By doing her research online Rachel was able to enhance the quality of her study time at home and avoid the time costs associated with travelling to university. For interviewees with multiple academic, social, and work commitments, not having to travel to university afforded them greater scheduling flexibility. As well as studying medicine, Carol worked two part-time jobs and experienced considerable time pressures as a result; being able to access the library's databases online precisely when she needed it helped her to uphold these competing commitments:

> I think it's helpful because it's a lot easier to access information and things like that. So if I'm at home, doing an assignment at the last minute, which I would obviously never do, but if I happened to be doing it and needed some random information, I can't go to a library. I just need to go onto the library databases, into the subject I want, into a database, search for this, find a reputable paper and information or a source to quote.
>
> **Carol** (All-Rounders)

As this passage suggests, accessing using the internet for research involved judgments about accuracy and reliability which did not apply to the use of lecture notes and other course content. Many interviewees felt the information found in books was more accurate than that found online:

> Of course. People post BS stuff online but as for books, you always know a published guide, especially respected books, you always know they'll always tell you - well most of the time they'll always tell you the truth, whereas with the internet, like I said, with 20 million something sites, five million might be accurate. The other might be trying to sell you something but let's face it, books don't try and sell you stuff.
>
> **Adrian** (Academically-Orientated)

Yet Adrian, who was studying towards a business degree, was nonetheless enthusiastic about the 'wealth of knowledge' that could be found online without having to 'waste your time in a library' or 'lug your books around'. For him, cross-checking online sources to ensure validity was a practice he had learned during his economics classes at high school. This meant he now viewed inaccurate information as a risk which applied to other users less proficient than himself. This confident attitude was shared by John. Along with many interviewees, he was sensitive to concerns about the credibility of information on sites like Wikipedia; yet rather than avoiding such sites, he found a way to use them:

> I go to Wikipedia and then read an interesting passage and then go to their reference and then read their reference and then reference that. Because Wikipedia is not reference-able because no one will possibly listen to you. So I use Wikipedia's reference and that's kind of what I did again because I kind of had the technological maturity to know that, that's where they get their information from.
>
> **John** (Less Engaged)

Compared to Adrian's approach, John's strategy emphasises finding information quickly and in a way that *appears* legitimate to his examiners, rather verifying the accuracy of this information. For John, being able to reduce the time costs of study in this way is a sign of his technological maturity. Brad regularly used the internet to do research for his studies in mechanical engineering, but displayed less confidence in his skills than either Adrian or John, and found the process of sorting through information online frustrating and time-consuming. Despite these downsides, he still views using the internet as easier than more traditional media, with which he had even less experience:

JS: Does it usually take you very long to find what you're after?

Brad: Some of the time it's pretty quick. A lot of the time it takes forever.

JS: What's the problem with that? Is it just there's too much and it's not all reliable or is it...

Brad: Just like a lot of the time you'll get things that are from forums which is next to useless, it's just opinions. Then you get a lot of advertising stuff which isn't really that accurate or that specific. Then you get some technical stuff, like with Wikipedia and it is way too technical. But it's a lot easier - well I don't know actually, I haven't used books that much. I imagine it's a lot easier than searching through heaps of books.

The convenience of online research was generally perceived as outweighing these potential downsides, as most interviewees had developed strategies which they felt negated such problems. The perceived severity of the risk and the sophistication of approach for dealing with it, were both related to a respondent's past experiences and their self-efficacy within this academic domain.

Outside of this context, activities such as online banking and shopping were also seen as more convenient than traditional means of achieving these tasks. Most respondents said they used online banking because it allowed them to manage their finances without having to go to the bank in person, or make a phone call to check their balance. While respondents placed a high degree of trust in the security of online banking sites, they were more wary of online shopping. Despite rating his online abilities as a '10 out of 10', and showing a willingness to download potentially virus-prone media from file-sharing sites, Steve felt that online shopping was too risky:

Steve: As far as online shopping goes, I try to stay away from that, just because everybody's saying you can lose your details over the internet - people can get into your money. It's almost as if I want to stay away from that just to avoid that trouble.

JS: So you don't think there's anything you can do to mitigate that risk, or is that something that you prefer to just avoid.

Steve: I do have Norton 360 (*an internet security program*) on the computer, just because of that. But it's sort of like I want to stay away from that, just to be sure. I have the safety there, but I'm not going to tempt fate. I don't want to screw up my accounts, just because of that.

By contrast, Nick offered a more modest appraisal of his skill level ('probably out of 10, a 6 or 7'), and was more confident in his ability to safely make purchases online whilst avoiding such risks. In addition to using anti-virus software, he articulated specific knowledge of the risks involved and a consistent strategy for mitigating these:

Nick: In terms of identity theft, it's pretty simple these days. In the URL bar it's got a green thing on the end if it's a secure website so if you're doing any transactions - I mean to do it through that and PayPal is so easy. It's just too easy because it's always secured and pretty much every website has it or direct bank transfer.

> **JS**: So that's the sort of thing you'll generally pay attention to when you're doing something that you think might be potentially risky?
>
> **Nick**: Yeah. I always trust PayPal, there's no reason not to trust PayPal as long as you're on the actual PayPal website. Because there are a few fake PayPal - like paypal.com or something like, there are others - but my bank is online so nab.com.au, that's always secure when you log in, and PayPal. They're the only two you really need, like you can just transfer money between PayPal and the bank and PayPal to any secure website, it's pretty easy.

Internet use was more likely to be perceived as convenient if had a clearly defined purpose, if that purpose was viewed as necessary, and if the benefits significantly outweighed the risks. Where activities like online banking and academic internet use were perceived as unavoidable tasks with remediable downsides, online shopping was regarded as a higher risk, more discretionary activity. For respondents with less knowledge or experience of how to mitigate these risks, the convenience of online shopping was outweighed by their anxieties about this activity. However, by this stage few respondents still confined themselves to internet uses which had a clearly defined purpose. Consistent with their changing circumstances and priorities, most engaged in the open-ended and interest-driven use more closely associated with the discourse of technological maturity.

Reaching out

Internet use was widely perceived as fostering social connectivity and interaction; but this was especially the case for interviewees whose internet use experiences had been framed within a discourse of technological maturity. By the time they were interviewed, all but two of the respondents - Brad and Olly - were using Facebook to maintain their existing social relationships and to foster new ones. Part of the reason why Brad didn't find Facebook appealing was because he preferred social interaction orientated towards a clearly defined purpose, and felt that communicating by email was more conducive to this:

> Usually it's more direct. You're not talking about - you sort of get sidetracked and then you're sitting around. But when it's just an email it's just to the point. It's not talking about what happened last weekend or anything.
>
> **Brad** (Less Engaged)

Despite his skepticism about many popular forms of online communication, Brad found an avenue of use - email - that was more tailored to his preference for activity-orientated interaction. On weekends Brad liked to ride motorbikes with his friends because, as he puts it: 'I don't really like sitting around and socialising - I like doing something while you're socialising.' This attitude was shared by Olly, but unlike Brad, he had grown up playing online games and learned to structure interaction around this activity. For Olly, who 'wasn't really that close to many people in school',

joining an online gaming group or 'clan' instead of Facebook had allowed him to make friends with whom he had more in common. Within the game he and his friends conversed over voice chat, coordinating their team's tactics, making small-talk, and sharing what was going on in their lives:

> **Olly**: We just - obviously, if it's a pressing situation in the game, we need to actually have our focus on that. But we tend to talk about just whatever.
>
> **JS**: Yes. So what other stuff do you normally talk about?
>
> **Olly**: Just whatever we feel like, whatever people want to talk about… One of my friends has sadly told us that he's just been to the doctor and they found out that one of his kidneys has been slightly defective from birth and it's going to cause issues.

The fact that he had never met his gamer friends in person didn't bother him: 'I feel perfectly connected. To me, they may as well be right next to me in the room.' Brad and Olly were similar in that they both cited privacy risks and lack of need as reasons why they chose not to use Facebook, but they displayed contrasting ideas about what internet use could offer them in terms of social connectivity. Consistent with his experiences growing up, for Brad the benefits of social internet use were purely instrumental; email was first and foremost a tool for working on group assignments and occasionally for arranging to catch up with friends in person. For Olly, social internet use was a solution to the alienation he experienced during school and consistent with the intrinsic curiosity that had driven his use from the beginning. Now, he fully embraced and tailored such use to cultivate new relationships that were a valuable source of social support and enjoyment.

This contrast between the only two interviewees to reject Facebook was also present amongst the majority who had adopted it, colouring their perceptions about its risks and benefits. Those who had been late adopters remained skeptical about site features which encouraged active, open-ended, and publicly visible interaction, such as commenting on status updates or on a friend's wall. Instead, interviewees like Amy preferred to confine themselves to uses which facilitated offline interactions they would otherwise miss out on:

> **JS**: Do you interact with a lot of people on there?
>
> **Amy**: No. I mainly just use it for events or - I do sometimes - I have a few friends overseas for the year so I - they're the only people that I really talk to on Facebook. I have two friends overseas and one interstate so I'll tend to either chat to them on Facebook or send them a Facebook message which is probably - that's easiest.

For this group of users, adopting Facebook was made necessary by its popularity amongst their peers, with whom it offered a more convenient way to communicate than email or chat. As Rob pointed out, 'emails are really slow… people don't really check them just as often'. Like Amy and Brad, his Facebook use was framed within a discourse of convenience rather than connectivity:

JS: What do you think you use Facebook for the most?

Rob: I think communication of people to set up times to see them in person, or very rarely do I actually just go on Facebook to just have a chat, because I'm bored.

These respondents justified their passive and limited engagement with Facebook by citing risks of information disclosure. Such risks had been emphasised in the school context or by parents:

> I think with something like that you've just got to always be careful that you don't write anything or don't put anything up that you wouldn't be comfortable with everyone seeing - future employers because companies do. I know Mum said that she knows of someone at her work that goes through and sees people on Facebook, like goes and searches their Facebook page and stuff like that before they employ people.
>
> **Amy** (Academically-Orientated)

More active and frequent Facebook users also noted these concerns about the potential for their use to damage to their employment prospects or reputation, but were less willing to forego the perceived benefits of sharing their everyday details about their lives with friends and family. For Michelle, the act of sharing involved mundane yet meaningful exchanges of information and support that enabled her to keep in touch with people she didn't see on a regular basis:

> I'll share that me and Mum have gone to the movies or that I'm sick and I'll get a post from my aunty who's all into herbal stuff and she's like try this, try this or the other day I tried baking fetta and spinach scones and I posted a photo of them and everyone's like: I want the recipe, so I had about 10 people wanting the recipe for my scones.
>
> **Michelle** (Socially-Orientated)

Similarly convinced of the benefits of sharing, Steve employed a strategy of self-censorship in order to mitigate the risks associated with this activity:

> You're always mindful of who's going to be looking at your stuff. That's just something you've got to do. Employers can go and look at your profile later on, and there's so much about that going on in the media, so I guess there is some form of censorship - self-censorship - that's going on.
>
> **Steve** (Socially-Orientated)

Others, like John, used privacy settings to reconcile the obligations they felt to include people on Facebook with the freedom they sought to express themselves in this space:

> For example I have my taekwondo instructor as a friend on Facebook, he's 65 or something. I have him as a friend on Facebook but I've blocked him from seeing my statuses because I believe I shouldn't not have him as friend because that would be rude, but then half the things that I post on I would rather him not see. Because I feel that our relationship as a student and an instructor would be changed if he saw, you know, what happens in my life every 40 seconds.
>
> **John** (Less Engaged)

As this passage suggests, the costs of social use began to outweigh the benefits for respondents when they felt a discrepancy between how they wanted to express themselves online, and what they felt was expected of them by their online audience. Self-censoring and adjusting one's privacy settings enabled savvier respondents to reduce this discrepancy by reflexively managing the expectations of those with whom they already interacted offline. Even though most interviewees reported only adding someone on Facebook if they had already knew them beforehand, respondents employed varying criteria for determining whether to add someone. More reluctant and risk-averse users, such as Amy, employed a strict criteria based on prior physical contact with the person:

> I generally don't add people. I generally - if someone adds me and I know them and I've met them in person more than once… I sound like a freak. But no, I have to have met them in person and know who they are and be at least sort of friends with them, can't just be some random - I won't accept randoms.
>
> **Amy** (Academically-Orientated)

Even though interviewees who employed this zero-tolerance approach interacted less online, many appeared to lack the social information-processing skills required to enforce this approach - thus remaining potentially vulnerable. For instance, Harriet recounted one experience in which she had unwittingly added someone she didn't know on Facebook:

> Generally if I don't know someone I won't add them. I think I've had one incident but that just happened to be that they had the same name as someone that I knew. Once I realised it wasn't them I just deleted them anyway.
>
> **Harriet** (Less Engaged)

Other more engaged users, who recognised the potential for interest-driven relationships with individuals beyond their immediate social networks, were at times more flexible with respect to such criteria. For instance, the prospect of romantic or sexual encounters had in the past led Mike into risky interactions with anonymous strangers:

> Yeah, I had a bit of weird people add me. Say, like random Indian dudes or something when they go on webcam. It's like this really old guy and he thinks that I'm a girl or something, delete, block. Yeah, that used to happen actually a bit because I used to add randoms too. I'd put my MSN address up for anyone to add.
>
> **Mike** (All-Rounder)

Mike noted that such experiences taught him to only interact with people he'd already met in person, but his current approach to adding people on Facebook still suggested that the perceived benefits of social connectivity still obscured any these potential risks:

> I'll go and look at their photos, if they look familiar, if they're from a neighbouring school or something. If it's some random from Victoria I'll probably just decline. Then, at a point, it sounds quite shallow - say, if it's a good-looking girl I'll probably just accept.
>
> **Mike** (All-Rounder)

As noted earlier, Mike had learned to engage with the internet in a home context where he actively sought out exclusive internet access and experienced little parental regulation of his use. Although Carol grew up with similar access and autonomy, she had a clearer understanding of her mother's concerns about the risks posed by online predators ('I know that she's very, very wary about that'.) As such, Carol articulated a more sophisticated strategy for verifying online identity:

> Like on Facebook, like you don't add people you don't know. It's as simple as that. If you're adding a friend of a friend or something like that, you can usually check dodgyness. Like there's lots of measures you can take to check dodgyness, like looking at the page, seeing how many friends they have. If it's a tiny number of friends, then you're like, oh, this is probably a fake person. Or if they've got like one dodgy photo of themselves, that's like oh this is probably a fake person. So you can look at things like that.
>
> **Carol** (All-Rounder)

In checking for 'dodgyness', Carol displays credibility assessment strategies, such as the cross-verification of sources, which one would expect to see in the academic context. When Carol branched out to establish a new relationship with someone she met online, she displayed awareness of the risks and confidence in her ability to mitigate these risks:

> **Carol**: If you're meeting someone from online, you don't - like you go with a friend or meet in a public place. Like you. I had no idea who you were. I met you in a public place.
>
> **JS**: Is that something you've done much before?
>
> **Carol**: I have actually. Yes. I met one of my previous boyfriends actually online. We - yes, I met him after a while talking. So I met him in Southbank in the middle of the day with my friend there.

Consistent with the discourse of technological maturity, Carol and Mike had grown up with more exclusive internet access with fewer restrictions on their use, and displayed a willingness to fully embrace the internet as a medium for expanded social connectivity. This orientation was grounded in a desire for meaningful social interactions centred around shared interests and experiences. However, it also required risk mitigation strategies, such as the ability to critically examine social identity cues in ambiguous online contexts, combined with self-regulation in the face of opportunities for social gratification. Carol, more so than Mike, had learned to reconcile academic and social internet uses during school, and developed these capacities for social information-seeking and academic self-discipline.

Always within reach

The more respondents used the internet, the more they reported feeling continuously within reach of the places, people, information, and other resources to which the internet afforded them this access. This was especially the case for respondents who had reconciled the discourses of academic and technological maturity throughout school. For instance, several respondents described how their internet use enabled them to keep up track of developments in news and current affairs. Jennifer, who had been the earliest amongst her friends to adopt Facebook, now prided herself on having been the first on Facebook to share news about the death of Osama Bin Laden:

> Like I remember hearing about Osama Bin Laden, that was before actually like the President announced it. Because someone had like posted it like on Twitter and then it was posted on Tumblr. Like I was the first person on Facebook to have a post about it, it was like two hours till someone else posted something. Like it's really, because it's really quick.
>
> **Jennifer** (All-Rounder)

Jennifer was able to leverage her frequent use of social media, and the sought-after information it yielded, to position herself as a gatekeeper and a knowledgeable expert within her own social network. Just as when Steve disseminated his knowledge about how to download pirated movies, this act of sharing enabled Jennifer to display her technological maturity to her peers, thereby potentially enhancing her status. For less socially-orientated users, like Bernard, the instantaneous nature of online news meant he could experience major events as they unfolded:

> I do like having - because I always have ABC News up - and I do like having the news just there and all that, like instantaneous news. For example, I was up the other night and I was about to go to bed and then I just thought okay, I'll just check the news. It said breaking news, Gaddafi captured, possibly dead. So I went, wow. Okay? So then I would do that, turned on News 24 so that was really good and I really thought - thank you internet!
>
> **Bernard** (Academically-Orientated)

Bernard liked 'having the news just there' at his fingertips because this ensured he could regularly check for developments, and then go and watch more extensive television coverage whenever something piqued his interest. This practice of 'just checking', widespread amongst those interviewed, was a key feature of the discourse of continuity; to stay accessible to others and to guarantee that vital information did not pass them by, respondents needed to constantly, actively monitor the internet. This gave them an overview of developments in the context of their daily lives, such as when John checked his bank account online to keep track of his finances:

> **John**: I do internet banking, so I check my banking at least once a day. Because it's just - two jobs and a lot expenses, I want to check what's going in and what's coming out.
>
> **JS**: It's easy to keep track of you think?
>
> **John**: Yeah I kind of check it and then say you know I've spent ten dollars on lunch today so there is it there. That's why that ten dollars is gone from there.

By opening processes in their lives up to scrutiny in this way, the practice of checking instilled in interviewees a sense of pervasive change throughout their life contexts and circumstances, and an insatiable need for information with which to process, participate in, and influence such changes. For more engaged users, this manifested itself as a perceived lack of control which they could only restore through more rigorous checking practices. This is how the discourse of continuity perpetuated itself, driving respondents towards a deepening, more intrusive, yet more seamless integration of internet use in all areas of their lives.

In Bernard's view, his decision to check the news was rewarded because it led to the excitement of watching a major news story unfold in real-time. However, the thrill of experiencing this development first-hand came at a cost to his usual routine - causing him to go to sleep later when he otherwise would have. The ubiquity of access many respondents enjoyed meant that, irrespective of where they were or what they were doing, they were presented with opportunities to gratify their various social, informational, and recreational needs online. The extent to which respondents felt obliged to act on, or resist these opportunities, depended largely on how they had learned to reconcile the ideas of academic and technological maturity during school. For instance, more socially-orientated users were often distracted from study because they felt obliged to respond to their friends' online messages in a timely fashion. By contrast, Academically-Orientated users viewed the internet's potential for distraction as a result of their own need to procrastinate from study, rather than any perceived social obligations. These interviewees had acquired the self-discipline to avoid time-wasting and distraction in the context of study, and found simple risk mitigation strategies effective as a result. As one academically-orientated user, Rob, observed, the simple act of logging out of Facebook was sufficient remind him of his need to study:

> **Rob**: I find that not actually turning on the internet at all helps, sometimes, it's futile when I need to research something. When I want to research something, I'll try not to - if I do log on to Facebook, I log out, because sometimes, I'll just study and open up a new tab and go to Facebook if I'm already logged in, but when I need to log in and I have to sign in, then I lose all impetus.
>
> **JS**: So not having in to sign in every time?
>
> **Rob**: It's like a little block in my head saying, oh not again.

For users like Rob, internet use was less central to his sense of autonomy than it was for more engaged users like Olly, who now found the prospect of disconnection too painful to consider:

> The benefit of the internet is that you can find anything you want at any time you want. There have been times where I've been cut off from the internet for whatever reason. It hurts because there's stuff I want to do or look up or find out, not even related to games. It just hurts that I can't find that out. I think in some ways the internet makes us a bit more lazy. But I don't think that's necessarily a bad thing because it just provides so much access to so much good stuff.
>
> **Olly** (Socially-Orientated)

Since these users conducted more of their everyday lives online, any anxieties they had about managing their competing priorities were often magnified by the inescapable, increasingly entangled nature of these commitments online. Illustrating this point, all four respondents who described internet use as 'addictive' belonged to the 'All-Rounders' group. One such interviewee, Carol, described how certain habitual internet use pathways had in the past caused her to lose track of her academic priorities and waste time online:

> Yes, definitely. Yes, I'm really conscious of the fact that the internet can be very addictive for me. Once I go onto the internet, I kind of don't want to get off the internet. Once I go onto the internet and I go onto YouTube and I start watching someone's channel, I don't want to stop. Once I go onto the internet and go on Facebook and start chatting to someone, I don't want to stop. So I have to be very conscious of those kind of little things that can get me sucked into my internet usage.
>
> **Carol** (All-Rounders)

In characterising certain activities as addictive, Carol displayed an acute awareness of 'little things' which triggered off this habitual behaviour, enabling her to identify situations in which she was at risk of excessive use.

Another practice used to optimise the benefits and risks of being always within reach was multitasking. Most interviewees described having multiple webpages open in different windows that they switched between; even when actively engaged in one particular activity, they were more passively involved in others. For more confident users, like Steve, indiscriminately combining different activities was a badge of technological maturity:

> **Steve**: If I'm studying, I'll also be on Facebook, because you could just be wanting to talk to your mates about going out later, or if you have a problem with math and you want to discuss something with somebody else, they're right there. Easy.
>
> **JS**: Do you find it difficult trying focus on the uni work, while you do all those other things?
>
> **Steve**: Honestly, it's just one big thing and you're doing everything at the same time. You don't even realise that you're switching between these things. It's just there and you're using it. It's natural.

Meanwhile, academically-orientated users like Amy had learned to be selective in their multitasking, taking into account the productivity benefits and cognitive costs of different activities, both offline and online. In her case, Amy combined recreational uses, such as watching TV online, with less cognitively intensive academic tasks in order to use her leisure time more efficiently:

> If I'm not I the mood for study I normally do something, like anatomy I use flash cards sort of thing, so I'll do something like that which is not - you don't have to think to write them out so I'll be doing that. Then I might be looking at music and stuff like that or looking at catalogues. So if I do this task which I don't have to think for and I can do while watching TV, I can do it while looking at catalogues and making more efficient time of it then I can take a proper break when other people or one of my friends want to do something. So it sounds bad that I'm multi-tasking studying and using the internet but I try to do it so that I don't just take a break for no reason.
>
> **Amy** (Academically-Orientated)

Far from being drawn into these recreational activities, Amy was content to positively contaminate some of her leisure time with academic work so that she had more time to spend with her friends in person. Like Amy, Carol was selective about the types of activities she combined, both offline and online. While she had learned to keep her study time uncontaminated by other social and recreational activities, her diverse experience of the social, cognitive, and temporal costs of these activities enabled her to sychronise her internet use with her domestic routines:

> **Carol**: Sometimes I can be downstairs. I'll be watching TV and using the internet at the same time. Or sometimes I'm cooking and using the internet at the same time. When I say using the internet, I mean Facebook's open and I'm chatting to someone.
>
> **JS**: How does that work? How much attention do you need to pay to what's going on online?
>
> **Carol**: Not that much. Because I mean generally the other tasks I'm doing aren't taking up too much of my brainpower, like cooking and things. So when I'm cooking, I'm usually just thinking about what's happening online anyway. I can be - if I'm getting dressed in the morning, I go into my bathroom to brush my teeth; I can kind of gauge the amount of time. Say I'm emailing someone, I can gauge the amount of time. Well, they should have replied by now and I'll go back into my room and check.

Overall, respondents saw internet use as allowing them to stay accessible to others, to keep up with major developments in their life context and the world around them, and to ensure that opportunities for gratification did not pass them by. However, this was contingent on them making room for internet use in their daily routines, and required skill and experience in to manage its often stress-inducing distractions, intrusions, and obligations. These were attributes displayed overwhelmingly by those who experienced fewer barriers to access and autonomy of use growing up, and who learned to negotiate a pathway between the competing discourses of academic and technological maturity. Such traits are likely to be increasingly rewarded as internet use becomes thoroughly embedded in everyday processes of economic, social and cultural participation.

Discussion

The analysis presented here focuses on my third research question:

> **RQ3: How do young people's internet use experiences during school affect their perceptions of the benefits and costs/risks of internet use after leaving school?**

The findings show that, after leaving school, young people have diverse ideas about what the internet can and should be used for in the context of their everyday lives. For those interviewed, the perceived benefits and costs/risks of internet use revolved around its perceived functions in terms of convenience, connectivity, and continuity. When these varying perceptions are coupled with respondents' own accounts of their changing internet use during high school, this provides a unique insight into the factors and processes shaping youth internet engagement. By contextualising

these findings within the theoretical frameworks outlined at the beginning of this chapter, I am able to enhance my interpretation of key results from the previous empirical chapters.

Digital Natives approach findings

The Digital Natives approach suggests that perceptions about the benefits and costs of using the internet are based on the inherent features of the medium itself and what how accurately users perceive as its *a priori* affordances. As per Burrell's (2012) interpretation of Roger's DoI theory (2003), innovation and diffusion processes were important in shaping respondents' trajectories of use during school, because changes in their access reduced the costs of more diverse and potentially beneficial internet engagement. For instance, the transition from dial-up to broadband typically meant that those who shared internet access with other siblings could worry less about the bandwidth costs of more resource-intensive recreational activities, like downloading media. Those who went from sharing a computer with others to having their own computer could worry less about the time costs associated with more time-intensive activities, such as chatting online. Finally, interviewees who upgraded to a laptop were afforded a degree of autonomy from, and mobility between, contexts in which different sets of norms, rules and expectations applied to their use at any given time. This meant they could worry less about their parents', teachers', and peers' ideas about the internet's proper role in their lives, and begin to form their own views. As a result, many respondents felt a personal lack of need for internet use until they had crossed a minimum threshold of access, at which point they began to develop a broadening sense of what the internet could be used for, and an increasing awareness of deficiencies within their access situation. Thus, the timing of access improvements was critical in shaping the trajectories of engagement examined here.

Findings from Chapters 4 and 5 suggest that students from regional and remote areas experienced poorer access early on, spent less time on more open-ended social use, and left school less confident and highly engaged internet users. The accounts of regional interviewees like Brad, Sandra, and Steve support this interpretation. As late adopters who faced barriers to access and autonomy of use growing up, Brad and Sandra had fewer opportunities for social and recreational use than their urban counterparts. Over time they came to regard such activities as wasteful, unnecessary, and risky; when they left school, a lack of experience and self-efficacy meant that they viewed the possibilities of internet use narrowly in terms of convenience. Meanwhile, Steve was an earlier adopter from a regional area who grew up with fast, exclusive internet access and no restrictions on his use. Upon leaving school, he embodied the Digital Native rhetoric, espousing a willingness to embrace technological change and innovation into every aspect of his life. The fact

that his internet use trajectory, which was characterised by exploration and intensification, varied from those of Brad and Sandra, whose pathways were defined by skepticism and preservation, could be traced back to differences in the timing and quality of their first usage experiences, and what these taught them about the *a priori* affordances internet use. However, results from each chapter indicate that even if respondents had enjoyed similar access to technological resources during school, this would not guarantee against such differing trajectories. This is because, contrary to the Digital Natives approach, young people vary in the degree to which they are intrinsically motivated to use of ICTs to begin with - as shown by the fact that many interviewees only began using the internet when adults in their lives prompted them to do so.

Digital Connoisseur approach findings

The Digital Connoisseurs approach suggests that norms, rules, and expectations about how young people should engage with the internet shape their views about the benefits and costs of its use during adolescence (Bourdieu, 1984; Kalmus et al, 2009). The results are consistent with claims that, from early on, parents, teachers, and schools are often in unison about the need for academic internet use that is narrow and task-orientated in nature (Kalmus et al, 2009). In line with Coleman's (1988) idea of intergenerational closure, this orientation towards academic engagement with ICTs at home and school was widely cultivated through the enforcement of clear rules and guidelines about appropriate use. However, as most respondents got older, they began to push for the access and autonomy they needed in order to keep up with the broader, more open-ended social and recreational uses of their peers. This highlights two contrasting ideas about the role of internet use in the transition to adulthood, and two potential avenues for the digital reproduction of social inequality described by Hargittai (2008). The discourse of academic maturity emphasised compliance with rules and structures of parents and teachers, who viewed internet use as a convenient tool to be co-opted selectively and productively into one's longer-term plans and aspirations. By displaying such use respondents demonstrated their fitness for these future roles and responsibilities, and signaled the legitimacy of their claims to better access with fewer restrictions.

By contrast, the discourse of technological maturity emphasised autonomy from these rules and structures, and alternative models of status attainment. It encouraged broader and more open-ended engagement with the internet an avenue for self-exploration and the cultivation of specialist skills, tastes, and identities through experimentation, play, and connectivity. To some extent, this was made possible through compliance with the informal rules and obligations of one's peer group, for instance, by keeping up with trends in internet use and remaining continuously engaged in

online interaction. The degree to which respondents' internet use converged with or deviated from their friends' use, signaled their status amongst their peer groups, and fueled their demands for better access and autonomy. Those who had decent, unrestricted access early on learned to position themselves as knowledgeable experts, setting the usage benchmarks to which others aspired.

The findings in previous chapters suggested that those who were more academically motivated (i.e. females, private school students, and children of highly educated parents) engaged in more task-orientated educational internet use, because this activity conformed with their parents' and teachers' ideas about appropriate internet use by adolescents. The experiences of Academically-Orientated students like Amy and Adrian supported this interpretation. Since their parents employed measures encouraging their educational internet use during adolescence, these users gravitated more towards a discourse of academic maturity, actively differentiating themselves from their many of their peers by displaying a taste for internet use that was perceived as productive by adults. Additionally, results from Chapter 4 indicated that a student's social internet use depended more on their technological orientation than it did on their broader social orientation. This interpretation was supported by the finding that, for interviewees like Steve, Olly and Rachel, social internet use provided an avenue for interaction in which their technological maturity and interest-specific expertise was recognised and valued, not by adults, but by their peers. While these users may be uniquely positioned to engage in internet use which enhances their status amongst certain peer groups, this benefit could also be negated if comes at the expense of the self-discipline learned through academic internet use, or the broader legitimacy conferred upon them by the adults in their lives who value such use.

Digital Explorer approach findings

The Digital Explorer approach suggests that young people learn to evaluate the benefits and costs of different types of internet use by experimenting with them and experiencing their outcomes across a range of contexts (Giddens, 1984; Livingstone & Helsper, 2007; Ito et al, 2010). As with findings from the previous chapters, the analysis shows that the interviewees branched out in terms of what they used the internet for and the skills with which they did so. To varying degrees, interviewees learned to navigate between the discourses of academic and technological maturity, reflexively orientating themselves with the norms, rules, and expectations of each. This meant they perceived the benefits and risks of activities like information-seeking, online banking and shopping, and social networking very differently, and employed contrasting strategies to optimise these outcomes.

Interviewees like Brad and Sandra, who faced access barriers early on, had few opportunities to develop internet use competencies beyond basic information-seeking skills. Although they were less confident about applying such skills in other contexts, such as when screening for 'dodgyness' on social networking sites or making transactions online, they defused potential risks by avoiding these activities entirely. Academically motivated respondents like Amy and Adrian were encouraged to put educational uses ahead of social and recreational uses, but as they grew older their parents trusted them to form their own judgments about what they did online. Rather than avoiding them entirely, they made limited, more purposeful use of social networking sites and other recreational activities, learning to incorporate these uses into internet use routines that were already structured around the productivity and efficiency of their study time. By engaging in more selective and focused use, they negated some of the risks posed by these activities, in terms of privacy, distraction, and excessive time use, but also negated many of their potential benefits.

More socially orientated users, like Steve, Jennifer, Olly, and Mike, never experienced significant barriers to access and autonomy of use during school, and developed broad and open-ended internet use structured primarily around their leisure habits and patterns of social interaction. As such, they viewed their increasing dependence on internet use, as a continuous means of access to people, places, and information, as unproblematic. Instead of dismissing new varieties of access and use for which they had no immediate need, they experimented with these on the assumption that they might discover or even cultivate such a need. Since they were less concerned about risks of distraction or information disclosure, they employed strategies like multitasking to maximise their opportunities for enjoyment and interaction rather than to enhance their productivity, and searched for ways to communicate online which were mainly compatible with their needs for self-expression and gratification. By contrast, users like Carol and Rachel sought to reconcile the diverse ideas of parents, teachers, and peers about how they should engage with the internet during adolescence. They were troubled by their dependence on the internet as a source of gratification, and displayed a refined sense of the benefits and costs of different types of use, having experienced many of these first-hand, or having parents who were vocal in their concerns about such use. Based on their experiences, these users employed strategies designed to mitigate the risks of their use whilst retaining the potential benefits. These included multitasking which took into account the cognitive, social, and temporal costs of different activities, screening for 'dodgyness' with respect to social and financial interactions, and taking measures to curb potentially addictive behaviour.

Conclusion

This chapter has explored changes in young people's internet use throughout high school and how these affected young people's views of the benefits and costs of use in the year after graduation. Combined with findings from the previous chapters, the main approaches to explaining youth internet engagement have proven useful for understanding different aspects of this process. The Digital Natives approach, which highlights the role of access barriers and their implications for early and later adopters, is useful for understanding the different internet use experiences of young people living in urban, regional, and remote areas. The Digital Connoisseurs approach, which illustrates the role of influential norms and discourses about adolescent internet use (H, is relevant for understanding the extrinsic motivations for young people to conform to academic and peer-based models of engagement, and the implications of them doing so. Finally, the Digital Explorers approach, which emphasises the role of enactive learning, is critical for understanding how young people combine different models of engagement to maximise their opportunities for economic, social, and cultural participation.

Chapter 7 - Discussion & Conclusions

The central goal of this thesis has been to explain how and why young people vary in their engagement with the internet between adolescence and early adulthood. To this end, the explanatory framework for this research reconciles three contrasting perspectives (Digital Natives, Digital Connoisseurs, and Digital Explorers) which attempt to explain differences in youth internet engagement and their relationship to social inequality.

The *Digital Natives* approach argues that, having grown up in a period of widespread internet access and use, today's young people share an inherent orientation towards confident, prolific, and effective internet engagement which distinguishes them from preceding generations (Prensky, 2001; Tapscott, 1998). Against the backdrop of diffusion theory, it concedes that some children experience new modes of internet access and use earlier than others, allowing them to display this orientation sooner. However, once the necessary technological infrastructure becomes more widely adopted (e.g. in the educational system), this is seen to level the playing field by affording all young people opportunities for economic, social, and cultural participation online (Jung, 2001; Rogers, 2003). The *Digital Connoisseurs* approach instead suggests that young people fundamentally differ in their orientations towards internet engagement, because these are grounded in their unequal social positions and resources (Hargittai, 2008). Moreover, this inequality is reproduced when they engage with the internet in ways which comply with, or deviate from, the dominant norms, rules, and expectations about internet use which apply in their academic and social lives (Bourdieu, 1986; DiMaggio et al, 2004). Finally, the *Digital Explorers* approach argues that young people arrive at their own individual judgments about internet use by first experimenting with those avenues of use that are left open to them once structural constraints (e.g. in terms of rules and resources) are taken into consideration (Giddens, 1984; Kalmus et al, 2009). Through a process of enactive learning and rational decision-making, young users are guided by past experiences of the benefits and risks of internet engagement to make better usage choices in future, thereby increasing their autonomy and expanding the broader opportunities they face.

Separately, in highlighting innovation, stratification, and reflexivity, these approaches provide important but incomplete explanations for how and why differences in youth internet engagement arise. For instance, young people may be a highly connected group in terms of access, but they are still more heterogeneous in their use than the Digital Natives approach suggests (Bennett et al, 2008). Young people from higher SES backgrounds are more likely to engage in

school-based and informational uses (Hargittai, 2010); yet contrary to the Digital Connoisseur approach, those who confine themselves to such approved uses miss out on various benefits arising from more diverse social and recreational forms of use (Helsper, 2012). Meanwhile, the broad experimentation which allows young people to optimise their use may only be possible for those already privileged with better access and more autonomy of use (Robinson, 2009). Nor is such optimisation inherently beneficial, as assumed by the Digital Explorer approach. Some broad and frequent users may tailor their use in ways that address their needs and priorities, but others may become less sensitive to those needs and priorities and more reliant on internet use for gratification.

In this thesis I have aimed for a more comprehensive account of youth internet engagement which productively combines insights from these approaches to address the above-mentioned limitations. Consistent with the notion of structural individualism, individuals were treated as embedded within the social structure, and differences in internet engagement were conceptualised as a social fact to be explained based on the intended or unintended consequence of individual actions (Hedstrom & Bearman, 2009). The three phases of my longitudinal, mixed methods approach focused on different aspects of youth internet engagement at different points in time. The first phase investigated the influences on young people's online time use for academic and social purposes at the start of high school, and the salience of these factors over time. Building on this, the second phase examined how these students varied in terms of their internet self-efficacy, and the breadth and frequency of their use, at the end of high school. Lastly, in the third phase I explored connections between young people's experiences of internet use during school, and their perceptions of its benefits and costs/risks in the year after leaving school. By integrating the aims, methods, and findings of these three phases I have attempted to provide a richer understanding of how internet engagement develops between adolescence and early adulthood than would otherwise be the case. Although multi-dimensional, longitudinal research into this process of development has been recommended by a range of authors, no such study has been undertaken thus far.

Key findings

The analysis for this thesis has produced findings which, as shown in Table 7.1, can be combined to illustrate three distinct internet engagement pathways between adolescence and early adulthood. These pathways, which I label in terms of preservation, productivity, and personality, indicate how the factors and processes examined in each chapter clustered together across the analysis. That is, each individual's engagement pathway during school represents a certain configuration of these typical pathways and the factors, processes, and outcomes of each.

Table 7.1: Overview of internet engagement pathways between adolescence & early adulthood

	Preservation	***Productivity***	***Personality***
Socio-demographic factors	Region	Gender & school sector	Gender, school sector & region
Early factors & processes	Access context (e.g. live in area with poor infrastructure or unable to afford access)	Extrinsic motivation (e.g. stronger academic orientation encouraged by parents & teachers	Mix of extrinsic & intrinsic motivation (e.g. stronger social orientation for females & intrinsic motivation for males)
Early time use	Less time on social and academic use at W1	More time on academic use in W1	More time on social use in W1
Self-efficacy & engagement score	Low self-efficacy & engagement (e.g. narrow/infrequent use)	Average self-efficacy & engagement (e.g. narrow but frequent use)	High self-efficacy & engagement (e.g. broad & frequent use)
Autonomy of use	No autonomy due to access constraints	Accept limitations on autonomy of use, increase autonomy by negotiating with parents	Resist limitations on autonomy of use, assume autonomy by circumventing parents or parents uninvolved
User orientation	Parental norms encourage rationing of use => no clear orientation towards mature use	Parental norms encourage school-based use => academic maturity	Peer-based norms encourage social and recreational use => technological maturity
Perceived benefits	Convenience (but this is not assumed - must be cheaper & easier than offline alternatives)	Convenience taken for granted, connectivity less so (must be compatible with work/study needs)	Convenience & connectivity taken for granted, continuity less so (must be compatible with social/leisure needs)
Perceived risks	Technical issues, volume/accuracy of information	Distraction, information disclosure/privacy	Excessive use/addiction, unwanted contact
Approach to optimising benefits & costs/risks	None (e.g. avoidance, reliance on others)	Selectivity & prioritisation (e.g. self-regulation, self-censorship, refined search strategies)	Exploration & integration (e.g. multi-tasking, awareness of online identity cues)

1. Preservation pathway: Initial access barriers explain limited engagement in early adulthood.

The first pathway is consistent with at least one premise of the Digital Natives approach: when young people differ in the intensity of their internet use, much of this variation can be attributed to the quality and timing of their early internet access. After controlling for other factors (including their social orientation), students who had slower home access and who shared that access with others at the beginning of high school (i.e. Grade 8), spent less time on social internet use throughout high school than students who had faster and more exclusive access in Grade 8. On the face of it, this suggests that social use requires more time and/or greater privacy than academic use, which was less closely correlated with the access factors examined in Chapter 4. Moreover, the analysis found that this had negative implications for students in regional and remote parts of Queensland, whose reduced social use when compared with urban students was explained by their poorer access. These findings were consistent with the entrenched cycle of reduced supply and demand in rural areas. Poor ISP coverage and lack of market competition makes high-speed broadband a costly proposition for those living in these areas (Khatiwada & Pigg, 2010; Whitacre, 2010); this includes parents in rural families who remain less convinced of the value in providing their children with such expensive access. Yet the Digital Natives approach suggests that children, irrespective of where they live and what their parents think, are similarly enthusiastic about internet use (Prensky, 2001). If this were the case, the universal diffusion of internet access to regional and remote areas should have enabled rural students to catch up with urban students in terms of their social use (Compaine, 2001; Rogers, 2001). Yet when they left high school at the end of 2010, the social use gap was even wider than it was five years earlier. Far from embracing the popular social use of their peers, young rural Queenslanders appear to be falling further behind their urban peers.

This finding is important because it suggests that those who miss a narrow window for online interaction during adolescence (e.g. when their peers begin doing so), may as a result be less willing or able to engage in social use once they are older - even when access is no longer an issue. Additionally, the results from Chapter 5 indicate that a student's social use trajectory during high school - more so than any other factor - explained differences in their level of internet self-efficacy, and in the breadth and frequency of their use, at the end of high school. One explanation for this is that by constraining students in their social internet use trajectories during school, early access barriers prevented them from engaging in the more open-ended, exploratory use necessary for their development as internet users. However, this interpretation does little to explain why earlier differences in access might still constrain young people's engagement later in life.

On this note, the qualitative analysis from Chapter 6 helps to provide a richer explanation. Faced with poorer access and autonomy of use in adolescence, interviewees like Brad, Harriet, and Sandra[5] came to terms with the fact that social and recreational uses were not an option for them. They did so by embracing their parents' and teachers' portrayals of such activities as wasteful and unnecessary; and such perceptions were reinforced by norms and rules designed to ration limited access fairly and productively amongst those using it. Once these interviewees became skeptical about the value of internet uses that were popular with their peers, and learned to go without such uses, this negative orientation was difficult to unlearn. This explains their narrow and infrequent internet engagement later in life: they continued to confine themselves as much as possible to those modes of internet access and use which they knew they could rely upon, which asked little of them in terms of skill and self-efficacy. They framed the benefits of internet use primarily in terms of its convenience, because it made certain essential everyday activities like information-seeking and online banking cheaper and easier than offline alternatives. However, these perceived benefits were offset by the technical problems they encountered and their concerns about the volume and accuracy of information available online. Since their engagement was geared towards preservation - of the old hardware they had always used, and of the same usage routines which had always worked - they were left unprepared when their hardware eventually broke down, and caught flatfooted when the digital landscape inevitably changed around them. These were times when they were forced to rely on other more skilled and confident users, or to entirely discontinue their use in favour of a more traditional, functionally-equivalent alternative.

2. Productivity pathway: School-based norms and rules about internet use help to explain selective & self-disciplined engagement in early adulthood.

The second pathway is more supportive of the Digital Connoisseurs approach: the variability of young people's engagement with the internet often has less to do with differences in access and more to do with their extrinsic orientations towards the uses in question. The results from Chapter 4 show that, unlike social use, which asked more of students in terms of their time and access to technological resources, using the internet to help with homework was more dependent on a student's broader academic dispositions. Previous research attributes the widespread popularity of educational use amongst adolescents to the efforts of parents, teachers, and the schooling system, who encourage children to view ICTs primarily as tools for learning and academic engagement (Kalmus et al, 2009; Cranmer, 2006; Selwyn, 2006). The analysis presented here suggests that this

[5] Examples from particular interviewees are selected to illustrate the general aspects of these pathways; they are not intended to imply that these respondents typify the pathway in question. Most respondents displayed aspects of each of these key engagement pathways.

process differentiated students in the amount of time they spent using the internet for study. In Grade 8, having a stronger academic orientation was the main reason why Independent and Catholic school students spent longer each week on academic use than State school students; it also partially explained why female students spent longer in online study than males students. The results also show that these gender and school sector differences increased over time. Even though they developed stronger academic dispositions as they got older, the early motivational barriers faced by State school educated and male students still explained why their academic use throughout high school lagged behind that of female students and those who attended private schools.

The significance of this finding is two-fold. First, as was the case with social use, it indicates that there may be finite window of time in which parents are be able to cultivate in their children a sense of the educational utility of internet use (e.g. before they begin to engage in more social use). Even if they eventually acquire the motivation to do so, students who miss out on this window may find it harder to integrate such use effectively into their broader academic routine as they get older. Nonetheless, the results from Chapter 5 also show that academic use is much less important than social use for one's overall development as an internet user during school, both in terms of internet self-efficacy and in the breadth and frequency of one's engagement. Students who learned to focus exclusively on narrow, task-orientated use during school were less likely to become robust and confident users. In this sense, the process by which media use tastes are transmitted between generations during adolescence appears to be important in shaping internet engagement later in life.

The qualitative findings in Chapter 6 enhance this interpretation. They confirm that many users, like Adrian and Amy, only began using the internet when their parents introduced them to do it, or when their schools made it a requirement. Such experiences instilled in them the sense that educational use was in line with their own academic interests and their parents' wishes. If any ambiguity remained about what the internet should be used for at home, this was removed by clear and regularly enforced guidelines about such use. The norms and rules surrounding Academically-Orientated users early on encouraged them to select academic use ahead of social and recreational uses, but not to discount these other uses entirely. Instead, parents tied the individual responsibility of judging between productive and unproductive uses to respondents' access to technological resources and their autonomy over them. Illustrating Bourdieu's (1984) concept of distinction, they afforded their children better access with fewer restrictions when they felt their children were displaying the right usage tastes. For this reason, these respondents learned to regard internet use as something to be co-opted selectively and narrowly into one's academic routine, and by extension, into their broader educational and occupational career. As such, they viewed disciplined and

productive uses as signs of individual responsibility and maturity, and gauged their progress as users by their ability to maximise the benefits of their narrow, task-orientated engagement. Having integrated most informational and service-related uses into their daily routines, they took the internet's convenience for granted. They were less certain about its benefits in terms of connectivity, and sensitive to its risks of distraction and privacy - not wanting to share information which might jeopardise their future careers. Their strategies for mitigating risk (e.g. self-regulation, selective multi-tasking, and self-censorship) kept their use productive at the expense of a deeper and more personal level of engagement.

3. Personality pathway: Peer-based norms and expectations about internet use, and intrinsic motivations for use, help to explain personal and exploratory engagement in early adulthood.

The final pathway lends weight to the Digital Explorers approach: when young people differ in the diversity of their internet use, this can largely be attributed to their intrinsic motivation for using the medium itself (e.g. their enjoyment of, and preferences for, media and media content), or the influence of peer-based norms and expectations. In high school, a student's orientation towards socialising with friends was less important for their social internet use than their enthusiasm for the medium itself. Two findings illustrate this point. First, as noted earlier, social use was strongly correlated with differences in access. As shown in the qualitative analysis, children who had faster, more exclusive access early on needed to prosecute the case for such access with their parents; this suggests that they were already aware of the merits of internet use and were not prevented, by parents or broader structural barriers (e.g. infrastructure availability & affordability), from getting the access they sought. Second, once they had access, students' social use was less correlated with a broader desire for social interaction and more a pragmatic response to the time use demands of the medium itself. Consistent with the Digital Explorers approach and the concept of structuration (Giddens, 1984), those who engaged in more exploratory use faced more decisions about which broader activities cohered and conflicted with such use. Thus, users who spent time chatting and emailing also spent more time hanging out with friends, watching TV, and listening to music, but less time on activities such as reading and doing chores. By contrast, academic use was a finite, task-dependent activity correlated with involvement in a wide range of activities, including socialising outside school, doing chores, listening to music, and reading books. This is more indicative of the higher social and cultural capital predicted by the Digital Connoisseurs approach.

As they progressed through high school, students' academic and social commitments increased, becoming less compatible with each other and with the other activities going on in their lives. Regardless, the time students spent studying and socialising online remained positively

correlated. This suggests that internet use provided students who combined social and academic use with a way to potentially defuse any tension between these competing commitments. As illustrated above, there were finite windows of time for entering into both these avenues of use, after which point the extrinsic or intrinsic motivations for doing so waned. Students with faster and more exclusive access (e.g. urban students) and stronger academic orientations (e.g. female students and private school students) were, in theory, better positioned with respect to these timelines. Yet despite having secured the necessary access, and displaying the requisite orientations, these students did not fare substantially better in terms of their internet self-efficacy and engagement scores; in fact, female students ended up less confident and highly engaged users than male students. One explanation for this may be that these students prioritised approved school-based use when going online, thereby negating the impact of social use on their user development. However, social use appears too strong a predictor of one's confidence and engagement for this to be the case, given that academic use was not even negatively correlated with social use or these outcome measures.

Another explanation, suggested by the qualitative analysis, is that students develop autonomy as internet users in different ways - the complexities of which are not captured by the user development variables included in the quantitative analysis. Some respondents earn better access and autonomy by complying with their parents' expectations about their use, while others who faced more entrenched access barriers learned to live without. However, there are many interviewees who, from an early age, had always had enjoyed better access with fewer restrictions on their use. These were users whose first internet use experiences were driven more by their own intrinsic motivation than by the encouragement of their parents or teachers. Respondents like Olly and Steve found their way online to access resources for computer games they were playing, or to undertake edutainment uses which they perceived as fun and interesting, and this gave their internet use a personal dimension. For others, like John and Sarah, this personal type of engagement emerged later when they began to feel extrinsic pressure to interact with their peers online, and when they had the access they needed to do so. Since recreational uses, like gaming, are more popular with adolescent boys, and younger girls prefer to engage in social use, this suggests that gender is influential in determining when and why internet use becomes personal for young people.

To varying degrees, more socially orientated respondents constructed their use within a discourse of technological maturity. This emphasised exploratory internet use which cultivates new skills, tastes, relationships, identities, and opportunities for gratification, either as an end in itself or as a means of determining a user's status amongst their peers. The extent to which they did so was attenuated by their compliance with parents' norms and rules, and with the broader discourse of

academic maturity, but it was never negated by this. Rather, once respondents realised how important internet use was for their own increasing independence, they became reluctant to give up what autonomy of use they had, and more inclined towards expanding it further. Navigating between the competing discourses of academic and technological maturity gave them more nuanced views about the benefits and risks of internet use. For many, its necessity in terms of convenience and connectivity was uncontested and already factored into the rhythms of daily life; but it was the continuity of this rhythm - the perpetual exposure to one's obligations and opportunities for gratification - which both excited and challenged them the most. They were willing to go farther than most to get what they wanted out of their use. While concerned about the risks of meeting online acquaintances in offline, or becoming addicted to certain uses, they were hopeful of avoiding these risks through their awareness of social identity cues and sensitivity to the costs, obligations and rewards of their expanding internet use. More than the other respondents, these users had passed a point of no return; knowing when to be bold and experimental, and when to be focused and self-disciplined, would now decide where they ended up.

Overlapping pathways: The case for a synthesis of major explanatory approaches

These pathways of preservation, productivity, and personality each contain aspects which can either help or hinder young people's chances of engaging with the internet effectively. As outlined in the introduction, there are three key areas in which internet use is likely to impact on young people's life pathways: their cognitive and broader educational outcomes; their economic participation and career opportunities; and their relationships, leisure practices, and wellbeing. Incorporating the three approaches (Digital Natives, Digital Connoisseurs, and Digital Explorers) into my explanatory framework has provided me with a diverse conceptual and methodological toolkit with which to identify the potential advantages and disadvantages of these pathways.

The preservation pathway holds the clearest potential for inequality because it confines young people to narrow, infrequent, and unskilled internet engagement, leaving them ill-equipped to keep pace with technological change it redefines economic, social and cultural participation. Yet, the general skepticism towards internet use which accompanies this pathway may also have its advantages, particularly if it means that young people account for traditional offline alternatives when they weigh up the benefits and risks/costs of online activities. Meanwhile, the productivity pathway does instill in young people the discipline to embrace in internet use in a way that is focused on their career aspirations. The problem with this is that it relies heavily on parents' and teachers' ideas about which internet uses will prove worthwhile in the long-run. Yet parents, teachers, or even researchers of internet use more generally, are often not in a position to say what

the likely impacts of internet use on young people's developing life pathways are going to be. This is where the personality pathway may advantage young people who put themselves in that very position, by exploring different types of use to see what works for them and what doesn't. However, even the savviest adolescent internet users cannot always distinguish between internet uses which will eventually lead to longer-term benefits, and those which are enjoyable but ultimately trivial or even detrimental to them. For some, this may come with age and experience, for others, it may require their parents' guidance, while for the remainder - most troublingly - it may not happen at all.

Based on this research, there is a strong case for reconciling key insights from the three main explanatory approaches incorporated in this thesis, whilst discarding or revising others. The Digital Natives approach is accurate insofar as it emphasises technological diffusion (Rogers, 2003) and the salience of having access to technological resources at an early age, but is misguided in suggesting that this is enough to ensure effective internet engagement. The Digital Connoisseurs approach is useful for its emphasis on social and cultural reproduction (Bourdieu, 1986) and the role of norms about worthwhile use, which help to explain the cumulative disadvantages of those with poorer access and less autonomy of use. However, processes of social learning were insufficient to equip young people with the diverse skills and experiences needed to adapt their internet use to their changing needs and circumstances. This required the reflexivity and enactive learning emphasised by the Digital Explorers approach, supported by the idea of structuration and its portrayal of young people as making rational decisions based on their past actions (Giddens, 1984). A key weakness of this portrayal illustrates the strengths of the other two approaches: for their broad and frequent internet use to be managed effectively, it required access to technological resources from an early age, as well as the unevenly distributed resources, orientations and skills needed to experiment with internet uses. These points may serve as a basis for further synthesis of these three perspectives in future research on youth internet use and its relationship social inequality. Such integration can help researchers to ascertain the net impact of the engagement pathways described here on young people's emerging life pathways. In doing so, it can contribute to a broader understanding of the intersecting processes of diffusion, stratification, and reflexivity which define the relationship between young people, digital technologies and social inequality in contemporary societies.

Limitations of this study and directions for future research

There are several limitations to this study. First, one of the inherent problems with using self-administered questionnaires with adolescents is the difficulty in establishing an accurate picture of parental socioeconomic status. The high amounts of missing data on mother's, and to a lesser extent father's, educational and occupational measures are consistent with similar studies such as

the Longitudinal Studies of Australian Youth (LSAY) (Marks et al, 2000) and have been controlled for in this analysis. However, it still remains likely that some SES differences in access and use more commonly observed in adult samples have not been fully captured. By including measures such as schooling sector and geographic region, which may serve as proxy indicators of SES, and accounting for parents' norms and values about internet use, this research nonetheless provides an insight into how such stratification processes operate on and through youth internet engagement. Second, the absence of concise, objective internet skill measures which could be included in the survey instrument meant it was necessary to rely on a subjective measure of skill which may be somewhat biased by the norms which surround young people's internet engagement. More recently developed measures, such as the web knowledge indices proposed by Hargittai (2009) and Hargittai & Hseih (2011), are stronger predictors of online task completion than self-reported skill measures. By including such indices in future waves of the survey I will be able to undertake more robust measurement of user development.

Thirdly, the research terrain of youth internet use has changed substantially since 2006, when the first wave of survey data for this study was collected. For instance, the use of mobile internet and social networking sites has increased dramatically, and more generally, concerns about differences in ICT skill and literacy now receive greater recognition alongside the traditional more traditional focus on access to ICT resources (ACMA, 2010). Subsequent waves of data collection in 2008 and 2010 have included measures designed to address these developments, but the absence of such repeated measures across all waves reduces the possibilities for longitudinal analysis in this area. Research using additional waves of data will allow for this more substantive examination of stability and change in young people's trajectories over time and the factors impacting this. Data from waves 4 and 5 of the Our Lives survey, to be conducted in 2013 and 2015 (when respondents are aged 19-20 and 21-22), will allow further investigation of how these modes of engagement unfold into early adulthood. As shown in the findings outlined above, the qualitative analysis for this thesis has provided some initial insight in this area, by illustrating key processes shaping these trajectories and linking data on young people's internet use during adolescence to their more recent views about its relevance to them. Future waves of data collection will examine participation in a wider range of online activities, ranging from avenues for social, economic, and political participation, to various risk behaviors such as online gambling and viewing pornography.

Finally, although it was not within the parameters of this current study, the main rationale for focusing on differences in internet use between adolescence and early adulthood is that they may significantly impact on the outcomes young people experience in the domains of education,

employment, social and familial relationships, as well as health and well-being. As indicated in Chapter 1, these outcomes depend more on the nature and quality of young people's internet use than whether or not they have internet access and are using it. The collection and analysis of additional waves of data will allow for an examination of how contrasting engagement pathways affect the quality of young people's early experiences of the labour market, tertiary education, and social/civic/family life. Given broader theoretical claims about the impact global uncertainty is having on young people's trajectories in these areas, and the lack of research examining issues of digital inequality in the Australian context, this thesis makes a significant contribution to national and international research literatures.

Policy implications

Much of the policy context surrounding youth internet engagement in Australia is influenced by the depiction of younger generations as Digital Natives (Facer et al, 2001; Facer & Furlong, 2001). On the one hand, this portrayal implies that young Australians have a shared orientation towards creative, savvy, and effective internet use which cannot be fully harnessed without providing them with better access to ICT infrastructure, and more fundamentally embedding its use into the educational curriculum (Prensky, 2001; State of Queensland, 2004). On the other, it assumes that young people are incapable of assessing the significance of these technologies for themselves, and that allowing them the freedom to do so could only heighten their exposure to online risks of various kinds (Buckingham, 2006). In the educational context, concerns about such risks have prompted a negative characterisation of many social and recreational uses which are shown here to be critical for young people's development as internet users (Notley, 2008). While there are certainly pragmatic reasons for restricting such uses in this context, these need to be separated from a more ideological insistence on youth internet engagement that conforms to the ideas of Information Society and Knowledge Economy.

As this thesis has shown, these are ideas which spread beyond the context of schooling via the discourse of academic maturity, with its emphasis on productive engagement; this sets a wider cultural benchmark for effective internet use which has little basis in actual evidence about the consequences of internet use, and more to do with the demonstrating a set of tastes which are approved and rewarded in the educational context. In this sense, curriculum planning and school ICT policy frameworks should err on the side of diversity in terms of which uses are recognised and encouraged within the academic context. This research suggests that, unless their preferences for more intrinsically motivated uses are more recognised at school, male students and those attending State schools may be increasingly diverted into personal modes of engagement with a focus on

sensation-seeking and gratification and an absence of productive self-discipline. For these students, 'edutainment' uses during adolescence may help defuse potential tensions between their needs for enjoyment and the academic expectations placed on them (Hasebrink et al, 2009).

More problematic still is the broader tendency for researchers and policymakers to discard as irrelevant or unreliable young people's own assessments about the benefits and risks of internet in their everyday lives. This undermines young people's agency by excluding their perspectives from discourses about how they should be engaging with the internet. In doing so, it omits the valuable insights they have to offer about what constitutes effective and meaningful internet use in their everyday lives. This thesis has employed a child-centred approach which situates young people's perceptions and experiences of internet use within the context of broader influences which enable and constrain their use (Livingstone & Haddon, 2009). Such an approach has revealed a discourse of technological maturity which is critical in driving young people's transformation into confident and innovative internet users. Many of the attributes young people are expected to display in the context of the Information Society are ones they learn outside of school, in response to peer-based norms and expectations, and by pursuing their own intrinsic curiosity and interests. Thus, regulations designed to cultivate academic use and minimise young people's exposure to online risks may do precisely the opposite when they discourage enactive learning and experimentation in this broader context. The clearest potential for inequality exists for those who do not develop the confidence and the discipline to make this controlled risk-taking work, because insufficient access and autonomy of use has prevented them from doing so. At a fundamental level, as well as indicating the need for a more diverse conception of effective internet use, this demonstrates the importance of policy measures specifically addressing the entrenched barriers to access experienced by those in regional and remote Australia.

For researchers and policymakers to play a constructive role in cultivating youth internet engagement, they must first acknowledge that there are multiple pathways to becoming an effective internet user. Each of three engagement pathways described in this thesis have certain advantages and pitfalls which can help or hinder young people's chances of using the internet effectively. It is the responsibility of those adults who young people look to for guidance to ensure that they encourage the positive aspects of these pathways, in terms of preservation, productivity, and personality. The notion of a digital generation, distinguished from preceding generations by their intuitive grasp of digital media, works against all stakeholders in this endeavor. When it comes to the technologies which increasingly mediate our trajectory as a society, young people have as much to teach past generations as they have to learn from them.

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Appendices

Appendix A

Summary of Multi-Dimensional Accounts of Internet Engagement

Table A2.1: Key examples of multi-dimensional accounts of internet engagement

Authors	Dimension of Engagement	Definition
Kling (2000)	*Technological access*	Physical availability of suitable hardware/software
	Social access	Professional knowledge, economic resources, technical skills for beneficial use
DiMaggio & Hargittai (2001)	*Technical apparatus*	Software, hardware, connectivity quality
	Autonomy of use	Location of access, freedom to use medium for one's preferred activities
	Skill	Ability to use medium effectively
	Social support	Availability of networks supporting use with technical assistance & encouragement
	Use purpose	Type of internet use
Mossberger, Tolbert, & Stansbury (2003)	*Access divide*	Hardware/software/connectivity, access location, frequency of use
	Skills divide	Technical competence & information literacy
	Economic opportunity divide	ICT attitudes, skills & use for economic & educational participation
	Democratic divide	ICT attitudes, skills & use for democratic participation
Warschauer (2004)	*Physical resources*	Access to computers and internet connections
	Digital resources	Availability of online content/material
	Human resources	Education and literacy (including ICT specific literacies)
	Social resources	Community, institutional, societal structures supporting ICT access
van Dijk (2005)	*Motivational access*	Motivation to use digital technology/motivational reasons for non-adoption/non-use
	Material access	Possession of/permission to use computers & Internet connections
	Skills access	Operational, informational, & strategic skills
	Usage access	Number and diversity of applications, time online
Wilson (2004)	*Physical access*	Access to ICT devices
	Financial access	Costs of ICT services relative to income
	Cognitive access	ICT skills
	Design access	Usability
	Content access	Availability of relevant applications and information
	Production access	User's capacity to produce online content
	Institutional access	Availability of institutions enabling access
	Political access	Access to the governing institutions
Fuchs (2008)	*Material access*	Availability of hardware, software, applications, networks, & usability of devices and applications
	Usage & skills access	Abilities to operate ICTs, produce meaningful content & communicate/cooperate online
	Benefit access	ICT usage that benefits the individual & society
	Institutional access	Participation in institutions that govern ICTs & internet / online political engagement

Appendix B

Supplementary Descriptive Information on Dependent Variables

Table A3.1: Distribution on online time use for both analytic samples and across all waves

	Full sample		*Core sample*					
	Wave 1		*Wave 1*		*Wave 2*		*Wave 3*	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Social Internet Use								
1 = None	1734	26.5%	495	24.0%	256	12.4%	90	4.4%
2 = 1-3 hours	2590	39.6%	882	42.8%	724	35.2%	571	27.7%
3 = 4-6 hours	1144	17.5%	376	18.3%	483	23.5%	552	26.8%
4 = 7-9 hours	545	8.3%	186	9.0%	304	14.8%	406	19.7%
5 = 10+ hours	536	8.2%	121	5.9%	293	14.2%	441	21.4%
	6545	**100.0%**	**2060**	**100.0%**	**2060**	**100.0%**	**2060**	**100.0%**
Mean	**2.32**		**2.30**		**2.83**		**3.26**	
Std. Dev.	**1.19**		**1.11**		**1.24**		**1.20**	
Academic Internet Use								
1 = None	1125	17.2%	249	12.1%	118	5.7%	106	5.2%
2 = 1-3 hours	3688	56.3%	1204	58.5%	1042	50.6%	688	33.4%
3 = 4-6 hours	1317	20.1%	479	23.3%	633	30.8%	685	33.3%
4 = 7-9 hours	295	4.5%	100	4.9%	183	8.9%	337	16.4%
5 = 10+ hours	124	1.9%	28	1.4%	84	4.1%	244	11.8%
	6545	**100.0%**	**2060**	**100.0%**	**2060**	**100.0%**	**2060**	**100.0%**
Mean	**2.18**		**2.25**		**2.55**		**2.96**	
Std. Dev.	**0.83**		**0.78**		**0.89**		**1.08**	

Table A3.2: Distributions on usage breadth, frequency, and internet engagement at wave 3

Breadth of use (wave 3)			***Frequency of use (wave 3)***		
No. of Activities	**n**	**%**		**n**	**%**
0	0	0.0%	1 = Several times a week or less (low)	193	9.4
1	9	0.4%			
2	18	0.9%	2 = At least once a week (medium)	353	17.1
3	29	1.4%			
4	75	3.6%	3 = Several times a day (high)	1514	73.5
5	193	9.2%			
6	371	17.6%			
7	542	25.7%			
8	596	28.3%			
9	273	13.0%			
	2060	**100%**		**2060**	**100%**
Mean	**6.3**		**Mean**	**2.64**	
Std. Dev.	**1.65**		**Std. Dev.**	**.64**	

Internet Engagement score (wave 3)		
No. of Activities	**n**	**%**
0	5	0.2%
1	4	0.2%
2	11	0.5%
3	15	0.7%
4	45	2.2%
5	47	2.3%
6	73	3.5%
7	25	1.2%
8	61	3.0%
9	31	1.5%
10	71	3.5%
12	174	8.5%
14	79	3.8%
15	201	9.8%
16	41	2.0%
18	356	17.3%
21	367	17.8%
24	315	15.3%
27	139	6.8%
	2060	**100%**
Mean	**16.9**	
Std. Dev.	**6.4**	

Appendix C

Supplementary Analysis for Chapter 4

Table A4.1: Unweighted vs. weighted model for time spent chatting/emailing (Full Sample)

	Unweighted model			Weighted model		
	b	SE	Mins	b	SE	Mins
Non-core sample member	*.70*	*.40*	*+42*	*.86*	*.46*	*+52*
Socio-demographic						
Female	.66***	.09	+39	.68***	.09	+41
School sector						
State school (Ref.)	–	–	–	–	–	–
Independent School	-.45***	.13	-27	-.44***	.13	-27
*Non-core*indep. school*	*.38***	*.14*	*+23*	*.36***	*.14*	*+21*
Catholic School	-.35**	.11	-21	-.37**	.13	-22
Geographic region						
Major city (Ref.)	–	–	–	–	–	–
Inner regional	-.13	.11	-8	-.11	.11	-6
Outer regional	-.18	.20	-11	-.16	.21	-9
Remote or very remote	-.46**	.17	-28	-.43**	.16	-26
Family living arrangement						
Lives with both parents (Ref.)	–	–	–	–	–	–
Lives with one parent	.18	.11	+11	.16	.12	+10
Other living arrangement	-.08	.10	-5	-.07	.11	-4
Parental occupational prestige						
ANU4 score (0-100)	.00	.00	+0	.00	.00	+0
Parental employment status						
Both parents employed (Ref.)	–	–	–	–	–	–
One parent employed	-.02	.08	-1	-.05	.09	-3
Neither parent employed	.06	.19	+4	-.03	.18	-2
Parental education status						
Postgraduate degree (Ref.)	–	–	–	–	–	–
Bachelor's degree	-.11	.13	-6	-.11	.14	-6
Trade qual. or certificate	-.22	.14	-13	-.21	.15	-13
Grade 12	-.10	.14	-6	-.08	.16	-5
Less than Grade 12	.00	.17	+ 0	.06	.18	+4
Access context						
Internet connection at home						
Broadband or ADSL (Ref.)	–	–	–	–	–	–
Dial-up access	-.91***	.09	-55	-.91***	.10	-54
No net access	-2.75***	.14	-165	-2.69***	.14	-161
Computer access at home						
Shared access (Ref.)	–	–	–	–	–	–
Exclusive computer access	.74***	.11	+44	.71***	.12	+43
No Comp. Access	.12	.23	+7	.00	.23	+0
Mobile phone ownership						
Owns mobile phone (Ref.)	–	–	–	–	–	–
Doesn't own mobile phone	-.38***	.10	-23	-.35**	.12	-21
Time use (None = Ref.)						
Doing homework						
Moderate (1-3 hours)	-.19	.22	-11	-.05	.23	-3

Intensive (4+ hours)	.02	.24	+1	.22	.25	+13
Hanging out with friends						
Moderate (1-3 hours)	.45***	.10	+27	.47***	.11	+28
Intensive (4+ hours)	1.28***	.10	+77	1.24***	.11	+74
Playing sport						
Moderate (1-3 hours)	-.14	.17	-9	-.14	.19	-8
Intensive (4+ hours)	.01	.16	+1	.03	.18	+2
Doing household chores						
Moderate (1-3 hours)	-.47***	.14	-28	-.49**	.16	-29
Intensive (4+ hours)	-.60***	.16	-36	-.66***	.17	-40
Watching TV						
Moderate (1-3 hours)	.14	.36	+8	.17	.40	+10
*Non-core*Moderate*	*-.79*	*.41*	*-47*	*-.90**	*.45*	*-54*
Intensive (4+ hours)	.73*	.37	+44	.77	.39	+46
*Non-core*Intensive*	*-.86**	*.40*	*-52*	*-.98**	*.46*	*-59*
Listening to music						
Moderate (1-3 hours)	.47***	.12	+28	.48***	.13	+29
Intensive (4+ hours)	1.51***	.17	+90	1.45***	.18	+87
*Non-core*Intensive*	*.46***	*.17*	*+28*	*.47**	*.19*	*+28*
Reading books						
Moderate (1-3 hours)	-.53***	.10	-32	-.53***	.11	-32
Intensive (4+ hours)	-.61***	.12	-37	-.59***	.12	-35
Constant	2.18***	.49	+131	1.99***	.54	+119
No. of obs.		6545			6545	
Pseudo R2		.194			.189	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^ Data weighted on gender and school sector

Pseudo-R2 measure of variance explained in latent interval regression variable

Table A4.2: Unweighted vs. weighted model for time spent studying online (full sample)

	Unweighted model			Weighted model		
	b	SE	Mins	b	SE	Mins
Non-core sample member	.27***	.07	+16	.25***	.08	+15
Socio-demographic						
Female	.32***	.06	+19	.30***	.06	+18
School sector						
State school (Ref.)	–	–	–	–	–	–
Independent School	.20	.15	+12	.22	.16	+13
Catholic School	.07	.12	+4	.07	.13	+4
Geographic region						
Major city (Ref.)	–	–	–	–	–	–
Inner regional	-.04	.13	-3	.06	.13	+3
Outer regional	.02	.20	+1	-.02	.19	-1
Remote or very remote	.30*	.15	+18	.30*	.15	+18
Family living arrangement						
Lives with both parents (Ref.)	–	–	–	–	–	–
Lives with one parent	-.11	.09	-6	-.12	.09	-7
Other living arrangement	.20	.15	+12	.26	.17	+16
*Non-core*Other liv. arr.*	-.42**	.16	-25	-.49**	.18	-29
Parental occupational prestige						
ANU4 score (0-100)	-.00	.00	-0	-.00	.00	-0
Parental employment status						
Both parents employed (Ref.)	–	–	–	–	–	–
One parent employed	-.03	.06	-2	-.04	.06	-3
Neither parent employed	.11	.12	+7	.14	.12	+8
Parental education status						
Postgraduate degree (Ref.)	–	–	–	–	–	–
Bachelor's degree	-.13	.09	-8	-.10	.10	-6
Trade qual. or certificate	-.17	.10	-10	-.12	.11	-7
Grade 12	-.48***	.12	-29	-.43**	.13	-26
*Non-core*Grade 12*	.30*	.14	+18	.26	.14	+16
Less than Grade 12	-.24*	.11	-15	-.22*	.11	-13
Access context						
Internet connection at home						
Broadband or ADSL (Ref.)	–	–	–	–	–	–
Dial-up access	-.11	.10	-7	-.11	.10	-6
*Non-core*Dial-up access*	-.31**	.12	-19	-.27*	.12	-16
No net access	-1.35***	.13	-81	-1.28***	.14	-77
Computer access at home						
Shared access (Ref.)	–	–	–	–	–	–
Exclusive computer access	.41***	.09	+25	.32***	.09	+19
No Comp. Access	-.15	.24	-9	-.14	.25	-8
Mobile phone ownership						
Owns mobile phone (Ref.)	–	–	–	–	–	–
Doesn't own mobile phone	-.16**	.06	-10	-.15**	.06	-9
Time use (None = Ref.)						

Doing homework	–	–	–	–	–	–
Moderate (1-3 hours)	.83***	.11	+50	.93***	.10	+56
Intensive (4+ hours)	2.14***	.13	+128	2.20***	.13	+132
Hanging out with friends						
Moderate (1-3 hours)	.14	.08	+8	.19*	.08	+12
Intensive (4+ hours)	.34***	.09	+20	.37***	.08	+22
Playing sport						
Moderate (1-3 hours)	-.02	.09	-1	.01	.10	+1
Intensive (4+ hours)	.19	.10	+12	.17	.11	+10
Doing household chores						
Moderate (1-3 hours)	.09	.08	+6	.11	.08	+7
Intensive (4+ hours)	.52***	.10	+31	.52***	.10	+31
Watching TV						
Moderate (1-3 hours)	-.08	.17	-5	-.17	.16	-10
Intensive (4+ hours)	-.01	.16	-1	-.14	.15	-8
Listening to music						
Moderate (1-3 hours)	.21*	.09	+13	.23*	.09	+14
Intensive (4+ hours)	.47***	.10	+28	.47***	.10	+28
Reading books						
Moderate (1-3 hours)	.15*	.06	+9	.17*	.06	+10
Intensive (4+ hours)	.38***	.09	+23	.37***	.09	+22
Constant	.42	.27	+25	.42	.24	+25
No. of obs.		6545			6545	
Pseudo R2		.221			0.218	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^ Data weighted on gender and school sector

Pseudo-R2 measure of variance explained in latent interval regression variable

Appendix D

Published Paper Based on Chapter 4

Beneath the 'Digital Native' myth

Understanding young Australians' online time use

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Abstract

As young people's internet use shapes their experiences of education, work and personal relationships, their portrayal as 'Digital Natives' suggests that they are invariably better positioned than preceding generations to capitalize on such changes. Recent debates in internet use research undermine this view. While acknowledging socio-demographic differences in use, theorists disagree as to whether these reflect disparities in internet access, processes of social stratification, or users' rational assessment of risks and opportunities. Incorporating these views, this article develops a framework for investigating differences in academic and social internet use by using data from 6444 high school students in Queensland, Australia. The results show that different factors structure students' entry into these use pathways. Since social use depends on one's home access context, remote students with poorer access spent less time on this activity, whereas students at independent and Catholic schools were heavier academic users, because they possessed the requisite academic orientation.

Keywords: digital divide, Digital Natives, education, inequality, internet use, young people

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> The learners in our schools today – Digital Natives – are different from the learners of yesterday. Digital is their native language – a global language in which they are fluent. In contrast, for our education system and most teachers, digital is at best, a second language … (Director-General of Education, in State of Queensland 2004: 2)

Social researchers and policy makers regularly conceptualize young internet users as an homogeneous group who are capable of integrating new media into their everyday lives. These claims typically acquire a generational flavour: those born today are 'Digital Natives' (Prensky, 2001), and members of a 'Net Generation' (Tapscott, 1998), who, in stark contrast to their parents, are surrounded by opportunities to engage in new, technology-mediated forms of social participation. Such opportunities are reconfiguring social life in a number of domains, including education and work, civic and political engagement, social interaction and relationships, and everyday time use. As debate centres on how internet use shapes outcomes in these areas, some researchers maintain that young people will invariably fare better than earlier generations who, it is claimed, find the language of effective internet use relatively impenetrable (Palfrey and Gasser, 2008).

Variation in youth internet use is already recognized and documented by scholars in the US (Hargittai, 2010), the UK (Bennett et al., 2008) and in Australia (Kennedy et al., 2008; Lovell and Baker, 2009). On the basis of such research, the notion that young people are uniformly well positioned to capitalize on the internet's diffusion routinely attracts criticism. Many argue that it relies on a simplistic view of internet access – typically higher among youth – as the only factor relevant in shaping the outcomes these adolescents experience when they go online. It is true that in advanced Western societies internet access has spread rapidly among the youth population. By 2009, access rates stood at 86% in Australian households with children under the age of 15, compared to just 66% in childless households (ABS, 2009a). By the time they begin primary school (aged 5–8), over half of all Australian children have been online, and when they enter high school (aged 12–14) nearly all have done so (ABS, 2009b). However, critics maintain that good access does not guarantee the regular, competent and rewarding use assumed by the Digital Native rhetoric.

Rather, the capacities young people develop for internet use reflect their varied and ongoing engagement with this medium. Researchers characterize this in terms of the quality and context of young people's internet access, the frequency, duration, motivations and purposes of their use, and their perceptions of its impact. Some theorists treat differences in these factors as indicative of broader processes of social stratification (DiMaggio et al., 2004; Hargittai, 2008), while others emphasize the agency with which young people tailor internet use to meet their needs and avoid risks (Livingstone and Helsper, 2007). Buckingham (2008: 14) dismisses the portrayal of young people as creative, savvy and effective users, observing

that most youth internet use amounts to 'mundane forms of communication and information retrieval'. Recent statistics show that 94% of Australian children aged 12–14 use the internet for study and 60% use it to communicate with their friends, whereas only 24% create online content such as blogs or websites (ABS, 2009b). Yet communicating online still involves the active production of content, just as using the internet for information still requires critical user input. Lovell and Baker's (2009) qualitative study of digital content production among Australian university students finds that young people approach such tasks with differing levels of digital literacy and confidence; as a result, they perceive the possibilities of new media use in varying ways. Economists argue that the growing use of such media represents a skill-biased technological change which accounts for the rising income inequality seen in post-industrial societies (Autor et al., 1998). In this context young people's capacity for even basic forms of internet use may open up educational and occupational pathways that would otherwise remain closed to them.

In this article we contribute to the debate on these issues by addressing two related questions:

(1) What are the relevant factors for explaining whether or not young people engage in basic forms of internet use?
(2) How do individuals differ on these key factors?

To explore these questions we analyse variation in the time adolescents spend on academic and social internet use. This analysis is based on data from a large sample of 6444 high school students in Queensland, Australia.

Explaining differences in adolescent internet use

The literature on internet use among adolescents is dominated by three main theoretical perspectives: universal diffusion, cumulative advantage/disadvantage and opportunity/cost.

According to diffusion theory, an innovation diffuses fastest among individuals of higher status, economic resources and educational qualifications, until a saturation point is reached, after which it 'trickles down' to less advantaged segments of the population, universalizing as it becomes cheaper and more widely available (Rogers, 2003). Early diffusion studies in the US employed the idea of a 'digital divide' between those with and without internet access (NTIA, 1995). Those with internet access benefited from the information they received via global computer networks. Whether or not one had access was influenced by a range of socio-demographic characteristics such as age, gender, income, education, language, ethnicity, geographic location and family composition (van Dijk, 2005). Research from Australia and the US provided support for this argument, indicating

that early disparities in internet access were in decline and that some structural differences, such as gender, had disappeared entirely (Compaine, 2001; Curtin, 2001–2; Ono and Zavodny, 2003).

More recently, the universal diffusion perspective has been critiqued for several reasons. The presumption that internet access alone entails certain benefits, regardless of what users are actually doing online, is now largely obsolete. The proliferation of new forms of internet access and use also means there is now no clear endpoint in the diffusion process. Norris (2001) argues that socio-demographic disparities potentially increase, rather than normalize, as successive digital innovations diffuse. Using the example of broadband versus dial-up access, she notes that people in higher levels of social strata, who tended to adopt dial-up earlier, were better positioned to upgrade to broadband earlier. As such, more durable disparities between internet users may arise if initial advantages in access are over time converted into new advantages in terms of skills and experience.

To identify such disparities and investigate their broader social implications, theorists now acknowledge the differentiated nature of internet access and use. Access differs according to cost (DiMaggio et al., 2004), connection speed (Norris, 2001), location of access (Hassani, 2006) and exclusivity of access (Hargittai, 2008). Similarly, internet use varies in frequency and duration (Livingstone and Helsper, 2007), purpose (Zillien and Hargittai, 2009) and difficulty (Hargittai, 2010). Researchers also note that differences in users' skills, needs, motivations and preferences help explain why some individuals are more likely than others to use the internet. Nguyen (2008) accounts for this by drawing on McQuail's (2000) structural approach to media audience formation. He employs the notion of 'media orientation', as 'an affinity for certain media, specific preferences and interests, habits of use, expectations of what the media are good for', to explain why online news use varies (McQuail, 2000: 386; Nguyen, 2008).

Building on Norris's earlier example, some researchers suggest that differentiated internet use reflects a process of cumulative advantage by which status and class hierarchies are reproduced. Hargittai (2008) argues that a user's resources, preferences and capabilities influence the nature and effectiveness of their use, rendering some people's use more advantageous than others. Effective use enhances one's existing human, financial, social and cultural capital, whereas unskilled or misguided use 'may outright disadvantage the uninformed' (Hargittai, 2008: 940). Drawing on Bourdieu's (1984) theory of 'distinction', Hargittai and Hinnant (2008) argue that, when entering into online activities, users are governed by their underlying, status-specific tastes. These ensure that internet use is always conducted in a way that reinforces the same unequal distributions of capital. There are two main problems with this account. First, given the lack of systematic, longitudinal research into the effects of internet use, it relies on assumptions about these effects (Livingstone and Helsper, 2007). Second, not only does

this view attribute a high degree of causal efficacy to users' preferences, but it also grounds these so directly in the social structure as to render individual agency virtually absent from the decision-making process (Elster, 2007). The result is a static view of internet use pathways that only admit users with certain resources, skills and preferences, and of users who only engage in those uses which reinforce their socio-structural location.

Theorists have softened this account of internet use and its outcomes by acknowledging how users tailor their use over time. Livingstone and Helsper (2007) characterize adolescent internet use as presenting both risks and opportunities, which are context-specific and thus difficult for researchers to generalize about. What distinguishes their account from the cumulative advantage approach is the role it assigns to choice; users are seen as rational actors choosing from a feasible set of actions which remain possible after a variety of constraints (i.e. logical, physical, economic, social, etc.) are taken into consideration (Elster, 1997). Drawing on Giddens' (1984) concept of 'structuration', Kalmus et al. (2009: 71) identify how 'rules and resources' structure young people's opportunities for internet use, such as parental restrictions on use, material resources at home and school, and the availability of time. Yet users' choices may, over time, restrict, modify or expand the opportunities they face. Using data from the UK Children Go Online project, Livingstone and Helsper (2007) analysed the extent to which 1263 young people aged between 9 and 19 engaged in a diverse range of online activities, while controlling for socio-demographic and contextual factors. They found that 'going online is a staged process, with systematic differences between those who take up more, and those who take up fewer opportunities' (Livingstone and Helsper, 2007: 683).

In their article, Livingstone and Helsper (2007: 683–4) identify four kinds of users, based on the online opportunities they pursued. 'Basic' users (16% of the population) focused narrowly on information-seeking use, which Kalmus et al. (2009) describe as 'school-favoured' use. 'Moderate' users (29% of the population), supplemented this with communication and entertainment, such as email and online games. 'Broad' users, (27% of the population), added in more 'resource-bound' activities such as downloading music and watching movies, as well as peer-to-peer engagement through instant messaging. Finally, 'all-rounders' (27% of the population) did all these activities as well as more interactive or creative forms of use, such as website creation, forum discussions, or taking part in online polls. Each stage of use coincided with increased frequency of use. Older adolescents were typically more advanced in their use; having been users for longer meant they had the experience needed to take up more online opportunities. This account suggests that individuals experiment with those avenues of use that are open to them once structural factors are taken into consideration. Those users who become familiar with a wider variety of online activities,

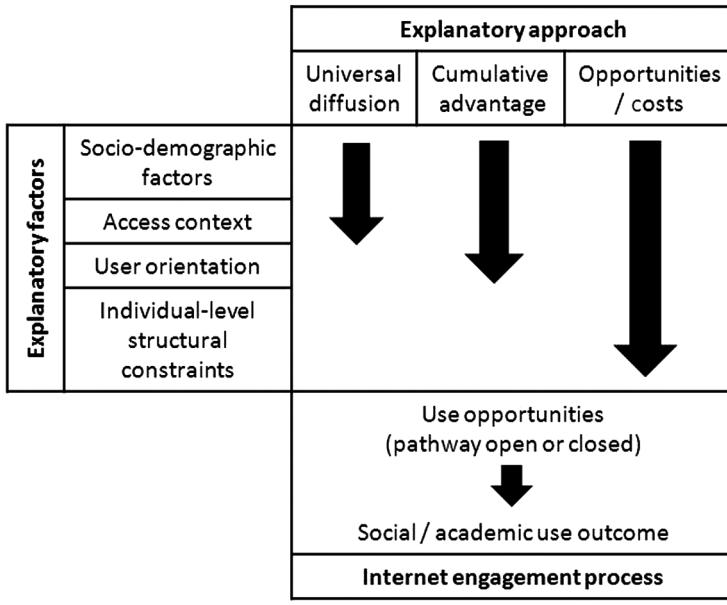

Figure 1: Framework for explaining differences in internet engagement

and weigh up the benefits and costs of each, may be better positioned to tailor their use in ways that meet their needs while avoiding risks.

The perspectives reviewed here show a progression in how researchers characterize one's chances of capitalizing on internet use, beginning with a focus on disparities in access, then on the social structure which internet use permeates, and finally on the rationality of the user. These constitute varying responses to the research questions posed earlier:

(1) What are the relevant factors for explaining whether or not young people engage in basic forms of internet use?
(2) How do individuals differ on these key factors?

Figure 1 shows a framework for researching these questions. The process of engaging in basic forms of internet use, referred to in question (1), is depicted at the bottom of the diagram. It shows that use outcomes, beneficial or otherwise, require the opportunity to engage in some kind of use. Our analysis will focus on differences in time spent on both academic and social forms of use. Not only are these the most common types of adolescent internet use in Australia (ABS, 2009b) but they are also significant in the context of the literature; the cumulative advantage perspective views them as contrasting, status-specific types of use, whereas the

opportunity/cost approach regards them as gateways to more advanced forms of engagement.

The top of the diagram shows the three main ways researchers have conceptualized the engagement process referred to in question (1) and on the left are four types of factors they identify as relevant for explaining how this process varies. For each approach, the centre arrows indicate which of these key factors is considered sufficient to explain differences in internet use. As noted earlier, socio-demographic variation in youth internet use is widely documented, and this is reflected in all three approaches. For the universal diffusion approach these differences are largely explained by one's access context. For the cumulative advantage perspective, an additional factor is involved – one's structurally determined orientation towards the use in question. For the opportunity/cost perspective, socio-demographic differences which cannot be explained by these factors indicate that there are individual-level structural constraints which users take into account when weighing up the risks and benefits of their use. Question (2) asks about differences between individuals on each of these key factors. Only by answering this question can the analysis identify which of these factors is most relevant in explaining whether young people engage in basic types of internet use.

Data

The data come from wave 1 of the 'Our Lives' project, a longitudinal cohort study that sampled Queensland high school students in Year 8 in 2006 (aged 12–13). As well as their internet use, students were surveyed about their goals, values and interests, their social networks, and their academic and social participation. The study employed a two-stage cluster sampling approach, with students contacted via their schools. State-wide, 208 out of 478 schools participated in the project. After excluding 71 schools to which access was denied by the relevant authorities, the overall school response rate was 51%. The student response rate within schools was 34%, yielding an overall sample size of 7031. Post-stratification weighting has been employed to correct an initial over-representation of females and independent school students. The sample is representative of students in urban, regional and remote Queensland. Respondents were excluded if they were missing data on any variables in the analysis where the size of missing data was too small to warrant imputation or controlling for missing data. This produced an analytic sample of 6444 students.

Dependent variables

To test the proposed framework this article analyses the time respondents spent using the internet for basic informational and social purposes.

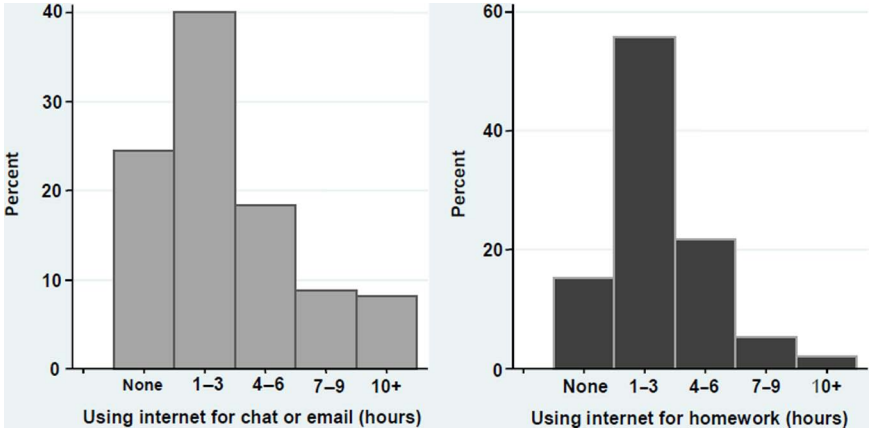

Figure 2: Hours per week spent online

Students were asked 'How many HOURS PER WEEK, on average, do you spend doing the following?' The two activities focused on here are 'Using the internet to email or chat with friends' and 'Using the internet to help with your homework'. Respondents selected from the following five response categories: 1 = 'None'; 2 = '1–3 hours'; 3 = '4–6 hours'; 4 = '7–9 hours'; and 5 = '10 or more hours'.

Figure 2 displays the frequency distributions on both dependent variables.[1] Overall, most respondents spend 1–3 hours per week chatting or emailing (40%) or studying online (56%). While more students report not using the internet at all for social uses (26%) than for academic uses (17%), heavier users (i.e. 7–9 or 10+ hours) are more common among those who use the internet socially.

Socio-demographic characteristics

Previous research suggests that respondents' online time use will vary depending on their socio-demographic characteristics. Model 1 in this analysis examines whether the time a student spends chatting or studying online differs according to their gender, school sector, geographic region, and family living arrangement, as well as their parents' education and occupation. Parental occupation was controlled for using the ANU4 occupational prestige scale. To apply this measure, students' responses to open-ended occupational questions were initially coded using the Australian Standard Classification of Occupations (ASCO), and then assigned the corresponding score between 0 and 100 on the ANU4 scale. A high

amount of missing occupational data was accounted for by scoring these observations as 0 on the scale and flagging them with a dummy variable. All other socio-demographic measures are controlled for using dummy variables, and the omitted reference categories have been included in the output. A students' geographic region was based on their school's location and coded using the Australian Standard Geographic Classification (ASGC). For parental education, cases where respondents did not answer or selected 'don't know' were controlled for with a dummy variable that combined these observations.

Access context and user orientation

The review of prior literature showed that the contexts in which the internet is accessed may influence internet use. Model 2 in this analysis takes into account two measures of access context. The first is the home internet connection type, coded 1 = broadband or 2 = dial-up. The second is whether a student has exclusive access to a home computer (1 = yes) or shares with others.

The compatibility of internet use with students' broader values and interests is also likely to affect their online time use. Model 3 explores how respondents' orientations towards academic and social activities offline affect the time they spend doing such things online. A respondent's 'social orientation' was gauged by the time they spent 'Hanging out with friends outside of school' and the number of close friends they had. Time spent hanging out with friends is measured in the same manner as the dependent variables. Number of close friends is measured with a question asking, 'Apart from family members, how MANY friends do you have?' Five response options were given: 1 = 'None'; 2 = '1–3 friends'; 3 = '4–6 friends'; 4 = '7–9 friends'; and 5 = '10 or more friends'. This question was asked for 'Friends in general' and 'Close friends', but this analysis focuses on close friends only. A student's 'academic orientation' is controlled for with a measure of the time they spent 'Doing homework', and with an index gauging students' dispositions towards academic engagement. This latter measure sums up respondents' scores on these questions: 'How important to you is being a good student?'/'How confident are you that your teachers won't let you down?'/'How much trust do you have in your school?'/'How important to you is being a member of your school community?' Since these measures range from 1 to 4 or 1 to 5, the lowest a respondent could score on the composite measure was 4, indicating a weak disposition, and the highest they could score was 19, indicating a strong disposition. This measure has a Cronbach's alpha of 0.7314, indicating a satisfactory level of internal reliability. Sample distributions on all measures are shown in Table 1.

Table 1: Distribution of measures*

Model 1 Socio-demographic variables	*n*	%		*Model 2 Access context variables*	*n*	%	
Gender				***Home internet connection type***			
Male (Ref.)^	3,312	51.4%		Broadband (Ref.)	4,165	64.6%	
Female	3,132	48.6%	**100%**	Dial-up	1,648	25.6%	
School sector				No net access	631	9.8%	**100%**
State school (Ref.)	4,109	63.8%		***Home computer access***			
Independent school	1,130	17.5%		Shared access (Ref.)	5,107	79.3%	
Catholic school	1,205	18.7%	**100%**	Exclusive access	1,119	17.4%	
Geographic region				No access	218	3.4%	**100%**
Major city (Ref.)	3,541	54.9%		*Model 3 User orientation variables*			
Inner regional	1,462	22.7%		***Social orientation***			
Outer regional	1,122	17.4%		No. of close friends (1–5)	6,444	3.5	
Remote	319	5%	**100%**	Time hanging out = None (Ref.)	824	12.8%	
Family living arrangement				Time hanging out = 1–3 hours	2,496	38.7%	
Lives with both parents (Ref.)	4,559	70.8%		Time hanging out = 4+ hours	3,125	48.5%	**100%**
Lives with one parent	996	15.5%		***Academic orientation***			
Other living arrangement	889	13.8%	**100%**	Academic disposition index (4–19)	6,444	14.2	
Mother's occupational prestige				Time studying offline = None (Ref.)	378	5.9%	
ANU4 score (0–100)	6,444	37.9		Time studying offline = 1–3 hours	3,431	53.2%	
Job data missing	1,312	20.4%	**100%**	Time studying offline = 4+ hours	2,636	40.9%	**100%**

Table 1: (Continued)

Model 1 Socio-demographic variables	*n*	%		*Model 2 Access context variables*	*n*	%	
Father's occupational prestige				*Dependent variables (hours per week)*			
ANU4 score (0–100)	6,444	38.8		***Time chatting/emailing***			
Job data missing	881	13.7%	**100%**	None	1,694	26.3%	
Mother's education				1–3 hours	2,549	39.6%	
Bachelor's degree (Ref.)	1,495	23.2%		4–6 hours	1,133	17.6%	
Year 12 or less	2,564	39.8%		7–9 hours	538	8.4%	
Trade/certificate	715	11.1%		10+ hours	530	8.2%	**100%**
Education unknown	1,670	25.9%	**100%**	***Time studying***			
Father's education				None	1,108	17.2%	
Bachelor's degree (Ref.)	1,255	19.5%		1–3 hours	3,627	56.3%	
Year 12 or less	1,981	30.8%		4–6 hours	1,299	20.2%	
Trade/certificate	1,281	19.9%		7–9 hours	289	4.5%	
Education unknown	1,926	29.9%	**100%**	10+hours	120	1.9%	**100%**
Total observations	6,444			***Total observations***			

* Data weighted on gender and school sector

^ Ref. = Reference category

Analytic approach

To test the proposed framework (Figure 1), we estimate three models for each dependent variable. Each model introduces a factor identified earlier in the literature as relevant for explaining why internet use varies. Model 1 identifies which time differences are attributable to socio-demographic factors, as theorized by all three explanatory approaches identified in Figure 1. Model 2 introduces the access context measures emphasized under the universal diffusion approach. Model 3 includes user orientation measures in accordance with the cumulative advantage approach. The role of individual-level structural constraints, central in the opportunities/costs perspective, is not directly measured; rather, it may be inferred by the presence of socio-demographic effects which remain unexplained by the previous factors.

The dependent variables are constructed in ordered intervals with upper and lower thresholds. This reflects the need to minimize the recall error that can arise when respondents are asked to place a specific numeric value on their time use. Values are 'censored' in that they fall within known ranges (i.e. 1–3 hours, 4–6 hours and 7–9 hours) or beyond a known threshold (i.e. 10 or more hours). We therefore employ a form of censored regression known as 'interval regression', which uses Maximum Likelihood Estimation (MLE) based on the known thresholds in which values can fall to provide more robust parameter estimates than would be obtained by ordinary least squares regression (Wooldridge, 2003). This analysis was performed in STATA (version 11) using the INTREG command. Interval regression coefficients are interpreted in the same way as OLS coefficients. In this case, 1 unit of the dependent variable is equal to 1 hour per week. The effect of each variable is also displayed in minutes by multiplying its coefficient by 60. To allow for the possibility of within-school clustering – arising from the two-tiered nature of the sampling process – we specify that the estimation of standard errors for all models take into account this intragroup correlation. While this option does not impact the coefficient estimates, it does allow for more robust tests of significance.

Results

Social internet use

Model 1 (Table 2) regresses time spent using the internet for chat or email on the socio-demographic variables. McKelvey and Zavoina's R-squared shows how much variation in time use is explained by each model. Model 1 explains 2.3% of the variation, with gender and geographic region displaying the strongest associations, net of other factors. On average, girls spend 49 minutes longer (0.819, $p < 0.001$) online per week than boys, and regional and remote respondents spend less time chatting or emailing than their urban counterparts. Those living in an inner regional area spend an average

Table 2: Interval regression of time spent chatting or emailing online (1 unit = 1 hour per week)#

Variables	*Model 1*	*(mins)*	*Model 2*	*(mins)*	*Model 3*	*(mins)*
Female	0.819***	+49	0.817***	+49	0.810***	+49
School sector						
State school (Ref.)	—	—	—	—	—	—
Independent school	−0.147	−9	−0.334*	−20	−0.236	−14
Catholic school	−0.342*	−21	−0.418**	−25	−0.394**	−24
Geographic region						
Major city (Ref.)	—	—	—	—	—	—
Inner regional	−0.256	−15	−0.084	−5	−0.112	−7
Outer regional	−0.539**	−32	−0.212	−13	−0.204	−12
Remote	−0.855**	−51	−0.458**	−28	−0.425**	−26
Family living arrangement						
Lives with both parents (Ref.)	—	—	—	—	—	—
Lives with one parent	0.082	+5	0.332**	+20	0.292*	+18
Other living arrangement	0.029	+2	0.101	+6	0.034	+2
Parental occupational prestige						
Father: ANU4 score	0.005*	0	0.001	0	0.002	0
Father: Job data missing	0.361*	+22	0.248	+15	0.265	+16
Mother: ANU4 score	−0.002	−0	−0.004	0	−0.004	0
Mother: Job data missing	−0.317*	−19	−0.226	−14	−0.201	−12
Mother's education						
Bachelor's degree (Ref.)	—	—	—	—	—	—
Year 12 or less	−0.091	−5	−0.01	−1	0.001	0
Trade qual.	−0.069	−4	−0.009	−1	0.039	+2
Education unknown	−0.223	−13	0.027	+2	−0.021	−1

(Continued)

Table 2: (Continued)

Variables	*Model 1*	*(mins)*	*Model 2*	*(mins)*	*Model 3*	*(mins)*
Father's education						
Bachelor's degree (Ref.)	—	—	—	—	—	—
Year 12 or less	0.126	+8	0.19	+11	0.171	+10
Trade qual.	−0.067	−4	−0.05	−3	−0.093	−6
Education unknown	−0.018	−1	0.071	+4	0.083	+5
Home internet connection type						
Broadband (Ref.)	—	—	—	—	—	—
Dial-up	—	—	−1.065***	−64	−0.935***	−56
No net access	—	—	−2.868***	−172	−2.744***	−165
Home computer access						
Shared access (Ref.)	—	—	—	—	—	—
Exclusive access	—	—	0.921***	+55	0.842***	+51
No access	—	—	−0.003	−0	−0.083	−5
Offline social orientation						
Hanging out w/ friends = None (Ref.)	—	—	—	—	—	—
Hanging out w/ friends = 1–3 hours	—	—	—	—	0.549***	+33
Hanging out w/friends = 4+ hours	—	—	—	—	1.560***	+94
No. of close friends	—	—	—	—	0.319***	+19
Constant	3.094***	186	3.456***	207	1.315***	+79
No. of obs.	6444		6444		6444	
McKelvey & Zavoina's R^2^	0.023		0.097		0.142	

* p<0.05, ** p<0.01, *** p<0.001

Data weighted on gender and school sector

^Pseudo-R^2 measure of variance explained in latent interval regression variable

of 15 minutes less per week than those in major cities, while those in outer regional and remote areas spend 32 minutes less and 51 minutes less per week respectively. Students in Catholic schools use the internet less than those in state schools while students whose mothers are unemployed or outside the labour force spend less time than those with employed mothers.

When Model 2 controls for access context, the total variance explained increases to 9.7%. Connection type and exclusivity of access strongly influence social internet use. Unsurprisingly, students with dial-up access on average spend 1 hour and 4 minutes less per week on chat or email than those with broadband access, while having no home access predicts a 2 hour and 52 minute decrease. Students who enjoy exclusive access spend 55 minutes longer per week than those with shared access. When these factors are included, the net effect of geographic region roughly halves. Furthermore, the negative effect of attending an independent school increases. In Model 3, the social orientation variables increase the total variance explained to 14.2%. The more close friends a student has, and the longer they spend with friends outside school, the longer they are likely to spend chatting or emailing. Social orientation also accounts for the negative effect of attending an independent school and having a mother who is unemployed or not in the labour force.

Academic internet use

Model 1 (Table 3) regresses time spent using the internet for homework on the socio-demographic variables. It accounts for 4.4% of the total variation in time use, with gender, school sector and family living arrangement displaying the strongest associations. Females study online for an average of 30 minutes per week longer than males. Compared with students in state schools, independent and Catholic school students report studying online for 34 minutes more and 16 minutes more per week respectively. A student living with one parent spends an average of 18 minutes less per week studying online than if they were living with both. For every 10 point increase in their father's occupational prestige, a student spends 3 minutes longer studying online. Living in a major city, or having a mother with a bachelor's degree, also predicts increased use.

Model 2 factors in access context and the total variance explained rises to 7.7%. The effect of connection type and exclusivity of access on academic use, though strong, is not as influential as it was on social use. Relative to those with broadband, students with dial-up spend 19 minutes per week less studying online, and those with no home access spend 75 minutes per week less. Having exclusive rather than shared access means students spend 27 minutes more studying online per week. Including access measures leads to decreases in the effect of family living arrangement, father's occupational prestige and mother's education. However, user orientation explains much more of the variance in academic internet use than it

Table 3: Interval regression of time spent studying online (1 unit = 1 hour per week)#

Variables	*Model 1*	*(mins)*	*Model 2*	*(mins)*	*Model 3*	*(mins)*
Female	0.504***	+30	0.504***	+30	0.307***	+18
School sector						
State school (Ref.)	—	—	—	—	—	—
Independent school	0.574**	+34	0.499**	+30	0.143	+9
Catholic school	0.259*	+16	0.225	+14	0.008	0
Geographic region						
Major city (Ref.)	—	—	—	—	—	—
Inner regional	−0.105	−6	−0.047	−3	0.049	+3
Outer regional	−0.199	−12	−0.067	−4	0.009	+1
Remote	−0.024	−1	0.155	+9	0.244	+15
Family living arrangement						
Lives with both parents (Ref.)	—	—	—	—	—	—
Lives with one parent	−0.302***	−18	−0.193*	−12	−0.066	−4
Other living arrangement	−0.116	−7	−0.082	−5	−0.062	−4
Parental occupational prestige						
Father: ANU4 score	0.005**	0	0.003	0	0.001	0
Father: Job data missing	0.185	+11	0.14	−8	0.116	+7
Mother: ANU4 score	−0.001	0	−0.002	0	−0.003*	0
Mother: Job data missing	−0.167	−10	−0.119	−7	−0.112	−7
Mother's education						
Bachelor's degree (Ref.)	—	—	—	—	—	—
Year 12 or less	−0.244**	−15	−0.207*	−12	−0.202*	−12
Trade qual.	−0.044	−3	−0.016	−1	−0.098	−6
Education unknown	−0.275**	−16	−0.161	−10	−0.121	−7
Father's education						
Bachelor's degree (Ref.)	—	—	—	—	—	—
Year 12 or less	−0.152	−9	−0.126	−8	−0.047	−3
Trade qual.	−0.003	−0	0	0	0.027	+2
Education unknown	−0.101	−6	−0.065	−4	0.038	+2

Table 3: (Continued)

Variables	*Model 1*	*(mins)*	*Model 2*	*(mins)*	*Model 3*	*(mins)*
Home internet connection type						
Broadband (Ref.)	—	—	—	—	—	—
Dial-up	—	—	–0.310***	–19	–0.328***	–20
No net access	—	—	–1.246***	–75	–1.246***	–75
Home computer access						
Shared access (Ref.)	—	—	—	—	—	—
Exclusive access	—	—	0.448***	+27	0.403***	+24
No access	—	—	–0.117	–7	–0.042	–2
Offline academic orientation						
Studying offline = None (Ref.)	—	—	—	—	—	—
Studying offline = 1–3 hours	—	—	—	—	0.905***	+54
Studying offline = 4+ hours	—	—	—	—	2.275***	–136
Academic disposition index	—	—	—	—	0.066***	+4
Constant	2.484***	149	2.599***	156	0.488*	29
No. of obs.	6444		6444		6444	
McKelvey & Zavoina's R^2^	0.044		0.077		0.192	

* p<0.05, ** p<0.01, *** p<0.001
# Data weighted on gender and school sector
^Pseudo-R^2 measure of variance explained in latent interval regression variable

did for social use. In Model 3, the academic orientation variables raise the total variance explained to 19.2%. The stronger a student's academic disposition, and the longer they spend doing homework offline, the more time they spend studying online. Controlling for a student's academic orientation negates the effects of school sector and family living arrangement, while reducing the effect of being female.

Discussion

In this article we developed and tested dominant explanations for why internet use varies. In general we find that participants in this study are more likely to use the internet for academic (i.e. homework) rather than social (i.e. chatting) reasons. This is consistent with national trends for this age group (ABS, 2009b). However, the ABS does not measure online time use for specific purposes. These results show that students' social use is more time-consuming than their academic use. For some, simply having enough time could be a decisive factor shaping their use. As students grow older and their academic and social involvement increases, these online practices may also compete against other important activities for students' limited time.

The regression analyses indicate that students' entry into these two kinds of use is structured by quite different criteria. Having fast, exclusive internet access at home impacts more on the time students spent chatting or emailing than the time they spent studying. When using the internet to communicate with friends, students require more time and greater privacy than when they use it for information. If a student lacks the means to engage in academic internet use at home, they can usually do so at school. However, school restrictions on non-academic internet use may impede those who want to engage in social use and lack the means to do so at home (Notley, 2009). This also coheres with the idea that less resource-intensive forms of use take precedence in the staged process by which young people go online (Kalmus et al., 2009).

By contrast, user orientation was more salient for academic use than for social use. Students saw 'school-favoured' internet use as fitting into their broader academic practices, which may again reflect the influence of parents and teachers. Their sense of how social internet use fits into their emerging personal relationships perhaps owes more to peer influence, or students' own experimentation with such use. This illustrates the role of norms that sanction some forms of use ahead of others, thereby structuring the process of going online. The cumulative advantage approach suggests that internet use is capital-enhancing when it adheres to status-specific tastes that attract broader social and cultural rewards. Yet children who only learn to comply with officially sanctioned uses may find themselves at a disadvantage in settings where those sanctions no longer apply, and where

their usual patterns of use attract new risks and benefits. Becoming competent across a broad range of uses allows individuals the flexibility to adapt to a wider range of circumstances. As argued by the opportunity/costs approach, it requires users to evaluate whether the cost of experimenting with unsanctioned use is worth the reward. Some users have the resources to withstand such a cost, while others do not. Social use may be rewarded outside school, but only if one has higher social capital to begin with. The positive association found between offline sociability and online interaction supports claims that social internet use can supplement face-to-face interaction in the process of social capital formation (Wellman et al., 2001).

Since these two use pathways had different entry criteria, they were open to some students and not others. Students in regional and remote areas, many of whom fell short of the necessary access criteria, spent less time chatting or emailing than those in major cities. For these students, the universal diffusion approach, with its focus on access, is relevant. By contrast, independent and Catholic school students, who displayed the requisite academic orientation, were more inclined than state school students to recognize and pursue the benefits of online study. This suggests that differences in academic use could be a function of broader processes of social reproduction, as indicated in the cumulative advantage approach.

Finally, some socio-demographic differences could not be accounted for by a user's orientation or their access context. In accordance with the opportunity/cost approach, this suggests that individual-specific structural factors may enter into some students' time use considerations. For instance, for students at Catholic schools, who spent less time chatting or emailing, stronger parental mediation of internet use at home may need to be taken into account. Males, who spent less time on both social and academic use, may need to balance these forms of use with other recreational internet uses.

Conclusion

The findings presented in this article make an important contribution to research on youth internet use both in Australia and internationally. They demonstrate that young people differ in their chances of capitalizing on the academic and social opportunities presented by the internet's diffusion. Furthermore, they show that each of the main ways in which researchers have viewed these differences have a role to play in explaining them. As scholars increasingly critique the Digital Native myth, a key lesson is that young people do not speak the digital language until, like preceding generations, they learn how to do so. As seen here, this process varies in important ways; explaining such variation is critical if we are to understand how today's adolescents are choosing to go online, and where, over time, these choices can take them.

There are several limitations to this research. First, it is difficult to accurately gauge a user's orientations and perceptions using a quantitative survey. Future research needs to incorporate qualitative analysis of the intentions that underpin young people's internet use. Second, the terrain of youth internet use has changed substantially since 2006, when this data was collected. For instance, the use of mobile internet and social networking sites has increased dramatically (ACMA, 2010). However, subsequent waves of data collected in 2008 and 2010 include measures designed to address these developments. Longitudinal analysis using these recent waves of data is also needed to assess how internet use pathways change over time, and the role of individual-specific structural constraints in this process. The research presented here shows that adolescents differ with respect to the factors that govern their entry into such pathways. As such, it serves as a baseline from which this necessary longitudinal analysis can proceed.

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Note

1. The correlation coefficient for these two variables is 0.2911, indicating a weak linear association.

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Appendix E

Supplementary Analysis for Chapter 5

Table A5.1: Internet Engagement Score (0-100) - OLS Regression w/ Core Sample

	Transformed Variable		*Untransformed variable*	
	b	se	b	se
Socio-demographic(W1)				
Female	-4.30***	1.14	-3.10**	1.11
School sector				
State school (Ref.)#	–	–	–	–
Independent School	3.57*	1.47	4.11**	1.40
Catholic School	.59	1.30	1.29	1.25
Geographic region				
Major city (Ref.)	–	–	–	–
Inner regional	.14	1.40	-.32	1.35
Outer regional	-.46	1.67	-.54	1.62
Remote or very remote	-1.22	2.81	-1.67	3.09
Family living arrangement				
Lives w/ both parents (Ref.)	–	–	–	–
Lives with one parent	-.33	1.70	.18	1.61
Other living arrangement	-.25	1.58	.44	1.56
Parental occ. prestige				
ANU4 score (0-100)	-.01	.02	-.00	.02
Parental employment status				
Both parents employed (Ref.)	–	–	–	–
One parent employed	.71	1.25	0.66	1.12
Neither parent employed	1.92	2.33	1.30	2.19
Parental education status				
Postgraduate degree (Ref.)	–	–	–	–
Bachelor's degree	3.86**	1.45	3.23*	1.41
Trade qual. or certificate	2.35	1.81	1.90	1.76
Grade 12	2.75	1.90	1.73	1.85
Less than Grade 12	1.80	2.12	.65	2.22
Access context (W1)				
Net connection at home				
Broadband or ADSL (Ref.)	–	–	–	–
Dial-up access	-1.84	1.25	-2.03	1.30
No net access	-3.35	2.44	-3.23	2.63
Computer access at home				
Shared access (Ref.)	–	–	–	–
Exclusive computer access	2.30	1.34	1.80	1.24
No computer access	-3.80	5.64	-5.05	6.97
Mobile phone ownership				
Owns mobile phone (Ref.)	–	–	–	–
Doesn't own mobile phone	-3.61***	1.08	-3.46**	1.10
Time use (None = Ref.)(W1)				
Doing homework				
Moderate (1-3 hours)	6.36*	2.90	6.34*	3.10
Intensive (4+ hours)	5.16	3.09	4.94	3.29
Hanging out with friends				
Moderate (1-3 hours)	1.67	1.50	1.84	1.57

Intensive (4+ hours)	3.45*	1.52	3.49*	1.52
Playing sport				
Moderate (1-3 hours)	1.31	1.92	1.37	1.97
Intensive (4+ hours)	.64	1.98	.75	2.02
Doing household chores				
Moderate (1-3 hours)	4.68*	1.81	4.88**	1.79
Intensive (4+ hours)	1.18	2.00	1.21	1.98
Watching TV				
Moderate (1-3 hours)	-0.71	2.67	-.92	2.70
Intensive (4+ hours)	.83	2.83	.85	2.83
Listening to music				
Moderate (1-3 hours)	.30	1.74	-.25	1.81
Intensive (4+ hours)	.83	1.79	-.04	1.83
Reading books				
Moderate (1-3 hours)	.94	1.18	1.08	1.16
Intensive (4+ hours)	2.48	1.32	2.64*	1.29
User Self-Efficacy (W3)				
Expert (Ref.)	–	–	–	–
Advanced	-7.56***	1.26	-6.64***	1.15
Beginner/Intermediate	-15.57***	1.51	-15.39***	1.53
Online Time Use (W1->W3)				
Online study				
Non-user/Drop-out (Ref.)	–	–	–	–
Late adopter	5.93*	2.34	5.71*	2.48
Moderate user	5.92**	2.09	6.18**	2.28
Upgrader	8.98***	2.17	8.96***	2.33
Downgrader	9.73***	2.65	9.32**	2.88
Heavy user	9.68***	2.25	9.89***	2.48
Chat/Email				
Non-user/Drop-out (Ref.)	–	–	–	–
Late adopter	13.43***	2.16	16.46***	2.54
Moderate user	12.03***	2.43	14.23***	2.73
Upgrader	20.54***	2.38	23.20***	2.77
Downgrader	11.48***	2.77	14.36***	3.21
Heavy user	24.53***	2.36	27.18***	2.77
Constant	18.90***	5.42	28.83***	5.88
No. of obs.	2060		2060	
R2	.203		.219	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix G

Example Interview Schedule

Introduction

- Thank for participating / get copy of consent form
- Explain purpose of interview – how they use the internet, what they get out of it, what some downsides are, how they decide and learn about things to do online .

General

- Icebreaker: In 10 years' time, where do you think you'll be, and doing what?
- Current routines (i.e. study / work / leisure) – talk through typical day
- Plans for after work / study? What parents think & parents background?

Day to Day Web Use

- Last time you used the internet? What they did & for how long? How they accessed it?
- Talk me through your internet use like on a typical day? Sites they go to? Specifically: Using internet for homework, socialising with friends, other things? Compared with friends?
- Do other things at the same time? What?
- Earliest memory using internet – describe. Parents/ friends around? Enjoy most? Most daunting?
- Talk me through how use has changed? Net user then -> net user now. How has net changed?

Risks, Benefits, Constraints

- What's most enjoyable now / most daunting now? Why?
- Internet making life harder or easier? Why?
- How's it made your life easier? More difficult or stressful? Examples: i.e. getting a job, choosing a degree?
- How does socialising online compare to/affect with socialising offline? Playing games online vs. offline?
- In general, do you think people act any differently online than they would offline?
- Easier to communicate vs. privacy risks? Feelings about risks and benefits involved?

Rules, Norms and Sanctions

- What's the first thing I should do when… What's the first thing you do when you add a friend?
- What's something I should never do.. on Facebook/online etc.
- What is it like using the internet at school? What used for, how much, etc.
- What rules were there? What happened if rules broken? Affect what you did?
- How about at home – should parents set rules about what their kids do online? What about your parents? And if rules broken?
- What sort of things do parents tell you to look out for?

Skills & the future

- How'd you learn to do <insert activity/strategy>? Who from?
- What are you good at? Bad at? Why? Compared to friends?
- Where do you normally hear about new things to do online? Do you share things with friends?
- Can't connect to internet for a week – what changes? What would you miss out on?
- How would you spend your time instead?
- How do you think you'll be using the internet 10 years from now?
- Anything other info about using the internet?

Appendix H

Overview of Respondents' Current Activities

What were the main activities on which each group spent their time in the year after school?

Group 1 *(Less Engaged)*	**Group 2** *(Academically-Orientated)*	**Group 3** *(Socially-Orientated)*	**Group 4** *(All-Rounders)*
John • FT study – Creative Industries – wants to be music producer • PT work – 20 hours p/w at Eagle Boys / student ambassador at uni • Taekwondo, playing/recording music Aaron • FT study – Engineering (5 days p/w) • Unemployed & looking • Taekwondo, reading, internet Harriet • Deferred from uni for financial reasons – Arts degree (Japanese) • Two PT jobs – 35-40 hours p/w (McDonalds, Pizza Capers) • Free time w/ friends at beach Alison (regional) • FT study – Law • Two PT jobs – bank teller during week & IGA on weekends • Most time spent studying, free time at the beach Brad (regional) • FT study – Engineering (5 days p/w, 4-6 hours each day) • PT job washing buses (20 hrs p/w) • Dirt biking on weekends – main way of socialising w/ friends	Bernard • FT study – business & psychology • PT work – 20 hours p/w at Woolies • Cricket, tennis, music in spare time Adrian • FT study – business – wants to be stockbroker – 3 days p/w • Unemployed & looking • Plenty of free time -> videogames, soccer, hanging out w/ friends who live on same street Sandra (regional) • FT study – nursing at uni • PT work – nursing assistant (short shifts, flexible -> most time spent studying • Spare time – catching up w/friends Amy • FT study – medical science (streamlined course, extra workload) • 2 PT jobs – homewares store (6 hrs) & tutoring (2-3 hrs) • Spare time – gym, friends, 'nothing' Rob • FT study – physiotherapy (possibly medicine) • PT work at KFC • Music takes up most of free time, also goes with friends 'too much'	Rachel • FT study (teaching – 3 days p/w) • PT work Woolies (flexible hours) • Gym, catching up w/ boyfriend & friends. Steve (regional) • FT study – engineering (wants to be project manager) – living on campus – 70% of time • PT work – surf club (patrol captain) – 20% of time • 10% - free time relaxing Nick • FT study – Criminology (wants to be AFP officer) • PT work – Woolies night fill – 25 hrs p/w • Gaming, girlfriend, scouts, bowling Michelle • FT study – business & arts (wants to be architect) – 3 days p/w • PT work – 24 hours p/w @ Big W • Weekends socialising w/ friends • Knitting, guitar Olly • Deferred uni – Creative Industries (wants to be games programmer - taking gap year) • Unemployed & looking • Reading, movies, gaming	Jennifer • FT study – teaching • Not working (unclear if looking) • Watching movies, reading, seeing friends Mike • FT study – paramedicine (wants to be army doctor) • PT work KFC (20 hours, 4 days p/w) • Gym daily, footy, gaming, girlfriend, going out Nicole • FT study – HR (4 days p/w) • PT work as crew trainer – 16 hours p/w • Time w/ family, going out w/ friends Carol • FT study – biomedical science (wants to do medicine) • 2 PT jobs –waitress, checkout attendant • Free time reading, using internet • Meets friends at uni Cameron • Doing traineeship – Cert III in logistics & transport – FT (wants to be sales manager) • Volleyball 4 nights p/w / volunteer chaplain assistant • Sees friends on weekend

FT=Full-time; PT=Part-time