

Supporting the “Digital Natives”: what is the role of schools?

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Abstract

The notion of the “digital native” has become pervasive in popular discourse about young people and new technologies. In this discourse, parents and teachers (“the digital immigrants”) have been characterised as unable to support young people in their uses of the Internet and other new technologies because (unlike the digital natives) the immigrants were not born into a world surrounded by new technologies. Yet in contrast, empirical research has shown that there is limited empirical basis for a distinction in the ways that people use new technologies because of when they were born and that young people are not all the same – they engage with new technologies in a variety of ways and vary considerably in their skills to use new technologies. Given this empirical evidence, it is important to better understand why and in what ways young people use computers and the Internet and if and how they need to be supported in this use. This paper aims to add to existing research by using empirical survey data on how and why young people in Britain use the Internet outside formal educational settings. The data is based on a nationally representative face to face survey of 1000 young people in Britain aged 8, 12, 14 and 17-19. The survey was conducted between December 2008 and January 2009 utilising a stratified sampling strategy. The survey forms part of the Learner and their Context study, commissioned by Becta, which explores young people’s views and experiences of new technologies outside school and is designed to inform the next phase of the UK’s Harnessing Technology Strategy. This paper will provide an overview of the ways young people are using the Internet for a range of activities (e.g. for homework, information seeking and creating content) and examine the factors that help to explain why young people are using new technologies for these purposes. The results demonstrate that there are a range of individual and contextual factors that help to understand use of the Internet and that formal contexts of education have an important role to play in supporting the “digital natives”.

Keywords

Digital Natives, Formal Education, Schools, Young People, Internet Use, Internet Skills, Internet Access

Introduction

The notion of the digital native has become pervasive in popular discourse about young people and new technologies. Digital native is one of a group of terms – net generation, Google generation or millenials etc. – which excitingly propose new ways of thinking about what technologies mean in the lives of young people. It stands for a growing folk belief that those “born digital” have, simply by growing up in an environment filled with digital technologies, become instilled with a capacity to make sense of and use them effectively: “they took to it like ducks to water” (Tapscott, 2009:1).

While there are a number of advocates of this view (e.g. Prensky, 2001; Palfrey and Gasser, 2008; Tapscott, 1998 and 2009) the empirical research does not bear this out. Young people are a heterogonous group who use and engage with technologies in a variety of ways, and vary considerably in their skills to use new technologies (e.g. DiMaggio and Hargittai, 2001; Eynon and Malmberg, 2009). Indeed, previous research in this area has identified a number of the reasons why and in what ways young people use computers and the Internet. These include: demographic variables such as age and gender, socio economic factors (Livingstone and Helper, 2007),

existence and quality of home access (Facer, et al., 2003), media literacy skills, self efficacy (Broos and Roe, 2006), peer use of technology (Ito et al., 2008), attitudes towards technology and learning and parental engagement / regulation (Kerawalla and Crook, 2002). However, the part that formal education plays in Internet use that takes place away from school or college is a less well researched area.

Using a representative survey of young people in Britain this paper aims to add to this existing research by providing an insight into the ways young people are using computers and the Internet outside formal education and examine the individual and contextual factors that help to explain this use, with a specific focus on the role of schools and colleges. In the UK, there is a significant push to use technologies in formal education to enhance young people's learning and to make better links between home and school or college (Becta, 2008). Given this context, a key question is how we best support young people in their uses of new technologies. Contrary to supporters of the digital native concept, here it is argued that formal educational contexts and adults – the “digital immigrants” – can support younger people in their use of technologies (Helsper and Eynon, 2009).

Methodology

This paper is based on data from a nationally representative face to face survey of young people in Britain aged 8, 12, 14 and 17-19. The survey forms part of the Learner and their Context research project, supported by Becta. The aim of the research is to gain up-to-date understandings about how a wide range of learners experience new technologies in their lives outside their formal education, and the learning made possible by those experiences.

The survey consists of a total of 1069 respondents: 265 8 year olds, 265 12 year olds, 275 14 year olds and 264 17-19 year olds. The group provides a representative sample of 8, 12, 14 and 17-19 year olds in the UK. The survey sample was identified using output areas (each comprising around 150 households) that were randomly drawn using the ACORN classification. In each of these output areas the interviewer was asked to find one 8 year old, one 12 year old, one 14 year old and one 17-19 year old to interview, knocking on every third door. Only one young person could be interviewed per household.

All the young people included in the survey were interviewed at home by a researcher from a market research company (ICM). The interview took between 20 and 40 minutes depending on the age of the child. The interview questions focused on use and non use of technologies, their attitudes and skills, the quality of access to technology, family, peer, school and work contexts and demographic and socio-economic variables. There was a set of core questions asked across all age groups, with some simplified questions for 8 year olds and some additional questions for 17-19 year olds about work and their educational achievements. The data collection phase took place across Britain from the 19th of December 2008 to the 1st of February 2009.

Descriptive and inferential statistical analysis of the data was conducted using SPSS. The analysis was conducted in two key stages: firstly exploratory factor analysis was used to identify types of Internet use and constructs of certain factors that previous research had identified as important in understanding kinds of Internet use. Secondly, linear regression was carried out to identify the individual and contextual factors (including formal education) that are important in understanding how and why young people use the Internet. Each of these stages is described in more detail below.

The survey contained a number of questions about the frequency with which the participant carried out different activities online (scale from 0 ‘never’ to 5 ‘several times per day’) and from these items five general “informal” categories of Internet use were constructed based on an exploratory factor analyses. They were communicating, information seeking, entertainment, participating and creativity. Communicating was measured with three items (chatting online, using a social networking site, sending and receiving emails; $\alpha = .87$). Information seeking was measured with four items (to look for information on a topic that interests you, researching products you would like to buy or own, to keep up with the news, to look for information on careers; $\alpha = .75$). Entertainment was measured with three items (watching TV on demand on the computer, watching videos on the computer and downloading or streaming music; $\alpha = .67$). Creativity was measured with four items (using a computer for creative writing, writing or composing music or lyrics, creative drawing or improving or editing photos; $\alpha = .69$). Participating was measured with four items (writing your own blog, adding or changing content in a wiki, putting podcasts, music or videos on the Internet, and reading a blog; $\alpha = .81$).

Survey participants who were still in formal education were also asked a number of questions about the frequency with which the participant carried out different homework activities online (scale from 0 'never' to 5 'several times per day'). From these items three general categories of use of computers and the Internet for homework, were constructed based on an exploratory factor analyses. They are: producing homework, researching homework and using a VLE or LMS. Producing homework is a construct developed from four items (writing homework on the computer, making a slide presentation, editing images or pictures for a school project and using a spreadsheet; $\alpha = .78$). Researching homework was measured from four items (finding a definition of a word or checking a fact, searching for information on a school project, communicating online with friends about how to do school work and finding things out using a dictionary or encyclopaedia; $\alpha = .72$). Using a VLE was measured from two items (logging on to school, college, or university to find resources and websites, and logging on to school, college or university to get homework information; $\alpha = .89$).

Exploratory factor analysis was also used to develop constructs of certain factors that previous research had identified as important in understanding kinds of Internet use. These were: employing a problem solving approach to technology (developed from 3 items: when trying to understand how to use or do something new on the computer you try to figure it out for yourself, you look on the Internet or in the manual for help and you try lots of things to see what works; $\alpha = .62$) and friends' engagement with technology (developed from 3 items: your friends like to use technology, you talk about technology with your friends and you use technology with your friends; $\alpha = .83$).

Other measures included in the analysis were: age group (i.e. 8, 12, 14 and 17-19), gender, having home Internet access, personalised computer access, level of Internet self-efficacy (Internet self-efficacy was measured on a four point scale from excellent (4) to poor (1) through the answer of the respondent to the question 'How would you rate your ability to use the Internet?'); Belief in ability to do well at school (a construct developed from four items: you expect to do well in school, college or university this year, if you try hard you believe you can do good work, it is important to you that you do well in school, college or university, and when you are taught something that doesn't make sense you spend time trying to understand it; $\alpha = .86$); How often they used the Internet at school or college (on a four point scale from rarely(1) to often (4)) and the normalised score on the Indices of Multiple Deprivation as a measure of socio-economic status.

Linear regression was used in order to explore how specific individual and contextual factors help us to understand how young people use the Internet in certain ways. Here, ten demographic, socio-economic, attitudinal, skill and contextual variables were included. They were: age, gender, socio economic status, home Internet access, personalised computer access, perceived ability to use the Internet, employing a problem solving approach to technology, friends' engagement with technology, belief in ability to do well at school and the amount of use of technology in school or college. The next section summarises the findings from this analysis.

Results

This section is split into three parts. The first presents an overview of who uses the Internet and who does not. The second focuses on the development of skills to use the Internet and the third presents the results of the regression analysis that examines the individual and contextual factors that help us to understand why young people use the Internet for communicating, information seeking, entertainment, participating, creativity, for researching homework, producing homework and using a VLE.

Access to computers and the Internet: the importance of formal education

Young people tend to be relatively high users of computers and the Internet. From the survey, 95% of young people aged 8, 12, 14 and 17-19 use a computer and 88% use the Internet. 97% of 12 year olds, 98% of 14 year olds and 90% of 17-19 year olds use the Internet at home, school or some other location. The proportion of 8 year olds using the Internet is significantly lower with 68% reporting that they use the Internet.

Furthermore, 87% of young people have at least one computer in the home and 82% have home access to the Internet. Schools and colleges are also places where the majority of young people access the Internet. At the

time of the survey, 87% of 8, 87% of 12, 90% of 14 and 94% of 17-19 year old Internet users who were still in formal education accessed the Internet from school, college or university in the past month.

Also, while the numbers are very small it is interesting to note that of the 10% (N=26) of young people aged 17-19 who did not use the Internet, all but two were lapsed users and all had left school. For those who had used the Internet in the past school was a relatively important feature in this decision. 90% of these lapsed users said they had first used the Internet because they had to use it for school, college or university and 73% of lapsed users said they had stopped using the Internet because they had left school where the Internet was available (other important reasons were cost (50%), difficulties in using the Internet (46%) and a lack of interest (32%)).

Overall, young people still in formal education are relatively positive about school and college use of ICTs. 86% agreed or agreed strongly with the statement the technology in your school, college or university is very good; 71% agreed or agreed strongly with the statement you have lots of opportunity to use technology during lessons or lectures, 65% with the statement you have lots of opportunity to use technology outside lessons or lectures and 71% with you are expected to use technology for your homework (table 1). Interestingly, while there seems to be satisfaction about the amount of use of technology in their school or college, many young people tend to use more technology at home. 73% of survey respondents still in formal education agreed or agreed strongly with the statement you use technology more than you do at school, college or university.

Table 1: Attitudes towards school / college ICT use and provision by age

	8	12	14	17-19
Technology in school is good (%)	83	90	83	89
Lots of opportunities to use technologies in lessons (%)	56	75	75	82
Lots of opportunities to use technology outside lessons (%)	38	70	74	85
You are expected to use technology for your homework (%)	42	78	83	87
You use technology more at home than you do at university (%)	65	75	76	77

N= (918 participants who are in formal education)

Skills to use computers and the Internet

While it is difficult for a survey to accurately measure specific skills it can measure perceived skills. Perceived skills are important as these are related to the kinds of activities people use technology for. In this survey, participants were asked a range of questions to measure perceptions about skills to use the Internet and online information skills.

Internet users were asked, if they had carried out the activity, to rate their skills on four items about their perceived ability to use the Internet on a scale from bad = 1 to 4 = excellent. The percentage of Internet users who rated themselves as good or excellent at carrying out these four specific online tasks is summarised in Table 2. In general, 8 year old Internet users tend to rate themselves less highly and 17-19 year olds rate themselves the most highly on these tasks. For example, 38% of 8, 76% of 12, 83% of 14 and 90% of 17-19 year old Internet users rated their ability to send and instant message as good or excellent.

Table 2: Perceived ability to use the Internet by age

	8	12	14	17-19
Finding information you need on the web (%)	38	70	79	87
Sending an instant message (%)	38	76	83	90
Downloading and saving files (%)	34	66	78	84
Updating your info on a social networking site (%)	53	72	83	86

Internet users aged 12, 14 and 17-19 were also asked to rate their agreement with four items about finding information online on a scale from 1=disagree strongly to 5= agree strongly. 88% of this group agreed or agreed strongly with the statement you can find things quickly; 87% agreed or agreed strongly with the statement you can find things easily; 71% agreed or agreed strongly with the statement you can find things you can trust; 90% agreed or agreed strongly with the statement the information you find online is useful.

Individual and contextual factors in understanding the use of the Internet

As noted above, survey participants were asked a range of questions about what and how often they carried out certain activities using computers and the Internet outside school, college or university lessons. Five different kinds of activities were identified: communicating, information seeking, entertainment, participating and creativity. Participants were also asked a range of questions about their uses of computers and the Internet for homework. From the factor analysis 3 main activities emerged: producing homework, researching homework and using a VLE or LMS.

Table 3 summarises the significant / non significant variables in understanding the five general or “informal” types of Internet use: communicating, information seeking, entertaining, participating and creativity. As can be seen from the table, the factors that are important in understanding types of use vary in number and significance. Internet users who have friends who are more engaged in technology, have Internet access at home, perceive their skills to use the Internet highly, have access to their own computer or laptop, are male, employ a problem solving approach to technology, and are older tend to use the Internet for entertainment more often. Internet users who have access to their own computer or laptop, are younger, use the Internet frequently at school and employ a problem solving approach to technology tend to use the Internet for creative purposes more often. Older Internet users, those who employ a problem solving approach to technology, have friends who are more engaged in technology, have Internet access at home, have access to their own computer or laptop and believe they will do well at school tend to use the Internet for information seeking more often. Internet users who perceive their skills to use the Internet highly, have Internet access at home, have personal access to their own computer or laptop, are older, have friends who are more engaged in technology, and don’t believe they can do well at school tend to use the Internet for communication purposes more often. Finally, Internet users who employ a problem solving approach to technology, who perceive their Internet skills highly, have friends who are more engaged in technology, and don’t believe they can do well at school tend to use the Internet for participating more often.

From this analysis, having friends who are engaged in technology, quality of access (in terms of home Internet access and / or having personal access to a computer or laptop); perceived skills (in terms of employing a problem solving approach to technology and perceived Internet ability) seem to be the most important factors in understanding these five different types of Internet use. The amount young people use the Internet in school is only significantly related to uptake of the use of the Internet for creative purposes.

Table 4 summarises the significant variables in explaining the three key types of use of a computer and the Internet for doing homework: producing homework, researching homework and using a VLE or LMS. Internet users who frequently use the Internet at school, believe they can do well at school, employ a problem solving approach to technology and have access to their own computer or laptop are more likely to use a computer and the Internet to produce homework. Internet users who have friends who are more engaged in technology, have Internet access at home, employ a problem solving approach to technology, believe they can do well at school, perceive their skills to use the Internet quite highly, live in less deprived areas (as evidenced by the normalised IMD rank), and who use the Internet more frequently at school tend to use computers and the Internet for researching homework more often. Internet users, who are older, who use the Internet more frequently at school or college and have friends who are more engaged in technology are more likely to use a VLE or LMS.

Looking across all three types of using computers and the Internet for homework there are a number of factors that seem to be particularly important. Frequency of use of the Internet at school is significant. Young people who use the Internet more at school are more likely to use the Internet for these three types of homework activities. Skills (both in terms of self rated ability to use the Internet and employing a problem solving approach to technology) are important, as are attitudes (beliefs in the ability to do well at school) and access (either in the form of having access to their own computer or having Internet access at home) for producing and researching homework more often.

Table 3: Linear regression of types of use of the Internet

	Entertainment				Creativity				Info seeking				Communicating				Participating			
	B	SE	β	p.	B	SE	β	p.	B	SE	β	p.	B	SE	β	p.	B	SE	β	p.
(Constant)	-1.391	.499		**	-.232	.382		.545	-3.08	.377		***	-2.28	.516		***	-1.41	.423		***
Age	.054	.024	.089	*	-.062	.018	-.139	***	.111	.018	.231	***	.098	.024	.144	***	.015	.020	.030	.454
Gender	-.290	.096	-.113	**	.105	.074	.055	.157	-.011	.073	-.005	.881	.155	.100	.054	.119	.070	.082	.033	.390
IMD rank	.018	.047	.014	.699	-.055	.036	-.058	.126	.006	.036	.006	.859	-.051	.049	-.036	.293	-.048	.040	-.04	.233
Home Internet	.569	.169	.131	**	.085	.129	.026	.510	.440	.127	.126	***	1.030	.175	.211	***	.154	.143	.043	.282
Own computer	.293	.102	.114	**	.366	.078	.192	***	.204	.077	.099	**	.457	.105	.158	***	.146	.086	.068	.091
Friends	.246	.083	.125	**	.095	.064	.066	.135	.208	.063	.132	***	.302	.086	.137	***	.213	.071	.130	**
Problem solve	.166	.073	.093	*	.146	.056	.110	**	.235	.055	.163	***	.147	.075	.073	.052	.309	.062	.206	***
Int ability	.256	.083	.131	**	-.004	.064	-.003	.945	.088	.063	.056	.162	.491	.086	.222	***	.256	.071	.157	***
Ability to do well at school	-.168	.088	-.077	.057	.119	.067	.073	.078	.163	.066	.093	*	-.221	.091	-.09	*	-.175	.075	-.09	**
School use of the Internet	.089	.072	.047	.220	.195	.055	.138	***	.029	.055	.019	.591	.040	.075	.018	.597	-.067	.061	-.04	.274
R squared	.156				.104				.256				.291				.131			

N=764 (all Internet users aged 12, 14 and 17-19 who are still in formal education) * Significant at $p \leq .05$, ** Significant at $p \leq .01$, *** Significant at $p \leq .001$

Table 4: Linear regression of types of use of the Internet for homework

	Producing				Researching				Using a VLE			
	B	SE	β	p.	B	SE	β	p.	B	SE	β	p.
(Constant)	-1.88	.392		***	-1.5	.380		***	-3.12	.584		***
Age	.023	.018	.049	.204	.021	.018	.045	.245	.129	.028	.188	***
Gender	.014	.076	.007	.855	.031	.073	.016	.668	.065	.113	.022	.566
IMD rank	-.066	.037	-.06	.075	.073	.036	.074	*	-.023	.055	-.01	.673
Home Internet access	.148	.133	.042	.268	.456	.129	.135	***	.372	.199	.075	.062
Personal computer	.233	.080	.114	**	.097	.078	.049	.211	.089	.119	.031	.454
Friends	.014	.065	.009	.826	.237	.064	.155	***	.295	.098	.132	**
Problem solving	.208	.058	.144	***	.152	.056	.109	**	.124	.086	.060	.149
Internet ability	.020	.065	.012	.765	.154	.064	.101	*	-.087	.098	-.03	.373
Belief in ability to do well at school	.305	.069	.175	***	.182	.067	.107	**	.101	.103	.041	.328
Amount of school use of the Internet	.369	.057	.241	***	.110	.056	.074	*	.307	.085	.141	***
R squared	.188				.188				.111			

N=764 (all Internet users aged 12, 14 and 17-19 who are still in formal education) Significant at $p \leq .05$, ** Significant at $p \leq .01$, *** Significant at $p \leq .001$

Discussion and conclusion

In some senses the concept of the digital native is accurate. Young people tend to be relatively high users of computers and the Internet; their basic home access to computers and the Internet is high relative to the remainder of the population (Dutton et al., 2009); and they are confident in their skills to use the Internet (although confidence is not the same as competence).

However, in contrast to the concept of the digital native young people do not all use the Internet in the same way. Young people use the Internet for a range of purposes both for general “informal” activities (entertainment, information seeking, communication, creativity and participation) and those directly associated with homework (producing homework, researching homework and using a VLE) to a greater or lesser extent. Looking across all of the activities there are a number of factors that help us to understand this use. They are quality of access (in terms of home Internet access and / or having personal access to a computer or laptop); perceived skills (in terms of employing a problem solving approach to technology and perceived Internet ability); attitudes (beliefs in the ability to do well at school) and (primarily for homework activities) the frequency of use of the Internet at school.

This kind of survey analysis can only tell us about patterns and extent of use with the Internet; it does not tell us what these patterns of use mean for young people and the implications such use has on daily life and learning. However, similar to other research on this topic, this survey has highlighted that at least some young people or “digital natives” do need support in using the Internet and that formal contexts of education may provide some of this assistance.

Quality of access still remains an issue, with home and personalised access being important for a range and depth of use with the Internet (e.g. Livingstone and Helsper, 2007). Here, despite the fact that: young people were relatively positive about school provision of ICTs, school was an important source of access for lapsed users, and those that use the Internet more at school were more likely to use the Internet more for activities related to homework - overall school use of the Internet does not appear to compensate for a lack of Internet access at home. As Ito and colleagues note,

Sporadic, monitored access at schools and libraries may provide sufficient access for basic information seeking, but is insufficient for the immersed kind of social engagements with networked publics that are becoming a baseline for participation on both the interest-driven and the friendship-driven sides (Ito et al., 2008: p.2).

Skills are also important. Here confidence in skills has been positively related to uptake of the use of the Internet for a range of purposes. These findings are similar to other studies (e.g. Broos and Roe, 2006). Thus, formal education can play an important role in supporting young people in improving levels of Internet skills.

This survey is limited in that we know very little about what schools and colleges are using the Internet for. Indeed, research has shown that there are differences between schools in richer and poorer areas in the way technology is used in class (Warschauer et al., 2004). Yet, it begins to take into account broader social and educational context in understanding individual uses of the Internet (DiMaggio and Hargittai, 2001) and helps to provide a more nuanced and balanced picture of what young people are using the Internet for and how schools can best support them. Further work is ongoing using latent profile analysis to identify coherent profiles of young people's use of computers and the Internet for homework and other activities. From these analyses we hope to identify specific subgroups of young people who are still in formal education and then determine how these usage profiles relate to individual and contextual factors associated with the Internet user and school use of technology. Early indications show that for some young people support in using the Internet is lacking and is having a negative influence on the range and depth of their engagement with the Internet.

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