Ellen Helsper
Digital natives and ostrich tactics?: the possible implications of labelling young people as digital experts

Discussion paper

Digital Natives and Ostrich Tactics?

The possible implications of labelling young people as digital experts.

Introduction

'The Nintendo Generation' (Green, Reid, & Bigum, 2003), 'The (tech savvy) Next Generation' (Carlson 2005); 'Cyberkids' (Facer & Furlong, 2001); Holloway & Valentine 2000) and 'Digital Natives' (Prensky 2001)… all these labels, given to young people in the last decade, make one thing very clear: the current generation of young people is born in a digital world in which they are seen as more at home than their parents, educators and future employers. For the first time in history young people are assumed to be more competent than adults in managing and living with new technologies that have become integral to everyday life (Tapscott, 1998).

Prensky's (2001) definition of the Digital Native has been picked up by many researchers and educators working with youth, it is a catchy phrase which intuitively reflects the image many have of young people. Especially in the area of education this term has been seen as enlightening because he argues that the environment in which this tech savvy generation grows up influences not only what they do with their time but also how they think and learn.

> *"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"* (p.1).

Researchers eagerly cite young people's intense interaction with a wide number of Information and Communication Technologies (ICTs), their enthusiasm for new gadgets and the speed with which they learn to use new applications as evidence for the existence of a new and different generation of people (Hsi, 2007). Implicit in these descriptions is that older generations will not be able to work, think or learn to interact and live with

ICTs in the same way as the younger generations. Prensky put the cut off point at 1980. According to him those born before then should be labelled Digital Immigrants. The concept of Digital Native is therefore almost completely linked to age; young people are grouped together by identifying a whole generation as Digital Natives and are expected to be technologically way ahead of anyone born after 1980. Prensky's Digital Natives would now be around 25 years old. However, ICTs have changed quite a bit since Prensky first coined the term and it is now perhaps more appropriate to speak of first and second generation Digital Natives. In most research the current generation of teenagers are seen as the real Digital Natives since they have grown up in a Web 2.0 environment, they could be labelled second generation Digital Natives. This in contrast to the first generation of Digital Natives (now between 19 and 25 years old) who grew up in an age when ICT interactivity and participatory production were less common.

This definition of the Digital Native as based purely on generational differences has not been challenged extensively. There is research which brings nuance to our understanding of the youngest generation, but this still mostly ignores whether the distinction between young and old is really the most important one to make within the framework of a digital world in which one can be either an immigrant or a native. It seems likely that a person's skills, their extent of engagement with ICTs, as well as, the number of years that a person has been using ICTs are just as important in indicating digital nativity as age (Helsper & Eynon, forthcoming).

Helsper and Eynon (forthcoming) have criticised the notion of the digital native as based purely on generational factors. This paper will briefly review these and other critiques of the Digital Natives concept and extends this debate by looking at what (erroneously) labelling young people as Digital Natives does to their perceptions of themselves as ICT users, independent of whether they are in fact more expert than other generations. The paper focuses in particular on the way young people deal with risks and opportunities online and on whether our identification of young people as Digital Natives might lead to adopt certain coping strategies. Conclusions are drawn about what this means for our

interpretation of literacy in relation to digital risks and opportunities across different and future generations.

Critiques of the Digital Native concept

Prensky (2001) took a deterministic view about the influence of age on the ability to use ICTs. He says that *"Those of us who were not born into the digital world but have, at some later point in our lives, become fascinated by and adopted many or most aspects of the new technology are, and always will be compared to them, digital immigrants."* (p.1-2) At first glance young people, on average, do seem all they are said to be; they integrate ICTs into every aspect of their everyday lives and take to new ICTs quickly if access is provided to them much more so then their parents (Livingstone & Bober, 2005b; Ofcom, 2006).

Researchers working with the term Digital Native have started to question this idea of expertise based on date of birth, there is enough evidence that real life is a bit more complicated than Prensky proposes. Two arguments have been given against the use of the term Digital Native: (1) it puts young people on one heap and thereby glosses over quite severe inequalities within this generation (eg. Facer & Furlong, 2001) and (2) there is enough evidence that young people are not completely comfortable with ICTs such as the Internet because they are often unable to avoid or evaluate online risks (Hope Cheong, 2008; Livingstone, 2008).

As an illustration of the first argument two papers merit more attention. In the same year that Prensky coined the term Digital Native Facer and Furlong (2001) wrote an article warning that labelling a whole generation as Cyberkids could have negative consequences. They argued that this term ignored the persistent inequalities within this younger generation in terms of access, skills and attitudes towards technologies. More conclusively, Bennett, Maton and Kervin (2008) reviewed the evidence for the existence of Digital Natives seven years later, and argued that grouping young people together as ICT experts and overlooking inequalities can lead to overconfidence in young people's skills. The same authors show that *"..emerging research challenges notions of a*

homogenous generation with technical expertise and a distinctive learning style. Instead it suggests variations and differences within this population which may be more significant to educators than similarities." (p. 781)

In relation to the second critique of the Digital Native, there has been empirical work by Livingstone and colleagues who criticize the notion that young people are by nature digitally literate (Livingstone, 2008; Livingstone, Helsper, & Bober, 2008). Livingstone and Helsper (2007) showed clear differences in Internet related skills amongst younger people and also showed that young people who were perceived to be more skilled and those were more active online were also more likely to be exposed to risks. Another paper by Livingstone and Straksund (forthcoming) showed that young people in different countries encounter different types and levels of risks, but that there were no European countries in which this generation was able to avoid negative experiences on the Internet completely.

The perception of young people as more ICT expert than adults when they, in actual practice, are not could have negative as well as positive implications in a world where many activities and services are Internet and technology based. These implications are not clear and no empirical evidence exists that addresses this issue comprehensively. Nevertheless, it should be possible to deduce some possible effects of this image on young people's behaviour and the way they perceive themselves by looking at what labelling in other areas of learning does to people.

This paper will address two questions in relation to digital literacy and learning. These two questions are seen as in need of an immediate answer in an environment which perhaps erroneously labels a whole generation as Digital Natives

- Does openly identifying and addressing young people as Digital Natives prevent them from seeking advice from others who are labelled novices (ie. Digital Immigrants)?

- Does this situation mean that young people fail to perceive or deal adequately with risks or hurdles when they come across them because they overestimate their own ability to deal with them?

Some evidence will be presented that suggests which direction the answers to these questions might take. However, current research and evidence does not allow us to answer these questions with confidence and one of the recommendations of this paper is therefore that this issue of young people's forced identity as expert ICT users and their actual digital skills needs to be further thought through and researched.

*Skills, self-efficacy and self-image?*
Social psychologists have long studied how others' views of us influence our identity. The importance of family and peer perceptions is especially important for the way we see ourselves (eg. our perceived self) during childhood and adolescence. These perceptions of others might differ from who we would like to be (ideal self) or who we think we really are (true self). Developmental and social psychologists have shown repeatedly that when we hear over and over again that we are 'bad' we start living up to this label and start internalizing this image of ourselves (Bargh, Chen, & Burrows, 1996; Chen & Bargh, 1997; Goodey, 1997; Link & Phelan, 2001). This relationship between internalising others' perceptions of the self, which brings perceived self and true self closer together, is undoubtedly also applicable when someone is repeatedly told that they are, on a more positive note, an expert. It would therefore not be a long jump to expect that if young people hear often enough that they are 'tech-savvy' or 'digitally native' they will grow up with high levels of confidence in their digital skills. In support of this argument, Helsper and Eynon (forthcoming) showed that young people have higher levels of confidence independent of their actual levels of experience or expertise. Other research shows that young people in general see older people as less expert (Helsper, 2007) and that parents often think their children are more expert than they are (Livingstone, Helsper & Bober, 2008).

Other research streams show that confidence breeds success, that is, if you believe that you are an expert you are more likely to act like one. Presumed experts are more likely to take risks and learn from their mistakes and through this process advance in the area in which they are the supposed expert. This self-fulfilling prophesy is evident in much of the research on self-efficacy. Bandura has shown over and over again that when people identify themselves as novices they perform badly even when they have the levels of skills required for a certain task (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Bandura & Locke, 2003). Gender has been a particular focus of studies into the relationship between perceptions of others, self-efficacy and behaviour in relation to educational outcomes. Girls are stereotypically seen as less apt at sciences and at interacting with technologies and this perception causes girls to underestimate their own skills in maths (for a critique see Hackett & Betz, 1989) and interaction with technologies (Broos & Roe, 2006; Busch, 1995; Durndell & Haag, 2002; Hargittai & Shafer, 2006; Imhof, Vollmeyer, & Beyerlein, 2007; Jackson, et al 2001; Joiner et al., 2005, 2007; Li & Kirkup, 2007; Torkzadeh, Chang, & Demirhan, 2006; Vekiri & Chronaki, 2008; Yao, Rice, & Wallis, 2007). The other side of this coin is that boys who are aware of their status as ICT/math experts are likely to perform better and feel more comfortable with technologies than girls with equal skills who are not put on this pedestal (Selwyn, 2007).

It is thus is safe to argue that the way in which young people are perceived by others is likely to influence the confidence they have in interacting with technologies. What remains unclear is what happens when the current young generation, labelled Digital Natives, encounter situations which they do not know how to handle (despite their confidence). Cheong (2008) showed that young people frequently encounter computer related problems such as error messages and not being able to load certain websites or programmes. Young people in particular are likely to try to solve these types of things on their own, more so than older generations.

Problem solving

Figure 1 Getting help for the use of the Internet by age
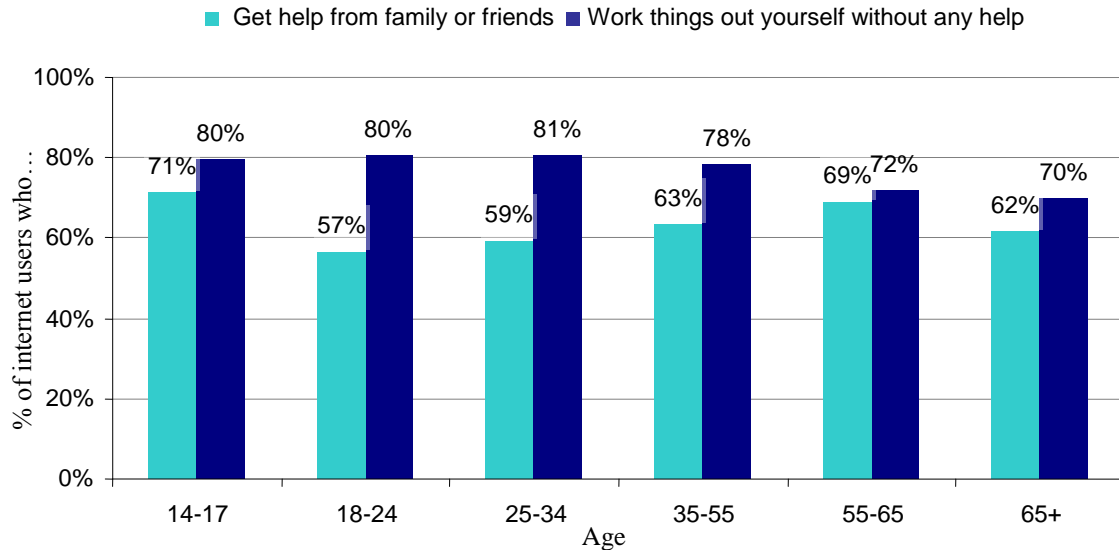
■ Get help from family or friends ■ Work things out yourself without any help

Source: Oxford Internet Surveys: 2007 (Dutton & Helsper, 2007)

Base: All Internet Users (N=1578). Weighted to represent UK population.

Note. Differences Significant at p<.05

The Oxford Internet Surveys (Dutton & Helsper, 2007), for example, show that 80% of young people under the age of 19 work things out for themselves if there is a problem while 70% of Internet users older than 55 years old do this (see Figure 1). However, this does not mean that the youngest generation has no one to turn to, teenagers do rely on family or friends to help them out while young adults – 71% does this-; even senior Internet users are less likely to turn to their family and friends in times of need than the supposedly tech savvy generation. These data do not show whether or not it is family of friends are most relied upon.

The widespread perception of young people as more expert than adults, whether this perception is correct or not, could therefore change the way generational relationships function in society. One consequence, in light of the evidence which shows that young people and their parents perceive themselves to be more expert digital problem solvers than adults even when they are not (Livingstone & Bober, 2005), might be that adults do

not realise when young people need their help and young people might be reluctant to ask for help in a situation where they are supposed to know what they are doing (Helsper & Eynon, forthcoming)

Risks?

As pointed out before, there are a number of studies that show that young people's wide exposure to and general enthusiasm for ICTs does not always equate with an ability to participate safely in the digital world (Buckingham, 2005; Liau, Khoo, & Ang, 2005; Livingstone, 2008; Livingstone & Bober, 2005a; Livingstone & Helsper, 2007; Livingstone, Helsper, & Bober, 2008; Livingstone & Millwood-Hargrave, 2006; Ofcom, 2006). However, we know very little about how young people cope with these more negative aspects of their engagement with technologies. Some of this uncertainty is related to a lack of clarity about what constitutes risky behaviour and which of these behaviours might subsequently cause harm to young people.

Therefore before continuing the discussion about how younger people actually deal with risks it is important to address what is generally meant by digital risks. This paper focuses, like most other research, on the Internet while keeping in mind that young people's lives and identities are shaped through a number of different technologies which include but are not limited to the Internet.

Recently progress has been made in the area of classifying different types of online risks that young people encounter, but it is still unclear what research and policy should include when talking about actual harm. In a recent very comprehensive review of research into online risks in Europe Hasebrink, Livingstone and Haddon (2008) have classified risks along four dimensions (commercial, aggressive, sexual and values) and with three category types (content, contact and conduct) and related these to the potential harm that might follow from these types of risks. Their classification is replicated in Table 1.

Table 1 *A classification of online risks to children*

	Commercial	**Aggressive**	**Sexual**	**Values**
Content *- child as recipient*	Advertising, spam, sponsorship	Violent/ hateful content	Pornographic or unwelcome sexual content	Racism, biased or misleading info/ advice (e.g. drugs)
Contact *- child as participant*	Tracking/ harvesting personal info	Being bullied, stalked or harassed	Meeting strangers, being groomed	Self-harm, unwelcome persuasion
Conduct *- child as actor*	Gambling, hacking, illegal downloads	Bullying or harassing another	Creating and uploading porn material	Providing advice e.g. suicide/ pro-anorexic chat

Source: EU Kids Online (Hasebrink et al, 2008)

This review deals with relatively low level, 'everyday' negative experiences and not with more infrequent but more severe risks such as grooming by paedophiles. While the severe types of risks are clearly more harmful than these types of everyday experiences, they are also less frequent and therefore less influential in the general online experiences (and perceptions of expertise) of the average Digital Native (Cheong, 2008). A review of the literature shows that low level risks, defined here as activities that may cause technical, emotional or financial, but not physical, harm have been a part of the Internet since its early days and are unlikely to disappear even when adults and young people become more expert at navigating the digital world. This definition of risk includes activities initiated by young people that expose them to risks (ie. providing personal details, downloading material, posting pictures) as well as activities that young people are subject to without their initiating interactions (ie. bullying, technical problems).

Coping

In relation to lower level, everyday negative experiences Livingstone and Helsper (2008) identified four types of risks: violent (eg. bullying), pornographic (eg. seeing or being sent sexually explicit messages), privacy (eg. sharing of personal details) and contact (eg. file sharing and communicating with strangers online) risks. While this and other research shows how parents and educators (try to) mediate and regulate young people's use of ICTs, such as the Internet, it is less clear what young people themselves do to protect themselves or to deal with something once it has happened. In relation to everyday offline activities research shows that teenagers take risks in all sorts of behavior. Often they know they are taking a risk but do not think that the consequences will happen to them (Cohn, MacFarlane, Yanez & Imai, 1995; Trad, 1993). The equivalent in traditional media research is the 'third person' effect, which refers to the tendency for people to think that harmful media content has bad influences on (vulnerable) others but not on themselves (Davison, 1983). It is unclear whether the same is true for internet risks; are young people aware of the risks they are taking and if they are do they consider themselves vulnerable to the negative consequences?

The research that does exist refers almost exclusively to post-hoc strategies, that is, to young people deleting nasty emails or blocking someone after they have sent a negative message. Potentially pro-active and preventative strategies, such as protecting personal information are more often done as part of a 'fooling friends' strategy than as part of a 'protection of privacy' strategy.

Three behavioural scenarios based on the Digital Native paradigm
Three possible scenarios can be constructed in relation to young people and online risk taking, the first two assume that young people (as experts) avoid risks when on the Internet, while the second two assume that young people (even when expert) do encounter risks:

(1) Young people are experts at avoiding negative or risky experiences because they are native to the digital environment and know how to manoeuvre in it.
(2) Young people use a 'predator tactic', that is they attack the problem with the means available and avoid it happening again. This is different from option (1) in

that young people do encounter risks and are not pro-active in avoiding them. Therefore, they have to wait until negative experiences happen and then they deal with them – a post hoc strategy.

(3) Young people use an 'ostrich tactic', that is they look the other way when negative experiences occur (eg. quickly deleting an email) and continue as normal after the 'threat' has passed. This is different from option (2) in that young people are aware of the risks but judge them to be irrelevant or 'facts of online life' and cannot be bothered to prevent them from happening again.

Important to note is that there is enough evidence to point out that not all young people are experts, and that internet skills differ by gender, ethnicity, socio-economic status, income, and education as well as by generation (Helsper & Eynon, forthcoming; Livingstone & Bober, 2005b)[1]. Nevertheless, all three scenarios apply whether or not we accept the commonly held assumption that all young people are digital experts. The scenarios were constructed to highlight that young people's coping strategies might not correspond to Prensky's original idea of the Digital Native or most adults' perceptions of expertise. These coping strategies might be a result of labelling of young people as experts when they are not.

Scenario 1 is the wishful thinking that often takes place amongst those who label young people as Digital Natives, that is young people are so comfortable with the online environment that they only go there where they will have positive experiences and are able to manoeuvre around the negative experiences. Scenarios 2 and 3 are more realistic based on what we know so far but, especially 3, counter the arguments made about Digital Natives and expertise as proposed earlier.

Scenario 2 assumes that young people are experts with an active approach. They are willing to seek help or to teach others how to deal with risks and are continuously updating their skills to avoid coming across a similar type of harm again. These we could

---

[1] Research also shows that it is unlikely that these differences will disappear even if high quality access to the Internet is ubiquitous and equally spread amongst all these groups (Helsper, 2008). So far there is no reason to assume an end to digital inequalities.

call the self-conscious, but confident experts since this type of scenario requires understanding that neither the system nor the user is perfect. There is an awareness that negative experiences are likely to occur again but that it is worth trying to change strategies and behaviours to avoid the same negative thing from reoccurring. This scenario is often the one hope of adults and media literacy educators.

The third scenario corresponds to the predictions made based on the self-fulfilling prophesy framework, that is, the young people who consider themselves experts and are so considered by others take their mistakes and the risks they run for granted. Any negative experiences they see as the fault of the system or of other (stupid) people online and not as the consequence of their own behaviour. This allows them to navigate the online world for a considerable amount of time before something really significant and negative happens. When something happens that they cannot ignore it is difficult for them to ask help anywhere because the image they have build up does not correspond to asking help from (immigrant) others. So instead they try to ignore the risks and go on living in this imperfect digital world without having to admit to themselves or others that they are sometimes not able to deal with the risks in their 'native' land. This last scenario argues that young people are not experts at avoiding risks, but that they are 'experts' at living with risks.

Evidence for scenarios 2 or 3 would imply that we have to reconsider how we think about expertise and how we think about talking to young people about risks. The rest of this paper will set out to test which of these images of young people is the most appropriate by looking at how age and expertise influence risk taking and encountering negative experiences.

Evidence for different scenarios
Evidence can be found that counters the idea that young people know how to avoid negative experiences. The UK Children Go Online Survey (Livingstone & Bober, 2005), The SAFT survey (Straksrud, 2005) and the PEW Internet and American Life (Lenhart, 2007) studies have all shown that young people, especially those who have more

experience with the internet, run into more risky situations on the Internet. These studies have focussed on young people and therefore do not have a representative sample of all (older) Internet users in the UK. This makes the comparison between younger and older generations difficult and it is unclear if young (digitally native) people run more or less risks than (digitally immigrant) adults. Analyses of Oxford Internet Survey data (Dutton & Helsper, 2007) shows that age, but more than anything else experience, is important in explaining the number of negative experiences that people have online. Table 2 illustrates how the number of negative situations that people encounter varies by age, skill, years online and the extent of the person's Internet use.

Table 2 Describing the number of negative experiences people encounter on the Internet

		Number of negative experiences	N	SD
Age	14-18	0.73	122	1.01
	19-25	0.93	202	1.33
	26+	1.01	1254	1.34
Self-efficacy**	Bad or poor	0.44	91	0.91
	Fair	0.69	501	1.02
	Good or excellent	1.19	976	1.44
Years of use**	< 1 yr	0.42	183	0.86
	1 to 5 yrs	0.75	739	1.09
	> 5yrs	1.42	635	1.52
Breadth of engagement**	1 to 4 activities	0.22	174	0.52
	5 to 7 activities	0.68	705	1.06
	8 to 9 activities	1.30	510	1.38
	10 to 11 activities	2.07	180	1.66
	All users	0.98	1569	1.32

Source: Oxford Internet Surveys: 2007 (Dutton & Helsper, 2007)

Base: All Internet Users (N=1578). Weighted to represent UK population.

** Differences significant at $p<.01$

Negative experiences are: Received obscene or abusive e-mails from strangers, Received obscene or abusive e-mails from people you know, Received a virus onto your computer, Bought something which has been misrepresented on a Web site, Had credit card details stolen via use on the Internet, Been contacted by someone over the Internet from some foreign country, and Been contacted by someone online asking you to provide bank details.

Table 2 shows that the number of risks Internet users run into does not differ significantly between those who are first and second generation Digital Natives (14-18yrs and 19-25 yrs) and Digital Immigrants (26 and older). However, they do increase with self-perceived level of skill in using the Internet, the number of years that the person has been using the Internet and the number of activities that the person undertakes online. Helsper and Eynon (forthcoming) showed that age and years of use are not significantly related in the UK; amongst young people and older people both short term users and long term users can be found.

Figure 2 shows how the different negative experiences are distributed over the different age groups.

Figure 2 Types of different negative experiences by age

Source: Oxford Internet Surveys: 2007 (Dutton & Helsper, 2007)
Base: All Internet Users (N=1578). Weighted to represent UK population.
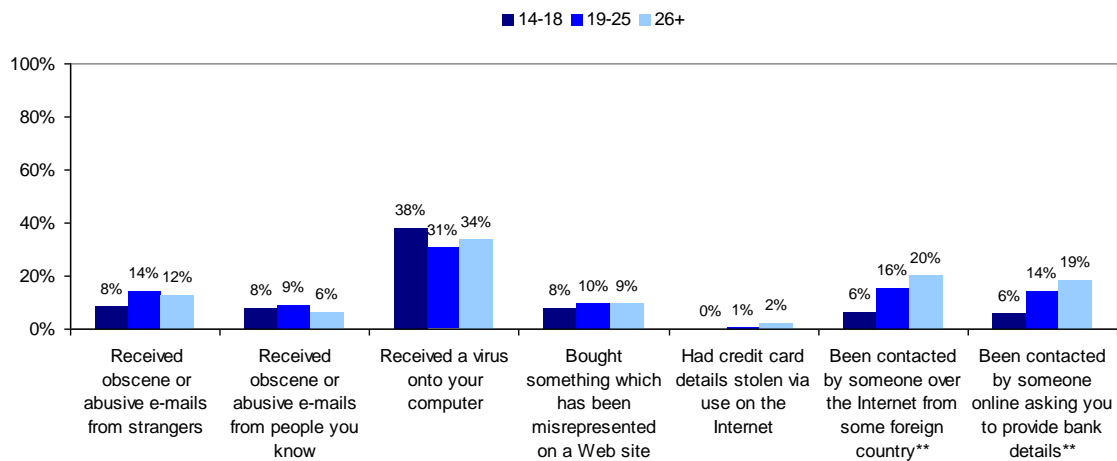** Differences significant at p<.01

That risks do not differ by age can also be seen in Figure 2. Only financial risks were more often encountered by the older generation, for all other types of risks there were no significant differences between older and younger generations. The two types of risk, both having to do with people trying to 'steal' personal financial information, differed

significantly between age groups and in this case it was the older persons who were more likely to encounter them. This could suggest that Scenario 1 is valid, young people are indeed Digitally Native, they are more expert than the older generation in avoiding these types of scams. There is a more plausible explanation; young people are simply less vulnerable to financial deceit. That is, they are less likely to be the target of financial scams since they, in general, do not have access to credit cards or enough funds to be of interest to financial scammers. This is supported by the fact that other contact and technical types of harm are just as likely to occur in young as in older Internet users.

To understand which factors are more important in explaining people's negative experiences online linear regression can be used (see Table 3).

Table 3 Explaining the number of negative experiences people encounter on the Internet

	B	SE	B	t	p.
(Constant)	-0.67	0.19		-3.50	0.00
Age	0.01	0.00	0.08	3.28	0.00
Female	-0.06	0.06	-0.02	-0.95	0.34
Education	-0.03	0.04	-0.02	-0.59	0.56
Self-efficacy	0.05	0.05	0.03	1.04	0.30
Years using the Internet	0.07	0.01	0.18	6.56	0.00
Breadth of use	0.05	0.00	0.32	10.97	0.00

Source: OxIS 2007 Internet users (N=1,578)

Table 3 shows that when all variables are controlled for, age does influence the number of risks people run, younger people are less likely to encounter risks. This counters some of the moral panics that exist around young people and online negative experiences, older people are more likely to encounter these. The definition of Digital Natives purely in terms of age seems misguided since experience and the extent of immersion in the Internet (breadth of use) are even more important. From these analyses we can deduce that for every 10 years of using the Internet about 1 negative online experience is added. For every 10 activities added, about half a negative experience is added. This seems to support Scenario 1 where young people avoid some risks that older people run into.

Livingstone and Helsper (2008) as well as Liau, Khoo and Ang (2005) argue that risks are the flipside of opportunities and that those children who are more eager to take up the opportunities that the Internet offers are also more likely to encounter what adults would label risks. Indeed the analyses above show that for both Digital Natives and Digital Immigrants being an intense user is related to more negative experiences. This suggests that scenarios 2 and 3 might also be valid for Internet users, no matter which generation they belong to, expert and intense Internet users are likely to encounter more risks than novices. Where Digital Natives might differ from Digital Immigrants is in how they deal with these negative experiences.

Coping with negative experiences

The previous section of this paper addressed how online negative experiences are related to generation, but also to experience and emersion in the technology. This does not say anything about how young people deal with negative experiences when they encounter them. As shown before while there is some evidence that young people avoid certain types of negative experiences, it is not clear what their general strategy is in dealing with them and therefore it is unclear whether as Digital Natives young people take up responsibility and use 'predator' tactics or whether they ignore risks using 'ostrich' tactics.

Table 4 Dealing with negative experience by age

		14-18	19-25	26+
Attitude to receiving unsolicited e-mail, sometimes called SPAM?	I don't receive any SPAM messages [a]	26%	27%	26%
	I receive SPAM but the number I receive doesn't bother me [a]	45%	32%	28%
	I receive a few too many [b]	20%	19%	20%
	I receive far too many SPAM messages [b]	10%	22%	26%
How concerned are you about unpleasant experiences when using email?	Not concerned [a]	20%	14%	11%
	Concerned but have not done anything [a]	22%	9%	9%
	Concerned and have done something [b]	59%	77%	80%

Source: OxIS 2007 Internet users (N=1,578)

All differences significant at p<.01

[a] Considered evidence of Ostrich Tactic

[b] Considered evidence of Predator Tactic

Table 4 suggests that the 'ostrich' tactic is more prevalent in the young than in the older generations when it comes to dealing with SPAM and Virus messages. They are more likely not to be bothered by SPAM messages although they do say they receive them. They are also proportionally more likely to say they are either not concerned or concerned about unpleasant experiences but not having done anything to deal with these experiences when using email. It is especially the second generation Digital Natives (ie. teenagers) who are more likely than other generations to use this Ostrich tactic (see Table 5).

Table 5 Explaining SPAM ostrich tactics ('not bothered by SPAM')

	B	se	Sig.	Exp(b)	Lower	Upper
14-18 yrs	0.72	0.23	0.00	2.05	1.31	3.21
19-25 yrs	0.27	0.18	0.15	1.31	0.91	1.87
Gender (Female)	-0.24	0.12	0.05	0.79	0.62	1.00
Basic education	0.24	0.17	0.16	1.27	0.91	1.78
Further education	0.24	0.17	0.16	1.27	0.91	1.76
Self-efficacy	-0.02	0.09	0.82	0.98	0.82	1.17
Years online	-0.04	0.02	0.09	0.97	0.93	1.01
Breadth of engagement	0.00	0.04	0.94	1.00	0.93	1.08
Constant	-0.75	0.41	0.07	0.47		

Source: OxIS 2007 Internet users (N=1,578)

Table 5 shows that generation and especially second generation Digital Nativeness (ie. 14-18 year olds) significantly explains whether people use Ostrich tactics to deal with spam or unwanted email. Teenagers were twice as likely as those over 26 years old to use this tactic even when online experience and expertise were controlled for. In fact the distinction between Digital Natives and Digital Immigrants was the only one factor that significantly explained the use of the Ostrich tactic.

Table 6 Explaining Ostrich tactics as regards unpleasant email experiences
('Haven't done anything')

	B	S.E.	Sig.	Exp(B)	Lower	Upper
14-18 yrs	0.18	0.29	0.53	1.20	0.68	2.09
19-25 yrs	0.18	0.22	0.39	1.20	0.79	1.84
Gender (Female)	0.12	0.15	0.41	1.13	0.85	1.50
Basic education	0.13	0.21	0.53	1.14	0.76	1.70
Further education	0.08	0.20	0.68	1.09	0.73	1.62
Self-efficacy	-0.30	0.10	0.00	0.74	0.60	0.91
Years online	-0.03	0.02	0.29	0.97	0.93	1.02
Breadth of engagement	0.08	0.04	0.05	1.09	1.00	1.18
Constant	-1.12	0.45	0.01	0.33		

Source: OxIS 2007 Internet users (N=1,578)

Table 6 contradicts the findings for SPAM because age is here not a significant explanatory factor. However, self-perceived skill is. Surprisingly, the more confident the person is in their skills the less likely they are to take the Ostrich tactic in dealing with negative emails. Here the Digital Nativeness is not determined by generation but by expertise.

Straksrud and Livingstone (forthcoming) showed that the ostrich tactic is also more common in young people as regards social interactions (ie. contact risks). Young people are most likely to just delete messages when they do not like them, ignored certain sexual or violent content or said they did not much think about it. They call this strategy neutral because it does not require action on the side of the user.

There is thus some evidence for the high use of an 'ostrich tactic' by the Digital Native as defined by generation in comparison to Digital Immigrants (Scenario 3). There is more support for this argument than for the argument that young people are so expert that they can avoid risks (Scenario 1) or that they deal with risks when they encounter them (Scenario 2 – predator tactics).

Discussion

This paper proposed that the labelling of young people as Digital Natives might have unexpected consequences. It was argued that this label might make them perceive themselves as more competent than they really are, therefore more willing to take risks and more likely to acquire skills rapidly. This has to be seen in comparison to the Digital Immigrants who would have lower internet self-efficacy levels and might consequently be more likely to admit they do not know something and ask for help, but they might also underestimate their own skill. The consequences of young people adapting their identity to the general perception that exists of them for problem solving in relation to the internet are still unclear. The paper asked if this label of Digital Natives makes young people less likely to ask for help and whether it makes them less likely to be aware of the risks they are taking online. Reviewing the findings from UK studies, the Oxford Internet Surveys in particular, this paper showed that young people are indeed more likely to try and sort things out on their own and not ask for help, although second generation Digital Natives (teenagers) were slightly more likely to seek help from others than the first generation of Digital Natives (young adults). The paper also argued that young people while perhaps encountering fewer risks are by no means able to avoid negative online experiences. They might encounter fewer risks because many of the privacy related risks are more relevant to older generations who have financial concerns, such credit card fraud and identity theft to worry about. It is therefore not the case that the young people are able to avoid these types of risks, but instead they simply do not come across these situations because they are not part of their digital world. It seems Digital Natives are just as likely to encounter other conduct, content and related risks as older users with the same level of skill and experience.

Three scenarios were proposed based on the Digital Native paradigm that would predict how young people deal with risks, the first –expert avoidance- paradigm is rejected based on the fact that young people were not able to completely avoid risks and did seem aware of them. The second –predator- scenario was not really supported since young people were not more likely than other groups to actually deal with a negative situation to make

sure that it did not happen again. Instead the third – Ostrich tactic- scenario seems more plausible. Young people were likely to either ignore the risks when they came along or to take a passive action which was unlikely to prevent the same negative experience from happening again. The evidence presented in this paper suggests that while generation might explain how people cope with negative online experiences, it is not clear that it is the most important influence on the number of negative experiences or risks encountered. Experience and expertise are more significant predictors of the latter than generation. Prensky's original concept of a generation of digital natives here measured as the skills to avoid of risks, was thus not supported. Instead the difference between generations might be in how they cope with negative experiences when encountered, but not clearly in a way that shows young people as employing more advanced coping strategies.

This overview of research and existing data could not determine if young people's 'Ostrich style' coping strategies were caused by young people not wanting to admit that there are situations online that they are not able or do not want to deal with because they are supposed to be Digital Natives. One conclusion is that Digital Natives see Digital Immigrants as incapable of helping in the digital world where young people are considered to be native, but evidence is needed to support this claim. There was a hint that the future might be different, first generation Digital Natives were less likely to rely on others than digital migrants, but second generation Digital Natives seem not to have 'inherited' this refusal to seek others support. They mostly seek support from their peers however or try to figure it out themselves.

Conclusions

Young people tend to use a tactic that is passive when it comes to dealing with negative experiences online. They seem to stick their heads in the sand and wait for the negative experience to pass and then continue as before. This was labelled the Ostrich tactic in this paper. This type of reaction could be influenced by older generations placing them in the role of Digital Natives even when not all young people fulfilled the requirements of expertise. It is imperative that the image of the latest generation as 'Digital Natives' does not distract educators and parents from understanding the complex issues that lie

underneath young people's everyday interaction with ICTs. Young people should be given room to fail and should be develop trusted relationships in which they can admit that they are not able to do everything perfectly when it comes to the digital world.

Adults need to make sure that their perception of young people as digital experts does not make them blind to the fact that ICTs often represent everyday offline life for these young people with all its highs and lows. I propose that a) risks are part of everyday life and of learning experiences and that b) cutting young people of from ICTs denies them the learning, social, and emotional opportunities that these offer. Educators need to understand that there is no such thing as riskless ICT use and ways need to found to help young people develop active instead of passive 'Ostrich' tactic styles of coping with the negative aspects of digital living. In most cases experiences of what Prensky called Digital Immigrants are not that far removed from those of Digital Natives and parallels can be found with the commercial, aggressive, sexual and value risks (see Hasebrink et al, 2008) that previous generations have run in offline life.

I would like to stress that this paper by no means implies that young people are stupid (ie. they do not see any risks) or that they completely lack the skills to deal with problems. Perhaps an alternative explanation is that they honestly do not care as much as adults about these everyday nuisances in using technologies and that, in this sense, they are different from adults. Perhaps adults are immigrants in the sense that the digital world is still separate to them from 'real life'. They have different criteria and different strategies for the online and the offline worlds. Young people might accept digital experiences as part of every day life online, as part of who they are, and negative experiences do not influence their functioning to the extent that they might for those who are not Digital Natives. Young people will be able to use their varying skills to avoid embarrassing or negative experiences in those areas for which they truly matter to them, especially in relation to their peers but not in relation to other privacy, social, technical, financial or other 'glitches of the system'.

Young people perhaps see these risks as unavoidable if they want to take up the benefits of online life. Just like most young people will not stay locked up inside because there are careless drivers or potential bullies outside, they will not stay off the Internet because they might receive annoying messages or get a computer virus. While they perceive risks as part of everyday online and offline life, adults still see these two arenas as separate and assume that young people are better at navigating the online than the offline. The ideal situation would be if young people can adopt what was in this paper called the predator tactic, that is face the negative experience and try to avoid it in the future by using the tools available to them. A completely risk and harmful online world is an illusion that might have been perpetuated by the image of young people as Digital Natives, instead of steering young people away from risks it might have led them to take a passive approach where problems are encountered but not faced or dealt with. A preferable future scenario would be a realistic evaluation of which negative experiences are most likely to bother young people in their everyday interactions with the technologies and accept that they are fallible while handing them to tools to deal with these types of situations. In other words, use a similar technique to how we teach young people to cross the road…not by keeping them inside but by allowing them incremental further steps, and perhaps a few close encounters, to really appreciate the risks while at the same time teaching them about the warning signs.

The Futures
This paper was written for the Beyond Current Horizons programme which stimulated the imagining of possible future scenarios with a special focus on educational futures. To end this paper I will discuss three scenarios based on the topic under discussion in this paper which can be divided into plausible, possible and preferable scenarios.

The plausible
It is likely that the integration of interactive technologies into our everyday lives will continue. The internet, on a myriad of different platforms, will become an even more integral part of everyday life. I would even go so far as to say that it will become so ubiquitous and integrated that people will not consciously separate it from the fabric of

society.[2] The internet and associated technologies will thus become invisible. From the material presented in this paper it seems that in this type of society the current generations are indeed 'Digitally Native'. While there might still differences in (quality of) access, skills and types of engagement with ICTs amongst young people, they do not seem to see the digital world as separate from 'real life', at least not to the extent that adult Digital Immigrants do. This would mean that instead of ignoring or being afraid of interacting with their own children in digital environments like the current generation of adults are supposed to be, the generation of Digital Natives will be comfortable with facing the reality of the digital as part of their children's everyday life. The current generation should therefore be equipped, perhaps through educational institutions, with the tool kit that allows them to talk to their children about the risks and opportunities that occur online. Most young people will already have the vocabulary to do this. So as long as current generations of adults (ie. digital migrants) accept that young people are not completely tech savvy and that the experiences of adults in the offline world have their parallels in the online world adults and young people should be able to strike up a constructive conversation in this area. Thus if we move away from the (erroneous) perception of unbridgeable chasms between generations and if we instead focus on the importance of expertise and literacy which can be learned independent of age this scenario is indeed plausible.

This scenario also means a shift to an education in digital literacy that focuses on critical literacy instead of technical literacy. It focuses on dealing with general situations that might occur in a digital world and not with specific applications. Many of these critical skills have been passed on by parents and teachers over the centuries in an offline context and a mutual discussion and understanding is necessary so that young people feel that it is okay to ask for help even if the adults do not have the specific technical experience. In a way a dictionary which translate the offline to the online and back again, where parallels are drawn between the past and the future, is needed.

---

[2] This scenario is likely both in case of an energy crisis and in the absence of one. The internet and the world wide web might be the only way to continue conducting global business when raw materials such as oil and gas run out or become prohibitively costly.

The possible

It is possible that the internet and technologies will change so much that the current generation of Digital Natives become the Digital Immigrants of the future. This scenario assumes that Prensky's ideas of an evolutionary development of the brain based on drastic changes in the environment are correct and that humans are fundamentally and irreversible changing. This would mean a continuing disconnect between generations and a continuation of the mistaken perception that young people and older people cannot communicate or learn from each other about interactions with ICTs. This is a scenario which could lead to what Selwyn (2008) labelled the 'death of schools' scenario. Those in favour of this perspective (Rowan & Bigum, 2003; Tapscott, 1999; Underwood, 2007) say young people are so disconnected and teaching styles so alienating that schools become obsolete as learning environments. One possibility is that while the physical school might continue to exist it no longer serves as the seat of power for teaching, that is, educators will take on a different role. They will serve as conduits or guides for young people to link up with experts around the world who do speak the language of the Digital Natives of that time and understand the risks and opportunities out there. Teachers might not teach anymore, they might just become supervisors of personalised learning by students from different backgrounds who come into the physical school building to then reach out to different areas and experts around the world. Peer-to-peer learning will be an important part of this system where young people learn from others experiences who have grown up in the digital world, that is, trial and error learning in those areas where adults cannot be of any help. Teachers will be present to help young people learn and answer basic questions, but the real learning will take place amongst the students who are attending courses by world wide experts through links with others outside the classroom. Schools are still necessary in this scenario to make sure that young people do attend and participate in these world wide curricula.

The preferable

The preferable future would clearly lie in a world where socio-economic status, education and other factors related to offline inequalities were not replicated in the digital world. A world in which all have equal access, skills and opportunities to use technologies to

improve their quality of life, a world in which generation and gender do not put a wedge in between people's abilities to deal with technologies. A world in which experience and expertise are really the most important aspects of adopting active tactics of dealing with negative online experiences would mean that adults with dedication can catch up and help young people deal with issues as educators and teachers again.

I hope that it is clear from the above that I am optimistic, my preferred and plausible scenarios are not that far removed from eachother, at least not when it comes to generation gaps. Nevertheless, I do believe that social/socio-economic inequalities in the ability to access high quality ICTs and in the skills people have to get the most out of ICTs while avoiding the risks associated, will continue to exist although in an ideal or preferred world they would have to disappear.

References

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Multifaceted impact of self-efficacy beliefs on academic functioning. *Child development, 67*(3), 1206-1222.

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology, 88*(1), 87-99.

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*(2), 230-244.

Bennett, S., Maton, K., & Kervin, L. (2008). The 'Digital Natives' debate: A critical review of the evidence. *British Journal of Educational Technology, 39*(5), 775-786.

Broos, A., & Roe, K. (2006). The digital divide in the playstation generation: Self-efficacy, locus of control and ICT adoption among adolescents. *Poetics, 34*(4-5), 306-317.

Buckingham, D. (2005). *The media literacy of children and young people. A review of the research literature.* London: OFCOM.

Busch, T. (1995). Gender Differences in Self-Efficacy and Attitudes toward Computers. *Journal of Educational Computing Research, 12*(2), 147-158.

Chen, M., & Bargh, J. A. (1997). Nonconscious behavioral confirmation processes: The self- fulfilling consequences of automatic stereotype activation. *Journal of Experimental Social Psychology, 33*(5), 541-560.

Cheong, P. H. (2008). The young and techless? Investigating Internet use and problem-solving behaviors of young adults in Singapore. *New Media & Society, 10*(5), 771-801.

Cohn, L.D., Macfarlane, S., Yanez, C.; Imai, W. K. (1995) Risk-perception: Differences between adolescents and adults. *Health Psychology,14*(3), 217-222.

Davison, W. P. (1983). The third-person effect in communication. *Public Opinion Quarterly, 47*(1), 1-15.

Durndell, A., & Haag, Z. (2002). Computer self efficacy, computer anxiety, attitudes towards the Internet and reported experience with the Internet, by gender, in an East European sample. *Computers in Human Behavior, 18*(5), 521-536.

Dutton, W., & Helsper, E. J. (2007). *The Internet in Britain: 2007*. Oxford, UK: Oxford Internet Institute, University of Oxford.

Facer, K., & Furlong, R. (2001). Beyond the Myth of the 'Cyberkid': Young People at the Margins of the Information Revolution. *Journal of Youth Studies, 4*(4), 451-469.

Goodey, J. (1997). Boys don't cry - Masculinities, fear of crime and fearlessness. *British Journal of Criminology, 37*(3), 401-418.

Green, B., Reid, J., & Bigum, C. (2003). Teaching the Nintendo generation: Children, computer culture and popular technologies. In S. Howard (Ed.), *Wired-up: Young People and the Electronic Media* (pp. 19-42). London: Routledge.

Hackett, G., & Betz, N. E. (1989). An Exploration of the Mathematics Self-Efficacy/Mathematics Performance Correspondence. *Journal for Research in Mathematics Education, 20*(3), 261-273.

Hargittai, E., & Shafer, S. (2006). Differences in actual and perceived online skills: The role of gender. *Social Science Quarterly, 87*(2), 432-448.

Hasebrink, U., Livingstone, S., & Haddon, L. (2008). *Comparing children's online opportunities and risks across Europe: Cross-national comparisons for EU Kids Online. EU Kids Online Deliverable D3.2 for the EC Safer Internet plus programme*. London: London School of Economics and Political Science.

Helsper, E.J. (forthcoming) Gendered internet use across generation and lifestages. Under revision at *Journal of Computer Mediated Communication*.

Helsper, E.J. (2008) *Digital Inclusion: An Analysis of Social Disadvantage and the Information Society*. London: Department of Communities and Local Government.

Helsper, E.J. (2007) *Internet use by vulnerable teenagers: Social inclusion, self-confidence and group identity*. Unpublished PhD thesis. London: London School of Economics and Political Science.

Helsper, E.J. & Eynon, R. (forthcoming) Digital Natives: Where is the evidence?

Hope Cheong, P. (2008). The young and techless? Investigating Internet use and problem-solving behaviors of young adults in Singapore. *New Media & Society, 10*(5), 771-801.

Hsi, S. (2007). Conceptualizing learning from the everyday activities of digital kids. *International Journal of Science Education, 29*(12), 1509-1529.

Imhof, M., Vollmeyer, R., & Beierlein, C. (2007). Computer use and the gender gap: The issue of access, use, motivation, and performance. *Computers in Human Behavior, 23*(6), 2823-2837.

Jackson, L. A., Ervin, K. S., Gardner, P. D., & Schmitt, N. (2001). Gender and the Internet: Women communicating and men searching. *Sex Roles, 44*(5-6), 363-379.

Joiner, R., Brosnan, M., Duffield, J., Gavin, J., & Maras, P. (2007). The relationship between Internet identification, Internet anxiety and Internet use. *Computers in Human Behavior, 23*(3), 1408-1420.

Joiner, R., Gavin, J., Duffield, J., Brosnan, M., Crook, C., Durndell, A., et al. (2005). Gender, Internet identification, and Internet anxiety: Correlates of Internet use. *Cyberpsychology & Behavior, 8*(4), 371-378.

Lenhart, A. (2007). *Cyberbullying and Online Teens*: Pew Internet & American Life Project.

Li, N., & Kirkup, G. (2007). Gender and cultural differences in Internet use: A study of China and the UK. *Computers & Education, 48*(2), 301-317.

Liau, A. K., Khoo, A., & Ang, P. H. (2005). Factors influencing adolescents engagement in risky Internet behavior. *Cyberpsychology & Behavior, 8*(6), 513-520.

Link, B. G., & Phelan, J. C. (2001). Conceptualizing stigma. *Annual Review of Sociology, 27*, 363-385.

Livingstone, S. (2008). Taking risky opportunities in youthful content creation: teenagers' use of social networking sites for intimacy, privacy and self-expression. *New Media & Society, 10*(3), 393-411.

Livingstone, S., & Bober, M. (2005a). Taking online opportunities? Children's uses of the Internet for education, communication and participation. *E-Learning, 1*(3), 395-419.

Livingstone, S., & Bober, M. (2005b). *UK children go online: Final report of key project findings*. London: London School of Economics and Political Science.

Livingstone, S., & Helsper, E. J. (2007). Taking risks when communicating on the Internet: The role of offline social-psychological factors in young people's vulnerability to online risks. *Information, Communication and Society, 10*(5), 619 - 644.

Livingstone, S., Helsper, E. J., & Bober, M. (2008). Balancing opportunities and risks in teenagers' use of the Internet: The role of online skills and family context. . *Information, Communication & Society, forthcoming*.

Livingstone, S., & Millwood-Hargrave, A. (2006). *Harm and Offence in Media Content. A review of the evidence.* Bristol: Intellect Press.

Ofcom. (2006). *Media Literacy Audit: Report on media literacy amongst children*. London: Ofcom.

Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon, 9*(5).

Rowan, L., & Bigum, C. (2003). Actor network theory and the study of online learning. New perspectives on quality. In G. Davies & E. Stacey (Eds.), *Quality Education @ a Distance*. Norwell, MA: Kluwer Academic.

Selwyn, N. (2007). Hi-tech = guy-tech? An exploration of undergraduate students' gendered perceptions of information and communication technologies. *Sex Roles, 56*(7-8), 525-536.

Straksrud, E. (2005) *SAFT Project Final Report*. http://ec.europa.eu/information_society/activities/sip/projects/awareness/closed_projects/saft/index_en.htm.

Staksrud, E., & Livingstone, S. (forthcoming). Children and online risk: Powerless victims or resourceful participants? *Information, Communication and Society*.

Tapscott, D. (1999). Educating the Net Generation. *Educational Leadership*, 56(5), 6-11.

Tapscott, D. (1998). *Growing up digital: The rise of net generation.* New York: McGraw-Hill.

Torkzadeh, G., Chang, J. C. J., & Demirhan, D. (2006). A contingency model of computer and Internet self-efficacy. *Information & Management, 43*(4), 541-550.

Trad, P.V. (1993) The ability of adolescents to predict future outcome. Part I: Assessing predictive abilities. *Adolescence, 28*(111), 533-555.

Underwood, J. D. M. (2007). Learning through digital technologies. *BJEP Monograph Series II, Number 5*, 1(1), 1-9.

Vekiri, I., & Chronaki, A. (2008). Gender issues in technology use: Perceived social support, computer self-efficacy and value beliefs, and computer use beyond school. *Computers and Education, 51*(3), 1392-1404.

Yao, M. Z., Rice, R. E., & Wallis, K. (2007). Predicting user concerns about online privacy. *Journal of the American Society for Information Science and Technology, 58*(5), 710-722.