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## Digital Natives

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### ABSTRACT

The term ‘digital native’ was popularized by Prensky (2001) as a means to distinguish young people who were highly technologically literate and engaged. His central claim was that because of immersion in digital technologies from birth younger people think and learn differently from older generations. Tapscott (1998) proposed a similar idea, calling it ‘The Net Generation’, and there have been numerous labels applied to the same supposed phenomena. Recent research has revealed that the term is misapplied when used to generalize about an entire generation, and instead indicates that only a small sub-set of the population fits this characterization. This research shows significant diversity in the technology skills, knowledge and interests of young people, and suggests that there are important ‘digital divides’ which are ignored by the digital native concept. This chapter synthesizes key findings from Europe, North America and Australia and predicts future directions for research in this area.

### INTRODUCTION

A ‘digital native’ can be defined as an individual who has grown up immersed in digital technology and is technologically adept and interested. The digital native is described in direct contrast to the ‘digital immigrant’, who having been exposed to digital technology later in life is fearful of it, mistrustful and lacks the skills to use

technology adeptly. According to Prensky's (2001) vision, all young people who have grown up since the widespread advent of the personal computer can be considered digital natives, and, by elimination, all older people are digital immigrants.

It is argued that the existence of the digital native makes dramatic educational reforms necessary because traditional education systems do not, and can not, cater for the needs and interests of young people. As a result, outdated schools and universities and outmoded teaching simply alienate students from learning, leaving them disengaged and disenchanted by education's alleged failure to adapt to the new digital world. By implication, education must be transformed by technology, coupled with new pedagogies. Although this argument is a familiar one to those acquainted with the broader educational technology literature, the digital native hypothesis provides a new basis for claims for revolutionary educational change through technology integration.

This chapter charts the development of the digital native idea and the debate that has surrounded it, provides an account of the research and conceptual work it has stimulated, and suggests future directions research may take in the coming decades.

## **OVERVIEW**

The idea of the digital native appears to have first emerged in an essay entitled *Declaration of the Independence of Cyberspace* by Barlow (1995) in which he admonished parents with the charge: "You are terrified of your own children, since they are natives in a world where you will always be immigrants" (p.12). Papert (1996), in *The Connected Family*, similarly evokes a rift between parents and children, and teachers and students, portraying older generations as being both afraid

of computers and technically incompetent. Clearly, the idea of a digital generation gap was gaining currency at this time.

Regardless of its exact provenance, it has been Prensky who popularized the term 'digital native' in his widely cited 2001 article, *Digital Natives, Digital Immigrants*. Around the same time, Tapscott (1998) had put forward the similar notion of 'the Net Generation', while social commentators coined the term 'Millennials' as a generational label (Howe & Strauss, 2000). Since then a proliferation of less widely used epithets has appeared, all attempting to capture the essence of the same phenomenon (eg. Generation C, Google Generation, Nintendo Generation etc).

In short, the idea of the digital native captured the imaginations of teachers, parents, journalists, commentators and academics. Closer examination of Prensky's arguments, particularly in his influential 2001 paper, reveals little in way of evidence to substantiate his claims, however. He relies on anecdotes, conjecture and speculation. Nonetheless his ideas have often been uncritically repeated and cited as if fact. Similar arguments purportedly based on evidence provide few details of the data collection methods and analysis processes, thwarting critical scrutiny of these studies (eg. Tapscott, 1998; Palfrey & Gasser, 2008). This presents a significant challenge in assessing the quality of this research.

It was a few years after Prensky's 2001 paper before researchers began to seriously address his claims, apparently galvanized by dissatisfaction with his arguments. Since that time a significant body of international research has largely debunked the idea of a uniformly technically savvy generation. Instead it suggests that the label 'digital

native' likely only applies to a small minority of the population. Of much greater interest is the wide diversity of technology use uncovered by this research. These differences are often thought of as 'digital divides' because they highlight significant gaps between the ways individuals and/or communities engage with technology. These gaps present an ongoing challenge to those concerned with equity and justice in education, and in society more broadly.

More recently there have been attempts to redefine and rehabilitate the term 'digital native'. In fact this emerged in Dede's (2005) argument that aptitude with technology is not necessarily related to age but to other personal characteristics. In recent years Prensky (2009) has also seemed to resile from his earlier sharp distinctions, praising rather than criticizing the role of the teacher. Nevertheless the original divisive idea remains potent.

In the next section we turn to examine some of the research evidence that has emerged in response to the idea of the digital native.

## **RESEARCHING 'DIGITAL NATIVES'**

### **Researching technology use**

In the mid 2000s researchers began to investigate some of Prensky's key claims about digital natives. The initial area of focus was on determining whether, in fact, digital technologies were as extensively used within younger generations of the population as was supposed by the digital native thesis (eg. Kennedy, Krause, Judd, Churchward & Gray, 2006; Kvavik, Caruso & Morgan, 2004; Oliver & Goerke, 2007). These studies

set about to establish the extent of access to and ownership of a wide range of technologies, and to discover the extent to which they were used for particular activities. In short, researchers wanted to know who was using what technology, how often and for what purposes. Similar research had already been conducted, for example through studies of children's use of technology in and out of school (e.g., Downes, 2002; Kent & Facer, 2004; Kerawalla & Crook, 2002), but these studies were not specifically driven by the digital native concept. Related work was also being conducted in disciplines outside of education, such as youth studies, cultural studies and media studies, but again these did not relate to the digital native idea (e.g., Livingstone & Helsper, 2007; Selwyn, 2003). These studies do, however, suggest that there was a broader appeal to research along these lines.

Early 'digital natives' studies tended to use survey methods to collect data from large populations, often of higher education students. In this exploratory work researchers attempted to gain a broad perspective by collecting data from participants who are relatively easy to access with a focus on phenomena relatively easy to measure through self-report (e.g., Kennedy et al, 2006; Kvavik, Caruso & Morgan, 2004). While questions about access to technologies and frequency of use are common features of these studies, many have gone further to gauge skills, interests and preferences, have included multiple age ranges rather than only younger people, and in some cases incorporated qualitative methods to complement quantitative data. One of the most notable surveys has been the ECAR series in the United States, which has run since 2004 with consistently large sample sizes of college students (see Smith & Caruso, 2010 for the latest report.). Similar studies from around the world have contributed to a developing understanding of technology use, particularly among

young people (e.g., Jones, Ramanaua, Cross & Healing, 2010; Kennedy et al., 2009; Oliver & Goerke, 2007; Margaryan, Littlejohn & Vojt, 2011).

In sum, the main findings of these studies have been as follows:

1. There is near universal adoption of some technologies (e.g., mobile phones).
2. Some technologies have not been widely adopted, for example, RSS feeds and some forms of social media. The reasons for this are not clear, however. Perhaps, some technologies are too specialized, overly technical, or judged to be less useful.
3. There are indicators of some differences due to age, gender, socio-economic background, and discipline of study (at university or college), although findings are not consistent across all studies or all technologies.
4. The studies trace how some technologies are abandoned, for example, because they are superseded in favor of alternatives (e.g., the demise of MySpace and the rise of Facebook, and the shift from dial-up to broadband Internet access).
5. Skills, knowledge and interests are highly varied when comparing individuals. Findings suggest that individuals adapt their technology use to suit their needs and interests and the contexts they engage in.
6. Younger people often have lower skill and knowledge levels than what might be expected based on the digital native hypothesis.

A common conclusion from these studies is that while there appear to be some age-related factors, diversity is often higher within age groups than between them. It is also important to note that while large-scale survey studies can indicate patterns, the measures used are relatively crude and their accuracy is limited by participants' abilities to recall and estimate their usage. There is a need for qualitative studies that

are capable of exploring technology use in greater depth and with sensitivity to individuals' contexts. There are also, to date, few studies from developing countries and of less affluent communities, making the global situation difficult to discern.

In short, the research conducted thus far suggests that only a small minority of the population can be considered 'digital natives', even disregarding age as a factor to include technologically adept older people. People adopt technologies for a wide range of reasons and have diverse patterns and habits, and the skills they develop are often narrow and highly contextualized (i.e., fit for a particular purpose). As a result, it would be wrong to generalize about a section of a population on the basis of how they use technology, and in particular on the basis of presumed exposure to technology.

### **Implications for education**

Prensky (2001) posed the problem for contemporary education as follows: "Our students have changed radically. Today's students are no longer the people our educational system was designed to teach" (p. 1). This pronouncement was based on the assumption that all young people were digital natives being held back by an outdated education system. If, however, not all young people are digital natives, only some, and there is significant diversity within the population with regard to technological prowess, then the problem for education is somewhat different. The challenge of how education can cater appropriately for learners remains, but it is made more complicated by the fact that learners comprise a diverse rather than homogenous group. A further challenge for public education is that if some students

are disadvantaged by virtue of their socio-economic situations, then how can an inclusive education system address that disadvantage?

Concerns about a digital divide between the 'haves' and 'have nots' first emerged in relation to differences in access to technology (Warschauer, 2004). As technology became cheaper and easier for ordinary people to obtain, the focus shifted to differences in the skills and knowledge people have to make effective use of technology (Selwyn, 2004; Warschauer, 2004). And as ideas about what it means to be digitally literate have changed, this has seen a move away from a focus on developing people's technical skills to a focus on developing their capacities to use technology responsibly, creatively and innovatively. This poses questions for education about how students can be equipped with these more sophisticated skills and understandings.

The infusion of digital technologies into everyday life has also raised questions about the relation between technology in education and out, particularly amongst those who speculate about how the high levels of motivation exhibited by young people while gaming or socializing online might be employed in learning (Prensky, 2001; Tapscott, 1999). This reflects a wider conversation about how Web 2.0 technologies might be integrated into education, and warnings that their application might not be straightforward because of fundamental differences between informal learning and formal educational contexts (Dohn, 2009).

These discussions indicate that while the original digital native hypothesis is not a sound basis for recommending or planning educational change, differences in the

ways technologies are used and their increasing prevalence in society continue to raise important questions for education. These are questions that need to be informed not only by empirical evidence gleaned from further research studies, but also by theories that help us to explain the phenomena and thereby better understand it.

### **Theoretical perspectives**

Just as the original proposal of the digital native lacked empirical foundations, theoretical underpinnings were also absent. However, as the research agenda has developed, casting doubt on the general nature of the claims and in doing so revealing people's diverse engagements with technology, researchers have begun to conceptualize both the nature of the debate itself and to propose theoretical constructs that might help to explain the phenomena and frame future investigations.

The debate itself has been described as an academic form of a 'moral panic', a concept widely used in the social sciences (Bennett, Maton & Kervin, 2008). A moral panic, as described by Cohen (1972), occurs when a particular group is seen as a threat to societal norms. Importantly, the concern inspired exceeds the supporting evidence. Thus, the lack of evidence base and the extreme language used in arguments for the existence and importance of digital natives is consistent with a moral panic. This characterization is useful because it helps to explain how the idea gained such prominence on the basis of flimsy evidence. It also explains how the form for the debate stymied genuine academic discussion until the emergence of empirical research.

More recently, researchers have proposed that this empirical evidence provide the stimulus for developing more sophisticated ways of thinking about and researching people's technology use (e.g., Bennett & Maton, 2010). Drawing on a range of sociological theories, these authors argue that concepts related to social networks (Castells, 2001; Wellman, 2002), social practices (Bourdieu, 1990) and the nature of knowledge and education (Bernstein, 1999) are critical to advancing understanding in this area.

## **FUTURE RESEARCH DIRECTIONS**

Future research into people's technology uses and choices will continue to monitor new developments, sparked by emerging technologies and changing patterns of adoption and use. In the short term, one focus will be on the impact of Web 2.0 technologies and their proposed capacity for democratizing participation in technology-based activities. More generally, the trend towards greater online connectivity through new services and devices will continue, and so pose further questions for researchers about digital divides and digital inclusion across societies.

Future research will also require a commitment to developing more sophisticated understandings of technology use and choice. As noted above, in-depth qualitative research will be needed to provide insights into the diversity uncovered by recent surveys. Findings from this work will enable the field to transcend simplistic labels and thereby truly account for the rich array of activities and practices with technology. These are developments that can underpin discussions about what role

technology can and should play in education such that the best learning outcomes can be achieved for all students.

To conclude, although misguided in its attempt to characterize a whole generation of young people, the idea of the digital native has been helpful in drawing educators' and researchers' attention to the under-researched area of young people's technological experiences and preferences. It has stimulated a very productive and promising avenue for educational technology research that has the potential to lead to better informed decision-making about technology and to improved teaching and learning.

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## **KEY TERMS**

Digital native: In its original sense, a digital native is a person who has grown up after the widespread introduction of the personal computer and therefore been immersed in digital technology. It is claimed that by virtue of this exposure digital natives think, behave and learn differently to older generations. More recently the term has been redefined by some to refer to a person of any age who is highly adept with technology.

**Digital immigrant:** A digital immigrant is a person born before the widespread adoption of computers and has had to adopt digital technology later in life. Digital immigrants are considered to be less technically able than digital natives and it is argued that they can never develop the same level of technology skills and knowledge as digital natives.

**Digital generation gap:** The digital generation gap refers to the proposed gap between children and adults (especially parents and teachers) due to young people's natural ability to adapt to new technologies more successfully than older generations.

**Digital divide:** Digital divides are gaps between individuals or groups due to differences in their access to digital technologies. Access refers to more than physical access, including also the ability to use technologies effectively. Divisions may occur due to factors such as age, gender, race/ethnicity, socio-economic status and/or geographic location.

**Digital inclusion:** Digital inclusion refers to mindsets, strategies and initiatives that seek to ensure that all people in society have equitable access to technology regardless of their personal circumstances. It is underpinned by the belief that access to technology and the ability to use it effectively are important to citizenship and social cohesion.