

Digital Natives: Mythical tribe, or savvy youth of nowadays?

Wybo Wiersma

Oxford Internet Institute

mail@wybowiersma.net

1 Introduction

The notion of *digital natives* has stirred up a lot of emotions since it was coined by Prensky in 2001.^{16,15} It refers to the idea that today's youth would be generally proficient with the wide array of digital technologies that have become available over the last decades, mostly because they grew up with them as a generation.

Not only does this issue intersect technology, and youth; the stuff of fantasy, vivid memories and fading dreams, but it was also introduced in the context of educational reform; a topic that almost everybody has an opinion about. Then add the silent struggle between the generations, and the colonial and emancipatory connotations of the term 'natives' into the mix, and we have the recipe for a heated debate, even if there would be no empirical basis.

In this essay we will get back to the facts. We will begin by critically assessing the notion of *digital natives* at a conceptual level. Then we will examine and discuss the evi-

dence that has been brought to the table so far. We will conclude that the current evidence for, and against, is either of poor quality or inconclusive, and that *digital natives* as a notion might very well be grounded, and useful, as long as it is understood as a socio-historical generalisation. But first we will clarify some of the limits of this essay.

1.1 Limits

It has to be made clear that no new evidence was generated for this essay, apart from a small calculation based on the OxIS 2009 survey.⁴ Secondly, we won't go into Prensky's most recent notion of 'Digital Wisdom', as it is quite different from that of *digital natives*. Thirdly, as we are all personally, as well as professionally, positioned in this debate, it is better to be explicit about our background:

In terms of age your author would be a border-case for digital nativeness. Yet he quickly became more proficient with ICTs than his parents (media-rich, middle-class, rural household). He and other media-students,

however, are hardly typical of their generation in terms of media skills. We should therefore be wary of a ‘survivor-bias’.

2 Analysis

2.1 Concept

There are several synonyms for *digital natives*, such as the ‘net generation’, and the ‘google generation’. All these refer to a supposedly tech-savvy generation, born roughly between 1983 and the present.^{bennett_digital_2008,6} According to Prensky, *digital natives*: prefer to receive information fast, want graphics before text, are used to non-linear, random-access information, regularly multi-task, and expect fast feedback, and instant-gratification.^{16,15}

Digital immigrants (the rest), on the other hand, eventhough they may become users of digital technologies, always keep traces of ‘an accent’, similarly to adult second language learners: such as not using the internet as their first point of call, printing off e-mails or papers, instead of working on-screen, and reading the manual before using an ICT.

Apart from a lack of evidence, the foremost critique raised against the notion of *digital natives*, is that it is a sweeping category. It lumps all those born in a time-span of roughly 25 years together, and assumes they are some-

how different because of their upbringing in a world sprawling with digital technologies.

Yet there is a lot of variation in youngsters actual access to digital technologies, even in the West. Especially in terms of social-economic, and gender differences, the variations are big: working-class children are 31% less likely to have access to a PC at home, and boys are twice as likely than girls, to have a PC in their room. Other differences emerge as well, such as different usage-patterns regardless of access. Especially in media-rich households, children seem to develop a preference for different media, such as ‘book-lovers’ and ‘PC-freaks’.¹²

So yes, there is variation, but to what extent does such variation stop us from using similarly broad categories in other contexts? Generations have received names before, such as the ‘Lost Generation’ of World War I, or the ‘Hippies’ of the sixties. We also easily speak of cultures, such as Islamic, or British culture, even within the social sciences. Yet most individuals in them are at best linked by ‘family resemblances’. Which means that as long as there is some similarity between most members of the group, there is a case for using a socio-historic generalisation (notion from Wittgenstein).¹⁹

And such similarity was, for example, found by Ling and Licoppe in youngsters

typical usage of mobile phones. They use text-messaging very differently (much more intimately, for example), and much more frequently (23 texts a day, for certain teenage girls).¹¹ [licoppe_connectedpresence:_2004](#) And given that communication (IM, social networking, multiplayer gaming) is a core usage of ICTs, network effects among youngsters are expected (e.g. peer pressure to adopt and use them in certain ways). This social nature of ICTs adds another justification for a cultural, or by reduction, generational generalisation.

Now of course one could argue that new technologies have been introduced for years, such as newspapers, the radio, TV and VCR, and that successive generations have learned to use them, to a smaller or larger extent. And this is true. But even if digital nativeness is a moving target, and comes as a matter of degree, this does not disqualify the notion. Especially as the variety and breadth of ICTs (and installed applications) that are found in most households have increased much faster over the last decades.¹² Even if some early *digital immigrants* reach skill-levels indistinguishable from *natives*, and even if experience was the real underlying cause, no causal link, or absolute match, is necessary for an useful socio-historic generalization. Similarly to how not every youngster of the ‘Lost Gener-

ation’ faced battle during the Great War, and naturally, none of them was maimed directly by their age.

A final problem with the notion of *digital natives* might be that it smacks of technological determinism, which is not a popular view. Yet it not being popular does not preclude it from being true, especially if it would be of the refined kind of Schroeders multimodal connectedness in which: not any specific medium, but the type of communication opened up by the whole range of devices matters. In short, a multiplicity of ICTs afford choice between a growing range of instant, easy, and unlimited communication, and as the range of choices increases, specificities of devices matter less.¹⁸

A comparison with a thought-experiment about the nurture-nature debate can clarify this further: If everybody received the same upbringing, all remaining differences would be due to nature. A similar thing happens in youngsters increasingly media-rich environment: the specific modality of media matters less, while for those that use many devices, universal natural human limits play an ever larger role in how communications are structured across the multimodal spectrum of devices (such as time-constraints, maximum number of friends humans can keep in mind, etc).

According to Prensky, even such limits could be bended by technology, as he argues that the brains of *digital natives* would actually be structured differently from those of *immigrants*.¹⁵ Whether this is plausible or not, in this essay we will defer our view on this issue until specific neurological evidence becomes available. As no such media-related evidence exists yet. Now on to the evidence that is actually there.

2.2 Evidence

Prensky does not quote much quantitative evidence in his two papers, apart from the claim that current-day youngsters send and receive a total of 200.000 texts and/or e-mails before leaving university, and play computer-games for more than 10.000 hours. While I could not find conclusive current-day data, his numbers seem a bit high. They would imply sending 23 messages a day on average (Licoppes number of texts for Swedish teenage girls), and more than 135 minutes of gaming a day (EU Kids survey finds 2 hours of internetting per day), for 12 years on end. Especially if they would apply for all youngsters.¹⁶

More substantial criticism is fielded by Ellen Helsper in her 2010 paper, based on the OxIS 2007 data.^{6,4} She goes on to define *digital natives* as those who would use the in-

ternet for fact-checking, training & learning, and current affairs, and then finds that besides generation, years of experience, and breadth of use, also make a big difference. For multi-tasking, for example, the standardized coefficients of the regression (comparable numbers) are 0.20, 0.13, and 0.28 for generation, experience, and breadth of use respectively.

Age and experience are mostly self-explanatory, but breadth of use is not. Helsper qualifies breadth of use as how many of twelve tasks one uses the internet for. The list of tasks contains things such as entertainment, shopping, finance, civic participation, and e-government. We think there are three problems with her notion of breadth of use.

The first problem is that it is very closely related to proficiency, and thus with things that would qualify digital natives. Arguably it even measures the same thing. And this does not make it very surprising that breadth of use explains a lot of the variation in multi-tasking and other measures of proficiency. Besides this, highly correlated independent variables can cause problems in statistical regressions (multicollinearity), the least of which is that effects caused by one variable (generation) could be attributed to the other (breadth of use).¹¹

¹¹There was no information on the specific regression method that was used by them, nor did we have – at short notice –

The second problem with the list, is which factors are included. As the paper briefly mentions, and then glosses over, the list contains activities which under-18s are unlikely to engage in, such as finance, e-government, civic participation (disengagement of youth is also an offline phenomenon) and to some extent shopping and travel, while only two categories are included that might be typical for youth (social networking and diary functions).^{9,8} This especially is a problem because a listing of partaking percentages per age-range is used to show that the difference between the generations is not that big at all.

And thirdly, very different activities are lumped together within single factors. For example: entertainment is everything from watching a BBC-video on-line, watching adult content, downloading an MP3 through P2P, to on-line gaming. While these activities clearly require very different skill-levels. If we take a more detailed look, then in the OxIS 2009 data there are still very big differences between adults and youngsters: 69% of students play games, versus 31% of others, 94% of students engage in social networking, versus at most 48% of working people.⁴ Contrasting more advanced and simpler activities might have given a very different picture.

access to the OxIS 2007 survey data. Therefore we could not confirm such effects with certainty

Though this might be hard as some advanced activities, such as designing levels for on-line computer-games or uploading youtube movies are not even measured by OxIS (for understandable reasons). Finally, the time-span is a year, so watching one BBC-clip in a year already qualifies. Surely this will level out any differences.

This lumping together of activities into factors, or types of use into mere use, is something that is done in other studies criticizing (or used to criticize) the notion of *digital natives* as well. In the EU Kids Online study, for example, they find that in most countries a slightly larger proportion of children use the internet daily, as compared to their parents (70% versus 60% for the UK).¹³ But there is use and use: reading an e-mail at work is not comparable to downloading a game through bittorrent, applying a crack to circumvent its copyright protection, and playing it on-line for four hours (both examples may not be typical, but they illustrate the range).

Another issue we have to be conscious of, is the difference between internet-users and non-users. In Helsper's paper, for example, most comparisons are between internet users. This makes the generational differences appear smaller than they actually are. For example in the OxIS 2009 study the correlation between age, and frequency of use, is 28%

(10 percent points) smaller if we only look at internet-users (table 1).²

Table 1: *Differences between internet-users and both users & non-users*

Sample	Correlation
Internet users	-0.2582
Everybody	-0.3605

This suggests that age does make a big difference, even if experience (as well as other factors), make a difference as well. Also it should be noted that if we disregard breadth of use in Helsper's study, even there age (generation) remains the biggest explanatory factor. This is especially relevant because, as she mentions explicitly (albeit to make the opposite point, the importance of experience) age and years of experience do not correlate in the OxIS 2007 data.⁶ Which means that youngsters' increased proficiency is not due to them having more experience in some way: Generation itself seems to be an important

²For frequency of use we recoded 6-value range ('Never', '< Monthly', 'Monthly', 'Weekly', 'Daily', '> Daily') to actual monthly frequencies. We did this for: instant messaging, chat rooms, email, email with attachment, voip, reading blog, writing blog post, updating personal website, forum, mailinglist, uploading photo, and social networking (the OxIS 2009 subset we had access to). Then we correlated this with age. We acknowledge that age is not generation, but doing a more complicated statistical analysis would go beyond the scope of this essay

factor. A remarkable find in support of the notion of *digital natives*.

But it is not too strong, as it is still very possible that experience (amount of time spent using it) is behind most of the age-effect, again in the form of a lumping-problem: Given the fact that most children spend more time online per day than adults, and especially the plausible assumption that they do this in more playful, explorative ways.¹³ And there is a lot of room for such lumping here, because Helsper measures experience in years of use. But even if this is the case, as noted earlier, as we see it, the notion of *digital natives* does not presuppose age as the underlying cause: merely as a useful generalization (biggest correlation at most).

Another minor issue with Helsper's criticism of *digital natives*, is that many of the adult heavy users of the internet are relatively well educated (education is the second-most important factor, after age for fact-checking, and training & learning). Now as education at least roughly correlates with cognitive ability, it should be noted that the majority of the new generation mastering ICTs to a level reserved for previous generations intelligentsia, suggests that there is at least some difference between *digital immigrants* and *digital natives* (though there are probably confounding factors for the education-link, such as the level

of income of the early adopters).

There is modest support for the notion of *digital natives* in some of the data as well. Livingstone reports that 84% of school-aged children use the internet for school-work, Bennett finds that 93% of university-age students own a PC, and 21% of them create and upload their own digital content.^{12, bennett_digital_2008} And the EU Kids Online survey (2010) reports that across Europe 68% of children aged 9 to 16 (even 87% for 15-16 year-olds) report to know at least a bit more about the internet than their parents.¹³ In which other factual domain than ICTs do we find such figures?

Finally, a criticism raised against the notion of *digital natives* (both in Helsen and Bennett) is that there is evidence that multitasking is actually less efficient. These claims are in both cases based on Meyer & Rubinstein 2001 and Hembrooke & Gay 2003.^{14,7} The former paper looks at the time-cost of task-switching, while the latter compares scores on a test about a lecture, either with laptops open or closed. Apart from problems of applicability (arguably task-switching is different from true multi-tasking, and the value of the work done/socializing on the laptop during the lecture was not measured, respectively), the foremost problem is with the subjects in both studies. If we assume write-up and publication

took a year (a conservative estimate), and take the trouble of calculating expected ages, then Meyer, who was studying undergrads in 2000, would have had subjects born in 1982 or before, while Hembrooke's American postgraduate subjects were born in 1980 at the latest. Of course it is true that we have to guard against sliding claims of the kind that the real natives will always be just a few years away, but the subjects of these studies were clearly not unambiguously in the *digital natives* age-range.

3 Conclusion

We first examined the notion of Digital Natives at a conceptual level: the generation born after about 1983, and proficient with new ICTs because they grew up with them. Then we discussed the degree to which generational generalisations can be made, even if there is some variation. We concluded that as long as we use them with care, as a socio-historic generalisation, and without pretensions of causality (mere correlation), then this does not have to be a problem. Especially as, with or without differences in brain-structures, those born in the last 25 years are indeed increasingly likely to grow up in a multimodal, media-rich environment. And thanks to network-effects, and the social nature of such technologies, they do this (to some extent) as a generation.

Then we looked at the evidence for and against the existence of *digital natives*. Here we found, first of all, that the evidence against it presented in Helsen and Bennett is of poor quality, and inconclusive at best. Breadth of use as defined by them is both a problematic contender and a questionable benchmark, leaving generation as the largest factor. If we then look at evidence from the OxIS 2009, the EU Kids survey, and other sources, we find modest evidence in favour. Such as for example more advanced uses by youngsters, and the majority (self-reportedly) knowing more about ICTs than their parents. Such things are especially remarkable as proficiency normally would be expected to increase with age, while in the case of ICTs we find the inverse of this.

So while it is true that Prensky does not provide any real evidence in his paper, which otherwise is also quite unacademic, and rhetorically laden, this can never disqualify the notion as such. Even if a thousand youngsters with a thousand digital typewriters had come up with it randomly, we would still have to look at the evidence to reach a verdict. And from the way the evidence lies before us, I simply cannot conclude otherwise than to give the notion of *digital natives*, as a socio-historical generalisation, the benefit of doubt, at least pending further research.

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