DIGITAL NATIVES

Rise of the Social Networking Generation

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► A new breed of employee, born into a world of digital technologies, is about to transform the workplace

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A WAVE of 'digital natives' —those who have spent their entire lives surrounded by digital technologies—is about to hit organisations in developed countries. But how will companies cope with the habits and assumptions of this new workforce? Will they ban Facebook at work, as Television New Zealand did? Or will managers—most of whom are digital immigrants—instead try to accommodate them?

ANDREW CALDWELL (ALL PHOTO-MANIPULATIONS)

DIGITAL NATIVES have grown up in a world where the use of information and communications technology is all-pervasive. They expect their digital devices to be always on and connected via ubiquitous information systems. And they expect to be able to take mobile phones, tablets and personal digital assistants with them wherever go.

IT HAS become the norm for digital natives to use digital devices that are connected to ubiquitous systems such as Facebook, YouTube and Twitter, for both personal and professional purposes.

However, almost all managers today—like the vast majority of their employees—are 'digital immigrants'. Most of us were not born into the digital world; rather, we learnt to use computers at some stage in our adult life.

If we look at current management theory and practice—particularly theories and methods used by management consultants, managers and IT professionals regarding the design and implementation of information systems – one feature stands out: all are based on our experience with digital immigrants.

This means that many of the underlying assumptions of these current theories and methods may already be out of date. More to the point, some current management practices may be counter-productive for digital natives. For example, a traditional assumption of information systems research and practice is that users resist new information technology. This assumption, regarded as general law by most information systems researchers and practitioners, is really just a derivative of a more general assumption in management that people resist change.

The idea of user resistance drives many of the activities carried out in major information systems development projects. For example, it is considered best practice to have 'user involvement' and 'user participation' during a project so as to minimise 'user resistance.' One user (normally a senior manager) is nominated as a 'project sponsor' and is usually asked to 'sign off' at various stages of the project. It is assumed that all this effort is needed to avoid project failure.

But what if the traditional assumption about users resisting new information technology no longer applies? What if digital natives not only do not resist new technology, but instead get frustrated when the IT policies of the organisation for which they work prevent them from using new technology?

If our argument is correct, we now have the curious situation where it is not the young digital natives who are resisting new technology, but rather their digital immigrant managers. A significant percentage of organisations have banned social networking sites and have even disabled features of smart phones and tablets in an attempt to keep their digital natives under control.

We suggest that this response has about as much chance of success as King Canute's attempt to stop the tide from coming in.

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Natives and immigrants

WHAT ARE the differences between digital natives and digital immigrants?

A survey by Project Tomorrow of 200,000 students in the United States (www.tomorrow.org) concluded that digital natives are not merely using technology differently; rather, their lives are being moulded by technology in a new way. They are digitally literate, highly connected, experiential, social, and in need of instant gratification. By age 20, they will have spent an estimated 20,000 hours online using a host of systems, from transaction and decision-support systems to collaboration support for personal and professional purposes. They typically use these information systems to explore their place and identity in the world. Unlike their digital-immigrant counterparts, they tend to be more comfortable with extensive peer-to-peer collaboration and the resultant disclosure of personal data.

Although many digital immigrants have become proficient users of technology, their use of it differs significantly from that of their digital-native counterparts. Communication via new technology is one such area—digital immigrants prefer to use email for online communication whereas digital natives prefer the more synchronous forms of instant messaging. With mobile phones, digital immigrants favour speaking to people whereas digital natives prefer texting. Digital natives also tend to share differently. Blogging is increasingly gaining currency for both immigrants and natives but, once again, for different reasons. Digital natives blog to share personal experiences and they treat personal blogging websites as forms of online journals. By contrast, digital immigrants tend to use blogging sites as an intellectual tool to share and discuss ideas with their peers.

Whereas digital immigrants are regarded by IS scholars and practitioners as users of IT (hence the extensive IS research and practitioner literature on user involvement and user acceptance), digital natives are creators of online content. Digital natives are adept at uploading videos to YouTube, building websites and communicating texting or Twitter. Hence, digital natives are not passive users of information systems; rather, they are creators and active participants in a new digital media culture, sometimes even launching their own online enterprises. More so than their digital immigrant counterparts, digital natives have meshed the digital world and its numerous technologies with their daily lives.

Although we believe there are significant differences between natives and immigrants in their use of, and attitudes towards, technology, our research indicates that there is no hard and fast distinction between the two. In other words, we suggest that digital nativeness is best seen as a continuum. Depending on their experiences, some people are likely to be more native than others. To what extent, then, can digital immigrants become digital natives, and vice versa? The phrase "You can't teach an old dog new tricks" is perhaps relevant here. While people may place themselves at different points along the continuum, we suggest that learning a new language and becoming comfortable with a new culture is not easy and that 'digital fluency', like fluency in English, can only be achieved after genuine immersion in the culture.

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Ubiquitous Information Systems

THE RISE of the digital native is being accompanied by the increasing popularity of a related phenomenon: that of ubiquitous information systems (UIS).

The word 'ubiquitous' is derived from the Latin '*ubique*', meaning 'that which exists everywhere'. In the context of information technologies, ubiquitous digital connectivity can be seen in the indispensability of the internet for digital natives, and the rapid uptake of mobile phones, laptop computers, and personal digital assistants. An increasing number of these devices and environments tend to be hybrid and smart (cars and buildings), enabling rich and flexible ways of interacting. In this article, when we talk about ubiquitous technologies we are including hardware such as tabs, pads, boards, dust, skins, and clay interconnected and interwoven into the very fabric of our lives through ubiquitous networks—often made available through 'cloud' computing. When we use the word 'system', we mean in it in the broadest sense of being made up of people, processes, information and communication systems and technologies. Ubiquitous information systems bring all these things together to impact on all facets and phases of human living.

We suggest that the rise of the digital native, along with the growth of ubiquitous information systems, has profound implications for management research and practice and, in particular, for how organisations manage the development and use of information systems.

We propose a model for understanding digital natives in the context of UIS (see Figure 1). Our model has four dimensions: Users (Digital Immigrants versus Digital Natives), Systems (Traditional Information Systems versus Ubiquitous Information Systems), Activity (Professional versus Personal), and Context (Office versus Home).

When these four intertwined dimensions are charted, a clear pattern emerges. Most research and practice in information systems has focused on the inner/central regions of

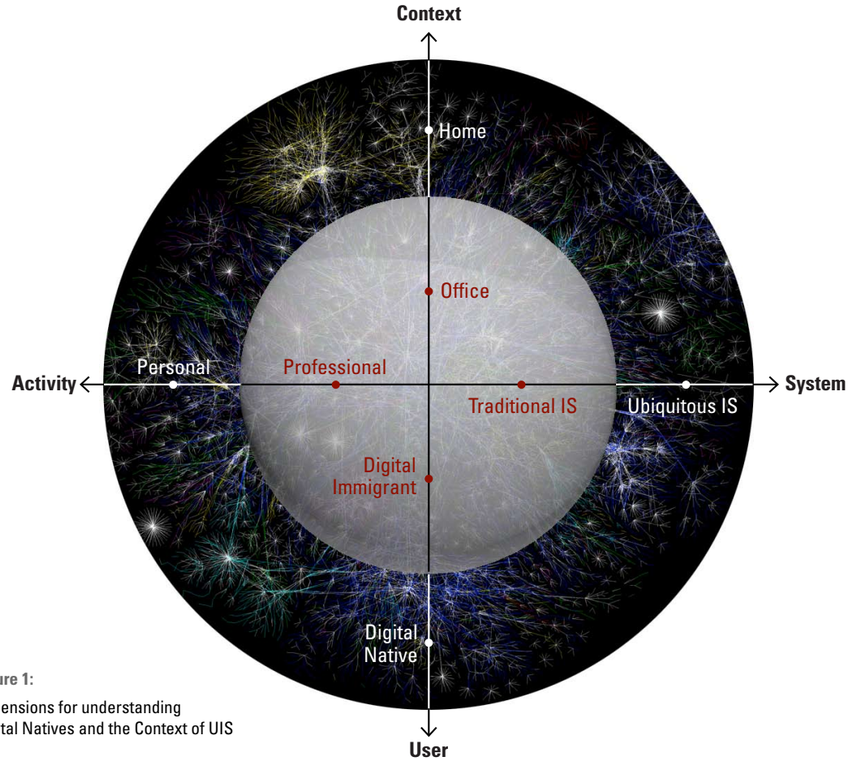

Figure 1:
Dimensions for understanding Digital Natives and the Context of UIS

the chart: namely, the traditional information systems used by digital immigrants for professional purposes at the office. However, little effort has been spent at the mid-to-outer regions of the chart, which looks at ubiquitous information systems used by digital natives for professional and personal purposes at the office and at home.

Traditional information systems help to improve the efficiency and effectiveness of organisations. The users of these systems in the past have been digital immigrants for whom functionality has been of paramount importance. For digital natives, however, interactivity, usability, flexibility, and connectivity are as important as functionality. Most aspects of traditional information systems, and the types of users associated with them, have been well researched. However, there is limited knowledge about the design, implementation, and use of UIS by digital natives and many organisations are struggling to develop the best policies and practices for this new audience.

Activities and context have also tended to be taken for granted. Implicitly, most IS research and practice has focused on the use of information systems for professional purposes in the context of the workplace. The use of information systems for personal purposes in non-office contexts, such as the home, has tended to be ignored. This is perhaps understandable, given that most IS researchers are currently based in business schools and most IT professionals work for large companies or public sector organisations. Nowadays, however, digital natives seamlessly transition between the use of traditional and ubiquitous information systems for both personal and professional purposes. Hence the boundaries and contexts are no longer very clear.

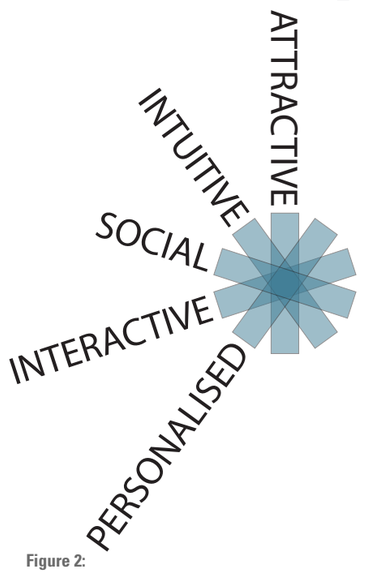

Figure 2:
Ubiquitous Information Systems Design Dimensions for Digital Natives

The way forward

AT THE University of Auckland Business School we are currently engaged in a research project that focuses on how digital natives are interacting with and transforming UIS, how UIS can be designed and implemented for digital natives, and the impacts and governance issues related to the use of UIS by digital natives. Along with several international IS researchers, we are partnering with a leading international management consulting firm and one of the world's largest IT software companies to help us with this project. Although the research project is still underway, a few tentative conclusions are described below.

How do we design and implement UIS for digital natives?

TO GUIDE the design of UIS for digital natives, we suggest a set of five interrelated dimensions, namely: personalised, interactive, intuitive, attractive, and social (Figure 2). Traditional information systems design has, for the most part, focused on functionality at the expense of the five usability-oriented design criteria identified above. However, we believe that while functionality is important, these five interrelated design dimensions are crucial when considering UIS and digital natives.

The personalisation dimension is primarily about giving digital natives ways to collaboratively change the design of a UIS. It can be personalised in two ways: by automatically adapting to the user's behaviour and by being customisable by users. Being adaptable means giving digital natives the opportunity to create customised start pages or dashboards. The iGoogle start page and the homepage of bbc.co.uk are examples of such functionality. Personalisation helps to match user expectations and perception of the web space. In terms of flow, personalisation allows users to adjust the difficulty of the interface according to their skills. Common examples of this are applications that offer an 'expert mode', enabling more complex functions.

Interactivity should be considered in the design of a UIS for digital natives. In a 2005 study of American and Australian teenagers, researcher Jacob Nielsen found that they prefered to be active "as opposed to just sitting and reading". In an earlier piece of work, researchers Sandra Hughes-Hassell and Erika Miller had sug-

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gested that the visual appeal of information systems, ease of navigation, currency and accuracy of information were all key elements in creating an interactive UIS for digital natives.

The intuitive dimension is rooted in the requirement to allow users to navigate easily. Intuitiveness is an attribute for interfaces that can be used 'without recourse to manuals or tutorials. The button in word-processing software that is indicated by a 'B', and which allows making selected text in a document bold, is an example of an intuitive interface element. And Yahoo mail is a web 2.0 application that is mostly intuitive for users with some basic computer knowledge.

The attractive dimension refers to the need to make the UIS specific to digital natives by incorporating 'cool' and up-to-date designs. The nature of such designs is, of course, difficult to specify. One way to address this challenge is to empower the users to contribute to the design of the UIS just as they can contribute to the content. Elements of this dimension can be seen in Facebook.

The social dimension captures the requirement to show who contributed what and to allow users to express their own virtual identity. Discussion boards are one manifestation of this concept. In discussion boards, every 'post' is attributed to a user and many platforms allow the maintenance of individual 'user pages' or customised personal messages below each post. Users are able to summarise their contributions in terms of their most popular posts or other resources they have created on the web.

Being connected is not only a part of what digital natives do, it is who they are.

How do UISs affect digital natives, organisations, and society?

WRITER Don Tapscott says that the 80 million digital natives coming into the workplace will want to be part of an organisation in which engagement and collaboration are the norm, rather than one that relies on command and control. This is because the workplace values and expectations of digital natives differ from those of older generations. For example, they tend to have expectations of rapid career growth, greater demands for work-life balance, and the need for clear and frequent performance feedback. This has important ramifications for management in organisations.

However, familiarity with computers, and their ease of use, also means that digital natives are less cautious with their personal information and so are potentially more vulnerable to the threats and risks that the internet poses. Proficiency with certain technologies does not necessarily translate into an understanding about personal security and privacy.

But simply blocking channels such as YouTube and Facebook to address governance and security concerns, as some organisations have done, is a poor solution. They may be missing an opportunity to empower digital natives to connect with one another and collaborate. Organisations often take a conservative stance with any new technology. However, being connected is not only a part of what digital natives do, it is who they are. They consider their digital world to be part of their personality. Not being constantly connected is the equivalent of telling digital immigrants that they cannot use the phone or talk to their peers during office hours. Digital natives expect that at work they will continue to be connected—to collaborate, share and have fun.

The rise of the digital native, along with the proliferation of ubiquitous information systems, calls for an entirely new paradigm for IS research and practice. Those organisations in which the digital immigrant managers seek to control and contain digital natives within fixed organisational boundaries will simply stagnate, whereas those organizations that welcome digital natives into their workforce and indeed take advantage of their 'cultural capital' will survive and prosper. ■

KEY TAKE-OUTS

- **A tsunami of employees who have lived their entire lives surrounded by digital technologies is about to hit organisations.**
- **Ubiquitous information systems need to leverage the strengths—and address the weaknesses—of these 'digital natives'.**
- **Personalisation, intuitiveness, attractiveness and social interactivity are of paramount importance in designing ubiquirous information systems for digital natives.**

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