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Digital Natives, Digital Immigrants: Some Thoughts from the Generation Gap

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In a two-part series entitled "Digital Immigrants, Digital Natives," Marc Prensky (2001a and 2001b) employs an analogy of native speakers and immigrants to describe the generation gap separating today's students (the "digital natives") from their teachers (the "digital immigrants"). The digital natives Prensky describes are surrounded by digital media to such an extent that their very brain structures may be different from those of previous generations:

Digital Natives are used to receiving information really fast. They like to parallel process and multitask. 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. (2001a, p. 1)

In contrast, those not born in the digital world reveal their non-native status through a "digital immigrant accent" that manifests itself in a number of ways—printing out a digital document to edit it rather than editing it online, for example (Prensky, 2001a, p. 4).

Prensky's analogy struck a chord for me. I could easily identify with the 12-year-old boy who moves with his family to the "new world," quickly assimilates into the new culture, and learns to speak without an accent. As a 30-something, I am a bit older than the generation that Prensky describes, but like that generation, I spent my share of time on television and video games, and I have assimilated into the digital age relatively easily. Until recently, I was employed at a U.S. university where I played a dual role: Part of my job was to help faculty integrate technology into their teaching practices, and the other was to teach technology courses to candidates in the teacher preparation program. In this dual role, the cultural divide that Prensky describes was apparent.

The native/immigrant analogy can help us understand the differences between those who are comfortable with technology and those who are not; however, I disagree with many of the conclusions that Prensky draws from it. In this article, I consider the implications of Prensky's analogy and whether it provides

sufficient justification to radically change the way we view teaching and learning.

Bridging the Gap: New Technologies, New Languages

Prensky argues that the gap between digital natives and digital immigrants is the fundamental cause of the alleged "decline of education in the US," and he contends that our current educational system has not been designed to serve today's students (2001a, p. 1).

Today's students have not just changed incrementally from those of the past, nor simply changed their slang, clothes, body adornments, or styles, as has happened between generations previously. A really big discontinuity has taken place. One might even call it a singularity?Â¢â€šÃ‡Â¨â€šÃ„Ã¹an event which changes things so fundamentally that there is absolutely no going back. This so-called "singularity" is the arrival and rapid dissemination of digital technology in the last decades of the 20th century. (2001a, p. 1)

How can we bridge the cultural and linguistic divide separating today's teachers from their students? According to Prensky, digital immigrants are attempting to teach the digital natives with methods that are no longer valid; the only choice may be for educators to change the way they teach. "Unfortunately," he says, "no matter how much the Immigrants may wish it, it is highly unlikely the Digital Natives will go backwards. In the first place, it may be impossible?Â¢â€šÃ‡Â¨â€šÃ„Ã¹their brains may already be different" (2001a, p. 4).

The solution Prensky proposes is for today's teachers to learn the language of the natives, to speed up instruction, and to provide "random access" (2001a, p. 4). Prensky argues for a new way of looking at educational content as well. A category that he calls "legacy content" consists of traditional subjects such as reading, writing, and logical thinking; "future content" is "digital and technological," including such subjects as "software, hardware, robotics, nanotechnology and genomics" as well as the "ethics, politics, sociology, languages, and other things that go with them" (2001a, p. 5).

Prensky's personal approach to this issue is the use of edutainment. "My own preference for teaching Digital Native," he writes, "is to invent computer games to do the job, even for the most serious content" (2001a, p. 5). According to Prensky, virtually all content can be taught in this way. He believes that it is

. . . just dumb (and lazy) of educators?Â¢â€šÃ‡Â¨â€šÃ„Ã¹not to mention ineffective?Â¢â€šÃ‡Â¨â€šÃ„Ã¹to presume that (despite their traditions) the Digital Immigrant way is the only way to teach, and that the Digital Natives'

"language" is not as capable as their own of encompassing any and every idea. (2001a, p. 6)

A Counterargument

I find it hard to believe that neurological structures could change to such a dramatic extent from one generation to the next. Yet even if we grant that digital natives think and learn somewhat differently than older generations, we may be doing them a disservice to de-emphasize "legacy" content such as reading, writing, and logical thinking, or to say that the methodologies we have used in the past are no longer relevant. For example, as a technology instructor of pre-service teachers, I found that while most of the younger students were proficient in using the Web, they could not adequately perform advanced searches or evaluate the validity of the resources they found. Digital immigrants and natives alike are bombarded with vast volumes of information in today's electronic society, which, in my opinion, calls for an even greater emphasis on critical thinking and research skills?Â¢â€šÃ‡Â¨â€šÃ„Ã¹the very sort of "legacy" content that teachers have focused on since classical times.

The Internet, being a primary medium of this emerging culture, is certainly not something that we in education can ignore. Non-native educators will need to learn to incorporate the Internet into their teaching because, as Prensky notes, that is the first place the digital natives will go for information. But before we discard all of our digital immigrant notions of teaching and learning, and before we turn to video games and simulations as the primary modes of instruction, we should answer a number of questions.

First among these is whether all of today's students fit Prensky's definition of digital natives. Are all students, for example, exposed to information technology and video games to the same extent? What are the demographic differences?

I currently am living with my family in Hungary, raising two bicultural children. From this perspective, I take issue with a number of Prensky's assertions about immigrants and cultural assimilation. It seems to me that Prensky overemphasizes the differences between his two groups and de-emphasizes the similarities. While it appears that the digital natives, on average, grew up reading less and engaging with digital media more, this does not mean that they are illiterate or unresponsive to traditional forms of teaching and learning. Like many observers of other cultures, Prensky overgeneralizes his description of the digital native and then draws dramatic conclusions from those generalizations. He states, for example, that "Kids born into any new culture learn the new language easily, and forcefully resist using the old" (2001a, p. 4)—an assertion that, in my experience at least, is completely unfounded. My own children are

living examples of young people who have no problem functioning in two cultures: They can easily speak Hungarian or English depending on their environment, for example. Moreover, many immigrant youths who do fully assimilate into the new culture later regret the loss of connection to their parents' background (Skerry, 2000). Cultural assimilation rarely entails a wholesale abandonment of previous customs or practices; rather, it typically involves a flexible process of negotiation and adaptation, wherein certain elements of both cultures are retained in a new combination with one another.

We can learn much from looking at the digital natives and immigrants as diverging cultures, but we need not take the analogy too far. Education does need to adapt and evolve with the times, and educators need to understand the learning styles of their students, but we do not have to assume that our students are incapable of learning from or communicating with the digital immigrants even if we suspect that their thought patterns are different from our own. One of the most significant problems I see with Prensky's description of the digital native culture is the generalization that all of today's students fit the stereotype of the kid glued to the computer or the television 20 hours a day. A typical classroom is much more diverse, with students coming from a range of backgrounds. Many do not have computers at home, some have disabilities, and some are simply not interested in computer games. Can a computer game adapt its lessons to this diverse population?

These considerations raise a more fundamental question: The computer may be an effective trainer, but is it an effective teacher? Prensky presents a number of examples of computer games being used to teach students skills and knowledge. And it appears, from these examples, that tutorials modeled on video games are the answer to tomorrow's educational challenges. In "Computers as Mindtools for Schools: Engaging Critical Thinking," however, Jonassen (2000) asserts that the computer is a tool to learn "with" rather than something we learn "from." Learning, Jonassen explains, is a something that is "constructed, not transmitted."

I do not believe students learn *from* computers or teachers—which has been a traditional assumption of most schooling. Rather, students learn from thinking in meaningful ways. Thinking is engaged by activities, which can be fostered by computers or teachers. (p. 4)

When seen as a tool for helping students construct knowledge, the computer plays a different role than that proposed by Prensky, and so does the teacher. In this perspective, the teacher uses computers to create an environment where students engage in active, self-directed learning. The WebQuest model allows teachers to create a contextualized Web-based lesson for students; CoVis is a

"collaborative visualization tool" that helps students understand complex weather patterns. With these example technologies, the role of the teacher is as important as ever since it is the teacher's responsibility to structure and support the students' learning experience. The computer is a medium, whereas the learner and the teacher are the mediators.

It is odd for me to argue in opposition to someone who is a proponent of using computers in education; usually I would be in the chorus of agreement and doing my best to drown out the voices of the Luddites. It is not that I disagree with all that Prensky proposes. I do believe that students are changing, as are the times, and that these changes call for different approaches to teaching and learning. I agree that computers can play a great role in education. I do not agree, however, with the types of changes that Prensky proposes or with the idea that digital immigrants must learn to speak a new language in order to be effective teachers. I know a number of teachers today who have adopted new, engaging teaching methods that are student-centered and that promote active learning. Some of these teachers have computers in their classrooms and some do not; among those that do, some often choose not to turn on the computers because they do not fit their particular teaching styles. Such a range of teaching methods does not necessarily suggest an unwillingness to adapt to new circumstances, but rather an understanding that the incorporation of technology in the learning process is always context-specific, always determined by the particular circumstances of a given course.

A final point: Not all technology-assisted learning needs to fit the stereotype of the digital native to serve as a conduit between the natives and immigrants. Consider the many discussion forums and mailing lists that have emerged in recent years in which educators from around the world are engaged in dialogue concerning all manner of educational issues. The technologies used to support such asynchronous communication are not flashy or fast-paced, "first-person-shooter" video games, and yet they do facilitate discourse in which a considerable amount of teaching and learning occurs. Soon enough, colleagues from the digital native generation will join such communities and be able to succeed without any short videos or flashy animations. For evidence of that proposition, just search the Web for discussion groups targeted at video game players (see for example, the Quake3World Forumsor the PlanetTonyHawk Forums). You will find that members of those communities teach and learn the intricacies of their favorite video games in much the same way that we forge education and technology discussions: through discourse. The very fact that the digital natives are forming such communities shows us that their cognitive processes are much the same as our own. While it is true that they are attracted to faster, more random forms of input (as Prensky suggests), they are also "wired" to use discourse as a means of making sense of the experience. This

capability suggests that we should conceive of the cultural assimilation between digital natives and immigrants as a mutual process of adaptation rather than a one-way street.

The rapid pace of change is undeniable, and it is likely that generations growing up amidst such change will be amazingly adaptable. Thus, there is no reason to think that they cannot adapt to an immigrant's way of teaching[1] as long as it is good teaching. Good teaching engages learners' interests. Given that fact, we would be wise to heed part of Prensky's advice and do what we can to learn about digital native culture as it emerges. However, good teaching also aims to improve students' ability to engage in higher-order thinking; it recognizes the diversity of learners' abilities and needs; and it reflects an awareness of both the complexity of the learning process and the need to make adjustments in different circumstances. Human teachers do not always accomplish all of these tasks at once, or any one of them consistently. Even so, there has yet to be a computer program that can come even close to replicating what a human teacher does on a daily basis. Rather than focusing on the development of computer applications that teach, I am in favor of creating better tools for teachers, and then helping teachers become better users of the tools.

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