

Educating Digital Natives in Analog Schools



Part I: On Being a Digital Immigrant

by Dr. Richard E. Riedl

Dr. Richard Riedl is a teacher educator who enlightens classroom teachers on uses of technology. He is also responsible for many innovations in information delivery systems. But now the truth comes out, as he confesses that even he is a non-native in our digital world. His realization, of course, has implications for our use of technology in the classroom—as well as for everything else which we share with our students, in special education or otherwise.

After Mark Prensky introduced the term digital native, a very scary thought entered my mind.

I am a digital immigrant!

And as a digital immigrant I wondered if I would ever be able to truly understand how to live and work effectively in a world in which the natives know their way around the rapidly changing landscape as well as I know the way around the never-changing streets of the town I live in.

Alan Kay has a simple definition for technology. Technology is anything invented after you were born. Today's children must think we are crazy talking about all the technology in the world...to them, these are just part of their natural world to be used, explored, played with and taken for granted. Why do we make such a big deal out of these things? As an educator and an immigrant into this digital world, can I seriously think that I can be an effective educator of the natives? The world I grew up in was analog, and I still treat much of the world as if it were analog.

In fact, much of our world is still analog. The digital natives have not yet reached an age when they have direct influence on our institutions. But that is a major conundrum for our schools. They are supposed to be educating children for full membership into our society. But the society I know and that our schools prepare children for is an analog society. They don't need to be educated for an analog society.

Our schools are clearly analog. I don't care how many computers you put into them, they are still analog. The calendar we use was developed to accommodate an agrarian society, and the structure of the schools themselves, the way we organize who goes where and what is done when, are clearly products of the industrial age. Digital technologies, for the most part, are still used to accomplish things in the same way that our schools have always done them: that is, they are used as perceived enhancements to our analog way of thinking and doing. The question is whether that is the right course to take when trying to educate digital natives.

Before we can go any further, let's figure out who these digital natives are. Actually, the best way to do that might first be to figure out who of us are digital immigrants, defining digital natives as those who are not immigrants. Trust me, it's easier that way.

So let's start with a little quiz. Here are 8 questions that will help us know if we are digital immigrants or not. If you answer yes to any of these questions, you are a digital immigrant.

1. Do you remember when telephones had a dial on them (after all, we still "dial" a phone number don't we?) and were actually connected to the wall by a wire?

Something interesting to ask about today's digital world: if the original dial phones didn't have letters on them would we have text messaging today?

Dial phones were a huge breakthrough in technology. But the phone companies didn't know if a person could remember a 7 digit number so they set up "exchanges" that had names followed by a 4 digit number. The first telephone number I learned as a child was in the Delta exchange. So I dialed DE3 followed by 4 other numbers to call home (much easier than what ET had to do to call home). In today's terms I would be "dialing" 333.

2. Do you remember TV test patterns and antennas on the roof?

TV used to be exclusively an analog broadcast system. If you were lucky you got 3 or 4 stations and they weren't on all day. The TV replaced the radio as the family center and nobody could imagine paying for free TV.

Now many family members go to their own corners to watch their shows on multiple TV sets. We pay to have 24/7 access to hundreds of channels; we digitally record anything we want, to watch it when we want; and we tell the system to send us a movie when we want to watch the movie. And next year all TV broadcast will go digital, freeing up more bandwidth to use for digital technologies.

3. *Do you remember the electric typewriter?*

Interestingly, just today, someone came into my office to ask if I had any whiteout (I do—a sign of how long I've been in the same office and how rarely I clean things out, I guess).

Do you know why we use QWERTY keyboards on our computers? (Look at the upper left hand side of your computer keyboard if you don't know why it is called that.)

The early typewriters had strikers that were levered into position to strike the carbon strip and, thus, make an imprint on the paper. If you hit two keys at or close to the same time, they would get stuck where they struck the paper. Therefore, the designer of the keyboard actually had to slow the typist down by putting the most commonly struck keys far enough apart to keep that from happening. There is absolutely no physical reason to have the key arrangement the way it is on today's computers. The Apple IIc computer came with a switch on it so that you could switch to the Dvorak keyboard, on which the most commonly used letters were in the most easily reached places. Just goes to show that ideas that make sense are not guaranteed success.

By the way, going back to the telephone keypads, have you noticed how fast some people can "type" using two thumbs on those things? Which keyboarding should we be teaching in school, the QWERTY or the telephone?

4. *Do you remember carbon paper?*

Many people regularly use the cc: field when we send email. But a good number of them don't know why it is called a cc: field (or why we "dial" a phone number or "roll up" a car window) and some don't even know why it is there. Of course, a recent survey shows that many younger people think email is an old and less efficient communication system.

In today's world you don't even get a credit card receipt reproduction using carbon copy technology. It seems it's actually cheaper to print a second copy, or to ask if you want a receipt so they don't even have to print out the second copy. In today's world full of identity theft, it seems pretty dangerous to me not to collect your receipts, but that might just be me.

5. *Do you remember the Apple II? The TRS 80? The Commodore Pet? How about the IBM PC? The black and white Macintosh?*

These early computers were actually the second wave of digital technologies to become generally available to our society. Digital calculators were the first, were very expensive and actually created the first digital divide, forcing engineering professors to decide whether to allow these devices into their classes or not.

Microcomputers were a huge step from the large cabinet-sized digital computers that were developed in the 60's. We began to see the impact of having processing power on the desktop. And this first nomenclature gave us a sense of history, telling us that in size they were a significant change from previous versions (cabinet sized computers were, at the time, called minicomputers) and that their roots were solidly in those early machines that were designed to do a lot of computations very fast.

That same nomenclature should give us fair warning about what is to come in the digital age. We would be very foolish to think that the device we know as a computer today will be the same in size, capacity, and use in the future.

6. *Do you remember America Online, The Source, CompuServe or other online services? Do you remember Mosaic or Netscape?*

These were online services that pre-dated the Internet. CompuServe was the first. It began with a company that provided computing resources for businesses that couldn't afford to purchase their own computers (the cabinet sized



Zits, by Jerry Scott & Jim Borgman
San Francisco Chronicle, 4/14/07
Reprinted with permission
Zits@Zits Partnership,
King Features Syndicate

minicomputers that cost a few million dollars). It occurred to this company that their computers were sitting idle for some portion of the day. They already had phone line access to their computers, so they decided to provide access to individual subscribers in the evenings when these expensive computers were mostly sitting idle. They provided email and access to information sources such as AP and Reuters news services. The concept grew from there, eventually shifting their main business to serving individual subscribers. The Source, America Online and others followed. Each was segregated from the other. If you belonged to one service you couldn't access the resources of another, nor could you communicate with a member of the other service (this changed later when email porting was enabled).

The Internet and the protocols that are now the backbone of the Internet were in development in the 60's as the means for research agencies to share data. These technologies became available to universities around the world in the late 80's. But something happened, and the Internet got turned loose on the rest of the world, made possible by the development of HTML and the web browser in the 90's. Life hasn't been quite the same since. By the way, do you remember Mosaic and Netscape? Even if you don't remember CompuServe or the other online systems that pre-dated the Internet, you should answer yes if you remember those early web browsers.

7. Do you remember getting broadband in your home?

My first modem was 300 baud—that's 300 bits per second. Modems today run at 56 kilobits per second (56,000 bits per second or just shy of 200 times faster). Broadband (DSL or Cable) runs at a minimum of 1.5 megabits per second (1,500,000 bits per second or over 250 times faster than the modern dial-up modem, going up to 10 Mbs). Broadband opens the door to audio and video and 3D settings and things we haven't yet imagined.

Some information of note: ¹

- 47% of all adult Americans have a broadband connection at home as of early 2007, a five percentage point increase from early 2006.
- Among individuals who use the internet at home, 70% have a broadband connection, while 23% use dialup.
- Home broadband adoption in rural areas, now 31%, continues to lag high speed adoption in urban centers and suburbs.

o Internet usage in rural areas also trails the national average; 60% of rural adults use the internet from any location, compared with the national average of 71%.

- 40% of African Americans now have a broadband connection at home, a nine percentage point increase from early 2006.

o Since 2005, the percentage of African American adults with a home broadband connection has nearly tripled, from 14% in early 2005 to 40% in early 2007.

- Still wide education and income disparities

- o Less than high school – 21%
- o College grads - 70%
- o Low income – 30%
- o High income – 76%

Despite some areas in which adoption is lagging, the trend is a steady climb toward readily available broadband access and use.

8. Do you remember the Compact Disc (CD)?

Yes, they are still with us but may soon go the way of the vinyl record. The music industry hasn't quite figured it out yet but they way they do business is changing right before our eyes. MP3's, the iPod, and music download sites are in the process of changing the way we purchase and play our music.

The music industry thought it went digital when digital CD's came out. They are just learning the meaning of going digital. The question is, do schools think they are digital because they have computers, or are we just learning what it means to go digital?

Okay, so you caught me. This little quiz is fixed. Based on your answers, you are a digital immigrant too. The question is, can we, as digital immigrants, do what we need in our educational system to prepare children, digital natives, for the rapidly changing, connected world? I have some ideas that I will explore in the next issue of *The Catalyst*. (Ed. note: stay tuned!)

Dr. Richard E. (Dick) Riedl, Department of Leadership & Educational Studies, Reich College of Education, Appalachian State University, Boone, NC 28608, (704) 262-2328 riedlre@appstate.edu

¹ John Horrigan, *The Pew Internet and American Life Project*, 2007