Use Their Tools!
Speak Their Language!
If we are smart, the mobile phones and games that our students are so comfortable with will soon become their learning tools.

By Marc Prensky

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"The most important things to remember are:
multi-player, creative, collaborative, challenging, and competitive."
– a high school student

"Whenever you add an instructional designer, they suck the fun out."
– a game designer

I don't know the exact numbers, but if Scottish students are anything like the rest of the world, a great many of them are walking around with powerful computers in their hands and pockets. Yes, I'm talking about their mobile phones. And I strongly believe, if we integrate these devices deeply into our educational processes and use them creatively and wisely, these "mobile communications devices" have the power to radically change and improve the educational process.

Of course between here and there, there's a lot of thinking that needs to change, at least on the part of adults and educators. But less so for the students. Every day they find new ways to use these devices. Why not for learning?

The reason mobile phones hold such promise for education is that education is primarily about communication. Mobile phones are primarily communications devices, with calculation added in. The more expensive devices we generally call "computers" are, of course, the opposite.

Right now, mobile phones are seen primarily as a distraction from learning, as students in class use them to play games, instant message their friends, etc. But these machines are essentially radios. They can be designed to accept and respond to signals put out by a variety of devices – including a teacher-controlled classroom computer.

And check out their growing feature set: In and out voice, text, pictures, video, animation, music, the entire Internet including search, location information, scientific monitoring. This potentially enables us to use mobile phones in education for collaboration, tutoring, research, communication and debate, foreign and native languages, literature, reading, writing, journalism and photojournalism, science and scientific research, art and music appreciation, and much more. In fact, it's hard to think of anything students *couldn't* learn from their mobile phones, if we only put our minds to creating it. And we can even use the students' own voiceprints to authenticate who they are.

I recently heard a gentleman complain about the problems he had teaching "computers" to Japanese students. "They each pulled out two mobile phones and put them on the desk and proceeded to message each other, go on the Internet, play games. It was very distracting." My reaction was "You have students who each have two computers that they know how to use very well, and you are worried?" It seems silly, at a time when more and more students walk around with these devices, to use tethered computers, or even wireless laptops or tablets to do a new job in what is already an old way. It's time for a new perspective.

Of course even when teachers understand we can control what students see and do on their phones (which we can), the other big objection we often hear from them concerns screen size (being adults, they often have trouble seeing small text.) But having a small screen is hardly a problem for the 150 million kids who already use GameBoys and similar devices. And things are changing rapidly in the display area. Today's high-end phones have screens with the same resolution as PDAs. In the next few years phones will have even greater resolution, viewable via built-in magnifiers, projectable onto surfaces, and connectable to monitors. It will be a whole lot cheaper and easier for schools to maintain flat screens at every desk than to maintain computers of any sort.

Clearly, our future students need learning tools that are their own, that they can take home and use for a variety of purposes, both school-related and personal. Since a mobile phone often costs less than a fancy pair of sneakers, it can be replaced every year at student (or subsidized) expense, something impossible to do with more expensive "computers." For uses that are purely educational, connection time will almost certainly be subsidized by phone companies and/or government. Already some new phones are being sold with extra "skins," that when attached, automatically insert specialized content into the phone's memory. In the not too distant future our teachers will be passing out "algebra" or "poetry" skins (or an equivalent) to their students.

Learning Games

OK, let's suppose all our students have their own mobile phones, or, in the shorter term, computers. What will they be doing on them to learn? How will we ensure that they *are* learning, and not doing something else?

There's only one way to get students to put forth the effort needed to learn: they have to be motivated. When our students are self-motivated, for whatever reason, we don't have a problem. We need only provide them with good information – they will break down any barriers that get in the way of their learning.

But for our students who are not as motivated to learn, either because they have difficulty, or because they don't see the relevance, or for some other reason, we need to do something more. We need to provide them, as our great teachers have always done, with instruction that motivates, teaches, and is adapted to each individual.

The students who have grown up in the last 25 years have had an extraordinary, never-before-seen set of formative experiences: An average of close to 10,000 hours playing videogames, over 200,000 emails and instant messages sent and received, close to 10,000 hours of talking, playing games and using data on digital mobile phones, over 20,000 hours of watching TV (a high percentage being fast-speed MTV), almost 500,000 commercials seen – all before they finish their A-Levels. And, maybe, *at the very most*, 5,000 hours of book reading.

We know from contemporary neurobiology that experiences of this intensity *alter the brains* of those who receive them in ways that enable them to accommodate and deal with these experiences more easily. So we now have a generation of students that is better at taking in information and making decisions quickly, better at multitasking and parallel processing; a generation that thinks graphically rather than textually, assumes connectivity, and is accustomed to seeing the world through a lens of games and play. (These are just some of the most salient of many important changes.)

I call this generation the "Digital Natives," in contrast to the "Digital Immigrants" – those of us who are older, and who arrived at the digital shores later in life. This distinction is important, because those of us who were not "born into" the technology – *no matter how fluent we become with it* – are different from the Natives. We will always retain to some degree a "digital immigrant accent," which can range from printing out our e-mails to preferring to type with our fingers rather than our thumbs. And we will never understand or use the technology in precisely the same way as the Natives do.

This distinction is critical in education, because we are currently in a time where all our students are Digital Natives, yet the bulk of our educators, teachers, administrators and curriculum developers are Digital Immigrants. Although the Immigrants realize some changes are needed, they often assume that with minor tweaking, or a change in the delivery system, what worked in the past will work in the future. But this is no longer

true. Today's students are different. They are no longer the people that our teachers were trained to teach. So much of the new instruction the Digital Immigrants develop – even if it has a "computer" component to it – is often essentially old, and doesn't work for a great many of our students. As the quote at the top says, it "sucks the fun out."

So what *will* work? How can we get through to the Digital Natives in terms of both motivation and learning?

In my experience the very best way to reach, teach, and motivate today's students is through *Digital Game-Based Learning*. This means taking the principles used by video game designers to hold players' attention for long periods and combining it with the content we want students to learn. The applicable game design principles include things like quick, continuous decision making, good pacing, high complexity, clear short, medium and long-term goals, immediate feedback, and adopting on the fly to the players' performance. When asked, students tell us they want their learning, like their games, to be "multi-player, creative, collaborative, challenging, and competitive." Most of these things are not now hallmarks of good educational design. But in the future they will have to be.

Developers have now gone beyond the drill and practice of "edutainment" to real games producing real learning and understanding. We are seeing new learning games emerge, almost daily, in science, maths, history, and other areas, often created by students and teachers at top universities, such as MIT. Many of these games are specifically designed to enhance learning in classrooms. You can learn about a number of these games, including custom-designed learning games and commercial-off-the-shelf (COTS) entertainment games with curricular-related content, online at www.socialimpactgames.com. And many of these same kinds of games are now appearing for mobile phones, which is the fastest-growing segment of the game industry, and the most innovative.

How much of our current and future curriculum can we put into game-based formats for the computers and cell phones available to our students? I have no doubt the answer is "most of it." The process has already begun, and we would be remiss and unfair to our students if we didn't use a great part of the money earmarked for the "digital curriculum" to do this.

But even if we create these learning games, can we get Digital Immigrant instructors to use them in their teaching? Again, I believe the answer is yes, and the biggest part of doing so is just being clever about how we go about it, so that no one is made uncomfortable. If you teach history, for example, and your students play historical games on their own – which many of them probably do – you don't need to be able to play these games yourself, or even assign them, to have the entire class learn from them. All you need to do is have selected students come in, demonstrate the games to the class, and explain what they think they have learned from them. As the teacher, your role remains just what it has always been – to probe, to encourage discussion, to point out important meanings and connections, and so on.

A number of projects in the UK, the US, and around the world, are exploring the use of off-the-shelf and custom learning games for teaching the school curriculum. In the US the Liemandt foundation is currently sponsoring a contest for college and university students to design and build learning games for middle schoolers (ages 12-15) (see www.hiddenagenda.com). There are 20 entrant teams, competing for a $25,000 first prize. Figuring out how these games can be integrated into the curriculum is an important part of the design.

Our students have changed radically, as have their tools. Any teacher who thinks we can change them back is fighting, I think, a losing battle. In this time of great methodological and curricular flux, we educators are presented with a unique, although challenging, opportunity. We can start to teach our kids in their own language, on their own tools, combining their needs with our expertise.

If we are clever, and do this well, all will benefit.

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