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Ubiquitous Mobile Computing and EFL: Web 3.0 and language learning

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Abstract

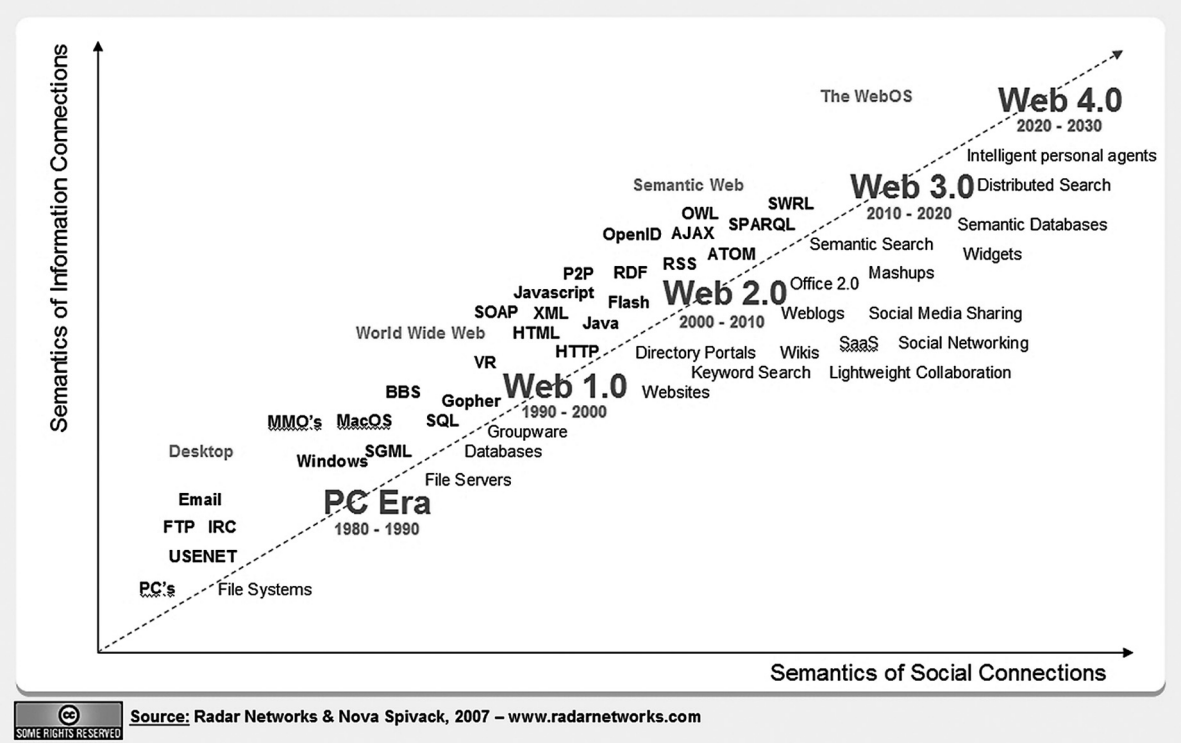
As the Internet progresses from version 1.0 through 2.0 and now onto 3.0, we are seeing ease of access steadily increase. The primary movement in the last year or so has been toward access from any place, at any time; or ubiquitous computing. To accomplish this, technology has become portable. The form factor of such portable technology, whether it be a laptop, a cell phone or something in between, such as the iPad computer from Apple, determines in many ways how it is used. This paper looks at how the form factor of portable technology affects language learning in general and EFL (English as a Foreign Language) specifically.

Using a netbook, iPod Touch, or smartphone to access the internet completely changes how we use technology and interact with information. In our steady progress from a static, slowly moving web (version 1.0) through a dynamic social web that is constantly updated by members of groups (version 2.0) through a smart, semantically aware web where technology interfaces with other technology in order to provide information to people at any time and any place (version 3.0) we are learning from our mistakes. Accessing the web from a mobile device requires the latest technology, a firm understanding of software and a concept of how to manage information on the fly. Previous articles for this publication (Ryan, 2007; 2008) have shown that in Web 1.0 and Web 2.0 the information infrastructure was insufficient. With the advent of Web 3.0, we are seeing some of those faults addressed.

What is web 3.0?

Definitions of Web 3.0 are various and fluid. In fact, the 1.0 - 2.0 - 3.0 progression is questionable (Ryan, 2007). While Web 1.0 was static and powered by HTML, Web 2.0 is dynamic, interactive and social. It is powered by Ajax, software that extends HTML to update frequently, almost in real time. A graphic representation of the different generations as shown on the next page is helpful here.

Web 3.0 is often referred to as the Semantic Web. The biggest advance is labeling content in a machine-readable form: tagging that follows XML and other conventions to allow computers to access content that has been tagged and manage it in myriad ways. When people connect in Web 2.0, computers will communicate with each other using small programs called *scripts* or *bots*, updating information for the user so that it is current and



(Spivack, 2007a)

available at all times. Tim Berners-Lee, inventor of html and Web 1.0 said, "The Semantic Web will bring structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users" (2001, p. 36). Probably the most succinct explanation of Web 3.0 is from Nova Spivack. He sums it up as,

> Web 3.0, in my opinion is best defined as the third-decade of the Web (2009–2019), during which time several key technologies will become widely used. Chief among them will be RDF and the technologies of the emerging Semantic Web. While Web 3.0 is not synonymous with the Semantic Web (there will be several other important technology shifts in that period), it will be largely characterized by semantics in general. (2007a)

Spivack goes on to develop seven different elements in Web 3.0;

> *__Ubiquitous Connectivity__, broadband adoption, mobile Internet access and mobile devices
> *__Network computing__, software-as-a-service business models, Web services interoperability, distributed computing, grid computing and cloud computing
> *__Open technologies__, Open APIs and protocols, open data formats, open-source software platforms and open data (e. g. Creative Commons, Open Data License)
> *__Open identity__, OpenID, open reputation, roaming portable identity and personal data
> *__The intelligent web__, Semantic web technologies such as RDF, OWL, SWRL, SPARQL, Semantic application platforms, and statement-based datastores
> *__Distributed databases__, the "World Wide Database" (enabled by Semantic Web technologies)
> *__Intelligent applications__, natural language processing, machine learning, machine reasoning, and autonomous agents (Spivack, 2008)

This paper will concentrate on the ideas of ubiquitous and mobile computing, and leave the machine-readable semantic encoding of the web for another article.

What is Ubiquitous and what is Mobile?

Ubiquitous is a term that comes in and out of fashion, and refers to constant connectivity from any location. As we move away from the desktop, we are using a variety of devices with Internet connectivity. The assumed goal is ubiquity. Other names for this kind of computing are pervasive computing, physical computing, haptic computing, and the Internet of Things. When this kind of computing weaves its way into the fabric of everyday life, it eventually becomes identified as invisible computing or transparent computing. The term *everyware* was coined by Adam Greenfield to define the devices (not just one, and not just computers) that we use to interface with computers.

The first word in the term Mobile Computing has a straightforward meaning, that of movement. If one is computing in different places at the office, at school or in town then the computing is said to be mobile. The computing part of the term is not as clear. The distinction between communication technologies and information technologies is becoming more and more blurred. As smart phones become more powerful, they meet the netbooks which are getting smaller, and become one kind of device. We will see more and more permutations of mobile computing as technology moves into cars, running shoes, supermarkets and other locations. Technologies such as higher speed wireless, greater distance wireless (WiMax), RFID chips for geolocation, bar-codes and scanners make this possible.

Mobile computing in Japan and abroad

Japan has been a leader in mobile computing, driven by some of the most advanced cell phones in the world and rates for wireless cell-based data that are among the cheapest in the world. The low cost of access—some plans offer free computers for signing a 2-year contract—has contributed to the popularity of netbooks.

The move, however, into smart phones, or phones that have more computing power, has faltered. Apple's iPhone has been making steady inroads on smart phone market share since its inception here in Japan. “Impress R&D, a Tokyo-based research firm, released a report this week that places the iPhone well ahead of the competition with 46 percent of the Japanese smartphone market“ (Etherington, 2009, p.1), or as was noted in the original report, “「最も利用しているスマートフォン」では，iPhone 3G が 24.6% で 1 位，2009 年 6 月に発売された iPhone 3GS が 21.5% で 2 位となりました。” (Impress, 2009, p. 1).

Personal Experience: The City in the Dell

Pursuant to the explosion of netbook computers (small, cheap, underpowered laptops that are "good enough" for network access and simple tasks like email and word processing) I decided to investigate this new phenomenon experientially. What follows is an illustration of ideas and techniques about using mobile technology in language learning and teaching, based on my personal experiences owning, using, teaching and learning with this new mobile technology.

Platform and form factor decision: The first decision was the one that would affect language teaching and learning the most; netbook or smart phone. Because of the larger screen, I chose the netbook. While smart phones could be used effectively for review and consolidation work, it would be difficult to use them to introduce new concepts or learning points (Chinnery, 2006).

Netbooks in Japan in December 2008 were rapidly becoming more affordable. Indeed, combined with a web access plan similar to a cell phone plan, the netbooks were factored into the monthly payments at about ¥2,000 a month for the minimum 24 months. I decided to separate the web access and the hardware purchase so as to be able to evaluate each on its own merits. The trade-offs involved made the new netbook revenue neutral, a requirement I arbitrarily put on the experiment. I stopped my subscription to the English language newspaper and my monthly cell phone. The plan was to use the netbook to consume news online at the breakfast table, and use Skype as a phone replacement. Thus the netbook experiment did not cost anything.

The separation of net access from the hardware had its consequences. The Dell mini ran Ubuntu Linux, my preferred operating system. EMobile, the company that leads Japan with mobile web access, requires Microsoft Windows Japanese version for operation. Installation of the software was an additional expense I had not counted on. Nonetheless, transition to Windows was simple, but it was necessary to purchase additional security software.

After researching many different mobile web access services, I found that EMoblie offered a special package and upgraded speed (from 3.2 to 7.1 mbps) at a reasonable rate (about $50 a month, compared with the $100+ in the US and similar rates in Europe). After initial installation EMobile provided excellent web access at almost any location in Japan. The only places coverage was lacking were those like a small retreat house in eastern Chiba and our Aizu facility in rural northern Japan. Speed was adequate for all but streaming video, and allowed collaboration in real time with classroom software such as Elluminate (combining text and audio chat among large groups of users).

About the same time, the department offered an iPod Touch to any interested faculty, and 3 teachers took up the offer. This would prove to be a very valuable comparative measure for convenience and usage in the effort at ubiquity. An iPod Touch functions the same as an iPhone when it is connected to the Internet through a wireless network. There were wireless networks both in the teaching environment (limited to one classroom) and at home. The home network serviced two members of the family already with laptop computers and adding an iPod Touch only took a few minutes. Because of security, school setup was considerably longer.

Daily use of the netbook started with breakfast, as a replacement for the newspaper. This turned out to be pleasant transition. The home wireless afforded speeds equal to a desktop, and instead of reading just one newspaper, I was able to assemble the best parts of 3 newspapers and read that in the same amount of time. At 1 kilo, the netbook did not add appreciable weight to my backpack for the bicycle ride to work. A snowboarding backpack afforded the best quick access to the laptop whenever I needed it due to a side-zipping pocket.

At work, the netbook provided Internet access in the classroom and at meetings without having to log into the school network. This was beneficial in many ways, especially to access materials I had created and posted at sites like Delicious and Google Docs. Access to the web during meetings provided instant access to all of my records, with outside references immediately available. Speed became very important: delays of only seconds would cause information to decrease in usefulness as the discussion moved on. In the classroom, access to the wealth of information made teaching much easier, but only when combined with software tools that made sense of the Internet, such as RSS feeds and other self-made filters, tagged items in reference sites such as Wikipedia, and a constantly updated stream of immediate answers to questions over services such as Twitter. Being able to navigate to my favorite YouTube videos and to build a set of images at Flickr allowed me to use a set of media that was compatible with a Powerpoint presentation or to simply show as a reference. Vocabulary explanations became unnecessary, as did the need for translation.

Even in discussions outside of work, the reference capabilities often changed the nature of conversation. In a discussion about acting and films, having IMDb.com open and ready allowed everyone in the conversation to improve their memory, making the discussion that much richer. Conferences were doubly interesting because one could check the references the speaker was presenting as she spoke about them. When Twitter was used as a back channel (feedback to the speaker in real time) the interactive nature of the event increased, and while this put more pressure on the speaker, it also resulted in much better presentations most of the time. Adding video from Ustream, with its comment feature meant that I could monitor

a conference presentation from the next room or across the globe and, using the comment feature, still interact with the speaker and the audience.

My computer use has gone through 5 stages. In high school I was an acolyte, presenting programs on pink paper tape to the priests controlling the mainframe. As a graduate student I began using technology on a personal level. A radical change in communication style began with home access to the Internet. This qualitatively changed when HTML was introduced and the WWW proliferated. Being connected whenever and wherever was a change equal to the other tectonic shifts in tech use. Being connected from anywhere was as important as being connected 24 hours a day. One begins to use the technology in a more transparent, invisible way. It gets woven into other activities and disappears. This is something I have advocated for the classroom; that one day, CALL (Computer Assisted Language Learning) will cease to exist. We don't have Blackboard Assisted Language Learning because they are so prevalent. But both blackboards and computers are changing, and the devices we are seeing now will lead us to connectivity that we can hardly imagine now.

Sadly, there are still barriers that must be overcome. Using the netbook as a replacement telephone was an utter failure. Even when left on, I was never aware immediately when someone called and the netbook was in the backpack. I'd get an email when I opened the cover, but not before. I'd have voice messages, but was almost never be able to get back to the person before they had gone on to another task. Start-up time, even though it was less than a minute, was too long. The keyboard was cramped and did not respond to English input very well, especially when editing on the web. I found myself using the wireless network a lot, but the EMobile access less and less. I finally decided that it was simply not worth the monthly access fees. I stopped the subscription about one month before this writing, and have suffered only a small amount of withdrawal. Normal access at home and at locations within the work environment are still covered by wireless, but I most miss access during meetings. I was so much more productive with access.

The iPod Touch has proved to be a boon, both in class and out. I keep attendance, grades, show video clips and slide shows. Upgrading to an iPhone or iPad for ubiquitous Internet access is something I am seriously considering. Visit a meeting of Tokyo 2.0, a group of web entrepreneurs, to see how tech is used for everyday access.

Recent advances

Mobile computing has lead to tremendous advances in geolocational services and software in the last year. What used to be the most fashionable site on the Internet, Facebook, has given way to Twitter, a micro-blogging site that only allows posts of up to 140 letters. It

has been wildly popular because it fits the new mobile technology that does not lend itself to long text messages. Geo-positioning in mobile devices (GPS) is bringing into existence new Twitter-like experiences. One example is a huge real-life treasure hunt game on a city-wide basis. Many pundits agree that this website, Foursquare, will take the Internet by storm in the coming year. When you arrive at a place such as a restaurant or bookstore, you note that, and the website will tell you if any friends are nearby, or other people that you don't know who have similar interests in food or books. You also get ratings of the food or service from others that have visited before. You can add to those ratings and increase your reputation and access to more information.

As tech moves into automobiles (carputing), kitchens, storerooms, and the office, it is having an effect on every industry and every action that we perform. Tech in cars, for example, allows you to call up, with a voice, directions to your destination, your favorite album, or even your friend through the telephone. Its also been discovered that mobile computing can be good for your heart (Tenner, 2010, p. 1) because it decreases time spent stationary, staring at a monitor.

By far the most popular and advanced technology is created by Apple (no longer Apple Computer). The iPhone, the iPod Touch and now the iPad have revolutionized mobile access. Like its predecessor the iPod, the actual hardware is only one part of the change. The other important component is the ability the software gives you to organize your music, your videos, and any other information you collect. This software allows you to connect to an organized, protected area of information that can be purchased or downloaded for free, then made portable. Where the iPod requires a computer for its Internet interface, the iPhone can access this area directly through the phone system, and therein lies its strength. iPhone was born without any supporting applications. Now there are thousands of media clips and applications to manage all manner of tasks. The iPhone was originally seen as a way to leverage the phone into a data world. The data have taken over, with only about 20% of the phones being used for "phone" calls, or what is now termed "voice communication."

Applications in Education

Mobile learning has developed along with the technology. Probably the most influential commentator on these developments is Mark Prensky (2005) who described applications according to how they functioned on mobile devices such as cell phones. Voice-only applications were the simplest; for example the phone calls to ALC to get English lessons. SMS, or short text messages allowed for feedback and collection of data such as answers from students in a timely manner, and this eventually developed into a rudimentary quiz-making facility. Graphic displays allow for simple representations and some text. Novels are written in Japan for cell phones, but novels written in text (SMS or Twitter) messages have

not been attempted yet. Middleware (a simple authoring software) for creating manga-based instructional materials is available for iPhones and other mobile devices. Internet browsers allow for access to the entire web, but are still frustrating because of their limited size. Adding cameras to mobile devices allows for sharing of visual cues, and even for short videos, which can enhance communication tremendously. Multiplayer search games using GPS systems built into phones are now morphing into augmented reality, where GPS and cameras allow a user to point at a building or some other place, and cataloged information about that building or place automatically appears, in real time. Harvard has teamed up with Foursquare (see above) to play a campus-wide game to orient students, and help visitors explore the grounds. (Van Grove, 2010, p. 1) Nowhere has mobile technology made more inroads than in distance learning, where virtual classroom business has been conducted for years online (Ryan, 2008). It is a simple and convenient move for students used to studying online to move to a more mobile platform.

Application to Language Learning

Even in the year 2000 there were attempts to create from CALL (Computer Assisted Language Learning) a new branch focused on mobile learning (MALL) or EMobile (Thornton & Houser, 2002). Since then sites for language learning have proliferated and become easier to access from mobile devices, or have been built using XML, Ajax, Java, and others so as to conform to the limits of the mobile technology. As Google ramps up their translation software to include machine translation and group coordinated translation, mixed groups from different nationalities will be able to collaborate without having a common language. This will change the focus of the needs of the language learner, so that an ability to negotiate ideas, to clarify concepts will increase while the necessity for direct translation, especially on a word or sentence level, will disappear (or rather, is disappearing now).

Role of the Instructor

Mobile learning will cause a redefinition of the role of Instructors, especially at higher levels of education. David Graddol (2006), in his freely available book English Next, explains how monolingual native English speaking youth face a bleak future compared to polylingual youth from other nations. Technology is playing a part in this. English used to be the predominant language of the Internet, but is no longer, moving from a 51% share in 2000 to 32% in 2005 (Graddol, p. 44). Mandarin and Spanish are becoming increasingly important both demographically and as a proportion of information on the Internet.

But of primary importance is the globalization of the university. With students becoming increasingly mobile, and univeristy lectures (indeed, all course content) coming online more and more transnational education is developing. Foreign campuses, joint ventures, and

exchange programs are all supported by advanced communication technology. Linguistic input is available anywhere, any time. This means that the role of the native speaker as a simple source of input (the meat-based tape-recorder) is coming to an end, because highly crafted, developed input is being created around the world at places like the Open University in the UK, and similar programs at MIT, Harvard and others. People have more choices about what they will watch and listen to; they will choose the best.

Technological and other shifts will change the role of native-speaking EFL teachers (Ryan, 2005). As English becomes increasingly a language spoken among non-native speakers, a native speaking model becomes less necessary. Native speakers will need to present content and work with advanced, higher-level communication and thinking skills instead of simple language production. The classroom may continue to be a key context, but is no longer enough. Students will want to take advantage of their mobile technology in more appropriate environments, more consistently.

The EFL classroom at university is probably the worst language learning environment on earth (Ryan, 2004). Putting 30 learners into a sterile environment with little or no input except one expert for 90 minutes a week, and then take a 10-week break after 15 weeks is a recipe for failure. Economic and social factors have supported this status quo for decades. Mobile technology will move the locus of learning outside the classroom, and change the role of the instructor to one of a facilitator and guide, giving support and creating a rich learning environment, using all the tools available. Fortunately for us all, mobile technology will allow learners to study and learn outside of class. A rich mobile learning environment will include challenges and activities that are authentic and mimic or simulate real-world problem solving to prepare them for an international lifestyle and productive work in the global marketplace by developing thinking skills and concepts in more than one language.

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Van Grove, J. 2010. Harvard teams up with Foursquare for collegiate check-ins.

Colophon: Document written on Google Docs using an Apple iMac running OS X. Netbook used was a Dell Inspiron Mini 1210 running Ubuntu Linux initially, later Windows XP Japanese. Web access obtained through EMobile for about ￥5,000 a month, with a stiff penalty at the end of ￥16,000 for not finishing the 2-year contract. For research both Zotero and Evernote were used to collect and organize information from the web, along with ongoing tagging at Twitter and Delicious, and constant referral to tags from various blogs on my Google RSS reader.

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