Where's the Beef: Finding Literacy in Computer Literacy
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Introduction

In Alberta, we liked that Wendy's ad from the mid 80's where a crusty old lady slammed her hand down on the counters of neighboring restaurants demanding an answer to the probing question, "Where's the Beef?" Who delivers the goods, she wanted to know. Where can a person actually get the full meal deal, and not some cheesy imitation.

Well maybe that's not a bad way of thinking about what many teachers call "computer literacy". Where's the Beef in all the money and effort schools are directing to technology? Are we paying attention to the right things? Are we doing the best we can to create students who are truly, richly literate in a knowledge age?

Let's Start By Taking a Quiz

Do you

- Print out your email

- Phone someone to see if they got the email you just sent

- Write out a draft longhand before changing over to your word processor

- Print out a document to edit it (rather than just editing on the screen)

- Call people over to your desk to see an interesting web site (rather than just sending them the URL)

- Read the manual

- Still look up numbers in a phone book

For every "yes", you give yourself away as what Marc Prensky (2001a, 2001b, 2003) calls "a digital immigrant": someone like me, born into a world "without computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age." Like me, you may be fascinated by this world, venture into it, even adopt many of its technologies, yourself.

But, says Prensky, this is not our home and native land. It's one you and I have traveled to, and like all immigrants, we carry both thick and subtle traces of our pre-digital accents. That is, we don't think and talk like Digital Natives. Sometimes we get a good chuckle at our own expense, as some of us did with the quiz, but as Prensky points out, it is really no laughing matter for educators, because as Digital Immigrant teachers, we are struggling to teach a population that speaks an entirely new language. Here's how Prensky (2001a) puts it:

> Digital Natives are used to receiving information really fast. They like to parallel process and multi-task. 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. (Does any of this sound familiar?)

But Digital Immigrants typically have very little appreciation for these new skills that the Natives have acquired and perfected through years of interaction and practice. These skills are almost totally foreign to the Immigrants, who themselves learned – and so choose to teach – slowly, step-by-step, one thing at a time, individually, and above all, seriously. "My students just don't _____ like they used to," Digital Immigrant educators grouse. I can't get them to ____ or to ____. They have no appreciation for _____ or _____ . (Fill in the blanks, there are a wide variety of choices).

As teachers, we know that many young people spend a lot of time online, yet we have very little understanding of what kinds of literacy skills they actually use. Often, we suspect that they may be going to intellectual hell in a hand basket. Even more importantly, however, we do not really understand what kinds of skills they **need** to develop in order to learn effectively in digital environments. And we certainly don't understand what we need to know in order to teach them.

As I start talking about those issues, I want to say two things about what this presentation will **not** be about. First, I don't think that the new literacies will make conventional print literacy obsolete. Books are not going to disappear. Students who cannot read words on a page will not magically be able to read them on a screen. Conventional skills of decoding, interpretation and composition will continue to be important.

Second, I won't talk about the new tools and applications you could learn in order to bring technology into your classroom. Here, too, there are lots of people with interesting and important things to say about what we commonly call "computer literacy", and while the acquisition of skills is part of the whole picture, that is not the focus of today's talk.

What I **will** do is flesh out a few ideas I think educators—that is, us digital immigrants—should start paying attention to.

Technology and Literacy

According to Andrea di Sessa (2000), all literacies, including conventional text-based ones, have 3 fundamental pillars: the material, the cognitive and the social. Understanding these pillars will take us some way in opening up questions about more educative uses of technology than the ones we so often see in schools today. In the same way that putting a piano in a classroom doesn't make for a good music program, just putting computers in schools doesn't mean that kids and teachers will use them in powerful new ways. Here's how Veenema and Gardner (nd) put it:

> *Technology does not necessarily improve education. Take a simple innovation*
> *like the pencil: One can use it to write a superlative essay, to drum away the time,*
> *or to poke out someone's eye.*

In order to ensure that we are not just drumming away the time online and on keyboards (or worse yet, poking out someone's virtual eyes), let's look a bit closer at those three pillars.

1. The material pillar: signs, symbols, depictions or representations.

"…We can install some aspects of our thinking in stable, reproducible, manipulable, and transportably physical form. These forms become in a very real sense part of our thinking, remembering and communicating" (di Sessa, 2000, p. 6). Written language is the current prototype of literacy. At the moment, studies of literacy focus on written text, and students' abilities to think in important ways with the material tools of letters, words, sentences, paragraphs and chapters. Conventionally, being literate means being able and eager to read and to write a wide range of written materials.

Here is the current question we should now be posing: what is the material basis of *digital* literacy? That is, what is different about the basic literacies in a digital age?   The rest of this talk will involve an exploration of this central question.

2. **The cognitive pillar: how we think**

We know that "new computer literacies will build on and extend humans' impressive spatial and dynamic interactive capabilities far more than conventional literacy does" (di Sessa, 2000, p. 8). Written language plays only a limited role in the development of *spatial intelligence*. We know that the structure of websites requires precisely this intelligence for students to compose **and** to consume with discrimination. The increasing interactivity of the web also calls strongly on what Gardner calls *interpersonal intelligence*. Think of the ease with which young people now use chat rooms and interactive games in their free time. Imagine the educational power of being able to talk

to experts in real time, to ask people and cameras to direct their attention to something you specially want to look at from a different angle. This example (http://www.galileo.org/secondary/macbeth/macbeth.html) of a high school English project in which professional actors in Toronto worked with students in Calgary shows you something of the educational power of videoconferencing.

The power of asynchronous environments such as email and discussion forums enhances both shared and personal reflection (Herod, 2003). This is key element of *intrapersonal intelligence*. In these forums, people can take time to compose their thoughts…literally and figuratively. This is quite different from the fast pace of a chat environment. There is a running record of everyone's contributions, and others can pick up ideas, questions, comments that they want to expand or challenge or reformulate. These kinds of environments challenge the assumption that a good classroom is a quiet classroom where everyone is doing their own work all by themselves. That is, reading is no longer something we do alone. Increasingly, we now read with others, and educators need to understand that better. Young people are discovering the pleasures of reading and viewing together in fan fiction sites. If you want to see how young people increase their collective enjoyment of Harry Potter, spend some time exploring this site (http://www.harrypotterfanfiction.com). If you want to see how adults are in on the act, too, to the fan fiction site for *Six Feet Under,* a quirky television series on HBO. (http://www.fanfiction.net/list.php?categoryid=1378)

3. The social pillar: knowledge building

For most of us, learning is the mysterious process that lives in our heads. In a digital age, we begin to take seriously what Scardamalia and Bereiter call knowledge building: "the creation or modification of public knowledge—knowledge that lives 'in the world' and is available to be worked on and used by other people" (Scardamalia & Bereiter, in press). In a knowledge-building space, all ideas are regarded as constantly improvable through others' ability to pose theories, build on contributions, ask questions, posit different theories, offer evidence from contrary perspectives, challenge interpretations. In order to learn to their full potential, individuals must develop and contribute ideas that are both shared and extended by others. (http://www.knowledgeforum.com)

So there are a few initial characteristics of digital literacy: it's spatial, it's interactive, and it permits shared reflection and knowledge building. Here's another one. These technologies will be like any of the other intellectual accomplishments of our society. There will be "a gradual, cumulative development that involves many people" (di Sessa, 2000, p. 19). The word "gradual" might surprise you in terms of technology. We are used to thinking that things change at the speed of light in a digital world. But remember, computers have been in schools for more than twenty years. Educators persist in thinking of them as new, but an entire generation of teachers has actually had access to them already. Sometimes I think that is the good news: we are just talking about how to understand what has been under our noses for a long time. We can do this. On bad days, I grind my teeth and wonder why the Athabasca Glacier seems to be moving faster than schools' understanding of what truly is new about technology. After all, twenty years *is* almost a whole generation of teachers. What's our problem?

On those bad days, I remind myself that the impact of new technologies such as books, radio and television took time, too. It was only as people learned what these technologies for good for, and how they were both similar to and different from the ones that preceded them that their use became widespread and more fully understood. It took 150 years for people to figure out that books made more sense when they were organized into chapters, when pages were numbered and easily readable fonts were developed. When automobiles were first designed and built, there were serious debates about where to place the buggy whips on the chassis. That's how ingrained the conventional notion of horse-drawn transportation was. "Get a horse," critics would sneer when a car got stuck in the mud.

 "I can do it better with a book and a pen," many of today's reluctant teachers claim. While enthusiasts would tell us that we are in the most advanced, techie whizzie world possible as they click and snap through applications that leave the uninitiated confused and breathless, I offer this caution about the current state of affairs, education-wise: our profession and our policy-makers are currently in the horseless carriage (http://galileo.org/LTL/horseless.html) state of thinking about digital literacy.

Schools remain tied strongly to industrial age assumptions about the individual as the primary site of learning, and we are either asking the wrong questions about computer literacy (ie how do we make students more fluent with applications? How can we lock students out of all the places on our network that might cause a security problem?) or we

have difficulty seeing the really important differences in composing and reading digital text.

Where do we see strong ties to the dominant understanding of text-based literacy in new environments? We see them in teachers' interest in creating courses to be delivered on line, in electronic versions of worksheets (http://ip.research.sc.edu/catalog/00289.htm), in "Go on the internet and find five interesting facts about Australia." And we see them in digital repositories of textbooks. The Web attracts our attention as a fundamentally new environment, but we must understand that it is still in its infancy. It's naïve to think that the mere presence of more computers will transform learning all by themselves. Educators are going to have to make the effort to understand what technology can, and cannot, do.   But I am certain that you have also encountered colleagues who believe that they can close the classroom door, pull the covers over their head, and wait for the fad to pass, the way they waited out the promise that television would transform the classroom. This resistance is downright dangerous.

In any transformation, "a community decides a material intelligence is powerful and valuable enough that it is worth the considerable effort of teaching it to all newcomers (di Sessa, 2000, p.19). This is where we are from a literacy policy perspective. Do we think that learning in new ways with digital technologies is worth the effort to actually change how we work with children and youth in our schools?

Consider that for almost the first third of the 20th century universities such as Oxford and Cambridge did not offer degrees in English literature. It was simply understood that reading novels was something that any educated gentleman did in his leisure time. It took a while for educators to decide to teach literature, to introduce film and media and popular culture studies into schools and universities. Each time, these literacies were dismissed as entertainment not worthy of the serious attention of educators.

New media environments such as games, simulations, and innovative uses of online spaces currently fall into this category. They are literacies education does not yet understand well, and their power is either dismissed or harnessed to conventional ways of doing things. Horseless carriage thinking. Visit the Moonlit Road (http://www.themoonlitroad.com) site to see far more intriguing online environments

So what? A cognitive view of material intelligence

Every new literacy changes the way we think about the world. The alphabet did this to oral cultures. Cheap books did it after Gutenberg. New literacies have the power to "rearrange the entire intellectual terrain. New principles become fundamental and old ones become obvious. Entirely new terrain becomes accessible, and some old terrain becomes boring (19).

So what is being rearranged in the intellectual terrain? Here (http://galileo.org/LTL/literacies.html) are a few ideas:

1. While words remain important, new *ways* with words are needed to hold readers' attention. Hypertext, graphics and sound have created story structures that are fundamentally 3 dimensional. Links between sections on a page are not linear. Graphics do more than simply embellish the meaning of written text, and sound becomes a potential aspect of meaning. The reader's ability to move through a site in many ways is a crucial fact of navigation that requires design skills that are simply not needed in conventional text. Meaning is created in ways that differ significantly from the left to right, top to bottom structure of conventional text. All of a sudden, the old organizers of "beginning, middle and end" simply are not enough to understand how to compose and read online. Visit some of these sites and have a look around. (http://galileo.org/schools/millarville/archaeology/index.html) and (http://www.poemsthatgo.com/gallery/winter2004/YHCHI/index.htm)

2. "When radio started, people first read newspapers on the air and that didn't work, and radio developed its own writing style. We read radio writing on TV, and TV eventually developed its own storytelling technique. Right now on the Web we're mainly using old storytelling techniques, instead of developing new ones" (Harper cited in Teoh Kheng Ya & Al-Hawamdeh). This is one of the symptoms of the Web's infancy. At the moment, readers have some ability to navigate, to choose where they will surf and how long they will stay in any one part of a site. That is, they can currently interact with content predetermined by others.

New media practitioners are leading the way in creating radically different digital

environments that go far beyond this. They are showing us how the "push" of

information structured in newspapers, books, television reports and film can be

replaced by interactants' ability to "pull" what they want, when they want it, how

they want it. One of the safe bets about the future of technology is that online spaces

will become increasingly personalized for each user. And they will be personalized

through the way a user interacts with information. That's a radically different

concept than customizing content by offering a menu of choices, which is the current

state of affairs. And that state of affairs is different enough from conventional

literacy spaces to beg us to pay attention.

Immersive technologies show promise in placing control in the hands of viewers who

can put themselves in alternative parts of an event, request others to supply added

information, or re-create real world events to surround "the viewer with a visual,

aural, and even tactile experience" (Al-hawamdeh). What will the fully literate

person do in environments like this?

(http://beehive.temporalimage.com/archive/34arc.html) It's a great question.

3. Time emerges as a new feature of literacy. Even in the rush to get books about

current events such as the American invasion of Iraq to press, there is a lapse of

months between writing and publication. When people want to know about late-

breaking events, they turn to online sources (http://www.theglobeandmail.com) for

up-go-the-minute, constantly changing sites. Note the date line for online stories:

accurate to the tenth of a second! And they don't just want to know what the

journalists or book authors have to say. They want to hear from people on the

ground, too. This push for timeliness and multiple perspectives puts enormous strain

on our conventional structures for assessing the accuracy and credibility of

information. At the moment, teachers tend to see these issues as problematic

limitations of web based information sources. "There's so much trash on the web,"

they complain, "and students just grab the first sites that come up."

What we need to understand better is that assessing the trustworthiness of sites is, in

fact, part of the material structure of literacy in a knowledge era. In the past, we

hoped we could trust journalists to check their sources carefully, for example. In the

urgency to get things on line fast, this has to happen in a different way. Readers need

to ask questions like these: how many points of view do you need to collect so you

can assess the accuracy of a story you find online? How do you know whether the

organizations which sponsor sites are credible and trustworthy? How do sites provide

for corrections and updates that draw attention to changing information and

understandings as stories unfold? Is the first site that comes up on a search engine

simply the one that is the closest match to your query? How can you tell if other

factors are at play? These are important literacy skills and dispositions in a digital

age. (http://www.media-awareness.ca) and (http://www.webcredible.co.uk)

Even more intriguingly, old notions of objectivity are giving way. Sites such as

Adbusters, (http://adbusters.org) which has been around for a while, are explicit about

their perspectives. In the old days, we would have called them biased. Now they are part of an important new phenomenon called culture jamming: taking dominant perspectives and critiquing them through lampoon. Remember how *This Hour Has Twenty Two Minutes* put an instant end to the Reform Party commitment to referendums? They did it by setting up a website that let Canadians vote about whether Stockwell Day should change his first name to Doris. It turned a major policy platform of the Reform Party against itself, made it look ridiculous—and made it disappear. That's culture jamming, and that's literacy.

And a whole new phenomenon called weblogs (blogs for short) sees increasing numbers of young people creating not just an audience for their ideas, but a public for social action. (http://www.adbusters.org/metas/corpo/canwestwatch) and (http://www.voteoutanders.com)

The increasingly mobile, connected world in which young people live permits the instantaneous transfer of voice, text and images anywhere, any time. Schools do not yet understand the literacies required in this milieu, and because we do not know what to attend to, we are not yet helping students how to interpret, create and critique environments in which they are currently only avid consumers. It is hard enough for many teachers to wrap their minds around what they might do on bi-weekly field trips to the computer lab. Think how challenging it is to get beyond our current images of computers as little televisions and typewriters, tethered to the wall by blue cable. People are now wearing computers.   We can activate computers by voice, have them

on our belts and in the palms of our hands, even wired into our bodies. Our phones become portals to everything, instantly. And we need to get a much better handle on what we should be doing with these fluid, flexible machines.

4. Contrary to current emphasis on teaching students how to master and use computer applications, new media practitioners tell us this: tools do not matter, because tools change fast. What **matters** is mastery of the medium. In particular, we need to master new ways of storytelling and communicating information. The literacy challenge of the digital age is to turn information into knowledge that people will pay attention to. The challenge is to master new ways of storytelling and communication that let people interact with information and with one another.

This mastery is an essential component of the exploration of simulations and role playing. As Shirley Turkel (1996) suggests, "we need to understand that the computer is a simulation machine, the new stage for playing out our fantasies, both emotional and intellectual…From this point of view, what children need to know is how to play on this new stage, how to sort out the complex relationship between the simulated and the 'real,' between representations of the world and the world itself…"

As children learn to design, build and critique simulations and games, they can be taught to understand and to challenge any model's built-in assumptions rather than just clicking through, edutainment-wise. This is a fundamental new literacy that is

seldom, if ever, developed in schools, even though children spend hundreds of hours in gaming and simulation environments outside school.

5. The concept of intellectual property and digital objects that can be accessed, but not modified in online environments, is changing. Sometimes called the "remix culture", (http://ethnomus.ucr.edu/remix_culture/remix_culture.htm) to site people who compose and interact in web based environments expect to be able to modify and rearrange digitized video and sound clips, "hyperlinking the multimedia enhancements into a compendium of stories in different formats"(Teoh Kheng Yau. & Al-Hawamdeh, 2003). Repurposing, recycling, reusing existing content blurs distinctions among media. Printed words, sounds, pictures, graphs, numbers, movement all become essential elements of literacy. And it seems almost unnatural not to sample and adapt the world around us. (http://galileo.org/LTL/index2.html)

   In our current, content-push environment, school assignments are so predictable that livings can be made selling papers on line to lazy or desperate students. In a remix culture, digital objects are meant to be changed, rearranged, rethought, juxtaposed, discussed and shaped…not just consumed. Currently, teachers' are concerned about the ease with which students can plagiarize by copying and pasting canned essays from the web. Instead of trying to outfox this cheating, we need to be giving entirely different kinds of assignments…ones that absolutely demand that students design and create far more complex and intriguing performances of their understanding. Further, I think that the Web environment has something of the character of a potlatch, where

people give away their best ideas. Rules that mimic text-based notions of intellectual property remind me of the missionary's sense of outrage at a gift economy they simply did not understand.

6. Digital literacies demand the ability to tightly integrate sound, words, numbers, images, shapes and colors into new communication units. The new science of information mapping treats chunks of text as the essential unit of meaning, rather than individual words or sentences. The conventional "chunks" of text-based meaning are phonemes, syllables, words and sentences. Increasingly, the artful use of briefs and captions become significant in attracting and directing attention. We also see that composing in a digital environment means giving up the idea that you direct attention from left to right, top to bottom of a page, from paragraph to paragraph and from start to finish. Where and how readers start reading a website, where and how they navigate it, how long they stay somewhere and when (if ever) they return to you: these kinds of issues (http://galileo.org/LTL/literacies2.html) are really important in thinking about what reading and writing are like in a digital age.

7. Finally, the ancient arts of storytelling are enjoying a surprising revival in our high-tech world. Today, we expect that if we have any kind of question, we can google it and get an answer—fast. But clearly, turning information into knowledge through the creation of unexpected insights is the storyteller's art. And if we sometimes feel stuffed with information and starved of meaning, then perhaps understanding that narrative is a fundamental cognitive structure will direct our attention differently. We

need to know a lot more about how to teach students to create and communicate the story in **anything** they seek to understand. Play with this simulation (http://www.msnbc.com/modules/airport_security/screener) to get a sense of how simulations and storylines are powerful literacy environments.

Conclusion

For the past hour we've followed some threads that might address old Clara's question, "Where's the Beef?" in computer literacy. It is a huge question. And as di Sessa suggests (2000, 22), "we simply cannot afford to limit our explorations of possible future literacies to extrapolations of what we think we understand about literacy now". We've been doing that for far too long.

We need to ask better questions—not just ones that technology enthusiasts can answer. We need to engage deeper exploration of our pedagogical landscapes. And we need to acknowledge that these questions are matters of policy vision and political will. Do we actually *want* to explore enriched educational possibilities through digital literacies? Here's three provocative challenges from di Sessa:

1. "Textual literacy draws on certain human competencies and not others. For example, the immense competence of humans in dealing with both dynamic and spatial configurations is barely engaged by conventional literacies. We can do better electronically." (di Sessa, 2000, 27). The issue now is: do we actually want to?

2. "We can wait for things to happen by accident, or with due respect for what we do not know, we can move deliberately in the direction of the best we can imagine" (di Sessa, 2000, 27). What would that be—the best we can imagine? Do you think education is doing that for kids right now?

3. "Cultural and technical history are powerful currents…Blindly following current directions means a delay, possibly a long one. " (di Sessa, 2000, 28). So—if we resist, drag our heels, take another 20 years to understand the world of digital literacy, what is the price we are willing to pay?

What is the price *you* are willing to pay?

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