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## **An Annotated Glossary for Dealing with the Digital Migration**

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*Important cautionary note: this is a work document. I expect it to evolve in the next months. I'd be most happy to receive comments and criticisms, but at this time I cannot engage in a discussion about the key principles and theses of the document, I mainly look for comments to improve it.*

*The document can be reused freely under the following Creative Commons License:*  *Some of what follows expands the theses I defend in a book Against Digital Colonialism (French and Italian versions, 2013.)*

The intended readership of this documents are parents, teachers, policy makers. Many of us are confronted on a daily basis with issues arising from a society that goes more and more digital. The digital migration is full of promises, but not all of them are necessarily going to be fulfilled, and in some cases new, hard problems are created. This means that we have to use (a version of) the precautionary principle in dealing with each single case of migration, i.e. not only reject the migration if it is proven detrimental, but also reject it unless there are proofs that it is beneficial. When discussing the migration on a case-by-case basis, we should be aware of buzzwords, rhetoric and insufficient and biased data, that introduce noise in the discussion, or cunningly tweak it. In what follows I propose some conceptual clarifications of some of the notions used in the debate about the digital migration. In some cases, I offer what seems to me a more accurate wording: just using more appropriate descriptions and phrases may help us see things in a clearer light, and this in turn may assist decision-making. The arrow '→' means that a certain concept to the left of the arrow should be replaced by another, to the right of the arrow.

### **Digitizing x → digitizing a representation of x**

You can digitize (and have migrate to the digital sphere) a *representation* of food or of a shelter against the snow. *Not* food itself, or the shelter.

Representations are the obvious candidate for digitization: we digitize the contents of books, pictures, recordings. Wherever information is processed, it can be processed in a digital format, and be mediated by an electronic device. Some activities are however bound to stay non digital. In some cases you have to move and process molecules and atoms, not just electrons.

### **Digitizing x → digitally assisting x**

I cannot digitize my stretching exercises, I have to *do* them, if I want to improve. But I can digitally assist them. I can use the Wii for exercising. But it is just a digital assistant, it does not provide a digitization of an activity.

A lot of guru rhetoric flows from ignoring these two basic distinctions. (Not to mention advertisement: “A device for everything in your life”, Microsoft 2013 ad campaign. Everything, nothing less.)

### **Multitasking → Task Switching**

The brain does a lot of *unconscious* multitasking (you could not read this, keep your upright position, and chew a gum at the same time); this notion is trivial and harmless. But the brain is not good at all at conscious multitasking, which is what is expected from children and adults who deal with the devices. You cannot at the same time fill in your tax revenue form, grade a student's assignment, and learn a poem by heart. What you can do, is *switching* from one task to the other, at the pace you like. The problem is, switching has *costs*. At the end of the day those costs add up, and task switchers are less productive than serial taskers.

Add to this that you cannot train yourself to better, more effective task switching, by just exercising it: contrary to any expectation, heavy task switchers are less effective than average task switchers in precisely in multitasking.

Ophir E, Nass C, Wagner AD. Cognitive control in media multitaskers. *Proc Natl Acad Sci U S A*. 2009 Sep 15;106(37):15583-7. doi: 10.1073/pnas.0903620106. Epub 2009 Aug 24.

### **Memory as mechanical information storage and retrieval → Human biological (messy) memory**

Computer memories use precise addresses, and thus never fail, in principle. Our biological memory works on a 'shouting' principle. When you search for your car keys, all mental representations of places in your apartment respond. Most (e.g. the representation of the wood-stove or of the TV set) whisper feebly, some (the key holder) shout out loud, because there is where you put them most of the time. In a shouting contest, the key holder wins, and this prevents you from remembering that you last left your keys on the TV set. Digital devices are good as an aid to an imperfect memory. But they do not help much if you need to memorize something. The best way to memorize something is to work on its mental representation so as reinforce it in a way that will make it shout out when needed: read it out loud (auditory supplement), copy it by hand (motor supplement), create a rhyme (phonetic supplement), draw a scheme or an image (visual supplement), make a summary and talk about it (conceptual supplement), and do some of this many times over! There are no shortcuts, unfortunately.

Marcus, G. *Kluge*.  
Kandel, E., *In search of memory*.

### **Digital natives → Digital subjects**

“Native” suggests the acquisition of competences in the way in which native speakers acquire their first language. Children born after 1990 (or any other significant date) would have been so deeply exposed to the new technologies that their minds would have changed and become empowered by them, like those of native speakers.

*There is no evidence of any such anthropological mutation.* Actually, given the extreme user-friendliness of all the devices nowadays circulating, everyone today is conversant enough with the new technologies (“digital grandparents” are on the rise). The notion of 'digital native' is a narration, not a hard psychological fact. Use “digital subjects” instead, to talk of people who have been exposed to digital devices for most of their life. It is more neutral, it does not suggest a new (inexistent) form of intelligence or cognitive ability.

Note that digital exposure does not automatically translate into digital competence.

Prensky, M., *Digital Natives, Digital Immigrants*. R. Schulmeister: *Gibt es eine «Net Generation»? Erweiterte Version 3*, Hamburg, 12/2009, [http://www.zhw.uni-hamburg.de/uploads/schulmeister\\_net-generation\\_v3.pdf](http://www.zhw.uni-hamburg.de/uploads/schulmeister_net-generation_v3.pdf). L. Cantoni e S. Tardini, *Generation Y, Digital Learners, and other Dangerous Things*, Qwerty, vol. 5, n. 2, Progedit, Bari 2010, pp. 15-25.

### **Today's children are wonderfully skilled at using complex technology → today's technology is so well designed that even a baby can use it**

This by itself should dispose of the notion of 'digital natives'. Given the extreme user-friendliness of post 2012 technology, grandparents – a wonderful control group – are as good as using tablets as are their grandchildren.

### **Generation, Y, Generation net, etc. → Generation Documentation**

If you do not buy the idea of a digital intelligence (you should not), you may still be interested in the the distinguishing feature of digital behavior of recent years. Is it the necessity to connect, to *share*? Elisa Ly, a NYU student, suggests an interesting descriptive category. Users seem to have a compulsive need to *document* what they are doing, what they think, what they plan to do, where they are located. This need is projected onto others, and results in at times nagging request of documentation addressed to others. If there was an empirical confirmation of this descriptive category, one could intervene more effectively on the distortions that are before the eyes of all, given that the collective abandonment of private life makes us all too easy prey of commercial and political interests, and because technology makes it automatic, and therefore no longer controlled on a case-by-case basis, collection of data.

### **Digital Conspiracy (an activity) → Digital Colonialism (an ideology)**

Even defenders of Conspiracy Theories are surprised by the impressive progresses of agencies such as NSA. But we should not limit ourselves to denouncing illegal, Government originated eavesdropping, because these *intentional* measures finalized to social control are not the whole story. Digital Colonialism is in a different ballpark. Digital Colonialism is an *ideology*, i.e. a set of *ideas*. The main thesis of Digital Colonialism is that

**whatever can go digital, must go digital.** The point of framing it as an ideology is that as such, it is *something you can subscribe to*, or that *you can reject*. It's up to you.

### **Apocalypse, Evangelism → Negotiation**

There is no particular need to reject all things digital, nor to accept them all. Negotiating their introduction and development is the healthiest attitude.

### **Digital Divide → Digital Divides (*in the plural*)**

Ten years back, there were concerns that a part of the population had no or insufficient access to the net. That was the original sense of 'Digital Divide'.

The divide would keep apart in the first place those who have access to technologies, in particular to the network, and those who are left out. This original meaning is easy to apply and has the advantage of providing an immediate and objective measure, useful to policy makers who can boost an increase in the number of connected schools and homes, say.

However, there are now other possibilities available:

-A provocative use made by Digital Colonialists of the notion of Digital Divide cuts in half households and classroom: on the one side parents and teachers, digitally behind, and on the other children and pupils, perfectly at ease, or so it would seem, with electronic gadgets (see *Digital Natives*).



-Another related idea is that the Digital Divide would separate skills within a population of pervasive users of new technologies. On the one hand there is someone who knows how to bend them to his or her own ends and uses them to run systematic searches and structured operations, on the other hand those who stop at the surface and accept the first result of a search engine. It will not surprise to find that wealth and a good (non-digital) education help getting lubricated in the first class.

-This outlines an ambitious frontier for the application of the concept. I happened to take a chairlift in Switzerland. On the protection bar an ad showed an image that could be that of my own feet dangling in the air; it depicted a hand holding a smartphone, which displayed an app for tracking currency trends. The message was somewhat predictable: thanks to our app you'll always be in touch with your business, even when you're on vacation:

in fact, for digital slaves *even holiday is work*. Another advertising welcomed me at the downhill the station. Here an elderly and certainly wealthy gentleman had a good leisure time, on teak terrace in front of eternal snows. Entirely different message; “Relax – while your assets are in good hands”, i.e., leave behind all the concerns, we will work on your money for you. The new digital divide is thus between those for which being connected is a necessity, to undergo even during the ascent on a chairlift, and those for whom, thanks to their wealth, can stay disconnected and enjoy their time.

-The final new meaning of Digital Divide is the *enforced* divide.

Governments create division when there were none. Many governments *require* to fill out forms online, replacing the possibility of more direct interaction with their personnel, or the exchange of pre-electronic documents; and they thus force people to connect, who did not want to.

### **Anthropological mutation, addiction → Cheesecake model**

If there are no Digital Natives (see *Digital Natives*) in the strong sense of the term, if there is no anthropological mutation on its way, what are the options? A popular model suggests that interaction with the screen creates a form of addiction. The plastic nature of the brain makes it possible to continuously reinforce certain decisional loops that keep us in front of screens for more time than it is reasonable. A weaker model has it that the new devices are so designed as to entice our inclination for images in motion, transients, music, light and colors. This inclination has strong evolutionary bases. As an analogy, we have a strong evolutionary basis for striving for fats and sugars. As a by-product, we fall for the cheesecake, and we neglect fruits and salads, *when given the option*. Anthropological mutations and addiction are hard to fight. But If the cheesecake model is correct, it is easy to design situations that nudge healthy physical and educational habits. Just do not display the cheesecake next to the salad, if you think that the salad is good for your health. Do not surround the book with videos, if you want the book to be read.

Carr, *The Shallows*. Spitzer, *Digitale Demenz*. Pasquinelli, *Irresistibili schermi*. Thaler and Sunstein, *Nudge*.

### **Making us stupid → Preventing us from becoming intelligent**

Learning is a matter of modifying your brain, in some cases permanently and massively. You learn to read (in the weak sense of being able to read out, of deciphering alphabetic symbols) by revolutionizing the brain architecture, making the shape recognition dedicated module team with the phonetic module, who have nothing to do with each other. It takes about 2000 hours of intensive training. A lot of what you learn involves storing in your memory information or procedures (see *Memory*) in a time-consuming, strenuous process. In the process, you become more intelligent. Internet may not really make you stupid or addicted, but it may prevent you from becoming intelligent – by reducing your emotional life, depriving you of sleep, reducing your ability to focus, and eating up too much of your time. Becoming intelligent is possible, but it requires some work.

Dweck, C., *Mindset*. Spitzer, *Digitale Demenz*. Wolf, Proust and the squid. Dehaene, *Reading in the Brain*.

## **Reading → What reading?**

“People read (and write) a lot with the new devices; they actually write and read more than they ever did!” Yeah, but people mostly text, i.e., write and read very short, often stereotyped messages. More in general, there is no single kind of reading. Basic reading is the ability to associate shapes and sounds. Here book reading appears to be correlated with greater lexical strength. In-depth reading is extracting complex meaning and elaborating it as you read. Deep reading a book requires a lot of sustained attention and concentration. (See *Memory*) It may require re-reading, taking notes, making summaries. If you do not just want your children to learn to read, but want them to learn to read in depth, make it clear, and request adequate instruments and policies. (see *Book*) Lean-Back Reading used to be the exclusive domain of reading on paper. It has been colonized by more attractive devices and activities. Reading has thus become Interstitial Reading – that is at odds with In Depth Reading. Make sure what kind of reading you have in mind when deciding about the support.

Wolf, M., *Proust and the squid*. Roncaglia, *La quarta rivoluzione*.

## **Strong readers use digital devices, hence digital devices are not hostile to strong reading → Mind selection bias! Strong readers are not representative of the problems of teaching to read in depth**

From the fact that many strong readers migrate effortlessly to digital devices, it does not follow that one can become a strong reader by using digital devices. Strong readers – typically educated in the paper ecology – tend to be strong readers no matter what. They can read on buses and in ballrooms, and of course we do not take their performance as an indication that buses and ballrooms are to be used for promoting reading.

## **Books as information storage technology → Books as re-exam technology**

You are told that “Books are an old technology for storing information”. Indeed they are this *too*. But if you consent to this definition, you are immediately invited to consider that digital books store more information in a searchable way, hence are better information storages than paper books. The reductive view of books as information-storage devices makes the digital transition almost irresistible (e-books are “augmented”: searchable, cut-and-pasteable, hyperlinkable). Now the definition is limited, as books are not only that, they are not only «memories». On top of being an information storing technology, they are a *technology for the careful inspection and re-examination of complex content*. They are such a technology because they stipulate a tacit Contract on the Readers' Attention: “As long as you'll stay with me, I will not distract you” (see *Multitasking*, i.e. *Task switching*.)

This in turn influences content production. The author is aware of the Contract when she writes her book. She presupposes a reader that fully uses his attention and memory for a long time span, and she writes accordingly. As an author, I'd write differently if I thought that my text is supposed to compete with the last fun video of a cat flushing a toilet. Today publishing houses require shorter and shorter, vivid “content pills”, chunkable content, from their writers, that are supposed to compete with many distractions in e-readers and tablets (devices that do not want and cannot stipulate a Contract

on Attention – by design). The superiority of the paper book is simply unbeatable when it comes to attention, and defending paper books in schools means, as a by-product, defending the existence of engaging, responsible writers. One of the great achievements of print is the emergence and dissemination of sustained argumentation – precisely because of the possibility of merciless re-exam. Depriving books of attention protection will inevitably drive content production back to « oral » forms of rhetorics.

Casati, R. Contre le colonialisme numérique.

### **Book → Books (in the plural)**

The paper book gives us the illusion that a book is everything that fits between two covers. But there are many different *types* of book. Consider a continuum: encyclopedia, cookbook, textbook, collection of articles, short stories, novel, essay. Some types of book are arguably better off in the digital sphere. (You do not want to print out the whole of Wikipedia's millions of entries.) Some live a double life. Some may be much better off in the paper dimension. Essays are powerful because the paper book protects the reader's attention (see previous entry.)

Consider an analogy with sailing. Most sailboats are gone, sailing is nowadays mostly a sport or a leisure activity. But the principles of sailing make it obvious that as long as there will be wind and the sea, there will be sailboats, in particular ten thousand years from now, when all internal combustion engines will be a faint memory. Actually, the evolution of sailboats has been spectacular in the last fifty years. Some books will go, but others will stay, because the principles of in depth reading and of human memory and attention are what they are. Author, if you want to be read attentively (not just bought or shared), make sure the paper book is an option for your publisher..

### **«Reading» a book → you mean, *searching* a book?**

Some would conceive the access to books as being just a search of their content. Of course this is something we sometimes do with books – looking for a certain passage, for instance, and it definitely is something computers are very good at. (With limitations, as every author knows who has created an index of her own work.) Books are simply not built using the idea of a one-to-one correspondence between concepts and words.

Aiden, E., Michel, J.-B., Uncharted.

### **Access to knowledge → Access to information**

“Access to knowledge” is a much used phrase that does not make sense. You can access on Wikipedia the formulation of Pythagoras' Theorem. But you do not thereby have a *knowledge* of it. You have to be able to read the formulation (understand mathematical symbols), to relate it to a geometric or algebraic interpretation, maybe to prove it yourself. You have to be able to apply it to various cases, including limit cases (those in which, say, the hypotenuse=0). What you can access is *information*. You'll find in Wikipedia the information that such and such is the formulation of Pythagoras' theorem; not the knowledge.

Some people trade on an ambiguity here. They would say that Pythagoras' Theorem is *knowledge* in the sense that it is *established*, or *proven*. It is a *piece of knowledge*. What they mean is that it is a *truth*. But truth is not

knowledge. And in that case, what you access on Wikipedia is the information that the theorem is a piece of knowledge, or a truth. You do not get any knowledge thereby.

### **Digital schools → Dual Schools (AKA: Replacement Logic → Accompaniment Logic)**

If you are not against the use of digital interfaces in school, you can insist to give to Caesar what is Caesar's. If in depth reading is favored by paper books, paper books should be used, not tablets. Of course, you can use tablets for *other* activities. (See “Swiss Knife Logic”.)

### **Swiss knife logic → Tailor-suit tools**

If you are to choose between a \$ 500 tablet, and a \$ 300 dedicated e-reader, why not go for the tablet, that does most if not all the e-reader does, and so many more things? Tablets are the Swiss knives of the digital era. Zillions of apps allow their users to read, watch video, play games, simulations, make calculations and connect to the web to do even more activity and access universal information. The logic is hard to resist, but here as in many other cases, less can be more.

Think of this simple analogy: No chef would get rid of the vast inventory of knives in his kitchen, and ask to buy instead a few or even a single Swiss knife. Any of the old fashioned knives is well fit for a specific purpose (splitting parmesan, finely slicing lamb, opening oysters, slicing bread, chopping bones), and it does what it does at its best because it does not do anything else. Paper books (see *Books*), paper exercise books, pens, chalk, have each their own feeling and provide different performances, create complex microcosms of sensorimotor exploration, and, as we said protect attention.

Consider using [Wenger's Giant Swiss Knife](#), it is very complete indeed, but it weights about 1 kg.

### **Multimedia → formatted multimedia (AKA saving support diversity, or bibliodiversity)**

Traditional books come in a bewildering variety of formats and supports, allowing for a number of different interactions (paper, cardboard, fabric, plastic, metal, stone, wood; black and white, color; silkscreen print, offset,...; pop-up books that unfold in 3d and contain physical paper mechanisms; cutout books that you are allowed to tear apart; text-only books and figure-only books. There is a huge biodiversity here that is worth preserving. Tablets trumpet multimedia capabilities, but they funnel information through screens and loudspeakers. Using one type of tablet means using one screen format and one type of loudspeaker bandwidth. Call this 'formatted' or standardized multimedia. Oppose bibliodiversity to it.

Stefano Delle Monache, Davide Rocchesso, Jie Qi, Leah Buechley, Amalia De Götzen, and Dario Cestaro. 2012. Paper mechanisms for sonic interaction. In *Proceedings of the Sixth International Conference on Tangible, Embedded and Embodied Interaction* (TEI '12), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 61-68. DOI=10.1145/2148131.2148146 <http://doi.acm.org/10.1145/2148131.2148146>

**The e-book should replace the paper book → the ebook should do things that the paper book cannot do**

Screens allow for moving images; loudspeakers allow for sound reproduction; internet connectivity allows for external links. Ebooks designers may want to work at something new that takes advantage of these capabilities of the tablet instead of insisting on a migration, or on an « augmentation » of the paper book, which actually impoverishes books.

**The 21<sup>st</sup> Century children should “learn to learn” → Children should learn *something* first**

Policy makers are scared or thrilled at the idea that most of the jobs of the future have not been invented yet. Their recommendation is to get rid of traditional “core” or “subject matter” learning, and move to a more flexible “learning to learn” attitude. But there is no such thing as “learning to learn”. In the digital environment, there is no such thing as developing a generic competence for obtaining good quality information on the web. Proponents of massive digitalization think that it would at least foster the development of a "digital competence". But this is a mirage. Generic competences can be acquired, but they are acquired through the development of specific competences first. The difference between me and an untrained high school student is that I can run a useful search of information on the web because I already know a lot of things in general, and I am highly specialized in my field. This means that I can resort to several heuristics to figure out if what I find is rubbish or gold. If I have to learn about subjects I do not know, an hour of serious work on a search engine leads me from a Wikipedia article to secondary sources and from both to primary sources. When I get to the primary sources, I can help myself to a long familiarity with other primary sources - I read each year hundreds of reports and academic articles, I know the difference between a study and controlled research, I know how to measure the significance of data, or how a valid argument is made. But there is no “all purpose” competence for using the net as an information mine, and even less a “magic” competence that would arise from the simple fact of having in your hands a tablet with access to the network. Indeed, we are clearly at the point where the use of digital devices takes our children away from the possibility of creating that very solid foundations that will enable them to understand how to separate the wheat from the chaff.

**There's a lot you can do with the new devices → there's a lot that you can do without them !**

See previous entry!

**Computers mainly for intellectual production → computers mainly for intellectual consumption (AKA the 2013 personal computer is no longer the 1995 personal computer)**

Your office computer is a vestige of what personal computers used to be, instruments mainly of intellectual production. After the iPad, computers are mainly instruments of intellectual consumption. Their design has radically changed, in order to favor consumption over production (see Windows8 and

the obliteration of the «start» icon.) This has consequences for how you can use your computer.

### **Stay connected (to a screen) → stay connected to the real world**

Lorenzoni, F. Letter to the ministry of primary education, Nov 2012.

### **Seeking innovation → seeking progress**

Once upon a time we used the notion of progress, that included a value dimension; technological change was supposed to be evaluated in terms of the improvement it delivered. We replaced it with the value-insensitive notion of innovation, and this in turn suggests that innovation be a value in itself. It is not («eat with your feet» - clearly an innovation, and not a progress.)

### **Paper only/Digital only books → Dual paper books are possible**



Not that paper books cannot be redesigned. Gino Roncaglia suggested inserting QR codes in paper books. They would point to web-based contents, that may usefully supplement the book, at the same time keeping it as a one-content-at-a-time, attention protecting devices.