



## THE NEW GUTENBERG REVOLUTION:

Radical New Learning, Thinking, Teaching, and Training with Technology... Bringing the Future Near

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### WHAT DOES IT MEAN TO BE “POST-GUTENBERGIAN”? AND WHY DOESN'T WIKIPEDIA QUALIFY?

In this issue I will be talking about Wikipedia. A great story. A great example of a Web 2.0 phenomenon, as thousands of people voluntarily assemble, edit, and maintain the greatest encyclopedia initiative in history. Definitely part of a social revolution that's occurring online.

But not a part of the New Gutenberg Revolution. At least not as I am characterizing it here. In fact, it is in many ways *antagonistic* to, not supportive of, the Post-Gutenberg Mind.

In what follows I will use Wikipedia as a case in point to clarify what the New Gutenberg Revolution and Post-Gutenberg Mind are, and what they are not. By examination of key criteria of the Post-Gutenbergian, I will argue that Wikipedia not only falls short, but that it throws up *barriers* to the movement toward Post-Gutenbergian ways of thinking.

In all of this, my goal is not to derogate Wikipedia. It is a spectacular accomplishment and of enormous value. It is one of the best examples yet of the populist revolution in the nature of media participation that the world is witnessing. But *that* revolution is not the New Gutenberg Revolution I speak of here. In some ways, the latter is a narrower phenomenon than Web 2.0 developments like Wikipedia. However, I claim that it has epochal implications

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for the evolution of our species. For it betokens a wholly new way of *thinking* shaped by media and fortuitously aimed at a great societal need (see earlier columns for explication of these points). Wikipedia is a new way that people are working together to build knowledge — but the knowledge they are building has an old-fashioned shape that promotes old-fashioned ways of thinking. As we'll see, just being online and having links is not enough to promote a Post-Gutenbergian mindset.

It is easy to confuse one revolution for another. So I will use the example of Wikipedia to sharpen our focus on exactly what we mean by this fundamental change in the workings of thought that is also in process, very much under the radar when compared to developments like Wikipedia, and that we call the Post-Gutenberg Mind.

### AWE and WOW

In past installments of this column I have pointed toward a new way of learning and thinking that is both needed (for a variety of reasons I've discussed) and supported by the Web. Unfortunately, not all random access media foster what I have called “random access learning and instruction.”

We all know that too much Web use doesn't go beyond looking for facts and finding ‘the answer.’ Yet, there are alternative ways around the Web, and many of us have delighted in finding them. In the last column, I described a process of iterative searching that deepens knowledge, builds curiosity for new subjects, and, when done right, allows the Web to teach you what you're looking for — rather than setting out to learn something and the Web providing it, whatever the “it” is. Through a dynamic collaboration with the Web, what it is you are trying to learn evolves and starts to take multiple shapes (all useful for different occasions beyond the present one, thus facilitating future *transfer* of knowledge). The Web teaches you, in part, by reformulating what you want to know. And this happens far faster and with much greater refinement and intricacy than more glacial and gross reformulations of knowledge and purpose in traditional learning. I refer to this as Advanced Web Exploration (AWE).

Yes, this is not the way most people search now. But better ways of searching the Web can be learned and taught. And when people have the ability and motivation to engage AWE, the Web soon opens wide to their exploration. The same Web that can be highly *closed* to unfolding and evolving searches (and I argue Wikipedia does produce such closing), shutting down as soon as some minimal criteria for task completion are reached, becomes endlessly open. I call this psychological stance the Wide-Open Web (WOW).

### Criteria for Post-Gutenberg Media and Mind, and How Wikipedia Goes Astray

So how does Wikipedia fit with all this? This is an important question because not only is Wikipedia getting a

ton of attention in the news media, but increasingly often the first thing that comes up in Google searches is a Wikipedia entry. And for many people, searches are being skipped altogether as Wikipedia becomes the first stop of choice for *any* inquiry they make.

So, does Wikipedia and the way it is used meet Post-Gutenbergian criteria? First let's recapitulate what some of those criteria are:

**Nonlinearity.** You have to take the Web out for a spin, not always knowing where you're heading, often going around corners — and that's a good thing because that's what the world of knowledge is like. Knowledge that has to be applied in the messy real world very often does not go in a line, is not divided into neat sections. But Wikipedia is.

**Luck.** Once you allow yourself out for a nonlinear spin around the Web, you open the door to serendipitously stumbling on what you didn't know you were looking for. (Though as we'll see in future columns, this is far from just plain chance.) To the extent you rely on a Wikipedia entry and a few out-and-back connections, you're cutting down the chances of luck working for you. As a result you will make fewer connections that might pay off in supporting transfer down the road, and you will have fewer moments of creative insight. In a world of complexity and change, everyday creativity has moved from luxury to necessity.

**Radical interconnectedness and decentralization.** The goal is to build knowledge that can be traversed in many ways. Wikipedia promotes more centralized representations that will work for some uses of knowledge and be not at all suited for others. Centralized and sectioned ("chapterized") representations — like those promoted by Wikipedia — are helpful when new uses of knowledge are like those old ones, and quite unhelpful when the new situations are ill-matched to the old representations.

**Multiple conceptual representations and virtual simultaneity.** Because of (1) the speed of connections on the Web, and (2) the psychological process of *spreading activation*, the Web, when used in AWE/WOW mode and with a Post-Gutenbergian slant of mind, begins to approximate a condition of *virtual simultaneity* (not literally simultaneous, in a temporal sense, but effectively simultaneous with a functioning cognitive space) in which many things are being considered in the context of each other and in which *conceptual wholes greater than the sum of the parts* can form. Thus *heterogeneous* sources become *loosely* connected (and thus flexibly rearrangeable — see the writings of David Weinberger, as well as the basic tenets of Cognitive Flexibility Theory) and a basis for forming complex understandings and for deriving new insights. (We will be returning in a future column to a detailed treatment of the importance of this virtual simultaneity of interconnected multiple conceptual representations as a basis for mastering necessary complexity and preparing for wide-ranging transfer. We'll also provide

some concrete examples which will be helpful in showing more specifically how it works.)

It is important to note that the multiplicitous virtual simultaneity of which we speak is a *conceptual* simultaneity. It is not *multitasking* (except in the sense that you are keeping several intellectual perspectives in the cognitive "air" at the same time). In fact, the cognitive demands of virtual simultaneity require more rather than less focus on a single intellectual task! Speed and spreading activation in the context of highly focused attention are crucial. Multitasking interferes with the Post-Gutenberg Mind.

**Active construction of knowledge and "authorship" of understanding.** We'll return to this point below. For now, suffice it to say I believe that Wikipedia promotes processing that is too receptive, too passive.

**Tractable complexity.** With Wikipedia you get the tractability without the complexity necessary for transfer and productive knowledge application. There are ways to get both needed complexity and cognitive manageability. In the New Gutenberg Revolution, complexity is balanced by cognitive manageability (a topic addressed in more detail in a future column, and something that is at the center of all learning environments based on Cognitive Flexibility Theory).

### Wikipedia as "Trojan Horse"

Wikipedia is essentially a populist *encyclopedia* with more links. It is *not* especially Post-Gutenbergian. In fact, Wikipedia is *opposed* to Post-Gutenberg principles. It is really no more than another *central repository* of authoritative knowledge. (That people will treat it as authoritative is now insured by the article in *Nature* that showed comparable accuracy on scientific topics with the *Encyclopaedia Britannica*.) Sure there are links, but the links aren't enough, for they tend to mainly take people out-and-back, from and back to the main source they are dealing with. Wikipedia is a very small step forward in the New Gutenberg Revolution, and it has *negative effects* that more than mitigate the positive ones: it reinforces the old worldview of "find the source and the answer is there."

And because Wikipedia is *so good*, and *so easy*, its character as a step back from the Post-Gutenberg Mind is reinforced. Its very power and "first authoritative stop" status diverts people away from the crucial digital/nonlinear/random-access affordances of the Web so necessary for the urgently needed habits of mind of complexity, change, and flexibly adaptive thought. It's seductively reductive in the same way a good prototype example or traditional encyclopedia entry is — the answer seems to be all there, so no need to explore further (when the real learning "gold" is to be found in just those further explorations). So in that sense it is especially harmful — it's an Old Gutenberg 'trojan horse' snuck into the bastions of the New Gutenberg Revolution. Switching metaphors,

Wikipedia is Old Gutenberg in a New Gutenberg disguise.

Another key difference between Wikipedia-type thinking and the Post-Gutenberg Mind is the element of *learner-as-author*. With Wikipedia the learner is receiving the knowledge in one place instead of assembling the knowledge, for the learner's evolving purposes, out of Web *fragments*. But possibly as important as this loss of active learner engagement is another kind of loss. The act of searching and search-refinement in AWE mode creates contours in the acquired knowledge that become *part* of the knowledge representations. The complex search process itself leaves behind its imprint on the represented knowledge structures! This is a step beyond "learner as author" — it's not just an active process, but the act of carrying out the complex search process is leaving complex content-structuring traces behind. This permits much greater subtlety in the knowledge representations (and they can stick, because they come from the learner rather than being imposed from outside and have a unified history that produces internal coherence) than the old way of thinking, knowledge structures assimilated from external *objects* (which I am arguing is the learning mode characteristic of Wikipedia).

Could Wikipedia be used in a better way? Sure. A learner could follow out different connections to other Wikipedia entries and then from each of those branch out further, eventually even dropping out of the Wikipedia world to more wide-ranging Web searches spurred by the encounter with Wikipedia. But I don't think that's likely to happen. There's too much working against it. There is a topic you are trying to understand, and you can read the entry, possibly going to some linked sites, and then coming back to "master" that page. This mode of thought and operation is just too easy. If you give most people something easy that will allow them to get by, they're not going to want to work harder than they need to. They'll always prefer to have their knowledge handed to them rather than having to search it out and build it themselves. The problem with Wikipedia is that *it's too good at what it does!*

But won't AWE and WOW lead to getting lost in hyperspace? Actually, it might appear you are getting lost in hyperspace, but that has now become part of the point. You want to 'lose' your original purpose and discover new ones as the fragments lead you in new directions and combine in new ways as the topic you are studying is altered by the reality of a complex knowledge space that is out there and that the Web increasingly enfolds. (In Cognitive Flexibility Theory we call this mode of nonlinear learning "criss-crossing landscapes of actualities," after a use of that metaphor by Wittgenstein.) And don't forget that processes of spreading activation are helping to hold the connections together in your mind while the best of the conceptual relationships are being cognitively consolidated and stabilized. By not letting you lose yourself very easily in a web of new connections, Wikipedia provides an illusory solidity that acts as an anchor when what is really

needed is lightness and coursing flight.

Wikipedia is a great social story of the new Web and the radical new mode of jointly constructing knowledge sources and programs. But for all of its sterling positives, it also has one big negative: it's going to make it harder, not easier to move to the Post-Gutenberg Mind.

### Some Thoughts in Wrapping Up the First Year and Pointing Toward the Next

This issue brings to a close the first year of this column. In coming installments, the themes developed in the present one will be expanded, and some concrete examples will be developed.

Also, we will shift gears somewhat and provide some illustrations of controlled hypermedia learning environments based on *Cognitive Flexibility Theory* that are Post-Gutenbergian through and through. (You'll be able to go online to play with these systems.) I'll argue that these systems, besides being self-contained learning environments in their own right, can act both as *bridges* between current uses of the Web and those that I advocate here, and guides to envisioning how meta-data structures can be overlaid on the Web to make the complexity of Post-Gutenberg learning activity more cognitively manageable.

Another thing that will make its first appearance is a focus on *training*. Those of you who are in the training business will have already recognized that the Post-Gutenberg Mind is just what the corporate and military worlds have wanted for some time now, but have been frustrated in attaining. As organizations have become more horizontal, the need for new workers who can deal with important complexities, who can think for themselves, adapt to changing circumstance, work on different teams, and be ready for learning that never stops, is being felt with increasing urgency.

Unfortunately, the Web won't work for many or even most of the needs of corporate and military training. But the Post-Gutenbergian way of thinking found in Cognitive Flexibility Theory can be used (in fact, it already has been, as we'll see in issues ahead) to build training systems that can function on the Web for distance training or as augmentations of in-person training regimens, as well as being ongoing complements to real-world experience.

Finally, as we move into the second year, the column may not appear as regularly as it did the first year (it was in all but one issue). Time is sometimes too short. And, regrettably, the press of time will prevent me from undertaking the major, new-form blogging exercise I had anticipated. However, I do want to encourage those of you who have been writing to me to keep the notes coming; and those who haven't yet written, this is a great time to start. Send your questions, corrections, points of discussion, and so on to [rspi@msu.edu](mailto:rspi@msu.edu). Eventually we'll start to move this exchange to the Web, hopefully in a form like I originally envisioned.