

Monograph “The Impact of Social Networks on Teaching and Learning”

ARTICLE

Network Promises and Their Implications

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Abstract

The new learning environment characterized by P2P networking allows for new forms of learning and new ways of knowledge production. One must be careful, however, not to confuse the more mature concepts of fluid and relative knowledge, which learners gradually develop through dialog and exchange, with some kind of epistemological revolution mandated by the new networked environment itself.

Interactive networks have been represented as somewhat “ideal” environments where nodes are equally dispersed and connected in an environment devoid of the constraints of space or time. While it is certainly true that P2P interactivity offers immense new possibilities for learners, we must strive to understand the dialectical nature of the new environment. What appears to be an ideally democratic social space can in fact be subjected to hidden power distribution and arcane control.

Learner control is one important dimension of networked communications, with implications reaching all the way to questioning the nature of learning and knowing. While network enthusiasts are prone to proclaim the new age of the “creative commons”, some very real steps are being taken

to upset this trend, and we should caution that copyright issues are far from being resolved in this environment.

Keywords

critical network theory, self-directed learning, learner control, creative commons, copyleft

Las promesas de la red y sus implicaciones

Resumen

El nuevo entorno de aprendizaje definido por las redes P2P facilita nuevas formas de aprendizaje y nuevos sistemas de producción de conocimiento. Sin embargo, se ha de procurar no confundir los conceptos más evolucionados de conocimiento relativo y conocimiento fluido, que los estudiantes adquieren gradualmente a través del diálogo y el intercambio, con la revolución epistemológica que exige el nuevo entorno de red.

Las redes interactivas se han representado como entornos hasta cierto punto «ideales» en los que los nodos están a la vez dispersos y conectados a un entorno carente de limitaciones espaciales o temporales. Si bien es cierto que la interactividad P2P ofrece inmensas posibilidades a los estudiantes, debemos procurar entender la naturaleza dialéctica del nuevo entorno. Lo que parece un espacio social idealmente democrático, en realidad, puede estar sometido a un reparto de poderes oculto y a un sistema encubierto de control.

El control del estudiante es una de las dimensiones más importantes de las comunicaciones en red, con implicaciones que llevan a poner en tela de juicio el aprendizaje y el conocimiento. Aunque los partidarios de la red se sientan inclinados a proclamar el nacimiento de la era de los «creative commons», se están tomando medidas muy efectivas para dar al traste con este movimiento, y, por otro lado, es preciso advertir que los problemas de copyright están lejos de resolverse en este entorno.

Palabras clave

teoría crítica de la red, aprendizaje autodirigido, control del estudiante, creative commons, copyleft

A Learning Paradigm

With the advent of interactive Web media, for the first time we are understanding the act of learning as a response to changes in the learning environment, rather than as an adaptation to a predetermined learning system. The traditional means of knowledge production – top-down, one-to-many publication – required in the past that the producer, disseminator or publisher of knowledge, distribute and organize information in a way that is intelligible to the learner, in a more-or-less agreed-upon format, as a response to the expectations of teachers in academic institutions or, more largely, of the managers of learning systems. With the emergence of the interconnected P2P network however, we are discovering that knowledge can be produced, searched, organized and shared in an infinite number of configurations, without necessarily resorting to instructors or external learning management systems. Knowledge is available to all, directly.

Nature of Knowledge

This interesting ecological shift brings with it a series of equally interesting questions, the first being “what kind of knowledge” (Siemens, 2008; Downes, 2006; Mejias, 2007). In Web 2.0 environments, people are confronted with an evolving epistemology where the learner is expected to define not only the process of learning, but also the meaning and value of knowledge itself. Many-to-many communication and zero-cost publishing have created a world where fluid knowledge is collectively built and deconstructed on a daily basis. It is no longer sufficient to “know” something (or learn something); one must keep track of ideas in constant motion, and ideally participate in their generation in order to fully grasp the evolution of their bases.

For some theorists, this means that the more familiar “expert, clearly defined and well-organized knowledge” is giving way, under the push of networked sharing, to ideas that are much less established and are “in continual flux” (Siemens, 2008, p. 5). The new-found ability of learners to aggregate information from any point on an almost infinite network, and to contribute to shaping its contents, requires that learners undergo an epistemic shift from a belief in static knowledge to a belief in fluid knowledge. This is a very interesting point, often made by network theorists and observers.

There is some confusion in this however. The nature of knowledge has not changed with the advent of information networks. What we are witnessing is that the value of uncertainty and fluidity is being discovered by many people simultaneously, as a consequence of their ability to network easily and quickly. Scientists have argued since the Enlightenment that knowledge will always remain an approximation of the unknowable because of the limited capacity of the human mind to apprehend the empirical, and that this approximation can be perfected through dialogic experience much better than by solitary speculation (such as that advocated by Aristotle). In other words, the nature of fluid knowledge constructed by a network of people is not a new development in the history of knowledge. Indeed, knowledge that theoretically cannot either be disproven by others, or proven to be imperfect or faulty, cannot be called knowledge at all, but rather something closer to dogma or

faith. Karl Popper expressed this idea with his famous epistemological axiom that “all knowledge is falsifiable”.

So, we are left with the emerging popularity of Web 2.0 learners’ participation in the creation of collective understanding, and with their attributing to that understanding a value that they had been unaware of until now. This is not an entirely new development. Neo-positivist and post-positivist doctrines such as phenomenology, naturalism and post-structuralism have introduced us to “post-scientism”, a paradigm that breaks away from the laws of the “universal” rationality created by Descartes, Auguste Comte, Kant and Pascal. Habermas proposed that human knowledge could be understood as being “instrumental” (e.g. useful science), “communicative” (based on shared understanding) or “emancipatory” (promoting social justice). One central part of Habermas’ view of knowledge is that science cannot distinguish between the knower and the known. Social explanation in particular “eludes the apparatus of general theories” and is destined to be challenged and collectively reconstructed by people. As we can see, the so-called “new” epistemological questions raised by the existence of Web 2.0 as a learning environment are not exclusive to it, and neither are they anything new.

What has changed however, is the probability that learners on the Web will be confronted with the fact that there are more ways than one of seeing things, and that people sometimes change their views when they come into contact with people who differ in their interpretations. This is not a new definition of knowledge; it is a new awareness of the knower about the variable and at times difficult definitions of knowledge. We could cautiously say that the most important development enabled by Web 2.0 is that it promotes growth in the epistemic beliefs of people. The real discovery here is not that knowledge is flexible and fluid, but that this important realization is facilitated by P2P interactivity among its users.

There have been many attempts to define and describe the stages that learners encounter along their journey towards epistemic maturity (Perry, 1970; Kohlberg, 1984; Baxter-Magolda, 1992). Perry (1984) for example distinguishes between dualism, multiplicity, relativism and commitment as the observable stages on a scale of “intellectual development”. Those who argue that the interactive Web produces a new kind of knowledge are simply observing that Web 2.0 interaction socializes people into attaining Perry’s third stage, “relativism”. What we are talking about here is the normal capacity of humans to develop in many dimensions of their lives, including the psychodynamic, physical, moral and epistemological.

In the end, it could very well be that today’s network enthusiasts are discovering for themselves the intricacies of dialectic knowledge, and are projecting that finding on others as a consequence of the “natural” properties of networks. As learning theorists are well aware, attributing one phenomenon to an unrelated cause is the root of superstitious belief, which is the opposite of rational discourse.

Nature of Networks

The second question that comes to mind when considering the fluid nature of communication made possible by Web 2.0 technologies concerns the nature of the network and the types of interactions

that it enables. At first glance, peer-to-peer interaction offers the possibility for any “node” on the network to link up with any number of other nodes in two-way direct interaction, tagged-object or weblog types of exchanges. This has considerable consequences for traditional mass media, as they incur the real threat of oblivion through instant obsolescence (Shirky, 2008). It also implies that a new kind of equality in communication is emerging, in what has been called network ecology: “an environment that fosters and supports communities and networks” (Goodfellow & Lea, 2008, p. 9). In this ideal learning space, where “the social subject becomes a decentralized node, unbound by location or physical space” (Mejias, 2009a, p. 21), learners are free to search among quasi-infinite repositories of information and to establish dialogue with other people sharing similar interests, using open-source tools while surfing a Web of unrestricted freedom. However, some of these idealistic assumptions need to be examined by learners who wish to negotiate the intricacies of Web 2.0.

First, the notion that the network is a horizontal “mesh” of potential links equally distributed among a large number is not quite an accurate representation. The seemingly absolute democratic environment of P2P actually responds to some simple laws of tendency, much like other types of networks (electrical, biological, etc.). While it is true, for example, that I can reach any point on the network because there is no “distance” between any of them, it is equally true that I will probably resort to an intermediary node as a booster in my search, for the sake of convenience. Given the large number of nodes on the network, it is just a matter of time before some of them become more “important” and develop more links to more nodes than I have. This simple fact of spontaneous human/information organization gives us “super-nodes” that can help us navigate the Web. Barbarási (2003) uses the examples of a road map, where cities and villages are more or less equally connected by roads, as opposed to an airline map, where most cities are connected to hubs, but not to each other. This network configuration can be helpful, but it can also be an obstacle by breaking up a network into sub-networks connected to hubs, but disconnected from each other. This can lead to the creation of “alternate realities” that are unrelated to each other. As Mejias (2007, p. 2) puts it, “the distance between two nodes – regardless of their physical location – is practically zero, while the distance between a node and something outside the network is practically infinite.”

Another consequence of the tendency of links to cluster around super-nodes is that this fosters competition between nodes for the attention of others on the network. As Simon (1971: in Hagel, 2006) puts it,

“... in an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients.”

In such an “information-rich environment”, the new currency is the awareness of the information-seekers; we are therefore witnessing the rise of an “economics of attention” in which the attention-grabbing value of any message outweighs the actual value of its meaning or intention. In this environment, “stuff” recedes in importance as “fluff” increases in importance (Lanham, 2006). It is not unlike traditional mass-media campaigns designed to wrangle up consumers, but with the difference

that all connectivity depends on a hierarchy of nodes that range in quality and importance from your friendly academic aggregator to more sinister forms of net monopolies.

Learner Control

The second obvious property of networked learning is that it allows learners to freely choose what it is that they want to learn. The control over the object – or content – of one’s learning is a central element that distinguishes formal learning from the informal, and the other-directed from the self-directed. But it is not the only one. Learners can exercise control over what they learn, and also why they learn and where, how, at what cost and with whom.

One related consequence of “liberating” knowledge from its traditional institutional guardians and setting it free on the network is the impact on academic credentializing. One convenient way of not having to demonstrate one’s competencies and skills each time they are required has been to obtain a credible, documented opinion about them in the form of a degree, diploma, or other educational credential. Although it is quite practical, there are important drawbacks to this system, such as the excessive power it gives to educational institutions and the underuse of countless competencies in the workplace due to lack of documentation (Livingstone, 2009). Much has been said about the desirability of Prior Learning Assessment and Recognition (PLAR), but the main problem with such a system is that it would necessarily be controlled by the same educational institutions that it wishes to bypass in the first place. These institutions have been repeatedly asked to act as bona fide evaluators of learning outcomes, rather than simply as witnesses of learning processes under their own control. So far, they have overwhelmingly eluded that challenge.

This problem of learning outside the institution has existed as an object of theoretical discussion for nearly half a century (Knowles, 1972; Candy, 1991; Long, 1993). The problems associated with self-direction in learning have been scrutinized by experts for decades, and many advances have been made towards elucidating its most prominent features. The fact that the new networked environments are confronted with the issue of learner control only makes the continued study of self-directed learning more relevant today.

Learners rarely have absolute control in any learning environment, not even the Web 2.0; rather, they follow a personal progression somewhere along a continuum, depending on two factors: (1) the degree of control allowed by the particular learning environment, and; (2) the degree of control that the learner is capable of exerting within that environment. Adult educators have known and talked about the importance of “matching” their interventions to the degree of autonomy manifested by the learner, while helping learners to access higher degrees of autonomy (Grow, 1991).

Similarly, learning environments, from formal education settings to managed learning systems and network aggregation tools, allow for different levels of learner autonomy, with P2P networking obviously at the top, offering the most potential for individual expression. This is not to say, however, that all learners are prepared to face the many complexities of Web 2.0 networked learning.

The mediation of learner control requires metacognitive skills that are not universally distributed among the population. Networked learning theories such as connectivism equate learning with

networking itself, but remain seemingly oblivious to the important corollary that successful learning requires successful networking. In an environment that purposefully avoids attaching value to any of its multifarious components, except perhaps the overarching appreciation of “net-neutrality”, the task of sense-making becomes overwhelming for anyone who is not adequately familiarized with the intricacies of epistemology and power distribution implied in the notion of learner control.

Computer as Metaphor

The use of computers can be said to have transformed our relationship with our own minds, at least in those dimensions where we, as human beings, are self-aware. In the very early years, the unheard-of capacity for computer data storage made us realize that knowledge need not be consigned to a person or a group of scholars, and that even the seemingly limitless access to written words through large scholarly libraries is very limited when compared to the quasi-infinite dimensions of computer databases and the ease with which data can be found and retrieved from them. Indeed, the notion of “external knowledge” that is now emerging as yet another intriguing concept in the age of computer networks (Siemens, 2010), was one of the mind-blowing realizations that came with the very first computers. The computer frees our minds from being over-burdened with ill-organized information. The computer was first recognized as a mind-expanding tool because of its large mechanical retrieval capacity. The first metaphor then, was “computer as memory”.

The second wave of digital insight brought us the metaphor of “computer as mind”. The emergence of complex but relatively lightweight software quickly began to transcend the mere usefulness of memory or simple calculation, and computers thus became recognized as enhancement tools for cognition itself. In a not-so coincidental parallel with the rehabilitation of the cognitive representations of Piaget and Vygostky in the 1970-80s, the structures of the mind (or schemata) became associated, more-or-less as given fact, to the “decision trees” used to describe computer software organization. In one giant leap, the computer was reformed from a dumb data storage device to a powerful booster of human intelligence. Indeed, what is the difference between human cognition and computer cognition?

The answer to this question, of course, lies in the third metaphor, or “computer as society”. For the first time, we as human beings are doing something that computers do not, namely, recognizing each other as participants in ongoing conversations about the fluid nature of knowledge, and then attributing value to that knowledge as an evolving, changing thing. This might seem like an odd development in the world of computer-person interaction, but it is nothing other than the natural result of the two preceding revolutions. Once we agree that “information as data” is easily available to all, and that machines can do pretty much anything that an intelligent person can do, we are confronted with what is missing from this picture, namely the negotiated construction of knowledge. This is perhaps the most intriguing development resulting from the advent of the network age, although it is more reminiscent of small village cracker-barrel exchanges than futuristic networks: humans need to agree on stuff, but before they can do that, they need to talk about it.

Accessible, Democratic... Open?

From a strictly epistemological point of view, there is nothing new about the interplay of dialogue and meaning (dialectics), which has been around since Socrates. The difference here is that there is no limitation on the possible interaction between any two people who are connected to a computer in the world. The flatness of the network, or its property of offering the same connectivity to any two of its “nodes” – also called the “random” feature of networks (Barabási, 2003) – is what gives it a truly prodigious potential for human and social transformation. There is ample literature that has looked at the political, social and epistemological implications of the newly networked humankind (Castells, 2000; Dron, 2002; Kop, 2010).

Stephen Downes (2006) pointed out that there are at least three immediate consequences to this property of networks. The first is that because of its “flatness”, the odds are greatly enhanced that dialogues will be informed by people who share a concern on the network, and that the most useful sources can be found rather effortlessly because of the “small-world” attribute of such networks (the so-called “small-degree of separation”). Networks are therefore greatly “accessible”.

The second consequence of the new-found connectivity is that familiar forms of political control over the free circulation of information and opinion are now so considerably weakened by computer and mobile technologies as to be virtually defeated. Networks greatly enhance democratic exchanges. We saw this when the Chinese government attempted to conceal the consequences of a major earthquake in 2008, but was frustrated by people’s use of the mobile Twitter application. Authorities are still trying to contain the haemorrhage (Tan Zuoren was sentenced to five years imprisonment for referring to the event – two years later – in an online article. See Branigan, 2010).

The third consequence of flat networks, and the one that is particularly exciting for educators, is that creative people and scholars worldwide can freely share and exchange their material without the cumbersome intervention of publishers and media corporations. This open-network phenomenon has been called “many-to-many” publishing, and it is at the origin of much of the hubbub over what is now called “Web 2.0” or, more recently, social media. As we shall see, this thrilling and apparently simple, direct implication of flat networking does not flow as freely as the other two attributes listed above.

The Openness of the Network

If all the nodes in a network are equally connected to all the others according to the “flatness” theorem, then it stands to reason that there are no important or unimportant people on the network, just interested or not interested ones. Among the interested ones (those participating), we will find people with different degrees of knowledge, relevance or competence, but not differences in status, since the connections are all equal at the outset and equally accessible to all. This is sometimes called peer-to-peer (P2P) networking. However, the notion of “supernode” predictably emerges when some contributors are recognized by a number of others as having particular relevance to, or knowledge

of, a problem. There seems to be a natural tendency within the “perfectly” democratic network to organize itself, over time, into a hierarchical system composed of leaders and followers. We are then left with a social organization that resembles the “outside” world of government and commerce, with the difference that the currency of exchange on the network is not money or power, but reputation and popularity.¹

This new “geek” currency is apparently liberated from the mundane mercantile constraints of commerce and industry, in a kind of emerging alter-capitalist exchange structure. Because the network deals with digital materials that can be reproduced infinitely, there seems to be no point in “imposing artificial scarcity” on them in the first place (Mejias, 2009b, p.7). In fact, a large number of artists and intellectuals, especially those contributing their work to online communities, have opted for the commercially-free distribution of their work (the “creative commons”). Does this mean that online materials will always be available for free to educators and learners? Well, it certainly means that they could be, unless someone were to try and stop it.

The development of vastly accessible online material has led to a parallel concentration of intellectual property rights. A few years ago, some initial warnings were heard that “governments have dramatically expanded the scope, scale, subject matter, and duration of intellectual property rights” (Sells, 2005). To increase control worldwide, watchdog agencies have been put in place internationally to ensure that copyright owners (as distinct from authors) can prevent the free distribution of their “property”.

In her book *Who owns academic work?*, intellectual property lawyer Corrine McSherry (2001) summarizes the nature of the crisis brought about by the “liberation” of knowledge and creativity in interactive networks:

“When documents can be copied and circulated worldwide with a few clicks of a mouse, and multiple forms of media (textual, visual, musical) can be digitized and recombined so that all traces of ‘originary’ sources are practically dissolved, it is generally difficult to ensure that persons (both corporate and ‘natural’) are compensated in their investments. Hence the development of legislation, legal doctrines and technologies designed to track and limit the circulation of digitized information and thereby to contain the ‘crisis.’” (p. 26)

We are indeed witnessing a growing divide between the proponents of “open-source” and the tentacular, globalized centralization of intellectual property organizations. At a time when we are proclaiming the existence of new and exciting ways to share and create knowledge for all, there has never been such a concentration of power in the hands of copyright and international intellectual property organizations. And these have been prone to defend their property by initiating, for example, SLAPP litigation (strategic lawsuits against public participation). Who can predict the outcome of this struggle for open-source against global copyright?

¹ There are also other reasons that networks aggregate in asymmetrical ways: see Barabási, 2003.

Academic Feudalism

The overarching appropriation of academic production worldwide by copyright conglomerates is of serious concern to educators and academics, for several reasons. With the emergence of P2P publishing, educators have expressed renewed interest in the idea of self-directed learning and learner autonomy. The widespread access to search and retrieval tools sometimes makes educators redundant as disseminators of knowledge, and while some educators have traditionally resisted the notion that learning could actually occur without a teacher, a good number of them, particularly adult educators, have been promoting that very idea, albeit in limited circles, for several decades. And now, the world is a learner's oyster, isn't it?

Another group that is quite vocal in its support for social networking and publishing is that of educational technologists, who for many years have been monitoring technological developments and mining them, so to speak, for their education potential. Proponents of "open-source learning" who advocate the development of personal network environments, and more recently personal learning environments (PLEs), have been investing great hopes in the new network technologies.

Both groups of educators are now strong advocates of open-source publishing and of some kind of resistance to the academic copyright takeover. Their argument is quite compelling.

Academic productivity has traditionally been loosely based on the understanding that research and dissemination were somehow an institutional obligation to the community, and were supported by the institution as a way of building up its own credibility/reputation. The circle was completed when students flocked to a university and paid their tuition fees in return for a reputable education. Academic publications were largely found in public libraries, the ultimate space of democratic access to knowledge, and not much thought was given to the direct return on investment of a particular book or article. Indeed, most academic publishing in Europe and Canada has traditionally been supported, directly or indirectly, by the state.

Today the majority of scholarly publications are found in privately owned databases to which libraries must subscribe, which means they are renting, rather than buying publications. As the years go by, the volume of available material in the database will inevitably increase, and so will the price of accessing them. Almost overnight, academic publishing – or rather the ownership of scholarly publishing rights – has become a big digital business.

The irony in this system is that research is still entirely supported by the institution and its ultimate backers: students and governments. Academics continue to publish without retribution, having already received a salary for their overall scholarly work, but they are prevented from accessing their colleague's work – and indeed their own – because one condition of publication in the new databases is the concession by the author of all copyrights (not even the scholar's alma mater is involved in the dealings). This phenomenon is not limited to digitalized material, but extends also to print material, whose copyrights are routinely handed over to large conglomerates for subsequent "monitoring". Of course, the only way to monitor the wide scale of print usage is to assume that a certain percentage of each category will be consumed, and therefore to set a price based on an actuarial – rather than actual – usage. This system has been in place for some time in radio stations, which pay annual fees to

music copyright companies on an “average-use” basis. The difference is that the fees are then directly paid back to the creators or their representatives, as anything else would be considered fraud.

In the end, academics and their institutions are made to “buy back” what they have themselves produced. We might call this a clever new form of capitalism, but in the end it resembles more a sort of feudalism, a medieval system that compelled users of the bare necessities of life – be it land, air or water – to pay a compulsory “tax” to their rightful “owner”, the feudal lord.

YouTube, Inc.

However much academics may whinge about their loss of control over their own work, the whole point of open networks is that they occur outside formal structures, isn't it? So, what about networks outside of academia? How free and open are they?

We should recall that, because of the nature of networks, there is no particular reason why any single node would receive any particular, spontaneous attention from the multitude of other nodes. This makes it very difficult for any particular voice to be heard over the clamor of the crowd. One way to get around this is to provide a free public platform where all users can post their own (non-copyrighted) production of a specified nature. The posting site then becomes the space where popularity and reputation are negotiated and established. Sites are organized around specific media; for example, there is a site where users can post their movies, another for favorite URLs, another for photographs, etc. Written posts are more diversified and are usually arranged around thematic ideas or blogs. Users can tag their postings and look for similar tags among the “folksonomy” thus created.

However, one of the functional requisites of this form of network organizing is that the number of specialized sites be kept to a minimum. In fact, their very *raison-d'être* is to reduce as much as possible the navigation requirements and give immediate access to the product at hand: people's media postings. The natural, almost universal occurrence in this system is that we are left with just one YouTube, one De.li.cious, one Flickr and one Facebook. When we find more than a single instance of a dedicated site, it is either in the process of replacing or being replaced by another, in order to restore the natural balance of uniqueness which users seek.

This is a bit like what economists call “natural monopolies”. There is no point of building three railroads to Glasgow, just as there would be no point in comparing three overlapping train schedules to Glasgow. Uniqueness is the ideal state for natural monopolies just as it is for social media sharing sites. The difference is that the train company offers a product that I can purchase. On the network, I am both the producer and the consumer.

We have moved from the notion of monopoly (only one seller, many buyers) to that of “monopsony”: a system where there are a multitude of “sellers”, but only one “buyer” (Robinson, 1969; Mejjas, 2009c). Normally, this type of structure is created to avoid price collapse in regional agricultural products such as wheat or rapeseed, and is almost always owned cooperatively by the producer/sellers. In the network, just like in academia, it is used to sell back to the users what they have produced themselves.

Conclusion

The new learning environment characterized by P2P networking allows for new forms of learning and new ways of knowledge production. One must be careful, however, not to confuse the more mature concepts of fluid and relative knowledge, which learners gradually develop through dialog and exchange, with some kind of epistemological revolution mandated by the new networked environment itself.

Interactive networks have been represented as somewhat "ideal" environments where nodes are equally dispersed and connected in an environment devoid of the constraints of space or time. While it is certainly true that P2P interactivity offers immense new possibilities for learners, we must strive to understand the dialectical nature of the new environment. What appears to be an ideally democratic social space can in fact be subjected to hidden power distribution and arcane control.

The newly evolving world of easily accessible multi-media and social resources carries with it a corresponding challenge for learners. If knowledge is to be freely constructed by the individual rather than by an external authority such as an instructor or a managed learning system, then the individual must develop the capacity to attribute value to various competing subjective realities, while cautiously remaining wary of inaccuracy and manipulation. Putting information and inference to the test of inherent validity requires specific skills without which the navigation of blogs and wikis might be a journey towards futility or worse, towards falsehood and superstition.

And finally, as much as we would like to believe that the network represents an alternative to the monopolies of commercial publishing and institutionalized learning, we must remember what is at the origin of our capacity to network in the first place: computer technology. This is a global industry and it certainly does not exist outside the commercial structures of the world. The newly established "liberation" of knowledge from the constraints of printing and housing books has been compared to a kind of post-Gutenberg revolution (Shirky, 2008). We must now examine how the promise of networks – the digital commons – can be realized without falling prey to the ongoing encroachment of global monopolies and copyright organizations.

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