

## **The Info that Ate Higher Education: Data Sludge or Primordial Soup?**

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One definition of chaos is that it is the confused state of things before the creation of order. That notion certainly applies to the information environment on the World Wide Web. This environment is what one observer has described as "the global sum of the uncoordinated activities of several hundreds of thousands of people who deal with the system as they please." It is no wonder that these and similar conditions led Neil Postman to say, "We have transformed information into a form of garbage." More precisely, we have allowed important and useful information to get mixed so thoroughly with useless, unsubstantiated garbage that it is hard to tell them apart anymore. But whom do you trust to make that distinction, anyway?<sup>1</sup>

There was a day, not too long ago, when everyone's first answer would have been "scholars," or taken to an institutional level, "higher education." However, higher education seems strangely absent from examination of this question, and one possible reason for its absence is intriguing. Perhaps higher education as we know it simply can't find a role that it can play in an environment where access to information is nearly completely unconstrained and uncontrolled.

Thinking through the implications of the Information Age—characterized in part by an explosion in access to information—is no small task. Analysts approach them from various angles and to varying conclusions. Bill Gates writes about how life will change for the better, thanks to the access to information that technology is bringing us, while skeptics from Neil Postman to David Shenk<sup>2</sup> skillfully highlight the human capacities that the resultant information glut may help us lose—to our detriment. In higher education, William Massy and Robert Zemsky focus on the need for significant shifts to accommodate the profound change that information technology signals. "Just as the development of the printing press forever changed the teaching enterprise," they say, "IT represents a fundamental change in the basic technology of teaching and learning."<sup>3</sup>

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<sup>1</sup> 1a. "global sum" quotation from Ciolek, T. Matthew, "Today's WWW, Tomorrow's MMM: The specter of multi-mediocrity," *Educom Review*, Volume 32, Number 3.

1b. Postman, Neil, *Utne Reader*, July-August 1995; 35, quoted from a speech given earlier in the year at New York City's Town Hall.

1c. the concluding question is paraphrased from Sheehan, Mark, "Intellectual Standards in the Information Resources Industry," *CAUSE/EFFECT*, Volume 20, Number 2, Summer 1997, 58-60.

<sup>2</sup> Shenk's 1997 book stimulated much of my thinking on this subject: Shenk, David, *Data Smog: Surviving the Information Glut*, New York: HarperCollins Publishers, Inc., 1997.

<sup>3</sup> Massy, William F., and Zemsky, Robert, "Using Information Technology to Enhance Academic Productivity," June 1995 white paper on academic productivity for the National Learning Infrastructure Initiative.

But the printing press and information technology share another, less salutary effect: they both were capable of eroding at least part of the foundation of institutional higher education. "Technology has a long history of enabling intellectual dishonesty and otherwise seeming to subvert the academic process," writes Mark Sheehan.<sup>4</sup>

In these early years of the current "information revolution," many damaging things can happen to the orderly process that we humans use to think, and to the institutions built around those orderly processes. But following that chaos may come something new, something with implications for the next phase of human intellectual history. That's why the endeavor of education—especially higher education—seems to me to hold such an essential place at the roundtable in the discussion of these matters, and it is why I'm disappointed that we don't see it there regularly.

### **Higher Ed and Information Validation**

You can make a simple argument that higher education has an even more important—if not critical—role in validating information when the supply of it moves from scarce to abundant. By "validating," I mean communicating that a piece of information is justified, supported, well-grounded and capable of being defended—as close to being truth as we can comfortably certify. Establishing the validity of "formal" information—information that we want to use as part of intellectual discourse—has always been a central role of education, especially higher education and research universities in particular. But has education truly grappled with what that role will mean in the continuing development of the Information Age as the distinction between "formal" information and other forms of it blur? The answer may be no, and the reason may be that some 800-year-old traditions get bounced around just by entertaining the question.

The process of validating information is to examine it in its appropriate context and then to apply expert perspective to judging its quality. Such a process turns raw information into useful knowledge. Many of the traditional academic instruments of validation—from orderly intellectual debate on college campuses to library cataloguing to academic course design to the scientific method's requirement of repetition of results to peer-reviewed (and printed) academic journals—are based on limitations of access to information. You have to be accepted as intellectually worthy for election to the faculty; be admitted to enroll in courses as a student, and then you must experience information in the order prescribed by the course syllabus; follow rigorous scientific method in research; publish in and subscribe to academic journals; have your ideas scrutinized by serious academic publishers before they print them in books; or go to the library where catalogues, bibliographies and human guides direct you to trustworthy sources.

In this way, access to and dissemination of information is limited so that it can be delivered in a context that helps the recipients make some sense of it and assign it some value in their own understanding of the world. The information is then transformed into personal knowledge. We—especially those of us in higher education—often see the process of limitation as a necessary factor to ensure academic rigor and discipline.<sup>5</sup>

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<sup>4</sup> Sheehan, op. cit.

<sup>5</sup> Let me define rigor as the conscientious exploration of all alternative viewpoints before choosing a single viewpoint as your own. Discipline, for our purposes, is double-edged in meaning: it is both the adoption of standards of inquiry and examination that will be followed consistently, and it is embodied in the organizations (academic "disciplines") that develop and follow such standards.

## **How to Validate?**

The model of limited access for the purpose of context-setting does not apply in a world of networked and easily accessible information. Whoever thinks of an idea can today put it on the World Wide Web instantly in a form that is nearly indistinguishable from the other millions of ideas (old and new) published through that medium each week. The problem, simply stated, is that the World Wide Web most frequently provides information context-free.

To see the symptoms, all anyone has to do is to use one of the common Web search tools. When you conduct a search on nearly any word, or combination of words, the results will include a range of materials from the electronic publications of individuals with only a superficial understanding of the subject through the Web pages of experts who have studied the topic all of their lives. It is extremely rare for any person to look at the range of information and be able to tell with any certainty which came from which kind of context. The more formal raw materials of intellectual activity are hard to differentiate from the less formal raw materials of entertainment or hobby.

For example, my son and I used the Web to find information about the ancient Egyptian god Ra. Once we sufficiently clarified our inquiry (it is amazing how many unrelated words have the letters "ra" in them), we found more than 200,000 documents that contained the words "Ra" and "Egypt" in them. We didn't have to go beyond the first ten to get the help we were seeking, but we had no real idea what the sources of those documents were—beyond what you can infer from a Web address. Here's what we saw as the return from our Infoseek search using the Search.com services:

1. *The Book of Gods, Goddesses, Heroes and Other Characters*  
*Provides info/links about Mythology, Mythologies of the World, Gods and Goddesses, Folklore, Legends, World Mythologies.*  
<http://raven.cybercom.com/~grandpa/gdsindx2.html>
2. *sun disk*  
[http://www.lj.eb.com:82/index.html/aDB/dictionary\\_alpha/thisR](http://www.lj.eb.com:82/index.html/aDB/dictionary_alpha/thisR)
3. *The Book of Gods, Goddesses, Heroes and Other Characters*  
*Provides info/links about Mythology, Mythologies of the World, Gods and Goddesses, Folklore, Legends, World Mythologies.*  
<http://www.cybercomm.net/~grandpa/gdsindx2.html>
4. *Ancient Egyptian Gods*  
*The gods of the Ancient Egyptians are numerous. They embodied not only the values of the Ancient Egyptians, but their survival as well. It was believed that particular gods were ....*  
<http://www.ntplx.com/~osiris/gods.html>
5. *The Importance of Osiris*  
*The very first Kings of Egypt were believed to be gods by the Ancient Egyptians. In later years, the rule of Egypt was entrusted by the gods to mortals, and the succession of the ....*  
<http://dspace.dial.pipex.com/aaes/quest/orion/osiris.htm>
6. *Ancient Treasure - Egyptian Gods*  
*Egyptian Gods. The Egyptian Falcon Horus Horus, Falcon-god 'lord of the sky' and symbol of divine kingship. His name ('Har' in Egyptian) is interpreted as 'the high' or the ....*  
<http://www.ancienttreasure.com/gods.html>
7. *Shawn's Egyptology Page*

*Egyptology. featuring Frequently Asked Questions about Egyptian Mythology with Summaries of notable Egyptian Gods. Rewritten and reformatted from the original "Frequently Asked ....  
<http://www.contrib.andrew.cmu.edu/~shawn/egypt/>*

8. *The Cat Goddess Bast*

*When I decided to name my new Pentium PC Bast, I went looking for a URL with a picture. I didn't like what I found, so I made my own page. Now there are beaucoup Bast pages, and some ....  
<http://www.waterholes.com/~dennette/1996/bast.htm>*

9. *Shawn's Egyptology Page*

*Last revised March 10, 1997 Egyptology. Featuring Frequently Asked Questions about Egyptian Mythology with Summaries of notable Egyptian Gods. Some useful Links. Tour Egypt: ....  
<http://www.andrew.cmu.edu/user/shawn/egypt/>*

10. *Egypt Travel*

*A Week on The Nile. Cruise along the River Nile on the MS Ra between Luxor and Aswan. 7 nights from £455.00. Travellers are returning to Egypt in great numbers and prices have not ....  
<http://www.vjv.co.uk/egypt/weeknile.html>*

Wonderful stuff, in some instances, but how were we to know what of it was trustworthy? Some of the material came from Britannica Online, and some came from an employee of Carnegie Mellon University who also is an ordained minister in the Universal Life Church. The latter material was the most immediately useful and understandable to my son, so that's what he used. He cited the Internet source carefully, but in the end we had no easy way to determine the material's validity. We chose an off-line strategy—we looked in a few printed sources to gain a little confidence. This is a success story. There are many more instances in which the information that you are seeking—and that you find—is much more obscure and much less easily "verifiable" by a non-specialist.

Mark Sheehan transformed the caption of the famous New Yorker cartoon<sup>6</sup> to apply to this notion as "On the Web, nobody knows you're a fraud."<sup>7</sup> I am inclined to less charity: "On the Web, nobody knows immediately if you're an idiot."

Take medical information, for example. Look up "gingko" as a medicinal agent. It will take many page-scrolls just to get past the information posted by firms selling gingko. If you persevere, you may get to a very interesting newsgroup posting about possible use of gingko by folks with attention deficit disorder. I have no way of knowing if the e-mail address of the poster, which includes the alias "kosmic moonflower," necessarily implies anything in particular about the validity of the viewpoint expressed there.

Judith G. Hall writes in "Technology Review":

[M]ost people who use the Web to obtain medical information do not know if what they are reading is sensible. This means that their clinicians can face a strange kind of liability. Many doctors, with their days already stretched by changes in the health care system, simply can't read everything given to them by their patients. But if we don't do so, our patients may end up with

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<sup>6</sup> Cartoon by P. Steiner, The New Yorker, 5 July 1993, 61.

<sup>7</sup> Sheehan, op. cit.

misconceptions and/or lose their trust in traditional medicine based on scientific studies.<sup>8</sup>

In the current revolutionary environment, the notions of academic rigor and discipline—and the notion of limiting access to ensure appropriate degrees of rigor and discipline—are missing in action, and the limiting of access also is clearly reviled. The battle cry of the Web is "information just wants to be free."

Higher education faces the dilemma of either convincing the general population to refuse to use the obvious easy means of getting information or trying to find for itself a useful and effective role as part of that easy means. Refusing to use the easy means of getting information sounds like the national campaigns that appear every couple of years to get families to turn off their televisions—perhaps a worthy goal but certainly a futile one. It is the other alternative—trying to find a useful and effective role as a full participant in the environment of easy access to information—that offers the most intriguing possibilities.

Returning to our medical-information example, Hall suggests that a scheme of validation may be the answer:

Perhaps the most useful way to help patients and their families obtain a handle on the legitimacy of what they're reading on the Web is to establish a publicly acceptable method of grading information (sort of a "V" chip reflecting authenticity).<sup>9</sup>

In fact, such a solution is already in progress, she reports:

For example, officials with the American Medical Association have published "core standards" consumers can use to consider the relative value of online health information, and the Health on the Net Foundation in Geneva has created a logo for medical Web sites that include "principles" set forth by that organization. This coming spring the Health Information Technology Institute (HITI)—which is associated with Mitretek, a nonprofit environmental and engineering-technology organization of McLean, Va.—plans to publicly offer medical-information "quality" criteria.<sup>10</sup>

### **Where is Higher Ed?**

Perhaps it should not be a concern that these solutions are developing under the auspices of professional organizations and new entities invented specifically to address issues of technology. But where are the universities and major libraries—traditional validators and disseminators of information—in this discussion? Perhaps it is not a significant concern when the question involves the AMA (some might debate even that), but when Microsoft moves higher in public perception as a trusted source of information than my university, higher education (and the information-consuming public) will be in deep trouble. This diminution of stature in the perception of the public strikes me as much more subtle and much more dangerous than the more superficial symptoms—such as migration of students toward "nontraditional providers" of education—described in many scenarios, including that of Massy and Zemsky. The threat is not just to higher education's "business competitiveness." It is to our very relevance in an information-abundant world.

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<sup>8</sup> Hall, Judith G., "Medicine on the Web: Finding the Wheat, Leaving the Chaff," MIT's Technology Review, Mar/Apr 1998, Volume 101, Number 2, 61.

<sup>9</sup> Op. Cit.

<sup>10</sup> Op. Cit.

So how can higher education find an important role in that world? A brief look at the history of our institutions suggests some possibilities.

### **A Historical View**

Notwithstanding lip-service given to the influence of such Athenian teachers as Socrates, Plato and Aristotle and of the library of Alexandria, our form of higher education owes much to traditions that began in Bologna and Paris centuries later. That is where the ideas of faculties, a college structure, courses of study, final exams, graduation ceremonies and academic degrees originated. Socrates, on the other hand, would have been surprised at a modern student's expectation of a certificate of attainment.<sup>11</sup>

The sudden rediscovery of classical knowledge—largely thanks to Arab scholars in Spain—led to the development of guilds of masters and scholars that would come to be known as universities in those 12th-century European cities, and later many others. Although the rediscovered knowledge moved the centers of education out of the monasteries and cathedrals, some characteristics of those environments came with it. From the traditions of religious education came similarly robed rituals, tests for orthodoxy, hurdles to demonstrate worthiness and notions of certification that seem to have little connection to classical tradition but much to do with control of education and limitations on access to information. Reverence for accepted authorities, or, less charitably, dogma, dominated the day, so the limited supply of hand-copied texts was in some ways a convenient means for information control.

"Hard, close drill on a few well-thumbed books was the rule," noted Harvard historian Charles Homer Haskins in a 1923 lecture at Brown University. "Of the text-books needed in all these subjects the university undertook to secure a supply at once sufficient, correct, and cheap, for the regulation of the book trade was one of the earliest and most valued university privileges."<sup>12</sup>

The university-based stranglehold on the publishing trade died with the spreading popularity of Johann Gutenberg's printing press using individually cast metal type in the late 15th century. And, when the new technology was used to print the works of Martin Luther, an alternative to church dogma was widely accessible and radically influenced the intellectual direction of the times, leading to the Reformation. As has often been noted by modern observers, Gutenberg's invention must have been to the medieval world's information and knowledge what the World Wide Web has become to ours. In terms relative to the conditions of the day, it opened the way for mass access to the world's accumulation of information, and it also allowed writers who previously would not have been able to penetrate the university-controlled book trade to publish without the sanction of scholars.

The Reformation changed but did not eliminate the influence of religion on education, especially higher education. Religion in one form or another continued to oversee the transfer of knowledge, and the dissemination of information continued to be in part an act of control and limitation aimed at creating good and moral people. Such were the standards that influenced development of American higher education. Soon though (by

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<sup>11</sup> This analysis and much of the following description of pre-Gutenberg higher education are derived from Haskins, Charles Homer, *The Rise of Universities*, Ithaca: Cornell Paperbacks (Cornell University Press), 1957, and from Frost, S.E., Jr., *Historical and Philosophical Foundations of Western Education*, Columbus: Charles E. Merrill Books, Inc., 1966.

<sup>12</sup> Haskins, 33 and 37.

the late 19th century), American universities exhibited some of the influence of Prussian universities that celebrated free inquiry—where "authoritative texts were abandoned for free discovery"<sup>13</sup> and where graduate education brought students and faculty into partnership as they pursued new knowledge through research.

### **American Higher Ed**

American universities became hybrids of the English colleges and the Prussian research universities, broadening and modernizing their curricula but maintaining an emphasis on prescribed courses (a general education) as well as electives for undergraduates. But they still carry important legacies of the Middle Ages, as did their English and Prussian models, that affect their capacity to be important participants in making sense of the chaos of information represented by the Web.

High-quality education—again, especially high-quality higher education—is fundamentally based on a "weeding-out," exclusionary model probably not much different from medieval patterns of religious training. Show your capacity to meet standards for rigor and to endure and adopt discipline, and you too can become a priest in the church of knowledge. But, the connection between academic ritual, guild-like certification and real intellectual progress seems doubtful, just as is the connection between religious rigor, discipline and someone's capacity to actually have conversations with God. The hurdles of demonstrating academic worthiness, when you look at them from sufficient distance, are similarly a strange combination of the social, the ritual and the subjective-judgment-based.

This is just what we might expect from a tradition based on the guilds and religious orders of the Middle Ages. Behind these notions is a set of important assumptions that seem to have receded so far into the background that no one acknowledges them as assumptions any more. Information, knowledge and wisdom are available only in limited supply, and they are dangerous in the wrong hands. They need to be guarded jealously. There is absolute truth, but only a small, selected group (identified by their survival of the rites of passage)—the priests or the guild masters—deserve to know it. Although as a modern, enlightened people we have rejected most of these notions at a rational level, their legacies survive in the cultural fiber of our educational structures.

### **Jefferson's Model**

Thomas Jefferson's model of higher education, the University of Virginia, was in its original design at least based on a different set of assumptions. Students would select their own courses and receive no degrees—just confirmation that they had enrolled. No meeting mysterious criteria for access to particular disciplines here—students simply made their own choices from among the educational possibilities.<sup>14</sup>

It is not hard to see Jefferson's starting point as quite different from that of traditional universities. Clearly, he saw information as abundant, probably more than any one person could ever know. The key was to provide opportunities for enlightened students to follow their own intellectual path in an environment that encouraged acquisition of knowledge and wisdom (Jefferson's library-centered Academical Village). Unfortunately, Jefferson's theory may have been well ahead of its time in 1819 when the University of Virginia opened. After dealing with the rambunctious behavior of early U.Va. students, a disappointed Jefferson and his successors gradually allowed the institution to change

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<sup>13</sup> Frost, 412.

<sup>14</sup> For a concise summary of the design of the University of Virginia, see Rudolph, Frederick, *The American College and University: A History*, Athens: The University of Georgia Press, 1990, 125-127.

toward the more common contemporary university model. Pieces of his design, particularly the elective system, would show up in the transformation of American higher education in the later 1800s, but no major institution attempted to duplicate his complete blueprint, which challenged the medieval trappings so thoroughly engrained in university life.

Jefferson's design suggests different motives for higher education students. Those who would enroll at a Jeffersonian university do so not because they want to be included in the exclusive priesthood of knowledge (although they may eventually become faculty themselves) and not because they want degrees that they display on walls and use as keys in opening doors to employment. They would enroll because they want to give themselves a firm intellectual base, to help themselves make more important contributions in their lives and to their democratic society.

Such a design thrives in an information-abundant environment in which access is limited only by the current interests of the student. To paraphrase Jefferson, in his higher education design, we tolerate any error in thinking as long as reason is free to combat it.<sup>15</sup> A higher-education institution then becomes the means by which the student learns to navigate through the information-abundant environment and the catalyst through which he or she figures out how to derive meaning from it. But for such an institution to exist in the emerging Information Age, it will have to find a way to define its own significant role as a navigation guide and meaning-promoter in the virtual world of information. The first step is to carve out an identity as an information validator in that world.

### **Back to the Original Question**

The issue of information validation on the World Wide Web, which is where we started this discussion, is a turning point for higher education and for intellectual history to a degree that is underestimated by most observers, in my view. To state the point succinctly, the revolutionary shift from information scarcity to information abundance is going to change human intellectual activity in ways that we cannot easily see from our vantage point here in mid-stream. That shift is embodied in the issue of information validation on the Web. But, talk to many members of our academic communities, and they'll tell you that they don't see the issue as particularly relevant. "Serious scholarship is a separate system from the mass information of the World Wide Web," most will say. "The Web is for casual thinking and entertainment, not rigorous scholarship."

Yet, the signs are everywhere that such a notion is just plain wrong. More faculty members are making scholarly information available via the Web each day, and more are looking at the intellectual-property issues of doing so—"How can I protect it so that I get proper credit/compensation for it?" Some find the contemporary system of peer-reviewed publication so academically bankrupt that the capacity to make new information rapidly available to their colleagues—and to wider audiences—seems intensely attractive. Others, with less noble motives, recognize the opportunity to influence more people and build a broader reputation for themselves by exploiting the Web to disseminate their views, leading to better faculty posts elsewhere or maybe fatter consulting contracts. The notion that all scholars will link arms to develop—and adhere to—consistent intellectual standards for publishing on the Web seems far-fetched in an

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<sup>15</sup> 1820 letter from Thomas Jefferson to William Roscoe—the original language is "This institution will be based on the illimitable freedom of the human mind. For here we are not afraid to follow truth wherever it may lead, nor tolerate any error so long as reason is left free to combat it."



era of declining support for higher education and greater competition among institutions. It is every scholar for her- or himself out there.

The chaos of the Web challenges the old assumptions about limiting access to information—and limiting the capacity to publish it—in order to ensure scholarly quality, which in turn requires rigor and discipline. If higher education is going to be successful in playing a significant role in resolving the Web's chaos to the benefit of the population of Web users, it will have to accept—perhaps even embrace—those challenges. Rigor and discipline may still be the bellwethers of scholarly quality; limiting access may not be the means of ensuring that they are present.

The task, then, for higher education is to find ways to validate information in this burgeoning medium that do not depend on limiting access. A part of the answer is technical—it is likely to involve imbedding into Web documents information about the source. Logically enough, this work will start (and of course has started already) with academic libraries and related organizations (see <http://www.cni.org> for example), where staff have been doing similar things with books and other materials for as long as they have existed. But I believe that part of the answer will involve a new close relationship between librarians and faculty members as they work together to make sense of the dizzying array of information available at the touch of anyone's fingertips to a networked keyboard. [Already I am dated—in a few years, the most common interface may depend on voices rather than fingers.]

With that step, higher education moves from a system that simply identifies the source of an item on the Web to a newer system—the product of the interaction between the librarians and the faculty—that provides perspective about the trustworthiness of the source. I suspect that this effort will lead to a complete redefinition of the publicly perceived identities and reputations of many institutions, including those in higher education. The University of Virginia may be less known—in this hypothetical future—as the place that produced Katie Couric than it is for the quality of information and knowledge it contributes (electronically via the World Wide Web and that medium's successors) to the world's stores of those valuable resources.

And the new reputations that emerge are likely to be highly differentiated and changeable over relatively short terms in the virtual world of abundant networked information. In fact, the notion of institutional identities seem likely to be proportionally reduced in importance and replaced, even in the public consciousness, with identities tied to schools of thought associated with the influential scholars. This fascinating possibility suggests the completion of a circular progression in higher education back to the model of Athens, where higher education was not oriented around places as much as it was around great teachers—those who built significant reputations for helping students derive meaning from the information to which they had access.

Moving even further into a vision of the future, it is possible to imagine a transformed system of education, capped by higher-education institutions that are based on a set of different assumptions and values than our present ones.<sup>16</sup> Perhaps the universities of the future will be hybrids that provide both Athenian master-teachers and hotbeds for the generation of new knowledge, without some of the medieval trappings that prevent current universities from directly engaging the chaos of the World Wide Web.

Ultimately, it seems to me that there are two ways to view the chaos of information in our present world and in the future we see just over the horizon. One is to take David Shenk's perspective of it as data smog, or worse, data sludge—an environmental hazard

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<sup>16</sup> An appendix to this article is an exploration of how such a system of education might look.

to which the appropriate response is an aggressive array of "conservation" measures. The other way to view the chaos is as the inevitable product of any revolution—the disorder that precedes an entirely new order. In this view, it is the next epoch's primordial ooze, a bubbling soup of all of human thinking and expression, from which will emerge whole new ways of contemplating and making meaning out of human existence. If higher education believes that the chaos represents Shenk's environmental hazard, we need to take all steps we can to avoid contamination, but in doing so we seriously risk irrelevance in the future if wrong. If higher education sees the chaos as "futures" soup, then the only choice is to recognize that we're going to be swallowed up in it sooner or later and to try to find a way to be a part of the new order that emerges from it.

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#### **APPENDIX:**

#### **A New Educational System for Just-When-Needed Learning**

Starting down the path of eliminating medieval assumptions—and embracing open access to information—in a model of higher education can lead to unforeseen destinations. Once you begin questioning the medieval roots of structures designed to limit access to information, you are removing foundation blocks from some very large and ornate edifices. But, put on your hard hat with me for a moment, and think about a model of higher education that combines some elements of the Jeffersonian model and the Prussian research university model with a philosophy of easy access to scholarly information and cost reduction.

Let's start with a hallmark of the traditional agenda—early education needs to focus on the basics. The notion of cultural literacy, promoted most eloquently by University of Virginia English professor E.D. Hirsch Jr.<sup>1</sup>, is aimed at providing a common core of knowledge, a common frame of reference, a common set of terms, and a common information base that will ensure that the diverse peoples in an information-abundant society can actually communicate with each other. Although the debates over what constitutes the appropriate body of cultural knowledge our educational system needs to deliver will be angry and lengthy, doing it will be essential to establish some common ground in an information-abundant environment. This step will help counter what observers including David Shenk describe as the nichification of human culture: "For when the world becomes so profoundly splintered into distinct consumer tribes, humankind begins to lose the most valuable thing it has ever had: common information and shared understanding."<sup>2</sup>

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<sup>1</sup> An example of how this notion plays out can be seen in Hirsch, E.D., Jr., Kett, Joseph F., and Trefil, James, *The Dictionary of Cultural Literacy: What Every American Needs to Know* (2nd Edition, Revised and Updated). Boston: Houghton Mifflin Company, 1993.

<sup>2</sup> Shenk, David, *Data Smog: Surviving the Information Glut*, New York: HarperCollins Publishers, Inc., 1997, 121.

An education based on concepts of cultural literacy might consume the secondary education curriculum through current grade 11 (junior in current high school), with mandatory attendance in most circumstances. Those who choose to end their education after this secondary stage would have the same array of career options open to them as those that exist now for high school graduates.

Then students might have three options for continuation of their education. One is three years of residentially-based private college (relatively expensive and unsubsidized by government), another is a three-year course of study at a non-residentially-based public community college (relatively inexpensive and subsidized by government), and the third is remote-delivered education for whatever time it takes to complete the same programs offered in the first two alternatives (should be the least expensive and should be unsubsidized). The goal of this level, which I'll call tertiary education, is to complete the post-secondary general education necessary to qualify for a range of employment opportunities similar to those of community-college graduates now or to prepare to enter the next level of education. Generally, courses would be graded as pass/fail only, and students completing the curriculum would simply receive a record of enrollment. Their mastery (or lack thereof) of relevant subject material would be revealed by tests given by employers or entrance exams for the next level of education. Because they, like the students in secondary education, are not pursuing a specific degree from a specific institution, but are preparing themselves for employment or entrance-to-quaternary-education testing, there are no issues of transfer credit or credit toward degrees, so many regulatory issues disappear. However, in order to preserve what has become the most important element of the current college structure—big-time athletics—the first two options (schools with a "place") will have athletic teams. But the pros will like this system better, because students exit whenever they want to.

A possible fourth option related to tertiary education could be a national service college, which requires a signed contract for four years, but which pays students a small stipend for their service in addition to providing residential accommodations for the duration of the program at centers around the country.

Quaternary education is a level of education presumed to take three to four years of fulltime study beyond the tertiary level. It is a level of deep specialization, and it includes the period of time previously allotted to undergraduate-major study and master's level study in one area of concentration. Again, certificates of attendance are the only certifications associated with this level of education. Students must pass entrance exams in order to be granted admission, and the only grading—when used—is pass/fail to indicate successful (or not) completion of each course. The job opportunities open to people who complete this level of education would combine the current opportunities open to holders of bachelors and masters degrees. Again, however, their suitability for any particular job would be based on tests by employers, not certifications from the educational institutions. Those who wish to proceed to the next level of education would also do so through the vehicle of entrance testing.

Quinary education is the highest level of education in preparation for something else (as opposed to continuing or life-long education, which I'll call sextary education). Here people who have demonstrated master's level competency at some area of specialization become paid apprentices to senior scholars or professionals for two to four years. Such roles might include research associate working with a biological scientist, physician associate working with a single or group of physicians (rotating associateships—the counterpart of current rotating services in medical education—would be a likely model), a lawyer associate learning the law. These experiences could be constructed in several ways—some with practicing professionals in the field, some with scholars whose focus

was to teach about the subject at universities where they also conduct academic research.

Universities would be composed of faculties who offered quaternary and quinary education. The student body would comprise students at the quaternary level, with associates at the quinary level serving as teaching assistants to the senior faculty. The teaching specialists faculty at a university would be a smaller group (which also would be expected to contribute to the creation of new knowledge)—in proportion to the smaller student body—but the faculty would also include research specialists with little or no teaching role. The size of the university faculty would be similar to that of current universities, but funded by reallocations of government expenditures—government would no longer have to support the large costs for housing and services to a huge residential student body at universities. Nor would administration be as large—the issues that occupy much of current administrative activity would be substantially reduced, so the staff could be much smaller as well.

Sextary education would involve continuing or collateral education for persons who were not pursuing education for the purpose of original employment but simply want to know more about their world and to keep up in their professions. All such education would be offered by remote means, keeping the cost low and accessibility high.

All learning beyond grade 11 in this scheme would be offered on a "just-as-needed" basis. Although designed with a particular completion interval in mind (i.e., three years to complete tertiary education) it would be offered with no requirement for a schedule of completion. Students would simply purchase courses as their finances and personal schedules allow. Students who pass the entrance requirements at any level through quaternary have complete freedom of choice for their course selections within the limits adopted for that level. There is no requirement to complete a set of courses before taking an examination for entrance to the next level—if a student can pass the entrance exam, he or she can move directly from grade 11 into quaternary education.

This system is based on tailored competency testing at many levels. Employers test applicants for capabilities that they have discovered to be the most important and relevant in their environment. There are entrance tests for each level of higher (beyond secondary) education. The biggest challenge to the society at large in this system will be to ensure that employment testing is regularly reviewed to be sure it is accomplishing its goals. In higher education, the challenge will be to ensure that the tests don't remain so static and so esoteric that they produce too homogenous a group of scholars.

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