

After the Last Generation: Rethinking Scholarship in the Days of Serious Play

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ABSTRACT

This paper picks up on speculations about likely changes in the nature and structure of higher education under the influence of video games and other forms of cybertext. It looks specifically at changes in the primary mode of academic production, arguing that significant space needs to be made for practical engagement alongside theory and criticism. A new genre of formal academic work is proposed, called the *intervention*, a serious work of application intended to contribute to pragmatics as well as abstract understanding.

Categories and Subject Descriptors

J.5 [Arts and Humanities]

General Terms

Human Factors, Theory.

Keywords

Cybertext, Games, Theory, Academics, Literacy, Intervention.

I was just living my life. I just liked to go live at the edge of the system, where things were breaking off and breaking down. It took me a long time to figure out what I was really doing, that I was always in some place where the big story was turning into little weird counterstories. But now I'm wising up to my situation, because I'm old now, and I know enough to get along in the world.

-- Lekhi Starlitz [26]

1. APOCALYPSE, THEN

For some of us, it's always the end of the world. I say this to frame an interesting remark heard recently from the linguist, literacy theorist, and born-again video gamer James Paul Gee. Gee had earlier addressed a group of English teachers, arguing that techniques and conventions developed in games were likely to unsettle very deeply the future of education [10]. Learning at all levels, he said, would come to depend more heavily on simulation and discovery, on iterative, intensely personal encounters with information, rather than traditional methods based in authority and exposition. As Gee has written:

If the principles of learning in good video games *are* good, then better theories of learning are embedded in the video

games many children in elementary and particularly high school play than in the schools they attend. Furthermore, the theory of learning in good video games fits better with the modern, high-tech, global world today's children and teenagers live in than do the theories (and practices) of learning that they see in school.... Is it a wonder, then, that by high school, very often both good students and bad ones, rich ones and poor ones, don't like school? [9]

Traditionalists may object that schooling is meant to be endured, not enjoyed, so students' discomfort may actually signal success. But such dismissals cede any practical advantage to games, whose appeal rests on their ability to help us find the pleasure in unpleasure. Drawing on his acquaintance with neuroscience, Steven Johnson argues that video games achieve this trick by exploiting basic brain chemistry. Because they create "a system where rewards are both clearly defined and achieved by exploring an environment," game designers can motivate players to find all manner of tedious, repetitive work ultimately and strangely satisfying [15].

Clearly, effects of the sort Gee and Johnson describe portend great institutional change, perhaps along the lines laid out by Pierre Lévy in his thinking about general reform in education:

Traditional representations of learning in parallel, graded steps, pyramids structured into levels and organized on the basis of prerequisites, converging toward "higher" forms of knowledge, should be replaced by the image of merging knowledge spaces, open, continuous, in flux, nonlinear, reorganizing themselves according to the goal or context, where each participant occupies a singular and evolving position. [17]

Those who have worked in cybertext or interactive design may detect a ring of familiarity toward the end of that sentence. Though we maintain healthy doubts about the claim, many of us grudgingly acknowledge that so-called new media blend the identity of the receiver with that of designer or author. The effect has important limits, but it is real enough up to a point. The "singular and evolving" role of the learner may thus remind us of the hypertextual reader, or the user of an interactive multimedia system, or the player of a video game. By analogy, then, the

seriously playful student envisioned by Lévy and Gee begins to look like a teacher or researcher.

Given such a shift in identity, what becomes of that "singular and evolving" subject position currently known as *faculty*? Will the university as "knowledge space" need such people? Could we instead imagine a community of co-learners, staffed by progressively senior students? I raised these points in a forum following Gee's talk, asking if the generation of the postwar Boom might be the last cohort of tenured professors. With due respect both for the senselessness of endings and the bluntness of my question, Gee said: "As we know them, yes."

This response leaves gracious room for interpretation. Those who know Gee's writings, especially *The New Work Order* and *What Video Games Have to Teach Us About Learning and Literacy*, can probably guess how he might have developed the idea himself. In the rest of this paper, I offer my own variations on the theme, which may wander far from anything Gee would have said, but which orbit more or less elliptically around a shared concern for the implications of new media.

Speaking of a last generation of tenured faculty invokes a fairly familiar apocalypse, at least for citizens of the U.S.A. In our increasingly privatized system of higher education, rising tuition is often blamed on supposedly inflated faculty salaries and putatively low rates of productivity, though what counts as academic production remains contentious (see, e.g., [23]). Critics view the institution of tenure, or any kind of academic job security, as an obstacle to wage-cutting market effects already introduced in other sectors of the globalized economy. Partisans of the Bush family's culture wars add to the bonfire ideological attacks on supposed moral relativism, secularism, and lately, empirical science. *Activist judges* have recently topped the political hit list, but *tenured professors* are probably not too far below them.

These concerns cannot be dismissed out of hand. In the U.S., there seems good reason to worry about the possible intersection of military recruiting needs, rising college costs, and popular antipathy to a formal draft. Assuming current foreign policy continues, and regardless which party wields power, this collision may engender an increasingly exclusive link between uniformed service and educational grants. In the ultimate stealth draft, enlistment could become the only route to college for those of less than exceptional means. Such a radical change would likely merge higher education with national defense in ways unimagined even in the Cold War, and would certainly produce an academic culture very different from what we now know. In this regard, game-based education, with its increasingly seamless connection to military training, may seem more than a little ominous.

But dire as this all may sound, it's actually not the end of the world. Political and economic factors are themselves affected by more basic influences; and while I imply no absolute or primary determinism, changes in technology, particularly in the realm of communication, surely rank high among these shaping forces.

Thus we may attempt a more sophisticated view, where politics and economics provide perspective for a subtler inquiry into identities and practices, involving vectors of change on longer, larger scales.

If not exactly optimistic, this orientation is at least responsible to reality. Yes, something nasty no doubt hangs above our heads, promising to wreak havoc with all those finely tuned systems evolved since the second world war; but *the end of the world* is after all just a language game, and the show must go on. Invoking Gee's escape clause -- the end of professors "as we know them" -- allows us to posit new species, as yet not fully described or understood. The older one gets, the harder it is to cross the event horizon that demarcates these new identities. Still, it is at least possible to trace their origins, and perhaps to speculate about their future.

2. NOT SO MUCH FOR YOU WITH THE WRITING

Lévy notes that "[t]he emergence of cyberspace will most likely have -- already has had -- as radical an effect on the pragmatics of communication as the discovery of writing" [17]. Given the scope of its terms, some might dismiss this remark as hyperbole. Humanist scholars in particular seldom seem willing to set anything on a par with the invention of writing, so centrally does that milestone figure in our profession's primal scene. As Walter Ong noted long ago, our enormous dependence on writing leads to a curious naturalization or internalization of technology. Scholars often assume -- fallaciously, Ong insisted -- that thought is identical to language, while language is, if not identical, then at least readily convertible to writing. As Ong observed, this tendency explains much of the staunch resistance among academics, at least in the humanities, to the introduction of media other than writing and print [20].

Never particularly successful, that resistance has lately become less futile than simply irrelevant. This is the point of Lévy's pronouncement. Earlier so-called communications revolutions wrought only partial transformations: the increased emphasis on the image in photography and film; the recovery of orality in telegraphy, telephony, and radio; the creation of mass consciousness through broadcasting. Though they began to challenge writing as the primary foundation of culture, these media did not affect the conditions of writing itself. This was good news for academics. It was possible to study just about any medium through the miracle of *content* -- by which we meant, written representations of our experience of the other medium -- without having to become much more than auditors or spectators. Among other things, this allowed the academy to draw a bright line between production work in various media (mere *techne*) and the writing of criticism and theory (the primary work of scholars).

With the coming of cybernetic communication systems -- hypertext, the World Wide Web, soon now the Semantic Web -- the conditions of all media are strongly transformed, and writing is clearly included. As Mark Poster and Lev Manovich each point out, a digital storage system is not the same thing as an archive of

written text. To begin with, digital information is not statically inscribed, but rather copied, distributed, indexed, and linked according to specific logical processes [22]. The locus of reading and writing has changed from stable page to flickering screen, and as Manovich puts it, "the screen keeps alternating between the dimensions of representation and control," between the supposed transparency of image and the opacity of menus and diagrams [18]. In Markku Eskelinen's terms, we experience a major shift in "user function," from the *interpretative* in writing to the *configurative* in cybernetic media [7].

Not surprisingly, Eskelinen makes this observation in a discussion of video games, the medium which at the moment represents the most interesting form of cybertext. Games (as I will hereafter familiarly refer to them) imply the most extensive transformation of the media object: from the work or text of writing to Manovich's dyad of database and interface. As we have seen, they seem also to embody principles of learning that have been neglected or suppressed in conventional models of education. But most significant for our purposes, they demand a momentous change in method from those who study them. As Espen Aarseth announces:

Games are both object and process; they can't be read as texts or listened to as music, they must be played. Playing is integral, not coincidental like the appreciative reader or listener. The creative involvement is a necessary ingredient in the uses of games. [1]

Johnson reports with devastating accuracy what happens when academics ignore Aarseth's precept: they tend to condemn video games as antisocial, deficient in "content," and tied to instant gratification [15]. These characterizations are, of course, either reducible to subjective judgement or (especially in the last instance) demonstrably wrong. People who write them have probably not spent much time handling a game controller, or have failed to understand the experience. In place of "creative involvement," they prefer critical insulation, substituting content-as-writing for the real essence of gaming, which is a dynamic encounter with a consistent simulation or virtual world -- in other words, serious play.

Aarseth's notion of play as "creative involvement" augurs a new conception of scholarship and critical response, one built on extensive practical engagement with games and other cybertexts. Surely this shift from representation to experiential immersion may be one defining feature of a new academic identity on which we have begun to speculate. But important as this difference may be, it is not sufficient to describe the species. We will need to expand what is meant by "creative involvement," pushing beyond Aarseth's primary injunction to play.

3. BY FITS UNBALANCED

As Ong, C.P. Snow, or Walter Benjamin might have said, scholars of the text seem often to back blindly and reluctantly into the future, gazing steadily at the past. Even the most apparently

progressive have a strong inclination to revert. Since I will be handing out blame here, I begin at home: my own work in hypertext fiction, along with my persistence in solo authorship and continuing addiction to narrative, surely count as retrograde. Moving to more illustrious company, we might remember Jay Bolter's remark that hypertext represents "the revenge of the text upon television" [2] or his and Richard Grusin's later notion of "remediation," with its useful and problematic emphasis on the integration of old media with new [3].

We seem to spend a lot of energy on recuperation in this passage from revenge to remedy. As the predominant prefix *re-*minds, we keep looking back. Consider this interesting remark from Gee:

When people learn to play video games, they are learning a new *literacy*. Of course, this is not the way the word "literacy" is normally used. Traditionally, people think of literacy as the ability to read and write. Why, then, should we think of literacy more broadly, in regard to video games or anything else, for that matter? [9]

Why indeed? Gee bases his answer both on the now canonical concept of "multimodal" literacy, a scheme of interpretation based upon sound and images as well as words, and on the idea of socially situated literacies, which focuses less on the ability to recognize patterns of letters than the ability to master and manipulate socially constructed memes.

Presumably, these approaches to media employ the term *literacy* as a kind of pivot, swinging almost instantly from any genuine concern with letters into concepts quite distant from writing. We would thus speak of *video game literacy* only to signify a system of competencies that permits increasingly sophisticated forms of understanding, on the analogy of reading and writing. In this sense, the formulation looks like one of Orwell's "dying metaphors," constructions so far removed from their original frame of reference that the remaining connections seem almost arbitrary [21]: for instance, when we find *dialing instructions* beside a touchtone phone.

To Orwell's original categories, dying and dead metaphors, we need to add a third option: the revenant or undead metaphor, whose referent uncannily haunts the living language. As Anne Wysocki and Johndan Johnson-Eilola pointedly wonder: "What are we likely to carry with us when we ask that our relationship with all technologies should be like that we have with the technology of printed words?" [28]. Applying that question here, we might say that expanded notions of literacy imply something like a franchise scheme -- by which I do not mean franchise as universal entitlement, but something more like McDonald's or 7-11: a distribution of proprietary interest. In this new conglomerate, the alphabet plays the role of corporate mascot, the sign in which we prosper. The franchisees of greater literacy carry over both the afflatus of high culture and the familiar method of content representation, maintaining their lasting investment in print. Comics, movies, or video games thus become McBooks, which we proceed to McRead, though our

standard of taste remains the *haute cuisine* of the bound volume and scholarly monograph.

If this treatment seems unjust, I concede the point: I have no real right to cast this stone, since every word you read here confirms my complicity as an academic writer. If the critique seems unjustified, though, consider what might happen if we blindly assert the priority of the printed page over cybernetic media. First, let us suppose that not every scholar will be as scrupulous and dedicated as Gee, whose advocacy of video games is informed by extensive, omnivorous play. The breadth of his gaming repertoire puts many of my aspiring undergraduate game designers to shame. Lesser lights may stint on the "creative involvement" and write from something less than adequate experience, with predictable results. But beyond this, even if we can define and insist upon some minimum of practical engagement, should we be satisfied with a regime where play and reflection remain separate?

In this respect, one thread in recent thinking about games seems notably problematic: the assertion, following Huizinga, that play is more primitive than culture [24]. The point may be beyond factual dispute -- plenty of mammalian behavior probably counts as play, and lately primate researchers have found that chimpanzees can decisively outscore humans in PacMan [11]. However, these observations raise some unsettling questions. If play itself is outside culture, how do we understand the theory of play? Surely it belongs on the inside: only one sort of primate produces academic essays. Do game theory and criticism thus constitute an interface between the primal and the civilized, the viewport through which our playful, animal selves are exposed to reflection, humanism -- and writing?

Resistance to this stance seems at least conceivable. For example, we might adopt Donna Haraway's neobiological continuum of animal-human-cyborg, allowing us to push the origins of language and culture back beyond the primal scene of writing, certainly far enough to include play. Yet this approach will probably strike many as extreme, if not as Haraway says, "blasphemous" [12]. Most academics will be far more comfortable distinguishing play from reflection. This view preserves the old separation of media, whereby all things not of the letter must be exchanged for letters in order to enter the system of learning. It also echoes yet again that mainstay of western patriarchy, the segregation of mutable, laboring body from abstracting, discursive mind.

As several generations of feminist critique have shown, this distinction always entails significant risk [4]. Aarseth rightly portrays the cybernetic renaissance of games as an important cultural opening, an opportunity for new syntheses of theory and practice; but the outcome of this development remains in doubt. Separating play from culture, or games from writing, would create a situation reminiscent of that "dissociation of sensibility" T.S. Eliot found in English poetry [6]. As Eliot put it, everyone after the Renaissance "thought and felt by fits, unbalanced," unlike Donne and the other Metaphysicals, who in Eliot's view were the last to hold reason and emotion in a unified linguistic field.

Graduate school taught me to scoff at this idea, for Eliot was a mere formalist, a knuckle-walker from the days before Structuralism; but whatever its limits as literary theory, the basic logic of Eliot's dichotomy seems worth reviving, if only in a death-defying metaphor.

In place of thinking and feeling, our new axis of dissociation opposes action to reflection. We play games, then we write about the experience. Play first, then write. If we remain true to this course, we will likely produce for game culture an academic field very much like literary studies, film studies, and other established specialties. No doubt such conformity has its advantages, but it would seriously restrict our horizons.

4. REWRITING WRITING

Assuming we choose to reunify our sensibilities, how can this be done, especially when we face such enormous diversity between the written word and media like video games? Could learning, as Gee suggests, become literally more like play, and what implications would this have for institutions and practices?

To approach these questions, let us begin with an admittedly ambiguous move, revisiting the amalgamation of media that underlies the new literacy, but this time with a crucial difference. As noted earlier, scholarly reflection depends almost exclusively upon the letter; but so in fact do video games and other ergodic forms, whose substrate consists (at least on one level) of alphanumeric code. This comparison may seem at first simply to replicate the new literacy; but every classical equation can be read two ways, and in this case we will read backwards, not exporting the ethos of writing to new media, but vice versa. As John Cayley declares:

Programming is writing, writing recognised as prior and provisional, the detailed announcement of a performance which may soon take place (on the screen, in the mind) an indication of what to read and how. Programming will reconfigure the process of writing and incorporate 'programming' in its technical sense, including the algorithms of text generators, textual movies, all the 'performance-design' publication and production aspects of text-making. [5]

Cayley's identification of programming and writing appears to close the same gap addressed by the new literacy, but in fact its implications are radically different. Multimodal or culturally-based literacies do not attempt to alter the status of writing, even if they imply significant changes in method, rhetoric, or genre. Setting the letter alongside music or video makes no changes in the operation of the glyph. Writing is still writing, even with funkier friends. But when Cayley opens the definition of writing to include programming, he registers *a change in the status of the letter itself* -- crucially, a change that flows into writing from cybernetic media. The elements of programming code, understood within their proper configuration, always signify on at least two levels: as elements of a syntax readable by humans, and

as instructions to be performed by software and hardware. This sort of writing is not simply intelligible, but also executable. When we identify writing with programming, we move the letter from the domain of inscription to that of computation.

Cayley's shift turns literacy from undead metaphor into a very live wire indeed, since it connects not merely by analogy, but in actual practice, to all the media that can be managed by cybernetic means. To be sure, Wysocki and Johnson-Eilola's question still applies here -- what do we carry over? -- but the answer comes out differently. No doubt we still import methods and ideologies from the history of writing, and now also from the origins of cybernetics. This point will need attention before we finish. In addition, however, and of more immediate interest, we export operations of writing itself, syntax, grammar, and even style, albeit in highly specialized, variant forms. These operations now coexist with performative features, such as modularity, inheritance, and recursion, producing text with radically new dimensions. In effect, Cayley's opening rewrites writing.

So how does this maneuver address our primary problem, the dissociation of experience and reflection? Most obviously, by expanding the ambit of writing to include not just the secondary creativity of play, but also the primary production tasks of programming, and by extension, media design. In fact, by situating the letter within the cybernetic process or feedback loop, this extended literacy directly connects writing with play. I mean not simply that it reveals the control structures that govern our experience of play, but that those structures *themselves become objects of play*.

This claim takes a bit of explaining. As veterans of the field know, game design is itself a game, a friendly but unstinting competition with other developers, distributors, hardware engineers, and most crucially, with the players themselves. On some level, the basic logic of game play applies to design as well: just as the player's performance can regularly be improved, subject to exhaustion or diminishing returns, so there must be evolution both within the responses of any game itself, and in the developmental sequence to which all games belong. This is another major difference between inscription and computation (though Barthes' transition "from work to text" points in this direction). Writing as "work" tends to fix itself in time, but cybernetic writing leans into the future. The code base of a successful game is at least momentarily stable, but while its popularity lasts it will remain in flux, subject to upgrades, service releases, versioning, sequelization -- not to mention unscheduled expansion by modders and other intensive participants.

6. INTERVENTION

There is much more to say on the level of theory, but practical questions present themselves most urgently at this point. What exactly does this rewriting of writing imply for readers, players, teachers, and learners? How will the shift into cybernetic textuality shape the new academic identities we are trying to define?

Should we insist, for instance, that all serious students of games and new media be able to make things with code? The point could be argued, especially if we are willing to count competence with ECMAScript derivatives (JavaScript, ActionScript), or similarly simplified tools like Lingo, VisualBASIC, or Squeak, for at least partial fulfillment of the prerequisite. Perhaps some advanced proficiency with electronic publishing tools such as Extensible Markup Language can suffice in some cases.

Certainly we could maintain, as Janet Murray has done for many years now, that students of new media should master "procedural" methods closely attached to code [19]. These methods may stretch beyond Cayley's initial equation of writing and programming. His remarks were originally addressed to cybertextual poetry, a genre where the convergence of executable and deliverable text is most apparent, and for which a single author will often suffice. The production of games and other large-scale, multimedia cybertexts involves more skills and more hands. It implicates sound design, three-dimensional modeling, lighting and texturing, motion capture, and animation, not to mention quality assurance and play testing. Software products used for these tasks generally offer graphical and parametric controls and require no knowledge of the programming languages in which they were written. Because these tools do generate code, albeit in an invisible or indirect way, and because designers must ultimately integrate their work into a general code structure, it seems feasible to include them within cybernetic writing.

We arrive, then, at an important expansion of "the creative involvement" with new media, one that includes a substantial, productive engagement with code, either directly or at a minimal remove. To put this very simply, an alternation of play and reflection is not enough. We must also play on a higher level, which means that we must build.

The received structures for criticism and theory are familiar: notes, reviews, papers, chapters, dissertations, books. How can the new-model faculty earn appropriate professional credit as designers and builders? Taking my cues equally from the Frankfurt School and Jerry Springer, I propose a new category of cybertextual scholarship called the *intervention*. The term will have many resonances, but I chiefly mean a practical contribution to a media system (e.g., some product, tool, or method) intended to challenge underlying assumptions or reveal new ways of proceeding.

Since I am always more inclined toward particulars than abstractions, I remain at best an amateur theorist, and thus advance the concept more as provocative sketch than complete working model. Hopefully others will massage and modify it, or find in its limitations the germ of better ideas.

To count as an intervention, a project must satisfy four criteria:

1. It should belong somewhere in the domain of cybertext, constituted as an interface to a database and including a

feedback structure and generative logic to accommodate active engagement.

2. It should be a work of production crafted with commonly available media and tools.

3. It should depart discernibly from previous practice and be informed by some overt critical stance, satirical impulse, or polemical commitment, possibly laid out in an argument or manifesto.

4. It should have provocative, pedagogic, or exemplary value, and be freely or widely distributed through some channel that maximizes this value, such as the Creative Commons or open-source licensing. Ideally, the infrastructure of the work should either be available to the receiver or documented in sufficient detail to permit productive imitation.

A fifth requirement is left implicit, namely that the value of the work will ultimately be established through robust, transparent peer review. Thus I assume both that interventions will be recognized as valid scholarly efforts and that some adequate community of reception will grow up around them.

We can find many forerunners and early examples of this new type of cultural product, and while illustrations will add substance to my scheme, there is always a danger in making lists, especially short ones. The survey that follows is not intended as any kind of proto-canon. It is simply a starting point for further discussion, and it certainly omits many worthy examples, either through economy or ignorance.

Offerings from several independent game developers come immediately to mind, from Brenda Laurel and Purple Moon [16] to the younger generation that includes Mary Flanagan, Ian Bogost, and Gonzalo Frasca. Bogost's polemical games, many of which appear on his Web site watercoolergames.com, offer excellent illustrations. Eric Zimmerman of Gamelab also deserves mention, both for his advocacy of independent game development and his conceptual experiments in game design (e.g., *Sissyfight 2000*) [24].

Much of the work loosely known as Net Art fits at least parts of my definition, for instance the interface pranksterism of the Jodi unit, many of the projects of the Media Lab's Media and Culture Group, and experiments by latter-day Oulipists such as Mark Amerika, Rob Wittig, Nick Montfort, William Gillespie, and Scott Rettberg. At this point we shade over into electronic literature, where again some relevant specimens can be found. We might turn first to Talan Memmot, who has already explored quite extensively the interface between code and conventional writing. Memmot's assimilation of psychoanalytic and poststructuralist theory into forms of digital expression opens a potentially rich borderland between traditions of academic writing and design work in new media. Projects like "Lexia to perplexia"

provide good examples of extant interventions. At its most playful, Memmot's work converges with Cayley's concept of "textual instruments" and Noah Wardrip-Fruin's corresponding work with "playable texts." Some of my own attempts in this line, including "Reagan Library" and "Pax," might also deserve mention, along with the interactive fictions of Adam Cadre, whose remarkable text adventures regularly reinterpret both their genre and the larger conventions of cybertextual writing.

We might ask how this very loose set of examples helps define the new academic identity. Though most of those named above hold regular academic posts, some do not (e.g., Wittig, Cayley, Cadre), and nothing in my definition restricts it to work-for-tenure. As Jill Walker's recent discussion of "feral hypertext" illustrates, we need to consider both formal and informal contexts of production when thinking about cybertext [27]. Many people who produce interventions will be master designers, public intellectuals, outsider artists, dedicated fans, and non-academics of other stripes.

So we should consider possibilities that satisfy only some of my criteria, but might still be argued onto the list. Take for instance the work of the satirists at RoosterTeeth Productions, creators of the "machinima" series *Red vs. Blue* and *The Strangerhood*. These efforts use popular video games (*Halo* and *The Sims*) essentially as puppet rigs, combining original voiceover with video content made by manipulating game characters. The resulting movies deconstruct and otherwise send up digital culture in various ways. These products are not cybertexts, since they take the form of video for playback, and their idiom has more to do with Comedy Central than *Leonardo*; but they suggest the potential of what Johnson calls "media riffing," recombining and redeploying assets from mainstream products as radically personal forms of expression [14]. Taken further, this do-it-yourself aesthetic raises interesting possibilities for interventions in massively multiplayer role-playing and particularly in the emerging area of alternative reality games, which recruit the ordinary structures of digital communication (blogs, e-mails, GPS systems) for purposes of performance and play.

7. GETTING ALONG IN THE WORLD

Treated as a valid form of academic work, the intervention would give a generation that understands writing's cybernetic turn the chance to act upon that knowledge in a recognized way. It would support an academic identity that includes production as well as theory, situating itself not in a culture removed from play, but within a rapidly evolving culture *of* play, thus avoiding the dissociative tendencies of our present institutions.

Yet while these speculations no doubt imply radical changes, they are not entirely at odds with the status quo. Honoring Bolter's emphasis on continuity and remediation, I do not propose that interventions entirely replace familiar forms of scholarship, at least for those who aspire to relatively conventional careers. Criticism and theory in their present form would certainly continue, and scholars would still be expected to produce a certain portion of their work in presently accepted forms. Cybernetic

writing is founded upon inscription, and no viable structure can destroy its own foundation.

Indeed, many who might serve as models for the new scholarly practice, people like Bogost, Wardrip-Fruin, Montfort, and Zimmerman, have produced notable efforts on both sides of the horizon, books as well as cybertexts. I sometimes think of this upcoming generation as elegant amphibians, equipped for survival in new worlds as well as old -- or if this looks like turning one's acquaintances into frogs, say instead *birds of play*, able to cruise for miles in the cybertextual element, but ready to plant their feet once again in the library.

Awkwardness about totem animals aside, that trope of metamorphosis broaches a theme that may prove troubling. Where did this talk of evolution and adaptation come from, and what does it mean? Why should we assume that those who come after the last generation must live in two worlds -- carrying, in effect, a double load of professional expectation? Before attempting answers, we need to bring back a question we have left hovering over this discussion: Wysocki and Johnson-Eilola's enduring reservation about ideology. Since we have gained much so far by inversion, however, let us turn the question inside out. What do we carry with us when we ask that our relationship with newer technologies *not* resemble our older investment in printed words?

As we have already noticed, interventions and programming-as-writing situate the new-model scholar within the greater game of software development. When writing enters the domain of computation, it falls under jurisdiction of Moore's Law, the surprisingly accurate assertion that the number of key components on a computer chip will double every 18 months, with some corresponding rise in processing capacity. Though the curve for software is less reliable, gains in sophistication for games and game engines do closely track the increasing power of infrastructure, and that power increases more or less steadily. Thus our revision of writing implies an ethos of endless improvement and expansion, very similar to the imperatives that drive professional sport, scientific research, business development, and other discourses of high capitalism. It seems no wonder, then, that we find ourselves thinking of evolution, transformation, and double lives -- or that the so-called last generation seems to assume that those who survive the end of our world will live more demanding lives.

We may wish this were not so. C.P. Snow observed that academic humanists are "natural Luddites," inclined whenever possible to disconnect themselves from machines [25]. To those who hold that increasingly old line, the ideology of endless expansion no doubt represents a monumental threat. Thinkers of this sort will of course reject software interventions, preferring forms of resistance that defend the original identity and function of the letter. Given the difficulties inherent in the new identity, we may feel the attraction of this position, whether we are of the insurgent generation ourselves, or just among those who wish for their success. There is a fundamental injustice in this intellectual

deflation, with its assumption that tomorrow all goods will be better, more abundant, and two for the price of one.

In spite of this unfairness, however, there remains a persuasive reason not to abandon the cybernetic turn in writing and its possibilities for intervention -- because for all its dark, Satanic machinations, and for all its ideology of ever-Moore excess, the world of cybertext contains in embryo the next great human invention after the discovery of writing. Lévy names this concept "the universal without totality," the model for a communication system that effectively internalizes its own deconstruction, legitimating itself not by any metaphysics, but through its own infinitely extensible discourse. He writes:

The ongoing process of global interconnection will indeed realize a form of the universal, but the situation is not the same as for static writing. In this case the universal is no longer articulated around a semantic closure brought about by decontextualization. Quite the contrary. This universal does not totalize through meaning; it unites us through contact and general interaction. [17]

Here we have lapsed, of course, into the language of high theory; but the enormous importance of Lévy's work lies not in its heady abstractions, but in its compelling particularity. The universal without totality provides a remarkably suggestive scheme for thinking about many of the great things in life -- natural language, for instance, and quite possibly the organization of the brain. For Lévy, though, the primary example of a universal without totality is the Internet, with its consensual protocols, its aspiration to truly universal coverage, and its lack of central control. So the universal without totality is the world of text as we know it; but at the same time, it is also the end of an older order some of us once knew, a culture that was not yet ready to connect theory with practice.

Now begins the time of contact and interaction, of engagement and intervention, of ideas in action. The new must in some way displace or transfigure what came before, but at the end of this day there is no sense of tragedy, only a certain sadness and frustration. Every moment has its discontents, its challenges and failures. Yet no moment is every truly last, at least not so long as we persist in human conversation. Play somehow resumes, albeit under the new burden of seriousness that must come with any real cultural advance. To rewrite mythology, it is the Icarians who fly above our labyrinths, and if like Dedalus or Lekhi Starlitz one has to say "I'm old now," there is at least the tardy consolation of wisdom, of figuring out, however late in the day, how to get along in the world. We may be the last of our kind, but other kinds come after, just across that strange horizon where world and word both change.

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