Wired Scholarship
The Invisible College Revisited

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'At this time, electronic publishing experiments are in most cases just trying to survive. As a result, the broad view is often missing.' (Guédon)[1]

Introduction Three years on from Guédon's comment, the situation has not altered much. What is interesting is not the remarkable change brought about in scholarly publishing by the new technologies so much as the remarkable resistance to change. This is not necessarily a bad thing. It may be that the eventual changes will be profound, so better that they should be approached circumspectly. Guédon summarises the situation aptly (unless one's taste is not for the gradualist approach): '[H]ow can we hold together the elements of continuity and those of change in such a way that they merge into something both new and recognizable?'[2] He goes on to note the main claims of the hopeful approach to electronic scholarly publishing: '[A] number of points are generally made about electronic publishing that do support its superiority over print: for example, electronic texts are easier to produce, and they are cheaper to obtain. They can be distributed more quickly, in fact almost instantaneously, and they can be reused within other texts with almost miraculous facility. ... Electronic texts can be searched word by word, or even by character strings with wild cards and Boolean operators. All of these arguments seem to point in one direction – that electronic publishing offers great functional improvements to the print world, and nothing else.'[3]

Still, academics worry about the hidden dangers that lie along the information highway – the technical potholes, the 'under construction' signs, the bridges to solid ground that have been washed away, the tolls that may have to be paid, the possibility of being led off into a wilderness where even one's identity becomes questionable. 'People worry', Guédon notes, 'about integrity and durability of e-texts, about access and usability, about legitimacy, about copyright and authors, and, finally, about the economics of the new medium.'[4] Beneath all of this, they worry about the technology's very insistence that it should be used, simply because it exists.

In fact, the relationship between scholarly publishing and the internet is proving to be a good test case for the question of technological determinism. If we are interested in using the internet as a medium for

scholarly communication, we need to pause and ask a few obvious questions. Does the internet answer some pre-existing need? Are we indeed only interested in using it simply because it is there? Or has it revealed, as it were, some possibility hitherto unrecognised – a need that scholars did not know they had? We see here once again the outline of those three possibilities originally sketched by Raymond Williams as he pondered television's development: (1) technological determinism, (2) symptomatic technology, and (3) a relationship between technology and 'need' more subtle than either of the first two.[5] With technologies developing autonomously in the engineers' laboratories, independently of need, the first option sees social usage simply acquiescing to the given fact of a technology's existence, while the second sees societies instead selecting what they want from the laboratories and matching the technologies against existing needs. The third way of looking at such things recognises, however, a more complex dialectic at work where moments or phases of autonomous technological development create new circumstances in which 'needs' redefine themselves and, in turn, drive further technological work in order to satisfy emergent requirements. George Gilder, in *Life After Television*,[6] provides compelling evidence that television and associated technologies are continuing to develop in that dialectical way (see, for example, Gilder's detailed discussion of the forces driving the development of high-definition, flat screen displays, to which we will return below).

So addressing the question of scholarly publishing's relationship with the internet means taking care to avoid the oversimplifications of the determinist and symptomatic perspectives in favour of this more careful view, where the use of any technology and that technology's own development are bound in an embrace of mutual influence and incremental redirection. What scholarly publishing needs are prototype systems to try various kinds of work using the internet. Some will take, others will fail, others still will evolve within the overall dialectic of engineering and need. In the meantime, we need to avoid the determinist assumption that scholarly publishing *should* use the internet simply because it is there and its benefits supposedly self-evident.

This 'report' marks the second stage in the evaluation of a particular prototype (the first is represented by a previous piece, in the journal *Computers and the Humanities*,[7] which focused more on the project's background, aims and general context). The author is not an objective observer but a co-developer of the prototype concerned, so what follows should be understood as a critique forged in the process of iterative design and evaluation but deeply coloured by the author's own interest in seeing the prototype eventually evolve into something genuinely useful. This is an account from inside the dialectic of technological development and social need, the latter in this instance a matter of scholarly publishing's intentions and responsibilities, the former a matter of how best to use the web in furthering those intentions and responsibilities.

Towards the scholar's workstation

So much for the preamble. The prototype in question is an electronic 'pre-prints' – or 'e-prints' – system for use in media studies and related fields. Pre-prints are academic papers not yet ready for, or awaiting, print publication. In some fields, such as physics, the concept is limited to papers accepted for print publication but perhaps undergoing revision as part of the peer-review process, so that pre-prints represent a means of speeding up the accessibility of information in papers that will later appear in a more 'finished' version. But, more generally and loosely, pre-prints may be taken to mean papers in various states of unreadiness for print publication via traditional peer reviewed channels. E-prints are simply versions of such material distributed electronically. The UK university funding councils' Joint Information Systems Committee established the Electronic Libraries Programme (eLib) as a means of developing such electronic distribution and working methods. The 'pre-prints and grey literature' section of the programme is only one of several, including on-demand publishing, electronic journals, etc. Together these well funded programme areas constitute a sustained attempt to create a research and development environment in which optimum ways of using the new technologies will be delivered into the hands of scholars and librarians. The project to be examined here is called 'Formations' and is one of a small number exploring the e-prints model in different academic fields, such as media studies, economics and education. 'Formations' is currently based in the School of Media and Performing Arts at the University of Ulster, Northern Ireland.[8] All the eLib e-prints projects are overshadowed by a single precursor – the Los Alamos physics archive.[9] What they share is the question of whether the success of the Los Alamos archive will transfer out of physics into other areas of scholarship. To what extent is there a match between the concept of e-print working, ideally suited to the web, and the working procedures characteristic of particular academic disciplines?

Beyond the question of this match between two sets of givens (technical delivery mechanism and established working practices) lies the more interesting question of whether a process of co-evolution might find scholarly work within a particular discipline reinventing some aspect of itself as it enters a dialectical relationship with the emerging technologies. With this in mind, it is possible to see Los Alamos as an instance of a relationship that required little co-evolution because pre-print working was already established as part of the discipline's routine – the internet then offered an irresistible improvement in speed and accessibility. Only from the technologically determinist perspective are such features sufficient to lead a technology inevitably into other areas. What we need to do instead is to consider more precisely the nature of scholarship in other areas and identify there the scope for accommodation or co-evolution.

This is where 'Formations' has got to as a research and development project, at the time of writing. It has developed its particular technology

to a usable level; it has tested for an immediate match with working practices in the relevant field (one does not exist); and it is reconsidering the positioning of the prototype in relation to forms of scholarship where some co-evolutionary potential may exist. The background for any such consideration is provided by a growing body of work concerned with critically examining the partial shift of emphasis in academic publishing from a print-on-paper to an electronic paradigm. This work is perhaps most succinctly and usefully represented by Peek and Newby's edited collection of essays *Scholarly Publishing: the Electronic Frontier*.[10] I want to pick up some further issues and ideas from contributors to that volume, before locating the 'Formations' project more precisely within these debates. There is a first proposition, however, in relation to which all the rest may be bracketed off as dependencies. It is simply this – everything will look very different when we have large, affordable, very high-definition, flat displays as a universal replacement for the cathode ray tube.

Imagine sitting down to work at a desk carrying a large thin screen on which text and graphics appear with at least the same resolution as they do on a printed page, a display moreover which does not depend on projected light and which, therefore, does not fatigue the eyes or generate peripheral flickering. The development of such displays is currently among the most significant engineering challenges being tackled by media technology labs worldwide. As Gilder suggests, the newspaper industry has most to gain from this work and is driving it forward with even greater interest than the television companies. Future newspapers in the converged world of computing, media and telecommunications will use these displays for the next generation of highly personalised information systems currently being prototyped by web-based electronic newspapers and information portals.[11] From our point of view here, the same displays will transform current thinking about electronic scholarship into something closer to the vision of a scholar's workstation, where the network is the library and working on a screen has transcended today's discomforts. But those last few sentences are beginning to take on the colours of a recognisable genre of writing about technology – that of utopianism. This genre and its inherent risks have to be recognised before such prognostications can be safely indulged and a project such as 'Formations' consigned to its particular niche.

Kling and Lamb[12] identify two classes of genre in writing about technology – utopianism and empirically anchored genres. The former includes the anti-utopianism that always already has its scope and positions defined by the utopian; something which confirmed cynics about wired scholarship fail to admit. Empirically anchored genres, which consider technologies more precisely and descriptively, include writing informed by social realism, social theory and analytical reduction. Writing informed by a social realism typically draws

evidence from ethnographic studies of particular technologies in particular situations. Writing informed by social theory typically draws evidence from a matching of empirical data against theoretical templates (such as structures of power in a society). Writing informed by analytical reduction typically presents empirical data as an end in itself and prioritises accurate description. At either end of this spectrum, it is not too difficult to see how badly most utopian (and anti-utopian) writing needs a dose of empirical reduction and descriptive precision or how descriptive writing might be improved by a more imaginative reach. It is in the middle of the scale, however, with social realism, that a securely explanatory and informed genre begins to take shape, drawing on, where necessary, elements of those approaches that characterise the other genres but grounding them on a bedrock of observational acuity.

Gilder's detailed account of work on high definition displays escapes utopianism in favour of ethnographic accuracy (he is an industry insider and talks to those who are developing and deploying the technologies), so we can fairly safely assume that such screens are on their way and that our imagined scholar's workstation of the near future is not some utopian daydream. We are free, then, to imagine what a difference this will make to the way a typical academic feels about his or her computer. Undoubtedly much current resistance to wired ways of working stems from the experience of using a fuzzy, small cathode ray tube on which text barely succeeds in achieving the 72 dots-per-inch promised in the technical specifications of today's monitors, information is cramped, and an inadequate refresh rate exposes the eyes to a constant, almost perceptible flickering. In short, it is not pleasant to read from most of today's screens. Thinking about the potential of electronic scholarship is held back by that basic experience of inadequate display technology.

This is important background for the following discussion of wired scholarship because today's prototypes and the debates that surround them have to be seen in the context of pending technological developments that will suddenly make the screen, as a network access point, a serious working tool for academic readers. By then, we should have a better idea than we do now of the sorts of work we might wish to do in the new environment. This particular discussion is grounded by the reality of the prototype being developed and claims allegiance, therefore, to the empirically anchored genres. We should ask of every cynic's objections whether they would survive the tempting replacement of today's cathode ray tube with screens every bit as readable as any printed page. With that in mind we can turn to some of the specific issues raised in debates about wired scholarship. It might be interesting to take them from the point of view of the aforementioned cynic, who usually has something like this to say:

> The academic community has well-established, fine-tuned procedures for ensuring quality control and legitimacy. As a means of scholarly communication, the web threatens an anarchic,

unregulated, disruptive undermining of these trustworthy procedures. That's too high a price to pay for any advantages in ease of production, accessibility, openness, reusability or searchability. Besides, with career progression tied to the established procedures, who would be interested in pursuing unproven alternatives?

Differentiating academic contexts

In one of the most important discussions of these issues to date, Silverman[13] problematises the whole notion of 'academic community' on which such views are founded, without surrendering any ground to the temperamental anarchist who agrees with the cynic's basic assessment but adds, 'so what?' Wired scholarship will be done no favours by those who see the internet only as a way of undermining established procedures of legitimation. Instead Silverman identifies four academic contexts, defined by four differing conjunctions of knowledge and 'community'. These differentiations are based on distinguishing the 'regulative' from the 'constitutive'.

Characteristics of the regulative include structures of authority, credibility based on orthodoxy, individualism and reputation building (eg in relation to career progression). Characteristics of the constitutive include networks of relations, flexibility, renegotiation of established procedures and orthodoxies, and collaboration. Neither is 'good' or 'bad'. Both appear in forms of knowledge and in identifiable academic communities. As a result, Silverman delineates the four academic contexts, for each of which we can sketch some possible characteristics:

(1) Regulative knowledge developed in regulative communities. Here we see 'the academy', the maintenance of normative structures, systems of reward, affective commitments to standards, quality assessment and forms of intellectual jurisprudence.

(2) Regulative knowledge developed in a constitutive community. Here we see the ongoing, disciplined development and adaptation of knowledge for particular purposes, where the foundations have been established by widely recognised authorities, accompanied by affective commitments to schools of thought (a common context of which the period of 'grand theory' in the humanities and social sciences is only one example).

(3) Constitutive knowledge developed in regulative communities. Here we see the knowledge base opened up and foundational knowledge renegotiated – but around the authority of established agenda-setters, accompanied by affective commitments to problematics or topics that have status defined by that agenda-setting.

(4) Constitutive knowledge developed in constitutive communities. Here we see fresh problems and objects of study and new ways of approaching them, giving knowledge generation and regeneration an ongoing constructionist form that is relatively unconstrained by regulative interests.

None of these is an entirely separate context – they shade together to varying degrees across disciplines, fields, institutional departments and groups of scholars. One person may inhabit more than one context, in different roles, and may move clearly from one context to another at different stages of an academic career. Although Silverman does not pursue this, it is tempting to chart the evolution of particular fields of study in terms of dominant contexts. So media studies in the UK, for example, may have started with context 2 dominant (the influence of 'grand theory') and moved to context 3 (influential agenda-setters replacing the original authorities), while successful institutionalisation and national quality assurance procedures inserted and fortified a context 1, leaving context 4 workers as a kind of disorganised diaspora. But the point is that these contexts and their complex interrelationships are a much more accurate description of academic working than any more general notion of an 'academic community'. Silverman takes the logical next step of proposing that electronic communication for scholarly purposes will have a differential impact across the contexts.

In relation to context 1, electronic working will be viewed as fairly marginal – less trustworthy than print-on-paper procedures and their regulation – except if linked purposely to peer-reviewed publication, as in physics, where electronic publication operates as a system of advance notice. In relation to context 2, electronic working is likely to find a niche in the form of peer commentary and similarly motivated exchanges, especially in disciplined contexts 'where attack and defense are a high art'.[14] Silverman notes that protocols may be necessary to avoid 'scholarship flaming' – the highly public and unmediated denigration of another's work. In relation to context 3, electronic working will be based on special interest groups, menus of topics, personalisation of access to electronic material according to interest, and editorial agenda-setting. In relation to context 4, electronic working may see the emergence of discourse communities, open forums, a recognition of informal communications and the value of collaboration. Silverman notes, however, that a new role may emerge here – that of editorially maintaining the 'special value orientation'[15] which characterises a constitutive context and deliberately distinguishes it from the other three, towards which there is a sort of distillatory tendency. In this context, the diaspora of scholars may more successfully reach each other through electronic communications than by any other means. At the risk of oversimplification, we can represent Silverman's argument in the form of Figure 1.

Undoubtedly electronic communication will become more significant within context 1 in a purely functional way – eg the use of e-mail and web sites for the communication and publishing of formal information – but it is in contexts 2-4 where prototypes are most needed for new forms of scholarly communication, with the 'need' increasing towards the base of the figure. Models already exist of course: e-mail lists serve special interest groups and a number of electronic journals have been

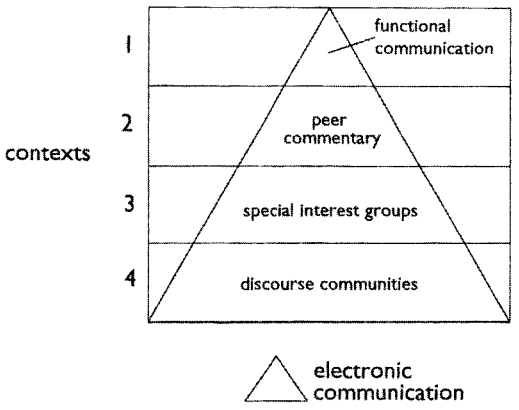

Figure 1: The relationship between academic contexts and electronic communication

experimenting with the use of discussion forums for peer commentary. It is presently less clear what tools are required to begin creating and sustaining on-line discourse communities and, in any case, substantial technical evolution can be expected beyond current list servers and forums. Continuing technical development on the web, in particular, is likely to reveal new possibilities and a greater degree of integration among tools such as mail, discussion forums and publishing systems.

Cynicism about the radical potential of scholarly electronic communication, expressed from a context 1 perspective, merely expresses the fairly limited potential that such forms of communication are likely to have within that context. Recognising increasing potential as one moves down through the contexts does not challenge the need to preserve trusted forms of intellectual jurisprudence within context 1. In context 4 the potential of electronic communication may have profound effects to the good on the development of constitutive knowledge in constitutive communities, not least on the capacity of such communities to form and recognise themselves. In fact, though, the real challenge may be to build systems that properly articulate the four levels, based on a recognition of differing requirements, priorities and values in each. For example, can systems of on-line working be devised that sustain the formation of discourse communities while feeding the more tightly regulated work of special interest groups? In turn, are there systems that will facilitate disciplined peer commentary on-line, of a kind that can support and extend established peer review processes? Finally, how might the 'peak' of these new on-line ways of working be integrated with the work of the regulative communities?

From e-prints to discourse communities

Broadening the concept of e-prints, as proposed here, provides us with one arena in which to pose these questions, especially around more concrete issues of practical prototype building and usability. This is what the 'Formations' project has been doing. The first 18 months of the project focused on constructing, and iteratively improving the functionality of, a basic 'building block' or module that could be subsequently used to

develop practical systems. This is not the place for a detailed technical or functional description but a summary is appropriate. The constructional module is a collection of integrated web-based processes presented to the user through a clean and consistent interface. These processes (handled by underlying databases) include on-line registration by users, submission of text and file uploading, the organisation of submitted material through various 'views' (by author, date, topic, etc), full-text indexing and searching, the automated launching of topic areas by users (where submitted material can be viewed), cross-submisson of material to various topic areas, threading and hyperlinking of submitted material, orientation and navigation devices, and so on.

The first deployment of this module was in the form of a straightforward pre-print submission and archiving system with a few added extras (such as a resource or 'library' area for recommending and commenting on other on-line resources). Users could set up their own topic areas (via a fast, automated, forms-based input procedure) as repositories for submitted pre-prints. Detailed usability testing on a functional level was followed by a launch period of publicity and demonstrations and then a six-month live on-line trial (September 1997 to February 1998). This fairly conclusively demonstrated that there was little existing interest in the field of media studies or related areas in an unregulated e-prints archive as such, a not entirely surprising result since anecdotal evidence suggesting as much had accumulated during the preceding technical development and demonstration phases. The project then moved into a period of grounded theorising, in which the nature of academic practices and the potential niches for on-line working methods were more thoroughly considered. If the Los Alamos model does not scale well into other fields, then other models will need to be developed. The present paper is part of this remodelling process. The essential feature of the e-prints model that is being retained is its openness to documenting the informal or 'off-stage' aspects of scholarship that are usually rendered invisible in contexts 1 and 2, behind the 'performance' of final print publication (see, for example, Penny *et al*[16]). In an e-print environment, material is unconstrained by the defining features of print journal publication – length, formality, generic conventions, etc – thus encouraging a more openly epigenetic sort of contribution.

There are still, however, vocal proponents of simply scaling up the Los Alamos e-prints model to other fields, chief among them being Stevan Harnad, whose view is that 'Formations' needed a longer period of determined seeding and editorial proselytising on the part of the development team. In this persuasive view, the newness of electronic working requires that pre-print and electronic journal experiments, for instance, be shored up by sustained efforts to encourage submissions until both a critical mass and sufficient 'mindshare' is achieved for them to become more independently sustainable.

Before unquestioningly accepting this view, Harnad's larger argument about how e-prints will fit into the overall information ecosystem is worth

repeating.[17] In abbreviated form the argument goes something like this. Academic authors write papers not for money but to achieve visibility and accessibility for their work. A quality-control and rewards system (anchored in our context 1 sits on top of this interest. Publishers of journals mediate this process because they are allowed to recover their expenses through subscriptions and site licences (and possibly pay-per-view in the case of electronic versions of print journals). This process is, however, becoming too costly to maintain unchanged – institutions are increasingly selective in their subscriptions, batch publishing entails increasing delays in time-to-print, new journals are difficult to establish. A move to electronic publication of journals (ie with editing, refereeing and so on intact) would reduce the costs to a third of what they are for the print publications and would solve most of the problems about accessibility. Harnad proposes that this remaining cost should be met by page charges paid by the author, via institutional funds provided from the two-thirds saving made by institutions on their subscriptions and licences. However, Harnad contends, this will not happen as a straightforward transition from print to electronic publishing, because the publishers have no clear interest in initiating such an abrupt transformation. As the shorter term benefits are more on the side of the academic writer and reader, the latter should kickstart the transformation by setting up on-line pre-print archives on their 'home servers' and simultaneously in a 'global archive', for which Los Alamos is the leading contender (ie extending that archive's remit to all academic fields). As a result, academic readers will become hooked on free on-line access to papers and the rest of the academic publishing system will have to follow along.

Harnad's vision remains the best guide for context 1 and 2 applications of on-line publishing – where many peer-reviewed journals eventually switch medium and the electronic handling of text supports new forms of organised peer commentary as a logical extension of conventional journal publishing. But viewing e-prints as merely a mechanism for reaching that point ignores the possibility of developing the e-print model into something new in order to support effective on-line working in contexts 3 and 4, especially the integrative, 'off-stage' forms of work that may be so essential to the development of constitutive communities, but which is usually pursued more privately in the humanities and social sciences. The equivalent visionary for this sort of work is perhaps Jean-Claude Guédon, who articulates a conception of the on-line 'seminar' ideally suited, in broad terms, to forms of communication oriented around the production of constitutive knowledge. Guédon sees this as a return to some of the lost values of the Republic of Letters.

Prior to the development of printing, the courts of Europe and the scholars they patronised relied on communication by letter for the transmission and discussion of intellectual news. From ad hoc beginnings an increasingly sophisticated system developed, with key players in any particular period filling the roles of originators,

commentators and circulators. Printing gradually subsumed this Republic of Letters and, in the process, both printing and the intellectual news changed character – printing taking on a role in the communication of transitory material while the latter became something to be archived for later reference. More formal groupings of correspondents emerged, such as the Invisible College in England, later to form the Royal Society. 1665 saw the first two intellectual journals appear as the culmination of this process – the *Philosophical Transactions of the Royal Society of London* and, in France, the *Journal des Sçavans*. These journals existed principally to archive scholarly exchanges. Today's academic journals have evolved into vehicles for the regulated publication of discrete finished papers in periodic batches, as part of the context 1 legitimation and reward system, other intellectual benefits in other contexts being largely secondary to that function. Guédon suggests that certain forms of electronic communication may effectively revive the original conception of supporting and archiving scholarly exchanges within an Invisible College or discourse community:

> The specific publication phase will begin to act as a sort of stepping stone leading to higher plateaus, a kind of intellectual stocktaking periodically needed to advance to new developments (through further discussions) with concepts relatively well cleaned up and data fully verified. But, simultaneously, publication may begin to appear as a way to broadcast the news from a particular discussion group to all other research communities. ... With electronic publishing, the batch production of knowledge will eventually give way to a flow production of results and interpretations inside the discussion groups. Whatever may remain of batch publishing will take the form of periodic syntheses. ... I have used the word *seminar* as a way to portray these new trends in recognizable terms, and as a metaphor to convey the potential impact of electronic publishing on the workings of the research system.[18]

In the terms suggested above, Guédon's description may be recast as the periodic shifting of material into the contexts of regulative knowledge from those of constitutive knowledge, with new seminar-like forms of electronic communication playing a more important role in the constitutive contexts, while established journal procedures continue to be important in the regulative contexts, whether those journals are print-based or electronic. Where Harnad sees e-prints and related ways of working on-line as a transition phase leading to formal electronic publication in contexts 1 and 2, Guédon would presumably like to see them developed into the core tools and working methods of contexts 3 and 4, embedded in on-line exchanges which, for want of a more precise terminology, he calls 'discussion groups'. A goal emerging more clearly in the later stages of the 'Formations' project is to use the constructional module already developed to build an on-line tool capable of supporting 'discussion groups' in this

very particular sense – where constitutive discourse communities generate more regulative special interest groups but the forms of knowledge remain constitutive and the production method is based on 'flow' rather than 'batch'. The 'discussions', therefore, need to support the exchange and interconnection of more substantial materials than the brief conversational exchanges of current on-line discussion forums – hence the retention of the pre-prints concept. 'Formations' is never likely to be, however, much more than an early prototype, valuable as much for prompting these sorts of consideration as for producing any long-term solutions.

The project's early intention – of taking the Los Alamos pre-prints archive model and designing a web-based tool for media studies and related fields that would have equal utility across all four academic contexts – has proved to be inappropriate for fields where no existing pre-print activity is already integrated into the regulative procedures of contexts 1 and 2. Early design features, such as providing hosts of topic areas with the facility to tag submitted items for inclusion in an automatically published electronic journal, were aimed squarely at contexts 1 and 2. Such features will be abandoned as the process of re-theorising the potential of on-line working effectively repositions 'Formations' within contexts 3 and 4 and recognises that the regulative procedures of the other contexts cannot be supplanted by 'radical' alternatives. But instead of trying to reproduce such regulative procedures in the on-line setting, the re-theorising reported here has clarified a need to design complementary working processes. These must recognise the specificity of the values and practices of contexts 3 and 4 while interconnecting with the other forms of scholarly activity which will continue to be pursued by other means (including electronic translations of existing practices) in the other contexts.

The purpose of this paper has not been to anticipate the next stage of the 'Formations' project but to report on the re-theorisation because of the general issues it has raised. On the other hand, it may be appropriate to finish with a signpost to the project's immediate future. Having recognised the constructionist emphasis of contexts 3 and 4, the project has turned to a major collaboration with a broadly constructionist form of print publication in the humanities and social sciences – the 'Companions', multi-contributor books that attempt to map given fields with overview essays, annotated bibliographies, glossaries of terms, etc. The integration of Guédon's on-line 'seminar' activity and 'flow' production of knowledge with such an existing 'batch' form promises much in terms of realising the (not a little utopian) vision of an electronic discourse community. With a book to anchor the project in the regulative ground of context 1, the on-line enhancement and continuing development of material through a web-based system for collaborative constitutive work is intended to attract at least the beginnings of an on-line discourse community. Whether *Formations: a Media Studies Companion*, as a combined Manchester University Press book and user-centred web site, will be able to build

something genuinely useful out of its practical and theoretical explorations remains to be seen. The more general point is to insist on the necessity of experimenting with such prototypes in anticipation of a near future in which constitutive knowledge in the appropriate academic contexts will be most successfully produced and communicated through some form of wired scholarship.

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Notes

1 Jean-Claude Guédon, 'The Seminar, the Encyclopedia, and the Eco-Museum as Possible Future Forms of Electronic Publishing' in *Scholarly Publishing: the Electronic Frontier*, eds. Robin P. Peek and Gregory B. Newby (Cambridge Mass.: MIT Press, 1996), p. 73.

2 Ibid, p. 72.

3 Ibid, pp. 71-2.

4 Ibid, p. 72.

5 Raymond Williams, *Television: Technology and Cultural Form* (London: Fontana, 1974).

6 George Gilder, *Life After Television* (New York: Norton, 1994, revised).

7 Dan Fleming, 'The Garden of Forking Paths', *Computers and the Humanities*, 32, no. 4 (1998), pp. 303-22.

8 See <http://formations.ulst.ac.uk>.

9 See <http://xxx.lanl.gov> (January 1999).

10 Peek and Newby, op. cit.

11 See the personalisation features of the news channel, for example, at <http://msn.co.uk> (January 1999).

12 Rob Kling and Roberta Lamb, 'Analyzing Alternate Visions of Electronic Publishing and Digital Libraries', in Peek and Newby, op. cit, pp. 17-54.

13 Robert J. Silverman, 'The Impact of Electronic Publishing on the Academic Community', in Peek and Newby, op. cit, pp. 55-69.

14 Ibid, p. 63.

15 Ibid, p. 67.

16 Alan J. Penny, Stephen Appel, Ken Harley and Robert K. Muir, 'Collaborative Research in Education: exploring an epigenetic landscape', *Studies in Higher Education*, 19, no. 1 (1994), pp. 21-31.

17 Stevan Harnad, 'Universal FTP Archives for Esoteric Science and Scholarship: a Subversive Proposal', in *Scholarly Journals at the Crossroads: a Subversive Proposal for Electronic Publishing*, eds. Ann Okerson and James O'Donnell (Washington DC: Association of Research Libraries, 1995).

18 Guédon, p. 81.