Rethinking the Dissertation in the Digital World

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Introduction

"Rethinking the Dissertation" is an ambitious title, so I will come clean immediately by revealing what I want to achieve and what is beyond the scope of this presentation, if not completely beyond my expertise. I am Senior Systems Analyst in the Office of the Dean of Graduate Studies at the University of Texas at Austin. My Dean, Dr. Teresa Sullivan, is also one of the Vice Presidents of the university. An Associate Dean, Dr. Terry Kahn, has worked closely with me in the implementation of UT's mandatory electronic dissertation policy from the beginning.

Let me begin by saying that I am not an expert in any field associated with electronic dissertations: I am not a librarian, I am not head of any institute or think tank that deals with data publishing, archiving, or dissemination, and I am not an expert in the field of technology. I am not a scholar by profession, though I am perhaps one by nature. I did successfully negotiate graduate school at Texas and successfully wrote and defended a dissertation on Chinese music, politics, and culture on my way to a Musicology Ph.D in 1992, years before the advent of electronic dissertations[1]. I wrote my dissertation partly on an electronic typewriter (which I thought quite an advance in itself), and partly on an old pre-286 PC with 640k of RAM and a 20 mb hard drive. I thought I owned the world.

This presentation is the result of dealing directly with students working with digital media, with translations to PDF, with decisions about graphics and fonts - working, in short, to fulfill Texas's mandatory electronic dissertation policy and also to take advantage, in a kind of probing, beginning way, of the expanded capabilities inherent in this way of presenting a dissertation. The University of Texas at Austin produces 600-800 Ph.D.s each year, and each student passes through our office with his or her dissertation in tow on the way to graduation. Some of these students I see at the time of submission; others I have spoken with in presentations to groups of graduate students that I make periodically on campus. I also deal closely with the staff whose job it is to accept the dissertation, and before that, to see that regulations are adhered to; and I have spoken often with faculty about the challenges and possibilities of electronic dissertations, and with representatives from companies (for example, creators and distributors of commercial fonts) whose products students use in their electronic files.

So this presentation has a bottom-up genesis; that is, my thought processes began with the difficulties and breakthroughs experienced by students, their supervisors, and our staff in implementing the electronic dissertation requirement. I have proceeded from there to a higher level of abstraction in order to approach and probe general issues and principles. This presentation will tack back and forth among several levels of abstraction

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[1] Brace, Timothy Lane (1992): <u>Modernization and Music in Contemporary China</u> UMI.
http://magnoliaarts.com/brace.pdf

in an effort to deal with day-to-day decisions (like which fonts to use in an electronic dissertation) and with the related "header" questions (like how does one decide which fonts to use, and why is it more of an issue with electronic dissertations than it is with print dissertations). At all times, however, I will focus on the practical decisions that must be made, so the heights of highest abstraction will not be scaled. I will set MacLuhan and Habermas aside, and I promise not to quote Foucault even once.

Why rethink the dissertation?

Periodically revisiting traditions, practices, and their products carries its own benefit and is crucial to any program that subscribes to continuous improvement or progress; this is especially appropriate at times when changes that impinge upon these processes (either externally or internally) reach a point where they are noticeable. We are at such a point with regard to the dissertation: changes in the possibilities of content and distribution have led to questions that need thoughtful answers. Some of these changes are not in the possibilities *per se*, but in the ease with which certain possibilities can be realized; some possibilities are entirely new. They can all be located around two issues: presentation and distribution.

New Possibilities for Presentation

The **inclusion of multimedia** items is primarily a new possibility with digital dissertations, and is the most commonly used and most obvious enhancement of text that digital dissertations offer. Examples can be placed into three categories:
1. Data <u>integral</u> to the dissertation. Examples of this include geographic maps, an animated graphic or executable code that displays a chemical reaction, and an audio/video file of a musical performance analyzed in the dissertation;
1. <u>Primary data</u> upon which the dissertation is based. Examples of this include audio files of interviews taken during research, and digital photographs of historical documents (or of people) described in the dissertation.
1. Data <u>supplemental</u> to the dissertation. Examples include a database from which statistics were derived that were used in the dissertation, or the full score of a symphony, an excerpt of which was analyzed in the dissertation.

Non-linearity. Print favors linearity – that is, printed text is typically structured for a straight reading from beginning to end. This form easily leads to a type of dissertation in which an argument is built "through time" as the reader moves through the text. The reader can diverge from this, but s/he is aware that s/he is straying from the "natural" presentation of linearity. **Non-linearity** involves a different <u>structure</u> for the dissertation; there can be multiple starting points, and multiple, equally valid journeys through the text[2].

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[2] An interesting experiment of this type was the <u>Choose Your Own Adventure</u> children's books some years back

Interactivity with the reader is a new possibility with digital documents. One might imagine a dissertation in which the response of the reader becomes part of the dissertation itself; or, the response triggers the next item offered to the reader. In this example, the dissertation would be a different experience for each reader[3].

Internal and external links are easy and convenient within digital documents. Print documents tend to be distractive if full of "see pg xx for more details" messages. In digital documents, any word can easily become a link to another place in the document, or to other documents.

Primary data can be more easily revealed in a digital dissertation. By that I mean that it is much easier in a digital dissertation for a scholar to show the reader the data (interviews, performances, etc.) from which s/he builds his or her interpretations, experiments, and conclusions.

The New Distribution

It is **easier to duplicate** a digital dissertation as compared to a paper dissertation. This is an obvious point, but a profound one. It will be the case that many more copies of digital dissertations will be in existence compared to copies of print dissertations.

It is **cheaper to duplicate** a digital dissertation compared to a paper dissertation. Duplication is essentially free of cost.

Internet distribution is of course entirely new with digital documents. This, combined with the ease and inexpensiveness of duplication, means that the proliferation of copies of a digital dissertation will be exponential as compared to print copies. Internet distribution of digital dissertations means that the capabilities of distribution are limited only by the availability of receiving hardware (currently primarily microcomputers).

Given the above, the digital dissertation potentially has **greater use as a research tool** than does a printed dissertation. This leads to the most profound reason to rethink the dissertation: its greater use will redefine its place in our culture. And it will change the way dissertations are written and judged – in short, what a dissertation means in academic culture.

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[3] As in the new GRE (see http://www.gre.org/cbttest.html#howwork).

Start at the Beginning with Basic Questions

What is the purpose of a dissertation?

According to the Graduate School Policy Manual for the University of Texas at Austin, a dissertation must be "an original contribution to scholarship." This means both that a dissertation must be original and that it must contribute to scholarship. But is that definition adhered to in practice? Generally, at Texas, yes – but there are exceptions. In the Department of Mathematics, for example, dissertation topics are often given to graduate students by their advisor, and consist of a mathematics problem to be solved. Research done on an original topic of the student's choice will be done in postdoctoral study.

Another purpose a dissertation often has is to be the basis of a book that, when published, will become part of a young scholar's documentation for tenure review. This purpose overlaps with the previous one, but focuses more on the student's professional career than on a field of scholarship.

A third purpose for a dissertation is simply that it fulfills a requirement for graduation. For some, this is its primary purpose. Some of these dissertations are collections of previously published articles. For these students, the original research and writing is done throughout the program of work, and the dissertation is not seen as the culmination of the doctoral program[4].

And finally, the purpose of a dissertation can be to show that a graduate student is ready to do scholarly work of the highest quality. The standing of the dissertation as a work unto itself is less important than is its introduction of a new scholar to a particular field.

What is the dissertation's place in academic culture?

The published dissertation serves as a primary source for researchers. How seriously it is considered and used as a primary source varies widely by discipline. Many humanities scholars, for example, regularly search through dissertation abstracts for dissertations relevant to a particular topic, with an understanding that, especially as time passes, other publications that contained the same information might become less and less available. For my research on Chinese Music, I was delighted to find a dissertation published just after the turn of the century that contained a Marxist analysis, in English and by an American scholar, of the Chinese music at that time; I could find no books in print or journal articles with this kind of analysis.

There are many disciplines in which the dissertation is not used often as a primary source; it is felt that if the information is important, it will show up in another form, such as a book or journal article. For these disciplines, the dissertation has another function:

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[4] This is common in the natural sciences.

that of a kind of <u>proto-document</u>[5] that will be turned into a book or scaled down to articles in peer-reviewed journals. For the hard sciences, this reflects the practice of publishing prior to the dissertation all that will be in the dissertation, and also a certain sense that information gets "old" and therefore "non-negotiable" rather quickly. This practice, especially for the humanities, reveals an elitist mentality in the sense that there is an assumption that if the information is "good enough" it will show up somewhere else in a more "respectable" form. But as shown earlier with my example on Chinese music, more "respectable" publications sometimes go out of print; and journal editors are not completely immune to the winds of politics of their day. And to all this one must add the fact that about half of dissertations never get published in another form. Could it really be the case that all of this information is irrelevant or unimportant?

Will digitization change this place? If so, how?

If the digitization of dissertations results in the dissertation being used more as a primary source for researchers, this raises issues of quality control for the current system of information exchange. If most information is exchanged via peer-reviewed journals, the lack of same as dissertations are elevated to a higher position in the minds of scholars threatens the control of "important" sources held within the current system. In other words, easy access, duplication and dissemination democratize information distribution. The researcher has a much greater variety of sources to which s/he can go for data. The rub is that less of it will have been "blessed" by experts in the field. The question on the table is whether the current system, dominated by peer-reviewed journal articles, can adjust to the new conditions, or will it be replaced by another system? I would not argue that the quality of research sources is unimportant; but the location where those decisions are made might change.

Easy dissemination <u>is</u> changing the dissertation's place in academic culture. Scholars are not waiting for books or journal articles to appear – they are going right to the original, the proto-document, easily, quickly, and often, without cost. More dissertations are available, in more variety and more easily, than ever before.

Deeper inside the dissertation: will digitization change how it is organized and formatted?

The inclusion of multimedia objects

The most obvious and most commonly used enhancement to paper dissertations offered by digital dissertations is the possibility of including multimedia files within the dissertation. Improved graphics capabilities include using the "zoom" capabilities of the viewing software to have graphics reveal several "layers." The inclusion of audio and

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[5] I first came across this concept in LaPidus (1998): *The Role of Theses and Dissertations as Independent Works of Scholarship* in <u>Scholarship in the Electronic World</u>. Virginia Tech.

video clips extends the range of expressiveness of a dissertation far beyond that which was possible in a paper-only expression. Animated graphics files or executable code files can render a chemical reaction or some other process over time and provide instant and easily understandable demonstration where, previously, pages of text would have been needed to awkwardly describe the same process. These kinds of multimedia capabilities are the first innovations to find their way into digital dissertations, and constitute a significant leap forward in what a dissertation is capable of expressing.

Linear vs. non-linear readings

The use of html pages, multimedia objects, links among the pages/objects (and between these and the "outside world") – these open up new possibilities for organizing and formatting a digital dissertation. Intratextual links simplify the movement back and forth among different sections of the dissertation; intertextual links can bring in objects from outside the dissertation. Both of these kinds of links affect linearity, in that they make it easy and convenient to diverge from a front-to-back reading of the dissertation. An html-based dissertation might not even have a "front" or a "back." Experiments in this direction are still in the early stages as of this presentation.

Interactivity

Interactivity between the reader and the dissertation can profoundly affect how a dissertation is organized and formatted. Responses from a reader can be directly entered into a database that then feeds its information dynamically into the dissertation for the next reader. Responses from a reader can be instantly analyzed and can determine what part of the dissertation the reader experiences next. As with non-linearity, experiments with interactivity are still in the early stages.

Interweaving with other objects

As has been stated, the digital dissertation has the possibility of linking to text and objects both within itself (intratextual) and with objects and text that exist outside the dissertation (intertextual). At the University of Texas at Austin, we allow students to link to sources outside the dissertation itself only if the information outside the dissertation is "supplementary" and not "integral" to the dissertation. As one example, in a recent dissertation, a student linked within the text to his bibliography. Within the bibliographic reference there was a link to a database maintained on the internet that contained the text of the article being referenced in the dissertation. Thus, a reader could suspend reading the dissertation to go directly to the article referenced and read it instead.

There are obvious stability issues with allowing links outside the dissertation that might not be there in the future. If exceptions are made, the student must include a "disclaimer"

within the dissertation that states that the links worked at the time the dissertation was turned in, and no guarantee is made of their availability thereafter.

Intellectual Property Issues

I have heard from music students that some owners of copyrights of musical scores are more nervous about allowing students to include significant excerpts in their digital dissertations, presumably due to the increased availability of a digital dissertation as compared to a paper dissertation. There are other examples of copyright owners in other fields shying away from allowing students to include information they "own" in digital dissertations. Students will have to take these concerns into consideration when they organize and format their dissertations. Will some formats (e.g., print versus audio file) cause less concern than others? Will students have to limit the length of their excerpts, or break them up into smaller pieces?

Fonts are often commercial software. Currently, many commercial font vendors are concerned about allowing students (even those with licenses) to embed licensed fonts into PDF files, for fear of having these fonts "stolen" from the PDF file and then made freely available via the Web. I have spent hours on the phone with representatives from several of these vendors, and they are genuinely concerned about the potential loss of income stream should this happen. They are apparently less concerned about the loss of income stream should students cease using their fonts because the students are not allowed to put them into a digital dissertation!

I have advised our students to limit the use of fonts, if possible, to those most commonly used worldwide. The principle is readability, not visual aesthetics. Occasional use of more aesthetically pleasing (or historically authentic) fonts (e.g., for a quote at the head of a chapter) can be accomplished by scanning in the printed page (thus making the font easier to render on the viewing monitor, as it renders as a graphic). The advice to limit the fonts used to common ones is perhaps the best example of how digital dissertations can be less expressive compared to paper dissertations – but again, it is in the interest of wider readability.

Partial free access via the internet

UMI, our preferred publisher for dissertations, allows free access over the Web to the first 24 pages of a digital dissertation. This constitutes a 24-page "advertisement" for authors. Amazon.com does this with books, showing a number of pages for free via your web browser. Should authors take this into consideration when organizing their dissertations? Should an author try to "hook" a potential reader with decisions about what to "frontload?" This is a small point, perhaps, but one that might determine whether a potential reader purchases the dissertation.

Universal access

Maximizing viewability is an important principle that needs to be applied to digital dissertations in order to take advantage of the ease of distribution and access afforded by the internet. Cross-platform accessibility should be a rule given very few exceptions; to not do this is to contradict, to make irrelevant, the very advantages digital dissertations have to offer. Another equally important element of enforcing this principle is making sure that file formats are readable by cross-platform, freely available software. One must not make the mistake of assuming that all the potential viewers have the latest software and hardware on their machines. Now, having said that fairly strongly, let me back off a bit: this principle is trumped by another – that of the recommendations of the dissertation committee that the dissertation (in whatever form) is qualified and valid as an important contribution to its field.

An example of this is a dissertation we accepted at Texas that consisted primarily of Windows-only executable software that provided pedagogic analysis and advice for piano teachers of children. This dissertation was obviously not cross-platform, and it's anybody's guess as to how long the code would remain executable in the Windows upgrades of the future; but the committee felt that the validity of the software as an innovation in the field of piano pedagogy was such that it overrode issues of longevity and universal access. We accepted the dissertation – but only after we had inquired as to the feasibility of making a version of the software that would execute on other platforms.

There is a balance that must be struck among sometimes competing principles. Our approach is to press for all of these principles to be fulfilled, and, if that proves impossible or too daunting a task for the student, each case is assessed individually, aiming at the best compromise possible. In all cases, the integrity of the work as a contribution to scholarship is the highest priority.

Paper or digital goal: will the "real" dissertation please stand up?

One decision that needs to be made is whether the binary file or the paper printout is the "real" dissertation – the standard, the goal. This decision leads to answers to whole sets of questions regarding formatting regulations. Our doctoral evaluator, early in the process of moving to digital dissertations, often objected to a particular "page" in a dissertation (viewed online) because 'it won't look right when it prints out." It took several discussions to realize that we were starting with a different goal in mind. For her, the printout was still the "final" state of the dissertation, to which all questions of formatting referred; for me, the digital file is itself the end product. If the digital file is the final state of a dissertation, it doesn't matter that the viewer might have to "zoom" in or out to see various sections of text or graphic – that's what computers do, and they do it well.

If the final state of a dissertation is paper, for example:
1. Margins are of great significance, as the printout might lead to a bound copy.
2. the size of each page is significant, as oversize pages might not print appropriately
3. The issue of landscape view versus portrait could cause trouble, depending on your printer's configuration.

If the final state is digital, however:
1. what the file looks like printed out is irrelevant
2. the standard is based on viewability on a computer monitor
3. the viewer can take advantage of the scalability of the viewing software

The current policy at Texas is that the digital file is the final state of the dissertation. We advise the student to keep some appropriate margins, just in case printing the file is desired; but adherence to strict rules for margins is less important than with a printed copy. As long as the file is viewable on a computer monitor (taking into consideration the cross-platform issues previously discussed) via means reasonable for the greatest number of potential viewers, we will accept the file. If the final state of the dissertation is a paper printout, then that is what should be submitted.

Deeper yet: will digitization change how the dissertation is conceptualized?

Along with the explosion of distribution that is beginning to occur as dissertations become available digitally, the most profound change that digitization brings is in the broadening of the possibilities for expression of a dissertation's ideas. Here are just a few innovative possibilities:

New content and subject possibilities due to multimedia inclusion

The ETD initiative at the University of Texas at Austin began when, in 1996, a student named Leslie Jarmon approached the Office of Graduate Studies with a request to turn in her dissertation on CD-ROM instead of a paper printout. Her request, which was granted, led to the faculty legislative body's decision to make electronic dissertations mandatory for all graduating doctoral students at Texas. The impact of her request was due to her contention, powerful in its simplicity, that the expression of her dissertation project (the interpretation of "body language" as it influences communication among people) was impossible via a traditional paper product[6]. The submission of electronic dissertations will reveal research projects and means of expressing analyses we cannot imagine at this time.

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[6] http://www.edb.utexas.edu/projects/mmdesign/fall96project/How/Dissertation/leslie.html

In addition to new projects heretofore impossible, electronic dissertations will allow traditional (paper-possible) projects to include previously impossible extensions. For example, my own dissertation on the modernization of Chinese music in the 20th century[7] was limited to verbal description of events I attended in Beijing in 1987 and 1989. With multimedia capabilities, this dissertation now could be conceptualized to include audio files of interviews I conducted (including demonstrations of traditional instruments) and/or performances I attended. The result would be somewhat different (and perhaps profoundly different) from the dissertation I produced in 1992.

Non-linear conceptions

This "paper" is conceptualized linearly – that is, it is intended to be read from beginning to end (indeed, some of the later remarks <u>assume</u> familiarity with earlier ones). With the increased interactive possibilities (see above) and the ease of accomplishing these in digital dissertations, non-linearity becomes more easily accomplished than with a paper final product. Non-linear possibilities result from increased interactivity. Most, if not all, dissertations, present an "argument" -- that is, they try to convince the reader of something. Most do this by starting at one place and gradually building "data" or "evidence" for the author's point(s). Digital dissertations more easily allow for other forms of argumentation to be presented. The dissertation could lead the reader through a series of mini-arguments (the order determined by the reader) that, taken together, present a convincing argument. Other possibilities will certainly emerge. A result of the rise of non-linear conceptions will be the questioning of the start-here and end-there form of argumentation as standard and necessary.

Interweaving with other sources

The possibility and ease of active linking among different objects allows for a digital dissertation to link to sources of information (integral, complementary, or supplemental) external to the dissertation objects that are submitted at the time of graduation. This could significantly increase the spread and scope of information experienced by the reader of a dissertation, thereby making the experience more valuable for, say, a scholar doing research. Linking also raises the possibility of collaborative dissertations among students at different locations, each maintaining a separate group of objects that together comprise the dissertation.

Interactivity

Digitization increases interactive potential. All media are interactive to some degree (passively reading is interacting, as one can choose to cease reading and do something else -- but it is a low level of interaction). Print media involving extended description and

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[7] http://magnoliaarts.com/brace.pdf

analysis (such as dissertations) require attentive interaction with the ideas presented, but the media is "invisible" as it guides the reader through the document. If the reader decides to cease interaction or skip over some of the document, s/he is aware of pulling out of the interaction requested by the document.

With digital dissertations, documents can allow or request a higher level of interactivity on the part of the reader/viewer. The dissertation can, for example, ask questions of the reader, the answers then becoming part of the dissertation; these answers can even determine what part of the dissertation the reader is presented with next. This is a very high level of interaction: the readers become part of the dissertation.

On a lower level than that is a dissertation that offers multiple entry points into the dissertation, and multiple entry and exit points for each "section" thereafter. The reader doesn't respond to the dissertation, except to take a more active role in choosing how s/he experiences the dissertation (with no "path" being presented as the preferred one).

Moving straight to interpretation

The inclusion of multimedia objects within a digital dissertation extends the range of data that can be "shown" rather than just "described." In paper dissertations, for example, an art student could insert a replica of a Van Gogh painting analysed in the text. Imagine how hard it would be to analyze this painting if the author had to describe it instead of showing it to the reader. Digital dissertations extend this capability to processes -- in fact, to any kind of movement or change through time. Authors can omit description and move directly to the deeper level of interpretation and analysis -- the point of high level scholarship.

Revealing primary data to readers

If scholars wish to do so, digitization makes simpler and more convenient the revelation of source data for the scholar's interpretation. This kind of revelation is controversial in some of the humanities disciplines (e.g., anthropology), with many scholars uncomfortable with the thought of "showing their work" to readers. Entering into this discussion is beyond the scope of this presentation; suffice it to say that it is easier to make available such things as original field notes (e.g., scanned handwritten notes) or informant interviews (e.g., video files) in a digital dissertation.

Summary Comments on Conceptualization Issues

Technology is a form of extension. New technologies increase our reach into areas previously unavailable. In addition, the technological standards at any given time influence the possible choices (and those most easily and conveniently chosen among the possible) a scholar makes during a project's conception. Print placed limitations on what

the scholarly world considered appropriate for expression in a dissertation. The extensions of this sense of appropriateness are opening up as we transition into an information era dominated by digital exchange. In this period, most of the early uses of the new technology are reproductions of what was the standard in the previous period. Thus, the vast majority of the dissertations submitted to Texas in its first year of mandatory digital submission were simply traditional text dissertations transferred to PDF -- that is, their conceptualization was identical to what it would have been had the digital requirement not been in place. Movement out of this area in a more innovative one will take place slowly (as it should). Some innovations will be abandoned; others will become the standards of the future, and we will wonder how we ever managed without them.

Problems with digital dissertations

Problems with innovation

Innovations, by definition, deviate from the status quo. Experts in a given field, even if supporting or encouraging innovation within that field, prefer the innovation to go in a certain direction. Innovations concerning process or presentation can be more challenging than innovations that occur within more traditional frameworks of presentation. Experts, in this case dissertation committee members (mostly but not exclusively faculty), see themselves as stewards of a field of knowledge. How will they react when presented with an innovative electronic dissertation that cannot be judged by the methods they are used to employing? Interactivity, non-linear arguments, collaborative dissertation projects will present serious challenges to faculty trying to assess the quality of the ideas in such a dissertation and to prepare a graduate student for a successful career.

This last point is crucial: even if a student convinces his or her dissertation committee to support an innovative dissertation project, will potential employers be as sympathetic? In this, as in other situations, the dissertation committee members have an important role to play in gauging the ability of their field to absorb and accept innovations. It is destructive to a career when an innovative project is completed, only to have the "experts" in the field that comprise potential employers underestimate the qualifications of the young scholar because s/he did not do the same kind of dissertation that the "experts" had done (or that the majority of the other candidates for the same positions had done.)

Problems with longevity

It might not be a popular thing to say, but I think it nevertheless true that we enter the age of the digital dissertation knowing full well that these dissertations carry a higher risk that they will not be viewable in 50 years as compared to paper dissertations. Let's make sure we enter this arena with both feet on the ground. Answers to critics who use this argument to deny the viability (or advisability) of moving to digital dissertations include the following:

1. What we gain outstrips what we lose: increased accessibility and ease of distribution and duplication will lead to a great increase in the readership of dissertations, thereby increasing their value to scholarship and to society (and early statistics from Virginia Tech and West Virginia support this). This increased use (and therefore usefulness) steamrollers concerns about longevity;
2. Trust the technological future: the standardization of PDF as the format of choice, along with this format's use in digital information in general, leads to a fair assurance that technological advances will not leave millions of digital documents unreadable. Third-party plugins for Adobe Acrobat can translate a PDF file back into a word processing document, from which preferred file formats of the future could be derived. The technology of the future can be trusted to allow us to continue to view digital files created today (especially if those files are of value to the society); and
3. Duplication insures longevity: the ease of duplication of digital dissertations insures that, at any given time, there are multiple copies circulating of a given dissertation. This is the genius behind the LOCKSS project, which endeavors to increase the chances of greater longevity for digital dissertations by setting up multiple servers around the world that will distribute copies as requested, thus hoping to avoid the disastrous historical and cultural effects caused by the destruction of the ancient library at Alexandria, Egypt, where great volumes of works of tremendous intellectual and artistic value were lost forever due to inadequate duplication of the contents of their long-lived materials.

Concerns about longevity are valid and should be addressed. They should not, however, and in fact are not, keeping the culture from moving away from paper and toward the digital creation and dissemination of information (including dissertations).

Problems with technology

Technological considerations are of a different nature with an electronic dissertation as compared to a paper one. With paper dissertations, the technological problems end once the product is printed; with electronic dissertations, the translation into a viewable product happens on the client side – that is, with the viewing hardware and software. The author-side technological issues with electronic dissertations are those that point to client-side access: fonts, graphics formats, cross-platform software, and file sizes, for example. The problems stem from lack of standardization on the client side vis-à-vis viewing hardware and software (whereas our "hardware" for paper dissertations – the eyes – are pretty standardized around the world), and from the constantly and rapidly changing technological products available that could be used in viewing an electronic dissertation's files. One has to trust that new products will be backwards compatible with the electronic dissertations currently being produced. Such a trust, though containing an element of

risk, is not blind, but rather puts its faith in the market, in companies that serve the market, and in technological innovation and progress[8].

Final Remarks

It is a platitude to say that much is yet to be settled with regard to many of the issues in the transition from paper to digital dissertations; yet it is also profoundly true. Intellectual property law was not designed for digital exchange of information; fonts were not designed to be embedded in digital documents. These and other cultural, legal, and technical structures produced for paper information production and exchange will have to change to accommodate the new era[9]. A major point to make here is that, despite these problems (including issues of archiving and longevity of access), momentum is on the side of digitization, wide distribution, and easy access. As I write this, there are whole fields of scholarship whose leaders are working to make the results of research available for free over the internet to any and all interested.

Some of the possibilities for digital dissertations mentioned in this presentation will become the norm; others will prove to be dead ends. Cultural and technological trends only now emerging will help to determine which is which. Institutions of higher education are for the most part moving slowly at this time, if they are moving at all. Each institution needs to find its own formula for performing its responsibility as a steward of a long intellectual tradition. Some are leading, others are holding back. Both positions have their risks. Those leading run the risk of producing leading-edge scholars whose pace of innovation outstrips their field's ability or willingness to absorb new ways. Those holding back risk losing the best and brightest students, who, generally, are excited by innovation and will attend those institutions that they see as producing leaders. Those who study tradition tell us that to remain alive, a tradition must change (and is in fact doing so continuously[10]). What is at issue in traditions is not <u>whether</u> they change, but rather <u>how</u> and how quickly.

It has been often stated that digital exchange and its conduits of dissemination (the internet) are contributing toward a "democratization" -- that is, a movement away from central control -- of information. A crucial issue in this trend is how information dissemination can be democratized and yet a reader or researcher can still be able to judge the quality of the information presented. The present system, which I believe will not survive (at least in its present state) involves scholars and publishers in a peer review system that "blesses" certain information, giving it cultural capital within a research field. This information assumes a privileged position, and its attitudes, questions, and conclusions become part of the scholarly tradition within a particular field (frequently by

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[8] For some interesting predictions about technological changes on the horizon in electronic publishing, see Fox (1998): *The Future of Electronic Publishing* in <u>Scholarship in the Electronic World</u>. Virginia Tech.
[9] See Schiavelli (1998): *Copyright: Who Owns the Universities' Research and Scholarship?* in <u>Scholarship in the Electronic World</u>. Virginia Tech.
[10] Handler & Linnekin, 1984 (cited in Brace 1992): *Tradition, Genuine or Spurious* in <u>Journal of American Folklore</u> 97: 273-290.

becoming part of a list of works students will read and analyze[11]). New structures for assuring quality while also accommodating quick and easy digital exchange will emerge. These will be internet-based and consumer-oriented. This last point is crucial: the present structure is owner-based. Journals and other publishers "own" information, and a consumer has to go to them for the information. The new structures (think AOL) will favor those entities (commercial or not) who can easily, conveniently, and inexpensively deliver quality information to the consumer.

The next generation of scholars will take digital information creation and exchange for granted. The creation of a digital dissertation for them will be an "of course -- what else would anyone do?" kind of experience[12]. Whole fields of research and analysis will emerge that were impossible or unwieldy in a paper world[13], and existing fields will be transformed by the new possibilities. Colleges and universities will need to accommodate the student leaders in these changes or be left behind.

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[11] See Hart (1998): *Scholarly Exchange: The Responsibility to Advance Knowledge in Graduate Education* in <u>Scholarship in the Electronic World</u>. Virginia Tech.
[12] At Dartmouth, some professors are assigning "multimedia essays" in which students are required to incorporate multimedia objects into their "papers" (Chronicle of Higher Education, June 14, 2002).
[13] For example, June of 2002 saw the First Congress of the International Society for Gesture Studies held at the University of Texas at Austin.