The Future of the Doctoral Dissertation

Summary, Agenda, and Proceedings

COUNCIL OF GRADUATE SCHOOLS

Introduction

Broadening notions of PhD career paths; team science; big data: so much about doctoral education is changing. Should dissertations change too? If so, how?

The CGS Future of the PhD Dissertation workshop, held in January 2016, convened top leaders in graduate education, publishing, library science, professional associations, and other experts to discuss the forces changing doctoral dissertations and how they might affect the future. Our goal was to identify key areas in need of further study and places where universities are in need of further guidance.

The papers prepared and circulated ahead of the workshop invited attendees to focus on big-picture questions affecting the enterprises of scholarly communication and graduate education, including:

- What is a dissertation? What is its purpose? Who are its audiences?
- What skills are or should be gained as a result of writing a dissertation?
- What new dissertation formats should be considered?
- How should dissertation research be archived, accessed, and disseminated?
- What is the role of the dissertation in the employment marketplace?

It is our hope that the papers compiled in this volume will invite your wide-ranging reflection about why the dissertation exists and whom it serves.

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Future of the Dissertation Workshop Agenda

January 28-January 29, 2016
Glover Park Room, The Dupont Circle Hotel
Washington, DC

Wednesday, January 27

5:30 – 6:30 p.m. **Networking Happy Hour** *Café Dupont*
Hosted by Suzanne Ortega, President, Council of Graduate Schools

Thursday, January 28

8:30 – 9:00 a.m. **Continental Breakfast**

9:00 – 9:15 a.m. **Welcome: Three Forces of Change**
Suzanne Ortega, President, CGS

9:15 – 11:00 a.m. **Trends in Scholarly Communication**

A Brief History of Doctoral Discourse
Christopher Loss, Associate Professor of Public Policy and Higher Education, Associate Professor of U.S. History, Vanderbilt University

Current Usage of Dissertations
Cassidy Sugimoto, Associate Professor of Informatics, Indiana University
Austin McLean, Director, Scholarly Communication and Dissertations Publishing

Moderator: M. J. T. (Mark) Smith, Dean of the Graduate School; Birck Professor of Electrical and Computer Engineering, Purdue University

11:00 – 11:15 a.m. **Morning Break**

11:15 a.m. – 12:45 p.m.	**The View from Scholarly Presses and Journals** John Sherer, Spangler Family Director, University of North Carolina Press Gita Manaktala, Editorial Director, Massachusetts Institute of Technology Press Greg Britton, Editorial Director, Johns Hopkins University Press Moderator: Nancy Marcus, Dean, The Graduate School, Florida State University	
12:45 – 2:00 p.m.	**Lunch**	*Café Dupont*
2:00 – 3:00 p.m.	**Open Access and Institutional Repositories** Mary Molinaro, Chief Operating Officer and Service Manager, Digital Preservation Network Lisa Schiff, Technical Lead, Access & Publishing Group, California Digital Library, University of California Office of the President Moderator: Brenda Brouwer, Vice-Provost and Dean, School of Graduate Studies, Queens University; President, Canadian Association for Graduate Studies (CAGS)	
3:00 – 3:15 p.m.	**Afternoon Break**	
3:15 – 4:45 p.m.	**Opportunities created by Emerging Technologies** Katina Rogers, Deputy Director, Futures Initiative and HASTAC@CUNY at the Graduate Center, City University of New York Carol Tenopir, Chancellor's Professor, School of Information Sciences, University of Tennessee, Knoxville Tara McPherson, Associate Professor, Gender Studies and Critical Studies, School of Cinematic Arts, University of Southern California Moderator: Steve Matson, Dean, The Graduate School, University of North Carolina at Chapel Hill	
4:45 – 6:30 p.m.	**Evening Break**	
6:30 – 8:00 p.m.	**Dinner**	*Foxhall*

Friday, January 29

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8:30 – 9:50 a.m.	**The Future of the Dissertation in the Humanities** Sidonie Smith, Mary Fair Croushore Professor of the Humanities, University of Michigan Paul Yachnin, Dept of English and Institute for the Public Life of Arts and Ideas, McGill and Director of Future Humanities 2—the TRaCE project Moderator: John Stevenson, Dean, the Graduate School; Professor of English, University of Colorado, Boulder
9:50 – 11:10 a.m.	**The Future of the Dissertation in the Social Sciences** Virginia R. Dominguez, Edward William and Jane Marr Gutgsell Professor (of Anthropology, Jewish Studies, Middle Eastern Studies, Global Studies, and Caribbean Studies), University of Illinois@Urbana-Champaign Jennifer L. Hochschild, Henry LaBarre Jayne Professor of Government and Professor of African and African American Studies, Harvard University Moderator: Edelma Huntley, Dean-in-Residence, Council of Graduate Schools
11:10-11:20	**Morning Break**
11:20 – 12:40 p.m.	**The Future of the Dissertation in the Natural Sciences** Tom Rudin, Director, Board on Higher Education and Workforce (BHEW), National Academies of Sciences, Engineering, and Medicine Alan Leshner, CEO Emeritus, American Association for the Advancement of Science (AAAS) Moderator: Mohan Kankanhalli, Vice Provost (Graduate Education) and Professor of Computer Science, National University of Singapore
12:40 – 1:00 p.m.	**Facilitating the Future of the Dissertation** Suzanne Ortega, President, CGS

A Brief History of Doctoral Discourse

Christopher P. Loss

Vanderbilt University

It has been eight years since I defended my dissertation at the University of Virginia, where I completed two doctorates—one in US history and another in education—before embarking on my professorial career at Vanderbilt University. To the extent that experience counts for anything, I suppose I am qualified to write this brief history of doctoral discourse.

Hopefully the title will elicit a soft chuckle: "a brief history of doctoral discourse." Everyone knows that there is almost nothing about the dissertation that is ever brief. I promise to try and keep this essay as short and on point as possible.

With this goal in mind, let me cut to the chase: the dissertation is the wellspring of scholarly communication and of the higher education enterprise itself. It is how disciplinary communities stake out their intellectual turf, stay together, move forward, and why they break off in new directions. In a real way it is the starting point of the entire knowledge production process and the main pathway whereby research—and the scholars who create it—gets spun out into the world. Within the university the dissertation is everything.

For anyone who has written a dissertation, I am not sharing trade secrets when I tell you it is a slow, plodding process that exacts a physical, psychological, and financial toll. The mere thought of "the diss" stirs up a flurry of competing emotions ranging from sadness to joy, and if you are like most people I know, not thinking about it at all is the preferred coping mechanism—if you can, that is.[1] The dull black binding with the gold-colored inlaid script; the signature page with the illegible scrawls; the heart wrenching acknowledgements; all those pages with all those words and equations; typefaces, spacing, and margins drawn to exact specification; and, of course, the punchy bouquet of ink, glue, and papyrus that only a dissertation emits. The dissertation is not easily forgotten.

In the United States the dissertation serves as the passport to a doctoral degree and a career in the academy, and has for a longtime. Like so much of our higher education system, the dissertation-doctorate was a German import brought here by American "Doktors" who studied at the great universities of Gottingen, Leipzig, Heidelberg, and Berlin in the nineteenth century.[2] Smitten by Wissenschaft, or systematic research, and the impressive social status that it conferred, they incorporated the research doctorate into the nascent American university complex that awarded 3,500 Ph.D.s by 1900. Slowly at first, then rapidly around World War II when government investment in research and development exploded, graduate training rocketed to life. By 1960 doctoral production exceeded 10,000 per year, a number that has climbed to 50,000 today, in 273 distinct fields,

[1] One study indicated that the lack of research on the dissertation is due to the stress and trauma of writing one. For more on this, see William G. Bowen and Neil R. Rudenstine, In Pursuit of the Ph.D. (Princeton University Press, 1992), 2.

[2] On the German roots of the dissertation, see William Clark, Academic Charisma and the Origins of the Research University (University of Chicago Press, 2006), 183–238. On the rise of the American university, see Laurence R. Veysey, The Emergence of the American University (University of Chicago Press, 1965).

from 297 different institutions, a third of which are classified as "RU/VH" ("very high research activity") under the Carnegie Classification of Institutions.[1] Although the country's share of worldwide Ph.D. production has been eclipsed by China in recent years, the US remains the gold standard for advanced training, and in virtually all fields—from engineering and science to the social sciences and humanities—a dissertation is required to earn a degree.[2]

That is where the problems start, since most students who set out to get a Ph.D. never end up with one. And those candidates who do take more than eight years to finish, on average, and then several more years, on average, to land an academic job, that is, of course, if they land one at all.[3] The misery of the academic labor market is nothing new, though with rare exception it has only been in the last several decades that scholars and learned societies, professional associations, philanthropic organizations, and some universities have taken a close look at graduate training and thought about ways to improve it.[4] Different fixes have been proposed, though most reformers agree that increasing aid and benefits, admitting smaller cohorts, encouraging interdisciplinary work with practical rather than theoretical applications, and preparing students for alternative, which is to say, non-academic, employment, is a good place to start.[5] All this in the name of cutting down the time-to-degree and shoring up a massive but deeply divided academic labor force in which half of its 1.6 million members are "contingent faculty" of one classification or another.[6] Over all, there have been a lot of reports and even more handwringing, though not necessarily that much coordinated action. Graduate education is an untidy business and universities have never been particularly well organized in this country. Institutional autonomy is prized above all else so most universities are still doing what they've always done: scouring the admissions pool for the most talented students and then bringing them in for what amounts to a lengthy apprenticeship in which there is a greater likelihood of failure than success.

At or near the center of this ongoing discussion is the Sisyphean task known as the doctoral dissertation—the heart's blood of all scholarly communication. What is to be

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[1] Chris Golde and George Walker et al, *Envisioning the Future of Doctoral Education* (Jossey Bass, 2006), 3; NORC, Survey of Earned Doctorates (SED), available at http://www.norc.org/Research/Projects/Pages/survey-of-earned-doctorates-(sed).aspx (accessed Nov. 30, 2015); Doctoral-granting University Data, Carnegie Classification of Institutions of Higher Education, available at http://carnegieclassifications.iu.edu/descriptions/basic.php (accessed Dec. 4, 2015).

[2] David Cyranoski et al, "Education: The Ph.D. Factory," *Nature*, April 20, 2011, available at http://www.nature.com/news/2011/110419/full/472276a.html (accessed Nov 21, 2015).

[3] Leonard Cassuro, "Ph.D. Attrition: How Much Is Too Much?" *Chronicle of Higher Education*, July 1, 2013, available at http://chronicle.com/article/Ph.D.-Attrition-How-Much-Is/140045/ (accessed Nov. 22, 2015); Dan Edmonds, "More Than Half of College Faculty Are Adjuncts: Should You Care?" *Forbes*, May 28, 2015, available at http://www.forbes.com/sites/noodleeducation/2015/05/28/more-than-half-of-college-faculty-are-adjuncts-should-you-care/ (accessed Nov. 22, 2015).

[4] For the earliest and most thorough study of the formative years of U.S. graduate education, see Bernard Berelson, *Graduate Education in the U.S.* (McGraw Hill, 1960). The more recent wave of interest was galvanized by Bowen and Rudenstine, *In Pursuit of the Ph.D.*, in the early 1990s, as well as by the Carnegie Foundation for the Advancement of Teaching and the Council for Graduate Schools, which in 2010 launched The Ph.D. Completion Project.

[5] For this distillation, see Louis Menand, *The Marketplace of Ideas: Reform and Resistance in the American University* (W.W. Norton & Company, 2010), 141–55.

[6] Faculty data at all Title IV institutions in NCES, "Enrollment and Employees in Postsecondary Institutions, Fall 2014," USDOE, p. 10, available at http://nces.ed.gov/pubs2016/2016005.pdf (accessed Nov. 22, 2015).

done with it? Should it be abolished? Or can it be improved? Does it remain an important vessel of scholarly intercourse? Or is it a useless relic of a bygone academic era? In short, what is the future of the doctoral dissertation? Does it even have a future?

To answer these questions requires a clear understanding of the mission of the modern research university that emerged after the Civil War. The architects of the institution, president-reformers like Charles William Eliot of Harvard, Andrew Dickson White of Cornell, and Daniel Coit Gilman of Johns Hopkins, backed by wealthy Gilded Age tycoons, sought to upgrade the fusty old-time college with a less fusty university. Both models would teach students and serve society though it was the research function of the university that distinguished the two, at least until "research" suffused the entire system. Soon enough the Ph.D. became the required credential for entry into the academic professions and specialized research in one of the budding disciplines the key to staying there. President Gilman of Johns Hopkins, then and later one of America's most fecund Ph.D. producers, captured well the professoriate's new role, declaring in his First Annual Report: "It is their researches in the library and the laboratory … which will make the University in Baltimore an attraction to the best students, and serviceable to the intellectual growth of the land."[1]

Not just any research, however, but focused, independent investigation in a specific field of study. Exact requirements varied from school to school, one disciplinary department to another, but well before the charter members of the Association of American Universities (AAU) convened for the first time, in 1900, to hash out uniform Ph.D. requirements most schools were already following Johns Hopkins' lead: two years of study beyond the BA in "one main subject" and "one subsidiary subject," followed by oral and/or written exams, and the researching and writing of an "elaborate thesis" prepared over the course of "the greater part of an academic year."[2] Except for the comparatively speedy three-year time-to-degree, the other pieces of the Ph.D. puzzle, centered on the dissertation, have endured.

So too has the criticism of the degree. Not long after the AAU standardized doctoral requirements, William James of Harvard entered the fray, warning that the "Ph.D. Octopus"—the pointless over-credentialing of pedagogues—was about to capsize the university ship.[3] This never happened because neither James, a trained medical doctor who never bothered with a Ph.D., nor anyone else ever came up with a good substitute for it. The doctorate may have been "a sham, a bauble, a dodge," as James bombastically claimed (ironically, at the time the M.D. was the bigger sham), albeit a necessary one to ensure the growth and success of the university and the professors who called it home.[4] Then as now, the main goal of doctoral education was to confer expertise by winnowing out the amateurs from the experts, and a rigorous test of intellectual mettle was perforce required to determine an individual aspirant's qualifications for membership. The dissertation was, and remains, that test; you cannot have a university without it.

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[1] Hugh Hawkins, *Pioneer: A History of the Johns Hopkins University, 1874–1889* (Cornell University Press, 1960), 65, italics added.

[2] John Higham, "The Matrix of Specialization" in *The Organization of Knowledge in Modern America, 1860–1920*, ed. Alexandra Oleson and John Voss (Johns Hopkins University Press, 1979), 11.

[3] William James, "The Ph.D. Octopus," *Harvard Monthly*, XXXVI (1903), 1–9, cited and discussed in Frederick Rudolph, *The American College and University: A History* (University of Georgia Press, 1962), 397.

[4] The dire state of medical education was subsequently exposed with the release of the Flexner Report in 1910, written by Abraham Flexner with support from the Carnegie Foundation.

At the same time, the dissertation is not just any test but a major milestone marking the culmination of one private, cloistered phase of academic life and the start of a new, more public one. The dissertation typically begins in conversation between student and advisor, and for much of its formative period of development, as it moves from an idea to a proposal to a draft, the advisor and the committee, and perhaps a trusted friend, are the only people who read it. The dissertation, truth be told, is a selfish document, and the author guards it with great jealously; it is written for the candidate and her committee and no one else.

Once the dissertation is signed, sealed, and delivered it enters its public phase of existence. The document, now repackaged as a book-like bound volume, is made available in the library stacks, online via Proquest, or for purchase, unless it has been embargoed. It is ready to be read, and read it will be by search committees and fellow specialists and by a few "proud" loved ones and family members (who never really read it). Some of these dissertations will yield articles, chapters, and books that propel their authors into fulltime jobs and, fingers crossed, tenured appointments. Of these a small subset of especially talented scholars may produce work that has a major, transformative effect on an entire field of study, changing the way fellow professionals and graduate students will think about and conduct their own research in the future. An even smaller subset—the best of the best, or maybe the luckiest—will make a profound "discovery" that reaches beyond the confines of the academy, that comes, improbable though it may seem, face-to-face with "regular people" who may now benefit from its wider circulation.[1]

Admittedly few dissertations ever achieve this level of impact. To the contrary, most dissertations remain buried in the stacks collecting dust, quiet and forgotten testaments of the grit and determination of the students who wrote them. It is for this reason that we are debating the very purpose of the dissertation as a vehicle of scholarly discourse. If few dissertations are ever read, if their public life remains shrouded in mystery, what is the point? Why not entertain other modes of certification? The dissertation is an historical construction after all, so maybe we should try something else? Updating and improving it, we have been told, might help both the dissertation and the universities that award them better meet society's changing political, economic, and intellectual demands.

The push for a "new dissertation" has been especially pronounced in the arts and humanities, an area I know well, where time-to-degree is longest and the market for tenure-track jobs, or any job requiring doctoral training, is tough to crack. In recent years there have been task forces, reports, books, and articles aplenty that have probed the dissertation dilemma and posited possible solutions to it, including everything from casting it into the proverbial "dustbin of history" to "re-envisioning" it for 21st century.[2]

To my knowledge there is not any firm data on where the academic profession stands on this matter, but I would wager that most faculty members have barely thought about it. As the direct beneficiaries of the existing model, who have the jobs they have in large

[1] For an enthusiastic defense along these lines, see Jonathan R. Cole, *The Great American University: Its Rise to Preeminence, Its Indispensable National Role, Why It Must Be Protected* (Perseus Books Group, 2009).

[2] Stacey Patton, "The Dissertation Can No Longer Be Defended," *Chronicle of Higher Education*, Feb. 11, 2013, available at http://chronicle.com/article/The-Dissertation-Can-No-Longer/137215/ (accessed Dec. 3, 2015); "Re-envisioning the Ph.D.," available at http://depts.washington.edu/envision/project_resources/Ph.D._career/resumes.html (accessed Dec. 3, 2015), cited in Menand, *Marketplace of Ideas*, 141.

part because they wrote a "good" dissertation, why would they? Among those who have contemplated the future of the dissertation, whether as a scholarly subject or as a member of some professional association task force, my sense is that most faculty favor renovating and expanding the model rather than bulldozing over it.[1] Hence calls for "soft" alternatives to the sole authored magnum opus, such as the portfolio model, the "digital" thesis, and the group-based capstone project where students meld theory and practice in order to solve a real-world problem.

These are several of the ways in which the traditional dissertation has been "re-envisioned" in the last decade. Each of them still requires lots of time and resources, and whether they will improve on the model we already have, or just diminish its value, is anyone's guess. Yet I think it is crucial that we continue to think about the future of graduate education and the role that the dissertation should play in it. And we need to be open to the possibility that a new and better model, more appropriate for the demands of our own time, might yet emerge from the experiments now underway.

To get it right we will have to move beyond the dissertation, however, and ruminate on an even bigger issue: the future of graduate education and the difficult governmental and financial dynamics that now surround it. Is our society committed to higher learning and willing to invest in it? Do we believe in scientific and humanistic inquiry? Or have the worsening budget cuts and the crippling political partisanship of the last several decades irreparably damaged our capacity to create new knowledge to change the world? And, closer to home, what responsibility must we, the faculty and administration, bear for the wanton overproduction of graduate students in fields that are simply incapable of absorbing new initiates? Can we build a better and more efficient university than the one we have now? Or can that only be achieved at the expense of the creativity and spontaneity necessary to produce cutting-edge research? Do we understand our social mission and are we willing to defend it? These are fundamental questions, and how we choose to address them will determine both the fate of the dissertation and that of the American research university.

[1] The most well publicized recent study was issued by the Modern Language Association, Report of the MLA Task Force on Doctoral Study in Modern Language and Literature (May 2014).

Current Usage of Dissertations: A Global Perspective

Austin McLean,

ProQuest, USA

The changing nature of scholarly communication

Technological disruption has impacted higher education profoundly in the last 15 years. No aspect of higher education has been untouched by the move from analog to digital technology. One of the most profound areas of impact has occurred in the master's theses and PhD dissertation arena. As the publisher of record for graduate research for nearly 80 years, ProQuest has an unparalleled view of this change both from a national and international perspective. The purpose of this paper is to share our observations regarding usage and formats of dissertations around the world. These observations are based upon our experiences as a disseminator of over 4 million dissertation and theses, reaching back to dissertations from as early as 1637.

The rise of the ETD

In 1997, Virginia Tech became the first university in the world to mandate ETDs (Electronic Theses and Dissertations). Also in 1997, ProQuest began to digitize all paper dissertations and theses and provide them in an online database called "ProQuest Dissertations & Theses" (PQDT). There were many advantages to ETDs for both authors and universities. Authors benefited from lower or completely eliminated printing costs as well as wider distribution due to their work being easier to transmit in electronic format. Author creativity was also expanded due to the more flexible standards that many universities offered for ETDs as compared to printed formats. Universities benefitted from shelf space savings and the ability to take advantage of digital storage and electronic dissemination.

At ProQuest, we have seen a substantial rise in the number of ETDs, beginning in 2001 when we received 3% of all dissertations and theses in electronic format. As ProQuest introduced the ETD submission and management tool, "ETD Administrator", this easy and accessible tool assisted many universities with the transition from paper submission to ETDs. The year 2009 was a tipping point in that it was the first year ETD submissions outpaced paper submission rates. The rapid decline of paper submissions began in 2010 as a tipping point was reached with most universities and authors comfortable with submitting using new electronic methods. In 2014, ETD submissions were up to 93% (figure 1).

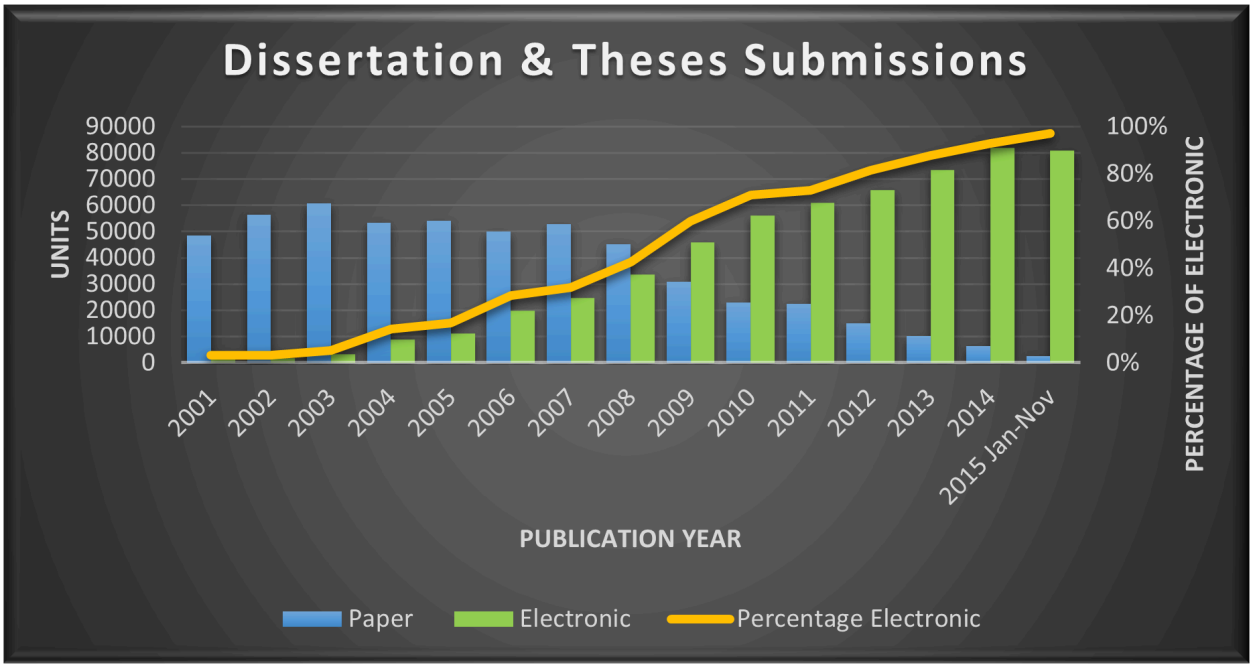

Figure 1: ProQuest Dissertation & Theses Submissions since 2001

Usage of ETDs

Because most North American-based universities contribute to the ProQuest program, the subject areas that comprise the nearly 2 million dissertations and theses available from ProQuest in full-text format map fairly closely with historical annual reporting of dissertations and their corresponding subject areas, including the Survey of Earned Doctorates (Figure 2).

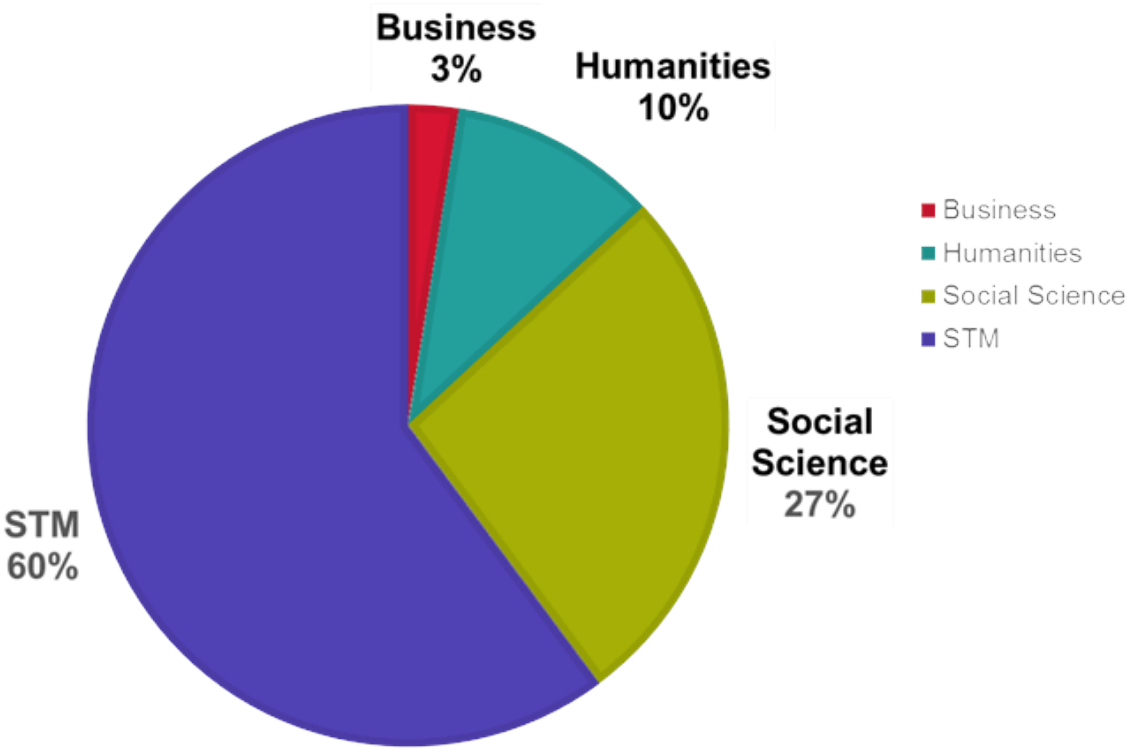

Figure 2: Distribution of full text ETDs in ProQuest databases by subject

When usage of dissertations is viewed by subject area, a different picture emerges (figure 3). For example, usage of STM dissertations, which consists of 60% of all graduate works received, are accessed less often via ProQuest, at only 40% of all full text accesses. Conversely, graduate works in the subject area of business comprise only 3% of all graduate works received, yet account for 11% of all graduate works accessed on the ProQuest platform. Both social sciences and humanities graduate works are used on a percentage basis more than their percentage of content received, with humanities being used 11% as a total of full text retrievals compared to 10% as a percentage of deposits. Social science ETDs comprise 38% of all downloads while only making up 27% of the total of graduate works received.

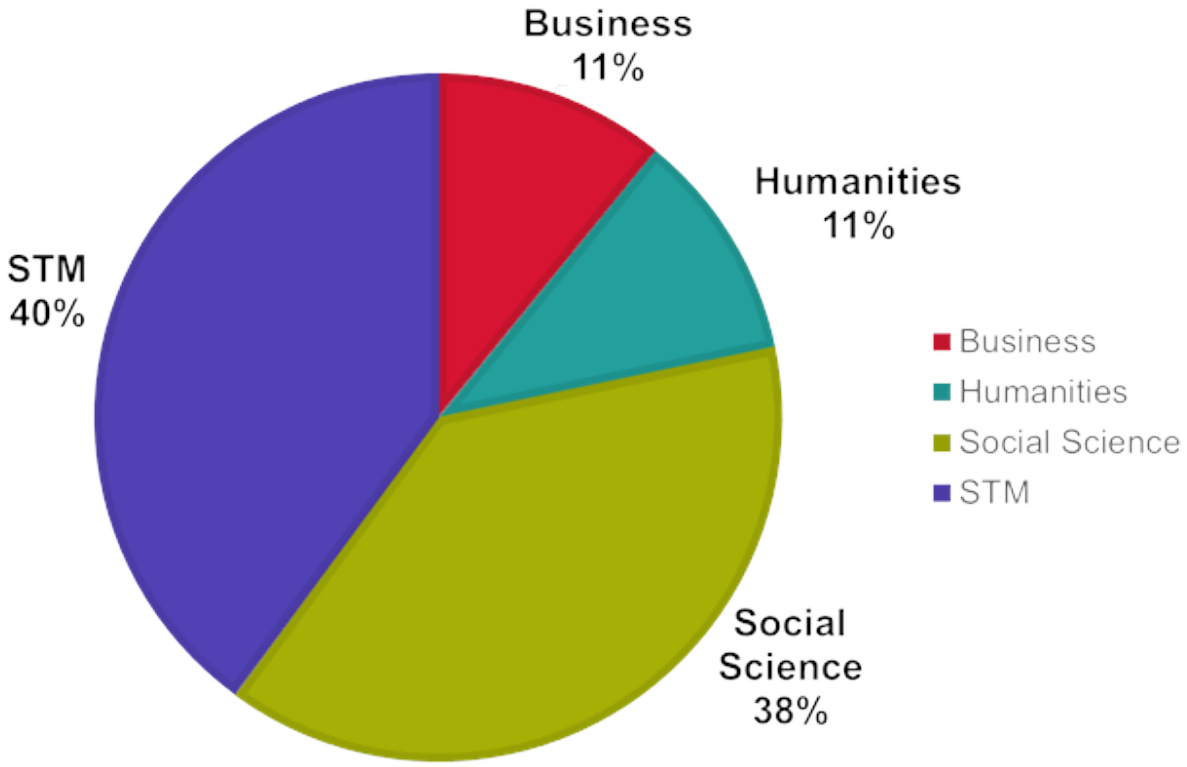

Figure 3: Usage of ETDs via the ProQuest platform (2013 – 2014) as a percentage of all ETDs downloaded. (Accesses include all full text downloads via ProQuest, including access via the ProQuest Dissertation & Theses database (PQDT), other ProQuest databases which contain graduate works and full text downloads from subject indexes (such as MLA, SciFinder, Compendex, etc.) where ProQuest facilitates full text links)

ETDs allow for insight and research into usage not previously available with paper dissemination. Of the corpus of approximately 2 million graduate works that are available for download, business ETDs comprise the highest level of repeat downloads (figure 4). In the period 2013 – 2014, the average download of each business ETD was 15.6 times, making this segment the highest average of any subject's ETD downloaded via ProQuest. (We surmise that ProQuest's established position related to our ABI database impacts the usage of business-related dissertations.) Conversely, if an STM ETD was downloaded, it was downloaded an average of 2.4 times during the same period.

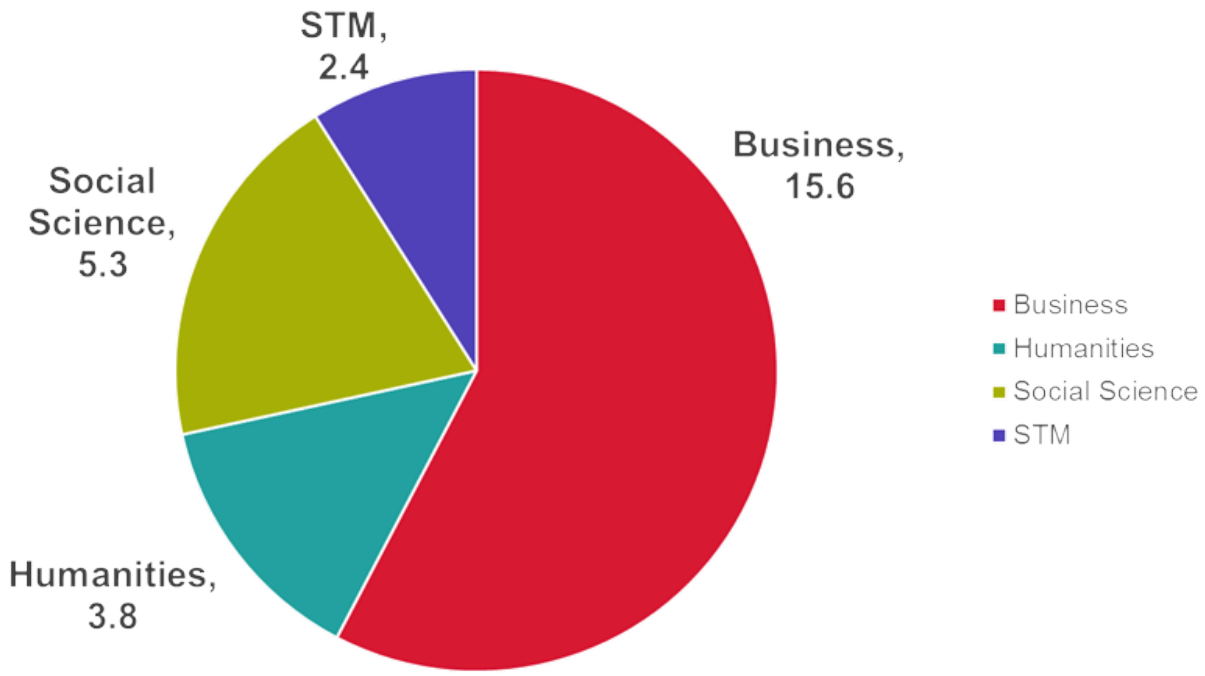

Figure 4: Average ETD downloads by subject via the ProQuest platform (2013 – 2014).

Next Generation ETDs

Most ETDs written in the Twentieth Century were simply PDF versions of dissertations that would have been created in paper format. However, some scholars in the Twentieth Century did create fully digital dissertations. The first such dissertation that ProQuest received was the 2000 dissertation titled "The Australian Theatre of the Deaf: Essence, Sensibility, Style," by Shannon Leigh Bradford from the University of Texas at Austin.

Today it is common to obtain dissertations with multimedia components. As seen in the chart below (figure 5), over the past 14 years, ProQuest has received nearly 4,500 ETDs with PDFs included as supplemental files. These PDF files are in addition to the primary ETD, which is most commonly also in PDF format. The supplementary PDF includes material such as a non-English abstracts, presentations, journal articles or other material. The second most prevalent file type, not including the "Other" category (which includes hundreds of various file types) is "Excel spreadsheets". Often these "Excel spreadsheets" include datasets which further expand upon the research contained in the ETD. Also prevalent as supplemental files are "Text," "Audio" and "Image" files.

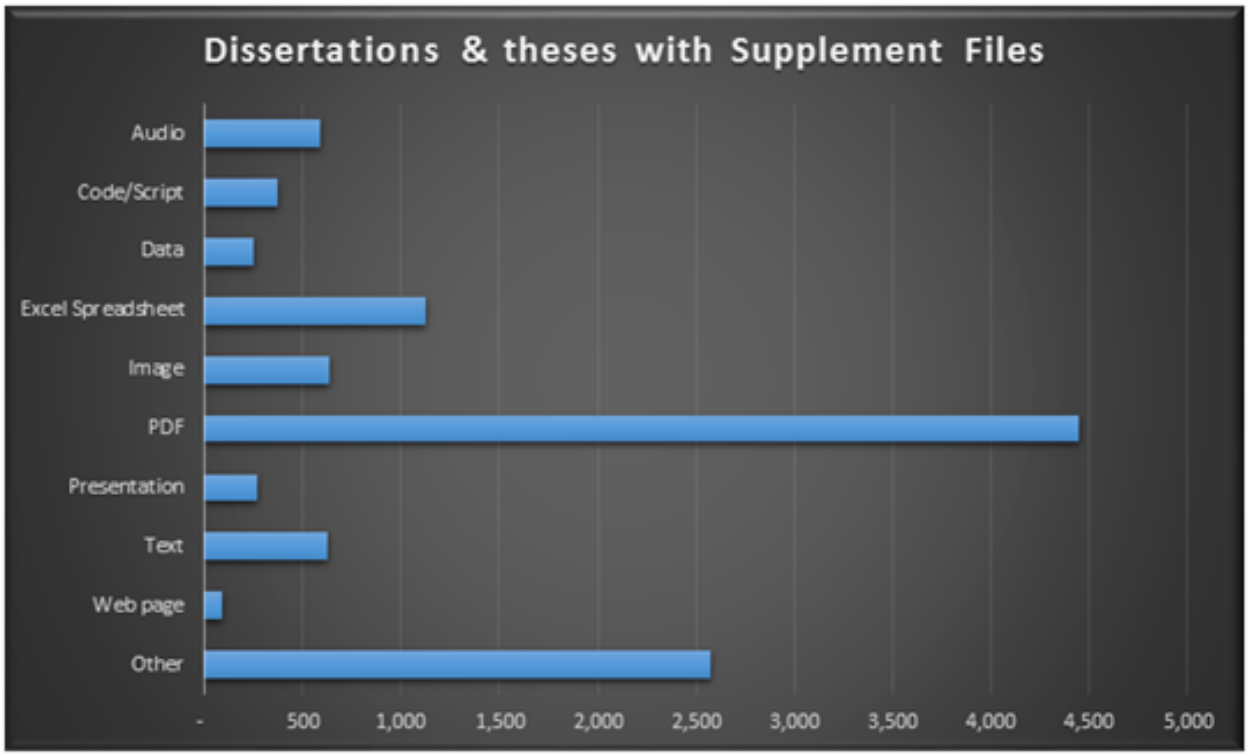

Figure 5: ETD Supplemental file types received by ProQuest since 1997

Full Text Embargos

One of the most hotly debated and contentious areas of ETDs relates to embargos. Embargos are defined as the length of time associated with withholding the viewing of full text. The growth of embargoes has occurred alongside the increase in number of open access university institutional repositories. Embargoes are often driven by an author or an advisor, with the length of the embargo typically agreed upon by working in consultation with the department or graduate school. The most common process is for a dialog to occur between the author and the graduate school prior to finalizing an embargo length.

Embargos are put in place by a variety of factors, most common being the desire for an author to derive additional value from the ETD prior to making it publically available. Reasons for embargos include patents, journal article publication, monograph publication or conference submissions. Most universities grant embargos for periods of 6 months – 2 years, while it is common for longer embargo requests to require permission from department chairs or graduate school deans. Many universities are willing to provide authors with extended embargoes past the initial agreed-upon term should the author be able to prove a need for the extension.

Conclusion

Scholarly publishing has undergone a vast change from analog to digital technology over the past 15 years. The evolution from paper to ETDs has helped graduate research output gain a much wider audience. By providing a national repository of dissertations and theses along with a free ETD submission and management system, ProQuest has been able to assist with the adoption of this new form of scholarly communication. Because of increased acceptance of ETDs on the campuses of universities throughout North American, authors now have the ability to take advantage of virtually unlimited creative expressions facilitated by ETDs.

Toward a Twenty-First Century Dissertation

Cassidy R. Sugimoto

I begin with a simple premise:

Nineteenth century dissertations are anachronistic in the twenty-first century.

The modern doctorate of philosophy—together with all its trappings—emerged in the late eighteenth and early nineteenth centuries. Previously, doctorates were reserved for theologians, lawyers, and medical doctors and were governed by particular social and pedagogical rituals. The rise of the research doctorate coincides with the emergence of the research laboratory as a model for science in the late nineteenth century (for more on the origins of the doctorate, see Clark, 2006). The dissertation was therefore aligned with the model of scholarship at the time.

I will argue in this essay that there is no longer alignment between the dissertation and contemporary models of knowledge creation and dissemination. As a brief example, early dissertations were actually written by the professor and defended by the student (who, incidentally, bore the cost of publication). Such a practice would be seen as both fraudulent and unethical in today's academic climate. It seems irrational and even irresponsible to assume that the form of the dissertation that emerged in the nineteenth century and stabilized in the early 20th century should still fit the needs of the contemporary education system. In this essay, I will examine some of the transformations in scholarly communication and the implications of these changes for the dissertation and doctoral education in the United States.

Good dissertations reflect the genre conventions (and inventions) of the disciplines.

It is well-established that there are different modes of production by discipline (e.g., monograph vs. journal article disciplines) and that these modes influence dissertation expectations. For example, the dissertation is intended to launch the pre-tenure book for humanists and many science and social science disciplines have adopted compilation models for dissertations wherein the dissertation is the aggregation of a series of journal articles. The goal is to align, as much as possible, the mode of inquiry and production with those that will be required post-graduation.

Conventions of dissertation writing in the humanities are fairly well-aligned for those who pursue academic, text-based, and sole-authored careers. However, this does not represent the majority. Fewer than half of humanities doctoral students, and less than a fifth of all doctoral students, will go on to academic positions (Weissmann, 2013). Those who do will find that, even in the humanities, collaborative publishing is on the rise (Larivière, Sugimoto, Tsou, & Gingras, accepted). Furthermore, doctoral students and faculty member in the humanities are experimenting with "non-traditional" forms of knowledge creation, trading in "the book" for digital humanities projects or other audio-video forms of production (Patton, 2013).

At present, these technologically-enabled projects are not mainstream. However, one must take care to watch the inventions within disciplines for potential transformations in the dissertation. Dissertations should be deeply embedded in the practices of the discipline and prepare students for the type of post-graduate work that they will be doing. For many disciplines and subdisciplines, the dissertation is a singular genre—once

completed, students will not return to this form again. I would argue that, were students asked to demonstrate their abilities in contributing to the genres of their discipline (and not hide these genres within the dissertation), this may lessen time to degree and make students more productive both during and following graduation.

Teams are the new academic persona.

The dissertation defense represents one of the last vestiges of the oral traditions that dominated early higher education. As noted earlier, the dissertation was previously disputational (Clark, 2006, p. 204): the trial for doctoral students was not defending something they had written, but rather something written by their professor. It was only in the nineteenth century that it became widespread practice for students to be authors: moving from disputational to authorial. Clark (2006) argues that the nineteenth-century doctorate of philosophy cultivated "a modern academic persona, a Romantic authorial person, exhibited through the masterpiece of the doctoral dissertation in which a spark of charism or genius, however small, must inhere" (p. 211). Charisma and genius, however, may not be the most important characteristics of the contemporary academic persona. The Romantic "hero of knowledge" (Clark, 2006, p. 211) has been replaced: teams are the new academic persona.

Collaborative research has become the modal form of research for the natural and medical sciences and is trending in this direction for the social sciences and humanities (Larivière, Sugimoto, Tsou, & Gingras, accepted). Therefore, collaborative work during the doctoral program and, I would argue, within the dissertation, provides a strong foundation for post-doctoral success. Empirical studies have supported this, demonstrating that students working in research groups during their doctoral time tend to be more productive post-dissertation than those who work alone on the dissertation (Platow, 2012; Larivière, 2012) and have higher completion rates (Larivière, 2012). Furthermore, the socialization process not only exposes students to cutting-edge research, but allows them to "perform" as scholars and as authors—navigating issues of authorship, research ethics, and scholarly communication practices with which they will be confronted post-graduation (Hakkarainen, Hytönen, Makkonen, & Lehtinen, 2016). Collaborative research also provides an opportunity for the doctoral students to take advantage of peer mentoring and other "mentoring constellations"--critical for doctoral education (Sugimoto, 2012a; Sugimoto, 2012b) Collaborative dissertation practices are the norm in many STEM disciplines, but are lacking widespread adoption in the social sciences and humanities. Of course, collaborative dissertations should not be superimposed upon disciplines where collective modes of investigation are not common. However, when collaboration is the norm, students should be acculturated into these modes of working during their doctoral work.

Contributorship models acknowledge distributed expertise and modularized participation.

Scholarly communication is, albeit slowly, transforming from an authorship to contributorship model (Rennie, Yank, Emanuel, 1997), particularly in fields marked by hyperauthorship practices (Cronin, 2001). Contributorship acknowledges that participation in the construction of new knowledge is not always strictly in the form of authoring the text of the paper. Rather, some authors never pen a word, but contribute to the design, analysis, or other tasks associated with knowledge production. For example, in a recent study of authorship in clinical and biomedical research, it was found that more than one-quarter of authors were associated with only one of five potential

"authorship" categories including: design, experimentation, analysis, contribution of materials, and writing. For all fields, the majority of authors were associated with three or fewer of the five authorship categories (Larivière et al., under review). The twenty-first century academic persona is therefore highly modularized: contributing in specialized ways to highly interdisciplinary and collaborative research. Should not the dissertation process reflect this modularization? How might a contributorship model of doctoral education be fashioned?

Badges have arisen in many sectors to acknowledge the composition of various skills exhibited by an individual, including authorship (Chawla, 2015). Used in a number of organizations and communities, badges serve as certification for a highly modularized and decoupled training. Many in higher education would be aghast at the proposition of badge-type organization of doctoral education: this might be seen as the continuation of a deterministic march towards the bureaucratization of neo-liberal education. It could also be argued that contributorship models favor a Taylorism of higher education, in which students demonstrate decoupled skills, but cannot design, argue, and defend a grand thesis. Allowing students to be credentialed on the agglomeration of skills might injure the entire ethos of the educational experience.

However, the proposition serves as a valuable thought-experiment in that it forces us to identify those criteria which a doctoral dissertation should fulfill. A contributorship model of credentialing could be seen as a way to eliminate the perpetual disparities in the scientific workforce. If each student was given an explicit template for what constituted work sufficient for a doctoral degree, it would demystify and thereby eliminate barriers—particularly for those who are first-generation college students or who have little social familiarity with academe. The myth of a dissertation, whose value is opaque and can only be judged by a select few (mainly the advisor, to whom all others defer) would be itemized in a contributorship model and, thereby, made transparent.

Doctoral education should educate and prepare, not haze.

Dissertations were originally seen as a series of "trials" that only the noble and strong could endure (Clark, 2006): the legacy of trial-by-fire remains in the oral "defense" of the dissertation. However, this is largely a theatre: few doctoral students are allowed to defend a thesis when it is not certain that they will pass. The defense—and in many ways the dissertation--has morphed from a rite of passage into a hazing ritual, whose pedagogical value is often unclear. It is necessary, therefore, for educators to identify more clearly what objectives are achieved through each of the milestones of the dissertation.

The implicit (and often explicit) message faculty members send doctoral students is that the only successful trajectory from doctoral education is to the Ivory Tower. Therefore, educational goals are framed around potential success in an academic market. Those who go into other sectors post-graduation are seen as either unfortunate or inevitable attrition. However, this is a great disservice to many doctoral students, given that half will obtain jobs outside of academia (Council of Graduate Schools and Educational Testing Service, 2010).

Non-academic employers of doctoral graduates have weighed in on what they see as desirable attributes of doctoral graduates: specifically, "skills related to working in a team environment, creating and delivering presentations, business acumen (skills necessary to deliver outcomes on schedule and on budget), project management, and the ability to

discuss technical issues with nontechnical individuals" (Council of Graduate Schools and Education Testing Service, 2012, p. 10). These employers have reported that doctoral students have high levels of expertise, but lack in many of these areas. The current rituals associated with the dissertation mask the persistent heterogeneity of the job market for doctoral graduates. Faculty members need to stop chastising and neglecting those doctoral students who aren't replicating precisely in their image and realign the doctoral experience to prepare students who can thrive in the dynamic and diverse knowledge economy.

Standards in credentialing must acknowledge the heterogeneity of the job market.

Many might argue that increasing the heterogeneity of dissertations could destabilize the academic labor market. Standardization in doctoral credentialing is based on the premise that this allows more efficient signaling to potential employers: a doctoral degree from a certain institution in a certain discipline will identify that the student has completed a type of work and has certain expertise. However, this simple signaling is already challenged by the contemporary doctoral process: students are highly specialized within their disciplines and conventions vary considerably from one institution to another (particularly across countries). Therefore, the dissertation has lost importance as a signaling device. A dissertation's value, in present form, is determined from a single criterion: that is, whether it has been completed. This speaks more to the genre as a hazing ritual than an opportunity to contribute to knowledge creation, particularly given the declining citation impact of dissertations (Larivière, Zuccala, & Archambault, 2008). Dissertations should now be evaluated for how they contribute to the discourse in the discipline. This is more easily achieved when they are speaking the language—and genre—of the discipline.

There are many mechanisms that allow us to distribute the credentialing process beyond the institution. For example, by requiring or encouraging students to publish during doctoral education, students are required to meet the epistemic standards of the discipline, rather than the local community (Hakkarainen et al., 2016). This involves the students in the collective practices of the global research community and, in many ways, is a better acknowledgement of whether or not they can meaningfully contribute to the academic dialogue. A move to external validation models is but one way doctoral credentialing can be expanded to include the increasingly global knowledge community.

This is particularly important given the trade of scholars across geographic borders. Doctoral education—and standards and expectations of the dissertation—vary drastically from one country to another. For example, the average doctoral degree in the United States requires a few years of coursework and takes, on average, seven and a half years and a full dissertation committee to complete (NSF, 2006). In the United Kingdom, theses are typically completed in three and a half years, without coursework, and under nearly exclusive supervision (EUA, 2007). Given the high mobility of scholars, universities are already transferring individuals across boundaries with very little standardization in credentialing. These people are widely judged on their prowess within the discipline: the ability to contribute to the field in disciplinarily-appropriate ways and the success of their research products, as measured from a variety of metrics.

Universities are also exchanging scholars across disciplinary boundaries with implications for the paradigmatic orientation of dissertations (Sugimoto, Ni, Russell, & Bychowski, 2013). The doctoral of philosophy was intentionally generalist in conception (Clark, 2006): focused on adequate ability to conduct research and engage in high-level

discourse on a variety of topics. In this era of heightened interdisciplinarity and specialization, universities need to reclaim some of the breadth and freedom of exploration under the broad umbrella of a doctoral of philosophy.

Doctoral students and dissertations are inputs as well as outputs of scholarship.

One can consider doctoral students both as output of the knowledge system and as input, that is, as a resource contributing to the generation of new knowledge during their time as students (Larivière, 2012). For example, in a study in Quebec, it was found that students were authors on a third of academic articles, though this percentage varied widely by discipline (i.e., highest in physics and lowest in the social sciences and humanities) (Larivière, 2012). The academic laboring of doctoral students can have immense benefits to the student and to scholarship, if this labor is ethically monitored and rewarded. However, by decoupling collaborative academic labor from the product of the dissertation, there is the potential for this labor to be peripheral and potentially exploitative. Reformed doctoral education should take academic labor into account in the credentialing process.

Dissertations can also serve as ripe objects of study. Large-scale and systematic collection of dissertations makes many types of analyses possible. Linking data allows for sophisticated academic genealogies: that is, "the quantitative study of intellectual heritage operationalized through chains of students and their advisors" (Sugimoto, 2014, p. 365). Analytic academic genealogies are particularly useful at revealing, in systematic ways, the evolution of epistemic communities. The assumption of analytic academic genealogies is that disciplines are propagated through knowledge transfer activities, of which doctoral education (and the interactions with trusted mentors) is one of these (Girves & Wemmerus, 1988). There are many reasons why analytic academic genealogies are useful and not mere navel gazing exercises. For example, it has been suggested that advisors may unconsciously choose advisees of their own race, thereby perpetuating advantages in science (Anonymous, 2011). These types of biases can be revealed through academic genealogies. If they are linked with other scholarly databases, they can also be used to reveal more in-depth information about networks of success and innovation.

Academic genealogy can also be used as an evaluative metric: "A scholar's lifetime is finite, but his contribution is amplified, enhanced, and extended through successive generations of mentees" (Sugimoto, 2014, p. 366). Therefore, the quantification of mentoring can serve to incentivize faculty members to engage in doctoral education. Studies have shown varied results in correlating mentorship (operationalized through doctoral advisorship (Sugimoto, 2012a)) with other metrics of success (e.g., citations and memberships in national academies) (Sugimoto, Russell, Meho, & Marchionini, 2008; Malmgren, Ottino, & Amaral, 2010). Access to more robust, open, and linked databases can help to illuminate some of these potential relationships.

Doctoral education is the entrance into open and linked scholarship.

Linking data is imperative for good academic genealogies. At present, the most comprehensive and high quality option for this is ProQuest's Dissertations and Theses database (Sugimoto, 2014). However, several limitations are present: notably, a bias towards English-language degrees conferred at North American universities (Sugimoto, 2014) and a misalignment between subject categories and disciplines in which the students received their degrees (Sugimoto, Russell, & Grant, 2009; Bowman, Tsou, Ni, & Sugimoto, 2014). Furthermore, and perhaps most fatally, advisorship information is only

comprehensive in recent years, making large-scale longitudinal academic genealogies difficult to do without manual data collection (Sugimoto, 2014). Several crowdsourced websites have emerged in recent years, but these lack validation and disciplinary breadth. At present, any linking between one database and another requires sophisticated author disambiguation techniques and extensive manual cleaning and validation. The optimal solution in an open scholarship era is to find mechanisms to link advisors and students with unique identifiers, such as ORCID identification numbers. Open and linked dissertation data could lend tremendous insight into doctoral education, the evolution of knowledge, and the construction of the scientific workforce.

Open is certainly the mot du jour: conversations around open access, open data, and open science dominate contemporary conversations of scholarly communication. The ideology underlying this conversation is that scholarship—as a public good—should be shared broadly within and outside of the academic community. Doctoral education provides an opportunity to acculturate students to open scholarship practices. Initiatives such as "Dance your Dissertation"[1] are light-heartened examples of a fundamentally important skill: what does it mean to be able to translate your 200 page dissertation into something that is meaningful to a wider audience? Credentialing in the twenty-first century should involve a demonstration that students can communicate broadly across disciplines and to the general public.

The twenty-first century dissertation is constantly evolving.

Acknowledging the heterogeneous needs of the contemporary knowledge society may mean decoupling doctoral education from the traditional concept of a dissertation, which has been shown to have marginal impact as a work of scholarship. Rather, it is the subsequent output which gains recognition and has value. Doctoral education should, therefore, be reconfigured to emphasize the engagement of doctoral students in disciplinarily-appropriate knowledge construction activities, rather than being subjected to what, in many disciplines, has devolved into a hazing ritual.

This doesn't mean a lessening of the rigor of doctoral education. In fact, it may actually make it more rigorous and, as a result, generate a more highly skilled and well-prepared scholarly workforce. Particularly in collaborative research environments, students will be acculturated into the norms of the discipline, have opportunities for distributed mentoring, and be exposed to the expectations of external reviewers. In humanistic areas, students will be better prepared to launch their academic career or, as will be the case for the majority of students, to leverage their expertise in non-academic environments.

The norms for the traditional dissertation reflected the norms of knowledge creation and dissemination of the time. Times have changed. So too must the dissertation. Furthermore, scholars should never assume that the evolution of the dissertation is complete. As the scholarly communication system continually transforms, so must faculty members reconsider the dissertation.

Acknowledgement

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[1] http://news.sciencemag.org/people-events/2015/05/announcing-2015-dance-your-ph-d-contest http://news.sciencemag.org/people-events/2015/05/announcing-2015-dance-your-ph-d-contest

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Bonfire of the Humanities

Greg Britton

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In the Humanities especially, dissertations have come to play a dual role, both as a credentialing device and as a book's first draft. This is a dangerous pairing in the current publishing climate. Publishing scholarly books, especially those peer reviewed and selected by a university press, continues to be the gold standard of quality for scholars. It is a measure of scholars' worth in the academic economy, a short-hand for excellence on a CV during searches and in tenure cases. This, however, gives editors remarkable power, and it holds scholars hostage to commercial forces.

The fact is, as editorial director of a large university press, I am a member of a small but influential group of individuals. Unintentionally, in the current state of the academy, this group has gained control over the scholarly careers of your students. We pick who gets published, and a nod from one of us means a chance at an academic career. This is not a role any editor wants to play, but it is one you have ceded to us. If I were you, I would be very concerned.

For a junior scholar that first book is often based on a dissertation. Having spent years researching and writing a dissertation, a new Ph.D. is then coached to "turn it into a book." This is an essential next step because it is the book that secures a job and possible promotion. As arduous a task as it is to create a piece of original, thoughtful, and nuanced scholarship that earns a Ph.D., however, it is even more difficult to land a coveted university press contract. The numbers bears this out: there are about 5,000 new Humanities Ph.D.'s awarded annually. At my university press, one of the largest, we publish about 175 new books annually, only 60 of which are in the Humanities, and only a handful are based on dissertations. There are only about 125 other university presses most of which have even smaller title outputs. Why is this?

The reality is that most Humanities dissertations have almost no commercial value. They were never intended to, of course. There was a time when they had a decent shot at being published and sold to academic libraries in sufficient quantities to allow a press to sustain this operation. With the loss of the library market (a book that once may have sold a thousand copies to libraries may now only sell 200), even presses with a scholarly mission have had to look elsewhere for revenue. The withdrawal of subsidies from parent universities further forced presses to avoid books that, although based on excellent scholarship, do not have enough market potential. Perhaps the greatest pressure comes from the overall decline in book reading, and scholarly book sales reflect this.

One effect of this is that scholarly presses have already pulled out of entire fields of Humanities simply because the market could not support books in those subjects. This is true, for example, in creative writing fields, languages, and some of the Social Sciences. Another result is that university presses have become incredibly selective about the books they do publish. This selectivity, however, isn't based just on the highest quality scholarship, but now on the economic viability of the product as well. To merit publication, a book has to sell beyond a narrow group of scholars. This commercial turn has serious implications for the Humanities dissertation.

For one, advisors allow graduate students to select topics and write dissertations that need to be turned into books, but for which there is no longer a large enough market to support. There was a time when a Humanities dissertation decently reworked stood a good chance of finding its way into print. The current reality is different: to get published a dissertation has to either be extraordinarily good or aimed at a broader readership. Second, we expect these students to spend an inordinate amount of time (and money) creating these works much of which will be excised from the book manuscript if it does get published. Third, considering the larger ecosystem, we measure scholars' value—their employability and even "tenurability"—on the increasingly unrealistic chance they will get published. By tying the credential to the book, we shift the measure of academic quality to market forces.

How could you change the current state of things? First, stop assuming a dissertation is the first draft of a book. Occasionally it is, but often it isn't. What if a degree could be awarded for a body of work including a number of substantial journal articles? This shift has already happened in fields like Philosophy partly as a response to the absence of book publishing opportunities. A side consequence of this would be that scholarship would appear faster and enliven their disciplines.

When a scholar does decide she is ready to write beyond her narrow specialization, she would do so without the burden of having to make it comply with the requirements of the dissertation, which often run counter to the needs of the publishing market. She will have the freedom to write something meaningful and relevant.

Second, if you insist the dissertation must become a book, then why only approach the gatekeeper—the university press editor—at the end of the journey? Wouldn't it be better if young scholars consulted with leading editors in their fields before crafting a dissertation proposal? Advisors, at the very least, could introduce their students to editors, facilitate those conversations, and get students thinking beyond their defense.

How might this change the dissertation? The editor could offer clear-eyed advice about topics and approaches most likely to earn publication. To any project, editors apply a simple question, "so what?" As part of any topic selection, students should be able to answer with remarkable clarity what it is about their work that matters. We should be as rigorous in challenging this claim as we are with anything else in their work.

Third, in measuring the importance of any piece of scholarship, let's stop considering its container. Sometimes a print book is the most effective container for a text, but it is also the most expensive one. By adhering to the idea that it is a print book (as opposed to something digital) that signifies legitimacy, we impose a higher cost on presses. This, in turn, means presses can publish fewer print monographs. If hiring and promotion decisions did not carry a bias for a print volume as "a real book" as opposed to an electronic one (even if fully peer reviewed and copyedited), presses could afford to publish more scholarship for smaller markets.[1]

In our current environment, relying on the dissertation-based book as an academic credential runs into the hard market reality of publishing. For decades, university presses have been strong partners in the scholarly endeavor by selecting, nurturing, and publishing excellent scholarship and, by extension, in credentialing scholars. It is <u>essential now</u> to uncouple those activities if we want to sustain those efforts.

[1] This point is explored with great clarity by Matthew McAdam in his essay "Deans Care About Books," The Hedgehog Review, July 29, 2014. http://iasc-culture.org/THR/channels/Infernal_Machine/tag/university-presses/

Council of Graduate Schools Dissertation Workshop Preliminary Statement

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Background on Distressed Funding Models:

University presses (UPs) play critical roles in the advancement, preservation, and dissemination of scholarship, while indirectly participating in the credentialing of faculty. The primary method presses use to execute these missions is the publication of humanities monographs and journals. By charging end-users for access, UPs have conventionally funded most of the costs associated with these activities but full cost-recovery has required additional subventions of presses by their host institutions.

However, the combination of the prolonged economic downturn with the development of alternative digital models of dissemination is putting unprecedented stress on the traditional financial model of publishing monographs. In a bygone era when institutional libraries and individual scholars had both the funds and the inclination to build large physical collections of scholarship, a marketplace existed that was substantial enough to allow presses to charge end users for access. This marketplace also allowed presses to acquire books in categories where cost-recovery was less lucrative, taking advantage of risk pool publishing, whereby sales of books in some disciplines offset those in others.

Numerous indicators suggest unequivocally that we no longer live in such a time. This is resulting in short term effects like increased price points, the growth in market-based factors driving acquisitions decisions, and a reduction in marketing resources to support dissemination. It is against these trends that we must begin to imagine what the future landscape of scholarly publishing might look like.

An inefficient workflow model at university presses:

The publishing industry—like newspapers and music but unlike, say, film—both produces and disseminates its content. Publishers have highly experienced content acquisition and curation teams, and even larger production and dissemination teams. Content acquisition and curation (and some publicity and marketing functions) remain activities that have resisted scale. Despite all the changes in our industry and the efforts of large media conglomerates to scale and automate publishing, this part of the business remains and indeed thrives in organizations that permit a creative, bespoke group of imaginative teams to develop content.

However, with the introduction of digital workflows and production tools, the benefits of scale are being realized in these latter, back-end activities of production and dissemination. This is one of the explanations for the acceleration in mergers and acquisitions in the publishing industry. Scale has always mattered, but now it matters more than ever.

In commercial scholarly publishing, the benefits of scale have led to larger and larger lists of monographs and windfall profits for large commercial firms. But most university presses, for a host of reasons (governance, structural, financial), are not able to take

advantage of this trend. It is not difficult to imagine a future landscape where either only the largest scholarly publishers survive, or the set of activities a university press executes is much more limited to list development and editorial work (presumably the activities most valued in the credentialing process).

Pressure on Press Subsidies

In an environment where costs associated with the system of higher education are under greater scrutiny, subsidies toward UPs and humanities publishing are witnessing a steady decline. These subsidies fund the incremental editorial work of filtering, developmental editing, and copyediting, which the marketplace simply cannot support. There is not a consistent return-on-investment for these activities, but they are critical for transforming dissertations into enduring works of scholarship.

Open Access as a solution:

In response to the prevailing economic trends, university presses have frequently reacted by reducing the number of first-book monographs they publish, and increasing the price points and restrictive barriers to their availability. Despite the growth of digital dissemination pathways, UPs are effectively reducing access.

Open access (OA) is widely hailed as a solution to the announced crisis in scholarly publishing. Indeed, in the journals world, OA is becoming a practical option in many fields, including some humanities disciplines. But there has been significantly less attention paid to the prospect of OA for humanities monographs. This is due to the distinct challenges with monograph publishing—the higher investments in time and money to prepare them for publication; the slow migration of formats from analog to digital; the lack of publishing funds from grant makers; and the deeply entrenched economic models at the primary publishers of monograph—university presses.

The future of UPs is likely to be tied to a new approach toward funding the publication of humanities monographs, paired with a more efficient, digital-first dissemination model. This will require a scholarly communications ecosystem that is prepared to embrace and utilize digital formats.

There are some potential moral hazards to be cognizant of when considering a new funding model. One of the strengths of the cost-recovery model UPs currently use is that we do not concern ourselves about the publication funding potential of individual scholars. While we certainly consider the marketplace in our acquisitions decisions, this is arguably a proxy for public engagement. In a scenario where a publisher is made financially whole when a manuscript arrives, our incentives to edit, market, and disseminate are significantly eroded. A publisher might easily increase its output, reduce its quality, and improve its margins. This would raise new challenges in the credentialing system for promotion and tenure committees. Or in another scenario where some scholars are at institutions famous for offering publications subsidies, it's not hard to imagine a gap growing between wealthier institutions and everyone else.

Which is all to say that while a "flipped" model of funding humanities publications would be superior to the cost-recovery one, it is not a silver bullet and it would need to be developed with concerns like this in mind.

The durability of the monograph:

The future landscape and potential solutions described above presume the enduring integrity of the monograph as both a measure of scholarly achievement as well as a format for presenting and preserving scholarship. It is probably not up to UPs to fairly assess whether this will, in fact, be our future. We try to recall Clay Shirky's aphorism that "Institutions will try to preserve the problems to which they are the solution." This is simply a 21st-century pivot from Upton Sinclair's comment that "It is difficult to get a man to understand something, when his salary depends upon his not understanding it."

In addition to the potential cost savings of a digital-first model for monograph publishing, the monograph itself may require a digital hosting platform. The growth of digital scholarship in the humanities creates the potential obsolescence—or at least a step off the pedestal—of the physical book as dominant transmission format.

But while that part of our future awaits clarity, the current economic and market trends are very clearly indicating that the current system of funding monograph publications will not be sustainable in the future. It arguably isn't sustainable today, and it will never get better...only more challenging.

At what cost closed? Or shifting to the other foot in the name of scholarship

Mary Molinaro

Digital Preservation Network

So what's the problem?

In order to understand current issues that impact the current state of scholarly communication, we need to better understand the history of libraries, scholarly societies, and higher education. Since the late 1800s learned and professional societies have shouldered the role of facilitating communication among members and the rest of the intellectual world. This began with hosting meetings of the members with letters being sent between the members about the topics discussed in the meetings. These letters began to be collected and became the proceedings or journals of the society. These journals were subject to editorial processes and peer review that gave them special authoritative status. These authoritative journals were then collected by research libraries to serve a broader community of scholars. This scenario served the academy well for many, many years.

Following WWII the system started to get out of balance. During this time, higher education in the United States experienced a boom era. A growth in the availability of funding for research led to a growth in the output of scholarly publications from the nation's researchers and faculty. The scholarly societies who had to that time easily managed the editorial processes and publication of scholarly literature found themselves overwhelmed by the volume of scholarly articles being produced. Commercial publishers stepped in to offer assistance and provide venues for faculty to publish their work and to take the burden off of the scholarly societies. It was a deal almost too good to be true. The commercial publishers offered to take the burden from the scholarly societies and provide them with income. This opened the door to the commodification of information by the commercial publishers while providing wider venues for distribution of scholarship. This fundamentally changed the balanced model, however. Faculty willingly signed over copyright to their work because they needed to be published in the most prestigious journals, now managed by commercial entities. Faculty, supported by their universities, volunteered time to serve as peer reviewers and editors of these publications. The commercial publishers were now in an enviable position of selling a product and realizing great profits with little "skin in the game." The product they were selling had a guaranteed market in research libraries that would purchase the journals even as the prices increased. Large publishing houses such as Elsevier, Springer and Wiley began buying up scientific journals with purpose.

By the 1970s and early 1980s library budgets started feeling the pinch. Libraries began cutting subscriptions as prices escalated. Prices were raised even more by the publishers so that profit margins could be maintained. As the prices continued to rise, libraries began cutting not only serial subscriptions, but the number of monograph purchases as well. University presses that once had a guaranteed market of over 1000 libraries for the scholarly monographs written by the faculty researchers began to see a continual decline in the number of books that they could sell. Academic libraries began limiting their purchases of humanities and social science monographs because rising serial budgets

were displacing book budgets. Science journals are very expensive (a subscription to Brain Research is nearly $20,000 per year). Thus began the vicious downward spiral with the amount libraries spend on serials continuing to rise and the amount left to spend on monographs continuing to decline. University libraries are now even forced to examine the amount spent on science serials because of budget shortfalls.

This has been a terrible situation for university presses. University presses continue to operate under increasing pressure. They have been forced to provide offerings that have a broader public appeal to offset the losses brought about by a decreasing market of academic libraries. Many presses are offering books with a local focus (regional cooking, heritage, gardening) that will help them stay afloat.[1] Many university presses receive significant funding from their parent institutions, but these funds are increasingly cut because of overall budget pressure in higher education.

Can things change?

So rather than spending a lot of time wringing our hands about how bad things are, what kind of things could be done to actually change things? In a perfect world, what kind of model could actually help promote scholarship? How can we get back to the original purpose of scholarly societies, that is to promote, vet, and discuss new ideas?

1. Most universities have institutional repositories to preserve and make available the intellectual capital of the academic enterprise. What if, rather than prohibit graduate students from putting their dissertations into the repositories or instead of enforcing a long embargo period, institutions require that all theses and dissertations be deposited into their repositories? Proper metadata can be assigned to make the scholarship discoverable through standard search engines.

2. If companies (such as ProQuest) want to text mine the dissertations to provide a value added service that could be commercialized, they can do so. It would be appropriate to compensate the universities for use of the content, because after all, the universities supported the scholarship by providing the institutional infrastructure (including salaries) that made the scholarship possible.

3. Scholarship deposited into open repositories contributes more to the flourishing of new ideas, just as was the foundational purpose of the scholarly societies in the first place.

4. The impact of the scholarship can be determined and measured through services such as Altmetrics (http://altmetric.com)

With a model like this, scholars would benefit by receiving appropriate credit for the actual impact that they make on the scholarly discourse. Additionally, the end goal of furthering scholarship is supported by a model like this rather that the increasingly unsustainable model of publishing "two monographs in a university press." To require junior faculty to publish two books with a university press to achieve tenure is unrealistic. Can academic achievement be better measured?

Shifting to the other foot

So what will it take, really, to turn this around? How will the academy insure that junior faculty have opportunities to disseminate their scholarship in ways that are not only feasible, but truly advance their work as they prepare for tenure. How do you

[1] Sherman, S., (May 6, 2014)"University Presses Under Fire: *How the Internet and slashed budgets have endangered one of higher education's most important institutions.,"* The Nation. Retrieved from http://www.thenation.com/article/university-presses-under-fire/

change institutions that are seriously entrenched in the current system? What will it take to reach a tipping point that will force change?

The availability of open repositories and new ways to measure the impact of scholarship provides a chink in the armor of the current system. New open access journals, new forms of digital scholarship, and the growth of e-books and open educational resources are now providing new avenues outside of the traditional avenues through university presses.

University presses are also taking advantage of new ways to leverage their offerings electronically. Could new methods of delivering quality content via university presses take some of the pressure off and allow them to stem the loss of resources?

Increased focus on open resources for academic libraries has the potential to take the pressure off of library budgets (although librarians have been hoping for this shift for many years now).

Faculty need to support open access journals and retain the rights to their work rather than sign it away to commercial publishers. In order for this to happen and for this to make a real difference and to start that shift to the other foot university administrators and peer scholars (provosts, deans, chairs, and tenured faculty) must purposefully recognize the new methods of scholarship for what they are - significant contributions to the scholarly discourse that deserve recognition and the awarding of tenure.

So the real question is, what are *you* going to do to fix things?

Creative Destruction: Open Access, Institutional Repositories and the Changing Dissertation

Lisa Schiff

Technical Lead, Access & Publishing, California Digital Library, University of California

The dissertation is a cornerstone of academia, serving as evidence that the student--now the newly certified scholar--has adequately mastered the accumulated knowledge and practices of his or her field and has, in the process, made a unique contribution to an ever-growing body of scholarly research. Through this regular vetting of aspiring members of its community, academia reproduces and renews itself. Clearly the dissertation occupies a foundational space in the constant development of new researchers and in the continual fortification of the edifice of higher education. But in a curious contrast, the dissertation also resides in a liminal place, between the established and the yet-to-be accepted. In this capacity, dissertations are potential sources of constructive destabilization, since these works are always the products of minds new to a domain, who by definition bring fresh (or at least different) questions, perspectives, skills and expectations to their fields of inquiry.

Amplifying this potential for change is the reality that the familiar patterns of scholarly communication are not, in fact, etched in stone, but are instead undergoing a variety of transformations across all domains. Modes of communication are expanding to include more informal venues of exchanges, from tweets to blog posts, in addition to the traditional genres of articles, books and conference papers. Access to scholarly output has dramatically increased via the open access movement and related new entrants into the domain, such as new open access and library-based publishers, as well as individual researchers directly promoting their work across the web. Emerging areas of research are being recognized (digital humanities, for example, is both novel and "old hat"), and new classes of scholarly materials are being reconceived as valuable objects in their own right for which their creators should accrue formal, promotion-worthy credit. This changing context impacts the dissertation as well. While the dissertation of today is still most frequently a text (and a PDF document at that)[1] and is still weighted in purpose toward acting as a certifying piece of scholarship, "today" is turning into "tomorrow" before our eyes. Students are more frequently including supplementary materials with their dissertations[2]; a slow, but increasing number of culminating projects are created in non-textual formats, such as video, audio, or other multi-media and non-linear presentations; and expectations about the potential audiences and uses of dissertations have grown to encompass a far vaster scope of people and situations.

As the academy aims to achieve expanded access to dissertations, the institutional repository (IR) frequently surfaces as a key resource to realize that goal[3]. The IR is a stable

[1] Gail McMillan, Martin Halbert, and Shannon Stark, "2013 NDLTD Survey of ETD Practices." *16th International Symposium on Electronic Theses and Dissertations, Hong Kong* (2013): p, 3, http://hdl.handle.net/10919/50978

[2] Educopia's IMLS funded project investigating the handling of ETDs with supplemental material speaks to their increasing presence. http://educopia.org/announcements/two-year-imls-grant-awarded-study-management-supplemental-data-etds

[3] Julia Lovett and Andrée Rathemacher, "Open Access and the Institutional Repository,"

access and (often) preservation platform that brings together scholarly content from across the institution, including previously published items, grey literature, electronic theses and dissertations (ETD), monographs, oral histories and data sets. Its primary roles are to bring light to this array of materials, provide a secure location for content that might have no clear public home elsewhere, and offer a sustainable and reliable alternative to the faculty website or personal computer. IRs are typically flexible and accommodating, and frequently situated in the library--that place on campus historically focused on discovery and access. At UC's California Digital Library, two different repositories link together in a modular fashion in order to provide a flexible ETD service to the 10 different UC campuses, each of which has its own ETD policies, practices and expectations. CDL provides preservation services through the Merritt preservation repository (available to all UC campuses) and enables public access (for those campuses that wish to make their ETDs openly accessible) via eScholarship, the University of California's open access repository and publishing platform. As of the beginning of November 2015, Merritt is managing the preservation of over 19,600 ETDs, and approximately 14,000 ETDs are available for public use in eScholarship. In the past year, these public ETDs have received on average almost seven requests per day, as compared to the just under five per day for all content in eScholarship. Clearly these items are highly sought after and their presence in the IR--eScholarship--facilitates their discovery and use.

Though now a familiar component of a university or college's scholarly communication landscape, the IR must continue to evolve to meet the changing needs of students and scholars[1]. As institutions rethink their role in stewarding and disseminating the dissertations of their students, IRs are well positioned to manage that process by leveraging existing, flexible infrastructure. IRs amplify the profile of ETDs by co-locating them with the scholarly outputs of more experienced researchers at the institution. In turn, ETDs substantially contribute to the ROI of an IR, providing a compelling justification for continued resource allocation and an excellent use-case for supporting new forms of scholarship as graduated students begin to push against the confines of existing forms.

The benefits ETDs receive from IRs demonstrate the fulfillment of the IR's essential mission--to capture and increase exposure of the variety of scholarship generated by the scholarly community within which it is situated. Given that content contributors are strongly motivated by the desire for increased use of their publications, they will generally only deposit their work in IRs that provide an effective mechanism for generating significant use. IRs, then, have a survival imperative to deeply engage in a variety of dissemination activities core to the flow of scholarly communication, beginning with the responsibility to follow basic domain practices such as the use of unique identifiers for primary content (e.g. DOIs, ARKs, or Handles), supporting programmatic discovery interfaces such as OAI-PMH, and providing human and machine readable licensing information, such as Creative Commons license marks and metadata. Of more interest to authors are the activities most obvious to end users, for instance ensuring consistent and solid indexing in Google, Google Scholar and other search

In *Proceedings of the Querying the Library: Digitization and its Impact Conference*, ed. Mark J. Caprio (Providence, R.I.: Rhode Island College, James P. Adams Library,2014), 22-29. http://digitalcommons.ric.edu/ebook_gallery/29/

[1] Joachim Schöpfel, Adding Value to Electronic Theses and Dissertations in Institutional Repositories. *D-Lib Magazine* 19 no 3&4 (2013). http://dx.doi.org/10.1045/march2013-schopfel

engines, and inclusion of content in third party free and commercial discovery platforms, such as Research Papers in Economics (RePEc), OCLC's Worldcat Local, and EBSCO.

Because of its focus on discovery and use and because of its inclusive tendency to accept local content of all sorts, the IR is a strategic service for realizing the scholarly communication goals of the institution. We have seen this play out over the last several years as faculty at an increasing number of universities and colleges across North America have adopted Open Access (OA) policies. Where they already exist, the IRs at those institutions can naturally serve as the locus for the archiving of scholarly works that fall under those policies[1] [2]. Not only do these IRs provide a pre-existing destination for the author's version of a published item, but they already have the processes in place to expose that content to the world. If one of the transforming goals associated with dissertations is to share that body of work with the public, then the IR is an efficient and logical place to make that happen.

Moving access out from the library to the web is of course not the only change taking place with ETDs. Formats of scholarly outputs are evolving, including those of dissertations, meaning that the infrastructure underpinning that content will also have to evolve. At the CDL, we find ourselves at two contrasting positions in the spectrum of potential infrastructure development. On the one hand, our preservation strategy will remain effective and will require no change, because the UC3 Merritt repository is agnostic regarding format. The conceptual structure and physical nature of the dissertation can wildly transform, but those transformations would in no way inhibit Merritt's ability to accept complex objects; to version those objects; to perform bit-level auditing and more. New formats present a more stubborn access challenge for IRs because of their somewhat limited capacity to support extensive customization of display. While eScholarship, like all IRs, supports a variety of genres, the presentation of those items is templated, varying only in the display of metadata fields considered essential for one type of publication versus another. The benefits of this simple approach are a reduction in startup and maintenance costs; a low burden of effort for content contributors; and a relatively minimal marginal cost to bring in new sets of material, assuming those materials don't differ in extreme ways from existing content types. The weaknesses of this approach are the lost opportunities to display varied content in the unique ways most suited to that content and the related challenge of staying in step with new forms of scholarship that are producing new forms of content. eScholarship, no doubt like other IRs, has had the unfortunate experience of having to say "No" to unique, valuable artifacts from its local scholars because the work involved in providing an acceptable display for those materials could not be extended to other items and, therefore, justified. Evolving formats for dissertations currently pose the same risk of being idiosyncratic "one-offs," but no crystal ball is required to realize that these new formats will, soon enough, be common for dissertations and scholarly works in general.

[1] Ellen Finnie Duranceau and Sue Kriegsman, "Implementing Open Access Policies Using Institutional Repositories," in *The institutional repository: Benefits and Challenges*, eds. Pamela Bluh and Cindy Hepfer (Chicago: American Library Association, 2013), 75-97. http://nrs.harvard.edu/urn-3:HUL.InstRepos:10202474

[2] Ellen Finnie Duranceau and Sue Kriegsman, "Campus Open-Access Policy Implementation Models and Implications for IR Services," in *Making Institutional Repositories Work*," eds. Burton B. Callicott, David Scherer, and Andrew Wesolek. (West Lafayette, IN: Purdue University Press, 2016). http://hdl.handle.net/1721.1/99738

The challenge for eScholarship and IRs overall is to develop new, malleable infrastructure that is therefore more long-lived. The first step is to build in solid support for HTML encoded publications while at the same time continuing to effectively serve PDF documents, which are likely to remain the bulk of our content for quite some time. Without investing resources to explore and devise solutions to this complex environment today, IRs risk becoming irrelevant and failing in their goal to support the many scholars who seek a robust OA platform for the dissemination of their work.

Though the potential display challenges posed by new formats are understandably of interest and concern for many involved with ETDs, the most frequent source of complications arising from CDL's dissertation service is the graduate student herself, who accidentally discovers that her dissertation is now widely accessible, but does not remember agreeing to make it so. Despite the variety of efforts on the part of graduate divisions and campus libraries to inform students about the preservation and eventual public display of their institutions' dissertations, the message is not effectively reaching everyone, no doubt because it often comes near the final stages in a student's education, at the moment when they are most tired and anxious and ready to be done. In reality, even if students take the time to conduct a close reading of their dissertation submission forms, at that point it is already too late. Decisions about research topics, methodologies and perhaps even future publishing goals have already been made, and made in the absence of understanding that dissertations are now a more vocal part of the scholarly conversation, even if the students themselves did not realize they were speaking out loud. The answer is to begin to build student awareness about these issues from day one, through small steps such as assigning ORCID iDs to new students and more complex tasks such as including discussions of licensing and data sharing in methodology classes. Accepted graduate students should, from the outset, understand the role of their future research as a contribution to the scholarly dialogue. Advisors can ensure that the developing scholars under their charge become familiar with issues around the opening up of the research process, access to an ever growing number of artifacts created in and out of that process, and how to explore areas of interest within this increasingly exposed context. Deans, graduate divisions and libraries can work together more closely to better understand each other's goals, responsibilities, and workflows and thus identify complementary tasks and compatible practices to achieve the best outcomes for students, the institution and the public.

The scholarly communication revolution continues to touch all parts of the academy, including the time-honored exercise of producing a dissertation. As scholarly artefacts in general become more heterogeneous in concept, construction and format, so too will dissertations. And as research outputs of all sorts become more readily available to the higher education community and the world at large, so too will dissertations. Though legitimate reasons for restricted use will persist and should be supported, the clear benefits of surfacing the knowledge created in our institutions of learning add momentum to those same efforts, inspiring us to increase the availability of more categories of materials, including dissertations. IRs, instrumental in enabling the opening up of faculty material of both familiar and novel types, will continue to be a strategic and efficient venue for liberating dissertations from within the stacks and behind subscription databases. Though these student works retain their traditional and critical role as foundational, certifying documents, they act also as tremendous contributors to the advancement of the scholarly record by the academy's newest members. The dissertation, then, is not just a cornerstone in the higher education's edifice, but a window onto the new as well, one that is well framed and supported by the institutional repository.

Opportunities Created by Emerging Technologies

Katina Rogers

As the capstone of doctoral training, the dissertation is the pivotal moment when graduate students synthesize and articulate their research, marking the transition from apprentice to scholar. It also serves an important professionalization and normative function: graduate students learn what is accepted as scholarly work based on the submission requirements for their dissertation and the values of their committee. If digital projects are to remain an important avenue for the articulation and public sharing of scholarly work, that work must be professionally viable for people from the outset their careers. By rethinking dissertation requirements, graduate students learn that exploratory, cutting-edge work is encouraged from day one, not something that must wait until after securing tenure. This means more than simply allowing different file formats to be submitted, however. The conversation must go beyond specific technologies to focus on the values we embrace, the methods we consider crucial, and the potential for impact that we can imagine in the dissertation process (where "we" includes all those involved in shaping the structures of graduate education).

These issues are not unique to the dissertation as a work of research. The same questions of values, methods, and impact are at the heart of the changing landscape of scholarly publishing systems, and new developments in one domain will undoubtedly affect norms and expectations in the other. With that in mind, a discussion about new opportunities for the dissertation must also touch on ways that innovative scholarship is received and recognized at later stages of a scholar's career, including expectations set out in the tenure and promotion process. I would argue that placing greater emphasis on public engagement, collaborative work, and creativity in both dissertations and other scholarly work, while also maintaining an open stance toward technological innovation, will result in meaningful research whose reach extends far beyond the academy.

Publishing is about making knowledge public. As tautological as that statement is, the central value of making research public is sometimes lost in discussions about scholarly communication. At the heart of research and publication is the goal of bringing new insight into the body of human knowledge. This happens in different ways—sometimes the best audience to reach is small and specialized while other times it is more powerful to reach a broad, interested public. Digital tools allow us new ways of doing each. Because working in digital environments and using new tools and platforms can involve a wide range of different skill sets, such projects often involve multiple people with varied and overlapping expertise. The collaborative process of working in digital environments is not merely expedient, however; it can also have a deep influence on the nature of the work itself, resulting in a project that may be more sophisticated and complex than a series of individual projects by the same people would be. Further, digital environments allow for expansive thinking and creative ways of articulating an idea thanks to the multimodal and multimedia capabilities of current web design.

The value systems that define dissertation requirements are shaped by what we consider the values and purpose of higher education to be. This is another reason why it matters greatly that robust digital projects have the potential for meaningful impact beyond the academy. Public engagement is an essential part of understanding higher education as a public good, and as such is critical to the mission of the Futures Initiative,

a program I co-direct with Cathy Davidson. Based within the Graduate Center at the City University of New York (CUNY), the Futures Initiative is part of the largest public urban university system in the United States. CUNY educates an incredibly diverse student body comprising 500,000 students across New York City's five boroughs. Understanding education as a public good, especially in the context of a huge public university system in the heart of a thriving city that is also home to massive income inequality, means that engaging with a broader community is critical to its success.

As part of the Futures Initiative's work, we connect not only with colleges across the CUNY system, but also with a global (though predominantly North American) community called HASTAC: the Humanities, Arts, Science, and Technology Alliance and Collaboratory. Though innovation is often thought of as something for elite and well-funded institutions, the Futures Initiative and HASTAC both see innovation happening out of necessity. Teams across the CUNY campuses have developed incredible projects (like Commons in a Box, OpenLab at City Tech, Vocat, Science Forward, and more) in part to stitch together such a diverse and geographically dispersed group of working commuter students, faculty, and staff. At the Futures Initiative, we place a strong emphasis on pedagogy, labor issues, and public engagement. Making effective use of digital tools allows us to to our best work in each of these domains and have a greater impact than we otherwise might. Understanding equity and innovation as two facets advancing a single goal allows the Futures Initiative greater clarity of purpose and approach.

Further, if we see equity and innovation as linked, rather than opposed, then it follows that recognizing a broader range of scholarly products makes it possible for scholars with varied backgrounds and skillsets to break new ground—it opens up new avenues so that scholars, departments, or institutions do not maintain the status quo, gatekeeping in ways that allow only certain kinds of people and ideas to advance. This kind of work also makes research and scholarship more accessible to different kinds of publics as people's work is shared through different channels and platforms. Both HASTAC and the Futures Initiative sites are public, so anyone—regardless of whether or not they are affiliated with a university or any other institution—can read, contribute, and become a part of the network.

In addition to networks like these that foster communication in new ways, scholarly work itself is also changing. There is an increasing prevalence of born-digital work that pushes at the limits of traditional forms, and some of the most creative work is being done by emerging scholars on dissertations.

One of the Futures Initiative's kick-off events in fall 2014 was a panel called What Is A Dissertation (better known on Twitter as #remixthediss), in which graduate students and recent graduates shared projects that don't resemble the proto-monograph of most dissertations. The work by these remarkable students and recent PhDs includes the use of Tumblr and other social media to share and discuss historical photographs of black women; ethnographic work on contemporary youth created using video and the multimodal platform Scalar; the ecology of proprietary data, explored and shared using mapping visualization tools; a dissertation on comics in comic form; and more.

These students and recent graduates are doing top-notch research and sharing it in ways that make it compelling to a wide audience. Still, many of them noted that they faced resistance to their projects at some stage of the process, and found that they needed to carefully articulate the value of their projects to ensure the scholarly merit was

recognized. As they found, scholars often must provide traditional materials as an additional component to their groundbreaking work, translating their projects into more familiar media. This puts an added burden on emerging scholars and acts as a disincentive from pursuing creative projects in the first place. Nevertheless, sharing work publicly and collaboratively not only benefits the public, but can also serve the individual scholars by making their work accessible.

Despite lingering fears that sharing work online will make formal publication less likely, some publishers see online engagement as an advantage and are thrilled when a work already has an audience ready and waiting. For instance, Nick Sousanis, Post-Doctoral Scholar at the University of Calgary and one of the #remixthediss panelists, had a book contract with Harvard University Press in hand before even finishing his dissertation. He was able to achieve this not only because his graphic novel Unflattening is brilliant and beautiful and innovative, but also because he had built a strong audience by sharing his work-in-progress online, thus demonstrating to the publisher that the book was marketable in a way that not all academic works are.

Other scholars have had similar experiences. Kathleen Fitzpatrick, Associate Executive Director and Director of Scholarly Communication at the Modern Language Association, shared her book Planned Obsolescence—an exploration of technology, publishing, and the academy—online for public comment. In effect she created an experimental publishing environment for her inquiry into academic publishing. The work received hundreds of thoughtful comments in a medium that allowed much more dialogue than traditional double-blind peer review. The open environment gave Fitzpatrick an opportunity to polish her work in conversation with peers, leading to a stronger final work, a positive collaborative experience, and an audience that was eager to see the final product. This deep level of interaction was possible in part because Fitzpatrick had already built an online community through countless interactions with peers. This is important to note because networks online work the same way they do in person—they must be built over time.

These are merely two examples of online engagement and the publishing of works-in-progress that led to traditional book publications. But what about more innovative, born-digital publications? New platforms like Scalar, developed at the University of Southern California under the direction of Tara McPherson, allow scholars to present research in creative, dynamic, multimodal ways that allow for incredible nuance, insight, and beauty. As one example, artist and educator Evan Bissell created a multimodal project called The Knotted Line to examine the history of incarceration, education, and labor. The exceptionally interactive result is something completely different than a traditional article on the same topic would be, even if the research were the same.

Purdue Assistant Professor and Digital Humanities Specialist Amanda Visconti's digital dissertation, Infinite Ulysses, is another compelling example of the power of born-digital work. Combining deep literary insight with interface design, web development, community building, and best practices in user testing and analytics, Visconti has created a space for collaborative interpretation of a text. Since its launch, hundreds of readers have annotated James Joyce's text. Further, Visconti has provided an invaluable service to the community by blogging every stage of her research, development, and defense, helping to make transparent the hurdles that other emerging scholars might anticipate when working on digital projects.

If programs begin to welcome new kinds of dissertations, they will also need to work

backwards and reformulate the kinds of training that their graduate programs offer. Research methods and courses might be paired with professional development opportunities to learn skills that will allow graduate students to create the best kind of project to suit their research. They might encourage more interdisciplinary work as well as increased collaboration. Most creative projects are not the work of only one person, but incorporate the expertise of many—someone (or some team) who develops an extensible tool, a developer who customizes it for a new purpose, a designer who determines the best way to present information to a particular audience. If each of these collaborators has deep grounding in humanities methods and values, the entire project can cohere in a powerful way. To enable programs to move in that direction, there needs to be a conscious decision to start valuing collaborative, interdisciplinary work from students in the early stages of the program.

Celebrating the scholarly merit of differently inflected, public-facing dissertation projects also means that students will be primed to succeed in more varied career paths. The skills they gain will help them to become excellent faculty members, too, who can work to further innovate the higher education landscape. Innovative projects may require specific skills—like video editing, web development, or database design—and they will undoubtedly require more generalized skills such as project management, navigating institutional hurdles, and public engagement. Fostering innovative scholarly work is a key aspect of helping students to be better prepared for multiple career possibilities. In other words, changing what constitutes a successful dissertation has the potential to change a great deal about graduate programs, from start to finish in a student's tenure: what programs look for in prospective students, how they structure coursework and exam requirements, and what kinds of careers graduates pursue.

Importantly, expanding our interpretation of success and rigor to include a broader range of projects that lead to more and varied career opportunities also has the potential to expand access to and equity within higher education. Access to higher education (and to good quality K-12) remains highly unequal across the country, with test scores mapping not to true achievement or potential but to school district and family income level. If we continue to look for the same types of outcomes in terms of scholarly work and career paths, we are likely to perpetuate the existing system. If, instead, we celebrate different kinds of successes, we are likely to attract a greater diversity of students who want to pursue a graduate degree for more varied reasons.

Our vision for the dissertation is expanding, but much work remains. Collaborative dissertations remain rare, even though deeply creative projects may require many hands. If we want to tackle the most complex questions, we might productively think of each student's dissertation as one aspect of a larger project, as Todd Presner describes in his notion of the "20-year dissertation". Technologies will change, so while issues related to building new skills as well as technical affordances and limitations may seem most pressing, questions centering on the purpose and values of higher education, and for the dissertation as the capstone of a doctoral degree, are far more important. If we care about higher education as a public good, we must find ways to foster graduate students' most creative, innovative, and engaging work.

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Technological Opportunities and Human Realities for Dissertations in The Future

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Introduction

There is no doubt that in the last thirty years technology has enabled and shaped many changes in dissertations and other works of scholarship. In 1984 when I completed my dissertation at the University of Illinois, I had to request and to be granted special permission to submit a dissertation that was printed out from a computer file rather than typed on a typewriter. This sounds like the Stone Age to modern ears.

In most universities, today's dissertations are not only born digital, they are submitted, read, and preserved digitally. The capabilities engendered by digital formats already offer the possibility of moving scholarship beyond static, fixed text. Yet, in many senses, today's electronic dissertations are not so different from their Stone Age counterparts and, for the majority of dissertations, the possibilities offered even by today's digital technologies remain peripheral to the main body of work.

Many of the aspects that remain the same are not due to technological limitations nor to technological possibilities; these similarities are due to long-standing conventions in scholarly communication and the ingrained systems of judging scholarly worth. In my talk, I will discuss some opportunities for things that have and will change in the near-term future, but also a cautionary tale of some things that have not or should not change in spite of technology. I will end with a somewhat controversial proposal, brought on by human responses to technological opportunities rather than purely by technological capabilities. Some findings from my work and the work of others on scholarly reading and publishing patterns over the last four decades has relevance to dissertations (King, Tenopir, Choemprayong, & Lu, 2009; Tenopir & King, 2000; Tenopir, King, Edwards, & Lu, 2009; Tenopir, King, Christian, & Volentine, 2015). Note that most of my research has looked at scholarly reading and publishing patterns in the sciences and social sciences; conclusions about scholarly outputs in the arts and humanities may differ.

Status Quo: Things that Have Not and Should Not Change

The purposes of a dissertation have remained unchanged for many reasons. The main purpose of a dissertation remains to demonstrate that a candidate knows how to conduct and report original research and has promise to make a continuing contribution to scholarship (Allen, 1973). Original work, proper attribution to the work of others, making a unique contribution, all while following established norms and procedures in a given discipline, must be visible to readers, especially to those who judge whether a dissertation is acceptable or not as a final capstone to the doctoral degree.

Even though these fundamental purposes need not be linked to any technological developments, dissertations today are still mostly digital versions of documents that at their essence are very much like the dissertations of the past. One reason for this is so the dissertation committee can make decisions and readily see that traditional requirements are met. Like the vast majority of other scholarly science and social science research

output such as journal articles, the written word is core to these dissertations; likewise a conventional structure that includes introduction, literature review, methodology, analysis, and findings makes it easier for readers to judge. Non-textual content is widely present, even if still most often as static figures, tables, illustrations, or graphs. Other enhanced non-textual content, such as video, audio, executable programs, modeling, and interactivity, can and should be increasingly present, but in most disciplines is still mostly used as supporting evidence for findings. There are historical, behavioral, and technological reasons for this.

Readers continue to rely on traditional measures of quality or trust to judge what is worth reading. In scholarly journal articles, this means that readers rely on things such as the impact factor of the journal in which something is published, knowing the author by reputation or citation record, or the prestige of the institution where the author works. Without these clues of quality or for readers unfamiliar with these clues, potential readers tend to focus on structural aspects, including checking the abstract, methodology, conclusions, and reference sections to be assured that the paper is of high quality (Nicholas et al., 2014; Tenopir et al., 2015; Watkinson et al., 2015). Both structural and origin clues greatly assist with the ability of readers to judge quality and place their trust in the scholarship.

Dissertations have slightly different purposes than scholarly articles, of course, so readers use different ways to judge quality. In addition to the purpose of communicating research results, dissertations must demonstrate that the author can conduct and convey research according to the norms of the subject discipline, must show writing ability, and must be recognizable as an original contribution to scholarship (Allen, 1973). Technological innovations must support these main purposes and not confuse the readers. That means that unless or until changes that technology allows are accepted as norms in a discipline it is difficult for them to become mainstream, or at least central, to dissertations.

Dissertations must also be discoverable and readable or viewable into the future. Readers and citers must be assured that what we see now will be what we see tomorrow and on every platform. Any content must be deposited and preserved in formats that will be readable and viewable 10, 20, or 100 years into the future. Technological innovation must not interfere with the primary obligations of providing trust, judgement, and preservation. All content must be self-contained, so as to avoid dead links, and must be preserved in non-proprietary formats.

Opportunities: Things that Should and Will Change

Issues of preservation and tradition lead to conservatism in presentation, but there are opportunities from born-digital dissertations that are beginning to change behaviors and norms and will gain momentum as technology enables and escalates change. These technological opportunities take several forms.

Firstly, improved standards for the preservation and reproducibility of non-textual content will ensure that dissertations that rely on non-textual information as a major component will maintain integrity of content for every viewer and into the future (Besser, 2007; Gaur & Tripathi, 2012; Stein & Thompson, 2015).

Secondly, the ability to link to the data behind graphs, charts, and conclusions will become an expectation in many disciplines, as data sharing becomes more common and the number of institutional and subject-based data repositories continues to grow (Data

Repositories, 2015; Registry of Research Data Repositories, 2015). Widely available data can improve quality control and reproducibility. Currently, a linked data set is quite separate from the dissertation, but the workflows and data subsets behind each finding could be executable or more tied directly to research findings.

Open digital dissertations also mean increased findability with widespread access. They allow for sections to be identified with a citation attached that can lead to more downloads and more citations. Findability and access increases discussion and interaction, which in turn can improve derivative science. Incorporating usage metrics and alt-metrics into the dissertation record can be incorporated by search systems to more prominently display the highly cited, downloaded, and impactful dissertations or the sections that are of most interest. Interlinking between dissertation sections and other forms of scholarly content makes dissertations a more integral part of scholarly discourse.

However, this leads to an unintended consequence. Many journals will only accept work that has not been published previously. A fully open and linked dissertation may disqualify authors from publishing the results in the peer-reviewed venues that are necessary to build their careers. If the associated datasets are also published and open, young scholars may be excluded from carrying forward this first important research project. Rather than putting a strangle hold on dissertations and data or disadvantaging students in some disciplines, perhaps, in this open dissertation and open data world, it is time for North American dissertations to change.

An Immodest Proposal

I have served on several dissertations in Finland where, similar to other European countries, doctoral students can select one of two methods for their dissertations. One is the same as the standard in the U.S., that is, the original, never-before-published monographic and monolithic method. The second is the "composite" thesis/dissertation. At Hanken University in Helsinki, for example, the composite thesis/dissertation is described:

> "The composite thesis for the degrees of Doctor of Philosophy and Doctor of Science (Economics and Business Administration) consists of articles or comparable scientific works that have been published/accepted for publication or corresponds to the requirements for publishing in refereed scientific journals. In addition to the articles, the thesis includes a summary section that constitutes the thesis manuscript proper."

The guidelines are quite explicit and rigor is not sacrificed. Indeed, the parts of a composite dissertation are scrutinized by a broader range of experts than a traditional thesis in this double peer review process. Committee members re-examine the quality of the previously published articles as well as examining the extensive summary section. A composite dissertation need not be more technologically inclusive, but it does respond to the potential negative unintended consequences of the full potential of open digital dissertations by allowing doctoral students to publish their original work first, create a cohesive research stream, and pull it all together in the dissertation.

Conclusion

Widespread acceptance of technological enhancements to dissertations is occurring, but sometimes at a pace that is slower than expected because adoption is partly dependent on non-technological factors. These factors include discipline norms and recognition of the primary purposes of dissertations, in addition to the technological issues such as preservation standards, consistent and appropriate software, and availability of data repositories. Sometimes tradition and policies of institutions and publishers can get in the way of technological opportunity. All of these issues together form a context for discussion of technology.

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21st Century Doctoral Dissertations in the Humanities

Sidonie Smith

At this historical moment, the challenge facing faculty and programs invested in educating future generations of academic humanists is the conceptualization of a 21st-century doctoral education. It must be an education adequate to the lived realities of the academy now; to the energies of students who make the choice to pursue a doctorate; and to the intellectual, affective, and social attachments that drive the pursuit of excellence in scholarly inquiry and teaching. The imperatives are multiple: to be purposeful in sustaining passionate conviction about the value of advanced study in the disciplines of the humanities; to be flexible in adapting to the shifting environment in which that study will take place; to be strategic in addressing concerns about the high level of attrition, the continuing lack of diversity in the humanities professoriate, and the exploitative conditions of contingency in humanities disciplines; and to be responsive to the diverse aspirations, dispositions, and intellectual interests of those willing to do the time, find the funds, and endure the long haul.

Of course, agents of change need to be cognizant of the disturbing trends related to the current state of higher education in North America: the retreat from commitment to public funding, the din of attacks on the value of a liberal arts education and humanities degrees, and the consolidation of corporatist discourse and practice. And they have to move beyond mere critique, and the nostalgia that feeds a sense of enervation, to suggest why the times are good enough to effect change. They also need to assay the emergent ecology of higher education in which humanities doctoral students will pursue their goals. There are a number of profound shifts in the everyday life of academic humanists now—shifts at once quotidian and profound, often troubling and far-reaching. They relate to the evolving concept of the university; the epistemic infrastructure; the new media and modes of scholarly production and communication; the trend toward the "open"; the reorientation of learning environments; and the emergent profile of a possibly posthuman humanities scholar. Doctoral students themselves will benefit from a better understanding of the current forces affecting the life of professional humanists and the emergent identities and roles through which their life as scholars and teachers in the academy will play out.

What is fast becoming the "new normal" in the everyday life of academic humanists will require people to be intellectually nimble; conversant in digital media, networks, archives, and identities; energized by collaboration; flexible in their modes of address; imaginative in their pedagogical practice; and adept at telling the story about what they do. The challenge is to reorganize doctoral education to meet the imperatives and the opportunities of the 21st-century academy in good-enough times. And for me, the place to focus attention now is on that capstone project we call the dissertation, in the humanities the dissertation as proto-monograph.

The argument for embracing more flexible dissertation options proceeds from recognition that, in these good-enough times, it's imperative to affirm the *intellectual mission* of the PhD as a project and redefine its paths of achievement. The current model is no longer adequate to the state of higher education, the state of the disciplines, and the nature of future jobs in the profession and in the greater humanities workforce. The

quality, extension, and liveliness of scholarly conversations across humanities fields in the next decades depend on this redefinition as well as the vitality of the liberal arts in an academy pressured to pursue an instrumentalist vision of higher education. If doctoral study is to launch the careers of future academic humanists and contribute to a robust humanities, then more flexible road maps through the degree, and a more flexible set of models for its capstone, are required.

Reaffirming that there is only one way of doing the dissertation—and that is as a proto-monograph—trains and constrains students in a one-model-fits-all version of doctoral education that is no longer adequate to the times. The current dissertation monograph remains inflexibly wedded to the traditional book culture format; and the habits of inquiry and production its conventional demands reinforce may not train doctoral students in methodologies enabled by, and skills necessary to navigate, this emergent environment. Remaining wedded to the dissertation monograph as an isolated venture will limit students' preparation for this increasingly collaborative scholarly world. Further, the model of success narrowly focused on one outcome—completion of the long-form proto-monograph and then a tenure-track position at an R1 institution—has run its course. It is exhausted; it is exhausting; it is no longer tenable in terms of student interests and prospects.

Doctoral students will enter many different kinds of institutions. Yes, a number of graduates will take up positions in R1 universities; they are collectively one of the largest sectors employing humanities doctorates. But many (about a third) will find academic teaching positions in regional universities, liberal arts colleges, and community colleges. And the latter educate around 44% of undergraduates across the United States. Others will pursue and find academic positions in libraries, institutes, administrative offices, student services, development, and outreach. Some will move to the nonprofit world of the humanities workforce; some to the world of government and public policy. Practically, graduate students need to optimize the range of opportunities they can pursue by recognizing the transferability of skills they already have and finding opportunities to gain skills they do not already command. If, as Alexandra Rausing argues, the new Alexandria of the future is an expanded network of knowledge producers inside and outside the academy, if the production of knowledge is an effect of the cloud and the crowd as well as professionally trained researchers and scholars, then preparing doctoral students for the larger humanities workforce will enhance opportunities for collaboration among intellectuals and researchers within and without the academy.

So let's design the humanities dissertation of expansive possibilities, of which the monograph form will be one among several options. Some students will pursue the traditional dissertation; but they will also recognize that there are other options and thus other kinds of preparation important for their future careers. Some will opt for alternative models if that option is available to them, and they will surprise advisors and graduate directors with their conceptualization of this capstone to their studies. The most common alternative to the long-form dissertation is the "suite" of three or four essays, a concept of the dissertation on the table for at least two decades. A suite might involve a theme and its variations; or a set of distinct essays, probing different topics, using different methods, elaborating different theoretical frameworks and approaches.

And there are other projects that could be combined into an ensemble dissertation involving multiple components. Here are several possibilities: Preparing a teaching

portfolio, including an extended essay on pedagogy and a design for sequenced courses geared to different levels, class sizes, and audiences; writing a metacritical essay on the intersection of scholarship and teaching in the classroom; pursuing a project of "public scholarship"; addressing issues of the humanities and public policy. An ensemble dissertation might combine a scholarly essay of original research of 80 pages; a metacritical essay on teaching in the field; an essay on theorizing digital curation; and an essay on the experience of community-based scholarship; all of which would evidence flexibility in communicating scholarship in different voices, media, and venues. Or, given the affordances of new platforms for scholarly communication, the dissertation project might involve an edition of some text or corpus of texts with multiple components to it. The expectation of research "scope" of a capstone project would derive from the depth of thought, sophistication of methods, and intellectual ambition arrayed across multiple modes and media assembled in the ensemble dissertation. For students in language and comparative literature units, a dissertation project might include a translation of a formerly untranslated scholarly or literary work or a new kind of translation of an already-translated work. The translation could be accompanied by a robust introduction that situates the work historically, or generically, or theoretically, or geographically, and an essay critically engaging theories of translation as a practice.

Then there are the new opportunities for born-digital dissertations. This mode of dissertation involves conceptualizing, mapping, composing, displaying, and offering metacommentary on a digitally environed scholarly project, often of significant value to other scholars, teachers, and students. Such projects might be, and are being, conceived under multiple rubrics, one of which would be "curation"; others might be ideation, multiple pathway argumentation, visual mapping, multimodal syncopation, interactive reading, and tool building. And there are other possibilities imaginable, such as documentary film or the creative dissertation of mixed modes.

However the dissertation is configured, whether as the long-form proto-monograph or some alternative ensemble of modes, projects, and vehicles, the prospectus stage of the doctoral study will take on a more dynamic, rather than formulaic, dimension. No longer a formality to get through, with a nod to the recognition that the proto-monograph will be very different in the end so the prospectus doesn't much matter, the prospectus in a time of choice could become the occasion to think about the content of the project and the vehicle together. As a graduate fellow at the Institute for the Humanities here at Michigan recently observed to me, "How beneficial it would have been to think through why I was writing a monograph for the form of my own dissertation—what specific skills I wanted to gain from writing a monograph, the rationale behind presenting my work in monograph form, etc. If doctoral students, with their advisers, were invited to think about and then make a case for the form they wanted their dissertation to take, I think this could be quite helpful."

In addition to a broadening of the options for the dissertation, there will be changes related to courses and to coursework. Programs might rethink the normative packaging of doctoral education in 3-credit courses. Across the curriculum as a whole and across particular courses, alternatives to the seminar paper could be introduced. These alternatives might include collaborative essays; series of collaborative essays; collectively produced glossaries of terms and concepts; a cohort essay project; a grant application addressed to a real grant program; a deep reading journal; a creative portfolio; a lecture

for an undergraduate survey course. Given the emergent ecology of scholarly communication in the humanities, seminars might be organized around a double format analytical project, with submission of scholarly objects in traditional print form and in a multimedia environments such as Wordpress or Scalar; a visualization or mapping project; a curation; a term-long blog; and other options.

The professionalization of doctoral students might be expanded to include opportunities for internships, internally with professional staff in libraries or presses, or museums or public relations offices; and externally with cultural institutions or public policy centers or the for-profit sector. Programs might expand the network of the people critical to successful doctoral education by identifying humanities professionals and others across the academy as mentors, tutors, teachers, and collaborators: humanists in libraries, in digital humanities centers and labs, in university publishing units, in tech labs. And, in concert with the initiatives of graduate schools and departments across North America, programs might provide opportunities for doctoral students to gain new skills and competencies increasingly important for humanities scholarship and practice and transferable to other careers graduates might imagine.

There is so much to be gained by expanding the repertoire of possible kinds of dissertation. I am convinced that the availability of more flexibility in programs, projects, and pathways through the doctorate will attract more diverse cohorts of students. I am convinced that humanities departments and doctoral programs will gain in creativity, cross-fertilization of ideas and practices, energized learning communities, and more satisfied students. I am convinced that, with an ensemble dissertation project, students will expand their critical, theoretical, and methodological perspectives and their collaborative sociability as they work with multiple mentors. I am convinced that the dissertations produced will be of higher quality than many of the proto-monographs delivered to faculty after long years of forcing five chapters to their less-than-compelling conclusion. I am convinced that doctoral programs will become more innovative, inclusive, and vibrant.

Instruments of knowledge: toward the reform of the PhD dissertation

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Three years ago, a group of Canadian and American scholars published a White Paper on the Future of the PhD in the Humanities (http://iplai.ca/what-we-do/research-public-exchange/future-humanities/). The White Paper concluded with seven recommendations. Here are the short versions:

1. **Mentorship.** Universities should create dedicated professional planning and placement services that serve to broaden the legitimate employment expectations of humanities PhDs and that prepare graduates for a multiplicity of career opportunities.

2. **The PhD Dissertation.** We recommend replacing the thesis with a coherent ensemble of projects, which can include single-author and collaborative essays, electronic archives or other kinds of digital scholarly resources, editions, translations, works of scholarship in a range of forms and oriented toward multiple audiences, and so on.

3. **Professionalization and Time to Completion.** We recommend that doctoral programs be four and no more than five years.

4. **New Scholarly Technologies.** We need to set a higher standard of digital literacy for humanities programs in recognition that graduates will be seeking employment in an information age.

5. **Recruitment.**We should expand the criteria by which candidates are admitted to PhD programs, considering skills, achievements, and career goals as well as past academic performance.

6. **The Labour Market and the Culture of the Academy.** Faculty, students, and administrators must take in the facts about the prospects for academic employment of PhDs and must begin discussions across the academy about how to redress the situation.

7. **Reporting.** We recommend that the leading academic/humanities organizations in Canada publish an agreement to the effect that all doctoral programs must keep up-to-date records, at a minimum, about recruitment of PhD students, years to completion, attrition rates, and a full accounting of placement inside and outside the academy—three, five, and ten years after graduation or after withdrawal from programs.

Numbers 1, 4, 5, and 6 have hardly raised an eyebrow. People shrugged their shoulders at 3, as if to say "of course, the programs should be shorter, but really, what can we do?" And, of course, the historians were not wrong to point out how long students have to spend in order to learn the languages they need for their research, not to mention the time they have to spend in the archives.

Recommendation number 7 is at the heart of the ongoing TRaCE project (http://iplai.ca/what-we-do/research-public-exchange/future-humanities/trace/), which is a collaboration of 24 Canadian universities, the Canadian Association for Graduate Studies (CAGS), the Federation for the Humanities and the Social Sciences, the Jackman

Humanities Institute at the University of Toronto, and a number of other partners, including Adoc Talent Management and the Higher Education Quality Council of Ontario (HEQCO). The project is headquartered at the Institute for the Public Life of Arts and Idea (IPLAI) at McGill University. It is funded by the Social Sciences and Humanities Research Council of Canada, the participating universities, and the partner organizations. (I will have more to say about the TRaCE project at the CGS Dissertations workshop.)

As I have talked to faculty members and students across Canada over the past three years, and especially in the course of the Future Humanities project in 2014-2015, it has been Recommendation 2 that has aroused the most discussion, debate, and resistance.[1] I was surprised to learn how many humanities students and faculty didn't know that the long-form thesis was not in fact standard across all the other disciplines. They were surprised that the "ensemble of projects" we were recommending in the White Paper was already standard practice in a number of disciplines.

But it was not the disciplinary isolation of my interlocutors that was most striking. What was most remarkable was how often people rose in defense of the long-form dissertation and how passionate their defenses of it were. Many interlocutors argued with both emotion and reason for the value of the long-form thesis because of how it signaled and also required the kind of deep, focused inquiry that is central to the humanities. And it is indeed not an easy task to reimagine the doctoral thesis as a work able both to go deeply into a particular question and also able to mobilize that research, or at least part of that research, for non-academic constituencies.

But some people seemed simply to be avoiding the larger question by undertaking a dissection of the practicality of the two model PhD programs, which were included in the White Paper, not as practical examples, but solely to provoke new thinking about program design. Many others said that changing the long-form PhD would degrade the degree, take out its heart, transform it into something else entirely.

As a literary scholar, I agree that the form of a text and the character of the implied reader are important. But I could not fathom why so many people thought that moving from the long-form dissertation to an ensemble of projects would amount to the destruction of the PhD itself. After all, while the projects were to be variously oriented, with at least one designed for a non-academic constituency, and each aiming toward a different form of publication and a different publication platform, they were also to be strongly interrelated around a single research question. Why this degree of emotional investment in the traditional format and the exclusivity of the readership for a work of scholarship?

There are likely many reasons for the deeply rooted attachment to the long-form thesis. I'll focus on only two of them. The first is a underlying binary that conditions our understanding of what we do as humanities scholars.

Faculty members often represent themselves as fighting for the intrinsic value of humanities scholarship at the top of its form, the "for-itselfness" of such scholarship, against the instrumentalization of knowledge demanded by an increasingly corporatized and commercialized academy.

Consider how even a savvy thinker like Stefan Collini can characterize humanities knowledge as something set apart from practical concerns and something that is

[1] For more on Future Humanities, see http://iplai.ca/what-we-do/research-public-exchange/future-humanities/,

misrepresented essentially by arguments about how the value of a humanities education consists in teaching reading, writing, and analytical skills. "[S]kills-talk," Collini says, "represents a failure of nerve. It is an attempt to justify an activity not in its own appropriate terms, but in terms derived from another set of categories altogether, categories drawn from the instrumental world of commerce and industry."[1]

Collini is right about a good number of things. Humanities education is not valuable principally because it helps students develop a set of so-called "transferable skills." And he is right that the modern university, even a university as deeply rooted in traditional scholarship as Cambridge, is increasingly likely to seek to justify itself by way of a limited set of terms that have to do, first, with the ability to develop innovative solutions to current ecological, economic, technological, health-related, and social problems and, second, with the capacity to prepare young people for the multiform world of work.

These things are true, and yet Collini's main claim about the incommensurability of the intrinsic worth of humanities knowledge and the instrumental worth of literary (broadly defined) skills is wrong. It is a false dichotomy, and one that is pervasive in the modern university. That its falseness is so largely invisible points to second important matter. The assumed truth of a categorical divide and a mutual antagonism between the intrinsic and instrumental value of the humanities is a product not of the texts we study or write or of our practices as teachers or researchers. After all, our scholarship and teaching, when we are doing them well, have the character of deep inquiry and critical self-reflection and also the capacity to educate others in new ways of seeing, reading, thinking, writing, and speaking. Our work is both valuable in itself and valuable for its usefulness.

One could argue that the intrinsic-instrumental divide is, ironically enough, an effect of the hugely successful institutionalization of humanities research and teaching in the modern university. Since the incorporation of loosely-knit groups of teachers and students in the European Middle Ages, institutionalization has enabled a measure of employment security and a high degree of scholarly freedom in the face of ecclesiastical and state power.[2] It has also had the effect of islanding scholarship within the university, especially since one important source of scholarly distinction has been its autonomy from what has increasingly been seen as the "outside world."[3]

The doctoral dissertation is the distillation of the treasured apartness of humanities scholarship. It is easy to understand how the most challenging and the crowning work undertaken by aspiring doctors of letters has taken to itself the values along with misconceptions of the academic institution of the humanities. Faculty members often say to their supervisees (I have said it) things like, "this is the best time of your professional life. Now is when you can get to focus on what really matters rather than having to deal with all the political nonsense and administrative busyness that comes with a senior, tenured position."

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[1] Stefan Collini, *What are Universities For?* (Penguin, 2012), loc 2353.

[2] Francis Oakley, *Community of Learning: The American College and the Liberal Arts Tradition* (New York: Oxford University Press, 1992), 11-37.

[3] One dire effect of the assumption that humanities research and teaching is islanded within the university, beset on all sides by "the instrumental world of commerce and industry," has to do with how many PhDs choose to remain on the island as underpaid, overworked adjunct faculty instead of seeking careers in the multiple sectors of work and action outside the academy. See Marc Bousquet, *How the University Works: Higher Education and the Low-Wage Nation* (New York: New York University Press, 2008).

The second reason for the high degree of resistance to the idea of doing the the dissertation differently is straightforward and understandable, especially when the recommended changes involve writing some parts of it in a non-academic style, framing parts in a non-traditional format, disseminating parts (or all of it) by way of social media or other publication platforms, or aiming parts for a readership (or a viewing audience) different from the readership inside a particular discipline (itself inside the university). Most faculty members have made their way in the profession along the well-established lines of the conference presentation and journal and book publication. The audience or readership they seek to engage is comprised of faculty members, postdocs, and senior graduate students. They have learned to write in ways that are familiar within their disciplines but often inaccessible to people outside their disciplines. They have never traveled the winding pathways that lead from doctoral programs to the many other places where PhDs have settled and made lives for themselves. Most of us (I include myself) would not know where to begin if we were to take on the supervision of a dissertation that was to combine the traditional methodologies and expectations of humanities scholarship with a much more experimental, mobile, and public-facing dimension at the level of content, style, format, and mode and place of publication.

In spite of these considerable obstacles, I nevertheless maintain that creative reform of the dissertation is urgently needed. I have discussed elsewhere how add-on skills training programs are well-meaning and useful but hardly enough to meet the challenges facing the present-day graduating cohorts of PhDs.[1] Since the great majority of PhDs in the humanities do not and will not be able to secure permanent academic employment, there is a pressing ethical requirement for the universities to redesign doctoral programs and especially the central, final element of the programs so that students do not internalize the widespread assumption that there is no place for them outside the academy and so they begin to learn how to carry their talent, knowledge, and (yes) skills into careers outside the university.

I am not arguing for reform of the dissertation so that PhDs will be "job-ready" for non-academic careers. We need a larger and more forward-looking view than that. The work I've been involved in for the past three years is certainly about changing the culture of the academy so that the PhD leads and is seen to lead to a multiplicity of rewarding and worthwhile careers rather than to only one. The work is also dedicated to creating a new humanities research and teaching community that flourishes both inside and outside the university and thrives especially on account of the exchanges of knowledge and knowhow between the university and the multiple non-academic sectors of work and action.

The creation of such a community and the fostering of such exchanges are important goals of the TRaCE project. To invite PhDs in careers outside the university to take part in limited but creative and formative ways in graduate teaching, supervision, and mentoring is to begin to enable the reform of the dissertation in earnest. That reform will in turn strengthen the humanities by teaching humanities research and humanities teachers themselves how to move. The island of the academy is indeed a wonderful place, but there are many other sites in society for the cultivation of humanities research and teaching. It is possible to build many bridges between the island and the mainland that will enable a new era of transformative two-way traffic.

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[1] "Rethinking the Humanities PhD," *University Affairs*, April 2015.

The Future of the Dissertation (in the Social Sciences)

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In preparation for this presentation and discussion, I sent email on December 13, 2015, to 20 anthropologists I have worked with. 12 already have Ph.D.s and 8 are working on them at the moment. Of those with Ph.D.s 3 are tenured, one works full-time at a VA Hospital, and 8 finished their doctoral degrees within the past 5-6 years. Four are archaeologists, one is a primatologist, two are linguistic anthropologists, one was an engineer and computer scientist but now works full-time as a sociocultural anthropologist, one is simultaneously a lawyer, 4 work at the intersection of social anthropology and public health, one is a filmmaker as well as a medical anthropologist, two have worked in (or shown exhibits at) museums, and 5 work at the intersection of state institutions or agencies and the people they serve. Most are women (17) as is increasingly common in anthropology, and 5 come from underrepresented sectors of U.S. society. All those with Ph.D.s are employed (and 8 of them have tenure-track or tenured positions in the academy).

I wrote to them because they are people I have advised, or at least worked with closely over the years, or they are people who have taken my Professionalization and Career Seminar over the past 16 months and I thought that the chances were high that they would respond. In fact, 5 (25%) had already responded within 48 hours of getting my email, and more came through after Finals Week.

Below are the questions I asked them (and in italics some summarized answers):

(1) Can you imagine a different format or length that could work to prepare you for a life as a professional with a Ph.D.? *All replied that they could.*

(2) Would any of the following seem appropriate as SUBSTITUTES (or alternatives) for what we require now?

(a) a documentary film (of at least 60 minutes) accompanied by a written text (of 30-50 double-spaces pages) explaining choices made in the filmmaking, the research on which it is based, and the reasons for making the film? *Many like this alternative, especially for people in visual anthropology.*

(b) 3-4 sole-authored articles accepted for publication in peer-reviewed journals--on different, though related, topics? *Most think that this is a good alternative, though they worry about the length of typical peer-review processes in the U.S.*

(c) 5-6 sole-authored article-length manuscripts SUBMITTED to peer-reviewed journals--on different, though related topics? *Many think that this is a good alternative, especially because they fear peer-review but appreciate the need to get published.*

(d) a blog on a specific topic maintained (and with readers) over a period of 1-2 years? *Most object to this as evidence of expertise, including the one who has had a blog for 2-3 years.*

(e) a sole-authored book manuscript accepted for publication by a scholarly (and not "vanity" press)? *Most think this is quite appropriate, though daunting.*

(f) 10-12 book reviews on a subject (each 1000-2000 words) written for and submitted to a journal (print or electronic) that publishes book reviews? *Most object to this as evidence*

of expertise, even though many have written one or more book review.

(g) 10-12 conference papers on different (though related) topics given at advisor-approved scholarly conferences? *Most object to this as evidence of expertise, though by now all have presented conference papers. The main objection seems to be that conference papers are not developed enough.*

(h) 2-3 years of full-time teaching at an institution of higher education in the United States? *So far, most object to this as evidence of expertise.*

(i) 2-3 years of full-time teaching in English at an institution of higher education outside the U.S.? *So far, most object to this as evidence of expertise and do not seem to consider the "outside the U.S." part of this especially understandable.*

(j) 2-3 years of full-time teaching in a language other than English at an institution of higher education? *So far, no one has actually commented on this.*

(k) 2-3 years of funded research on a topic approved by a committee of advisors and with a funding source (s) approved by a committee of advisors? *Most wonder if doing the research is enough and whether there shouldn't be at least some writing about the findings.*

(l) a sole-edited book manuscript accepted for publication? *People seem somewhat split on this as an option, though many have no experience of the work entailed in editing a volume.*

(m) 10-12 accepted journal articles or book chapters in which you appear as first, second, or third co-author? *People in less science-oriented areas of my field find the number listed here daunting, though they do not usually publish multi-authored texts.*

(n) a co-edited book manuscript accepted for publication? *People seem somewhat split on this as an option, though many have no experience of the work entailed in editing a volume.*

(o) 6-8 completed Senior Theses or Masters theses that you have supervised/directed? *Most respondents so far do not consider this as enough evidence of expertise.*

(p) 1-2 inventions for which you have received a patent? *Those who have commented on this say they think this might work for people in the sciences.*

(q) directing a field school for 3-5 years? *The non-archaeologists have nixed this, but I have not yet heard from enough archaeologists.*

(r) publishing at least 3 sole-authored articles or book chapters in a language (or languages) other than your native or dominant language (and not simply translated by someone else)? *This may work but a number of respondents have said that they do not understand the value of this.*

(s) envisioning, running, and securing funding for 3-5 conferences/symposia lasting at least one full-day (with 3 required if sole-organized and 5 if co-organized)? *Most respondents have said they thought this was not sufficient evidence of expertise.*

(t) testifying as an expert witness or consultant 5-6 times in court or at an approved state-level , national-level, or international tribunal or institution? *Some respondents said this could be a very attractive option, especially for people wanting to work with NGOs or policy in general.*

(u) 1-2 medium-sized museum exhibits on a particular topic at an accredited museum and with you as the leader, accompanied by a catalog you author or co-author? *Many people thought this could and should be a good option for archaeologists or museum studies experts.*

(v) anything else?

Observations/Realizations from this Exercise

In my email on Dec. 13, I added "think 5-10-15 years from now, too. And notice that all of the above still assume that a PHD is a degree given to someone who has shown evidence of being, becoming, or being regarded as an expert on a topic." I realize that this last statement might well have been directive enough to affect some of these answers, but I also realized as I was imagining future alternatives to the doctoral dissertation that I felt strongly about what a PhD signifies (and should continue to signify), namely, expertise in a topic & the ability to imagine, design, & figure out how to work on a topic in the future.

That these continue to be, to me, the hallmark of a Ph.D. is important. Should the Ph.D. at some future time stop being seen as the highest degree a university gives, I am convinced that the academy, the government, or the corporate world would come up with some other form of training deemed necessary to generate the level of expertise and competence that we now deem marked by completion of a Ph.D. In fact, I often think that something like this is already happening in a variety of fields in Europe and in the natural/physical sciences in the U.S., where people with doctorates typically get post-docs (and not Assistant Professorships) upon completion of their Ph.D. If time to completion is taken into account across many fields (including significantly different subfields of anthropology), it seems that 8-10 years is the norm for someone to go from starting graduate school to being deemed expert enough to get a job as an Assistant Professor in their field.

But in the social sciences (and certainly in social, cultural, medical, legal, and linguistic anthropology) most of that time occurs prior to getting the Ph.D. and the Ph.D. now stands for what I said above, namely, that it is a degree given to someone who has shown evidence of being, becoming, or being regarded as an expert on a topic." Hence, the question remains whether a doctoral dissertation is the only way, or even the best way of ascertaining that level of expertise and accomplishment, and I am not convinced that it is, though I imagine that it will continue to be seen as the necessary marker of such expertise and accomplishment at least for the next decade. Tertiary education is often quite slow to change, so I approach the future of the dissertation with a mix of imagination and practicality.

Openings

I am aware of some possibilities that already exist in some departments in some graduate schools in the U.S. For example, I know that some time in the late 1980s or 1990s the American Studies Program/Department at the University of Iowa decided to allow their doctoral students to make a documentary film or similar audiovisual project in addition to a shortened written text in lieu of a standard doctoral dissertation. I also know that the vast majority of doctoral students in that program/department have continued (since then) to write standard-length doctoral dissertations.

I also know that already by the 1980s some science departments at Duke (where I began my faculty career) were requiring published articles instead of a standard doctoral dissertation before they awarded the Ph.D. If I am not mistaken, this included the Duke physics department, which required their Ph.D. candidates to have published (or have had accepted for publication) 3 articles (with, I think, the doctoral candidate as first author) plus a review of the scientific literature in the field and some kind of introduction and conclusion bound together before they awarded the Ph.D. And I know that the biological anthropology doctoral students in my own department are at the moment

being led in that direction, although there is no rule in my department that requires publication prior to getting the Ph.D.

Since the Master's degree in my field already went through significant change in many Ph.D.-granting institutions since the 1980s and 1990s—with many of these departments not even granting them to graduate students or switching to requiring a paper in lieu of a thesis—I think it is highly likely that there will be some change, some alternatives, indeed some openings in the next decade in Ph.D.-granting departments in the U.S. in the social sciences. But what these will be, and what these should be, is the question.

Possibilities

The options I gave my current or former students via email on December 13 are ones I consider plausible, though I think some of the suggestions seem more imaginable than others—and some of the numbers I included in my original email could easily be adjusted. For example, how many articles could count and how many book reviews could count, or how many different college-level courses could count?

The doctoral dissertation in anthropology is, as I usually tell my student advisees, both the last piece of student work they do & a proto-book. There is little question that it is the last piece of student work, but I am less sure that publishers consider doctoral dissertations to be proto-books. It has been clear for several decades that most scholarly publishers in the U.S. do not even consider unrevised doctoral dissertations for publication as books, so why do we require them & should we continue to require them?

The length of a typical doctoral dissertation in my field is between 230 and 400 double-spaced pages. It is supposed to be original scholarly work, based on first-hand research that advances the field or some subfield of the discipline. It is supposed to be based on many months of first-hand research, and to include both new data (not yet generated by others) and analysis of that data (that relates to work published or at least publicly presented by other scholars). To this end, doctoral candidates are almost always required to relate their research question, data, and analysis to the work of other scholars, and this typically leads doctoral candidates to write many pages reviewing or analyzing relevant bodies of literature. Sometimes they do so in a chapter of the doctoral dissertation that is just that---namely, a review of relevant scholarly literatures. And sometimes such a section is more embedded in a longer introductory chapter that includes such a review. It is often these chapters or sections that publishers find most objectionable, and yet increasingly over the past 3-4 decades these chapters or sections of dissertations have become longer and longer, at times being as much as one-third of a dissertation. If a dissertation is not actually deemed good enough by publishers to consider publishing them, then I am probably wrong to consider it a "proto-book"—either that or perhaps it serves a different function and I should change my description of it or, alternatively, we could change the way we direct doctoral candidates in the writing of their typical doctoral dissertation.

Consider yet another problem, one that may not be shared by all the social sciences but I doubt it is unique to anthropology: namely, that many doctoral dissertations have a great deal of new and original data but not much of a thesis or argument. Colleagues may argue that this is fine, if the data they do include are indeed original contributions to scholarship but I, for one, do not consider that sufficient. So, while I would consider all of the options I offered my current or former doctoral students, I think U.S. graduate schools should consider changing doctoral dissertation requirements, certainly in several fields

including anthropology so that the final requirement for the Ph.D. better meets our expectations of what the Ph.D. means. Based on my own experience of more than 30 years of training and producing PhDs as well as the feedback I have gotten from the 20 anthropologists I contacted in preparation for this presentation, I could imagine giving doctoral candidates options, perhaps based on their goals & areas of expertise, and requiring their doctoral committees to approve of the plan.

Ruminations about the Future of Dissertations in the Social Sciences

Jennifer Hochschild

Being no expert in graduate education, I propose to reason backwards from changes that I see in the arena of scholarly publications to possible implications for dissertations. I will focus on three changes of note– the apparent decline of the scholarly monograph, the apparent rise in journal publication, and the push toward data transparency and replicability or interpretability.

Most scholarly monographs have never sold in large numbers, but sales can now be ludicrously small. According to one expert, " a fair estimate would be that the average sale of a scholarly monograph has shrunk from 600-700 copies in the 1980s to 300-400 copies in 2007. . . . At the same time, sales of monographs to scholars and students have declined, although not to the same extent."[1] The number of sales have arguably declined further since 2007. Speakers at an American Library Association forum in 2014 gave talks on "Monograph Collecting in Crisis: A Publisher's View" (Michael Zaoli, from YBP Library Services), or observed that "for the last four years, sales have been flat or down for all publishers. E-book purchases had been increasing but now have plateaued. Smaller library budgets mean fewer cloth book sales, which are the most profitable. University presses face some unique issues, such as reduced funding from their home universities. . . . Another issue is fewer paperback sales to students" (Alex Holzman, Director of Temple University Press and president of the Association of American University Presses for 2008-9). A third speaker pointed to her library's "low usage statistics for their print monographs" and the fact that it "has eliminated the traditional faculty-driven collection development for this format" (Julie Swann, Northern Arizona University). All three participants offered possible reforms or innovations, but Holzman concluded that "any solutions. . . are merely band-aids. The model of scholarly publishing must change to be sustainable." [2]

If this rather dire picture is accurate and remains in place, there seem to be clear implications for dissertations that take the form of book drafts: arguably they will be even more difficult to publish, and eventually to reach an audience, than they are now. This change will affect the humanities the most, the natural sciences the least, and some but not all of the social sciences. At least along the dimension of book-to-article publications, the social sciences occupy a middle space; some disciplines such as anthropology and history look more like the humanities, while others such as economics, geography, demography, and psychology look more like the natural sciences.[3] Political science and sociology are themselves mixed, with a range of modes of publication from political philosophy or ethnography (mostly books) to analyses of administrative data or surveys (mostly articles). Graduate students will therefore be more or less harmed by the

[1] Bill Harnum, "Reflections on University Press Publishing," *Academic Matters*, April 9, 2009. http://www.academicmatters.ca/2009/04/reflections-on-university-press-publishing/ Mr. Harnum is the former executive director of the University of Toronto Press.

[2] "PVLR Forum: What Drives Acquisitions in 2014?" *ALCTS News*, a publication of the American Library Association. n.d.; circa 2014. http://www.ala.org/alctsnews/conf/mw14-pvlr-forum

[3] Exactly what disciplines are in the social sciences is contestable. Across 31 highly selective colleges and universities, history was a social science in 20 and in the humanities in 11; psychology was a social science in 23 and in the natural sciences in 8.

decline in publication and sales of scholarly monographs depending on their discipline or subdiscipline – but none will be benefited, so far as I can tell.

A cautionary note: this scenario of "the death of the monograph" is contested by some experts. Richard Fisher, formerly Managing Director of Academic Publishing at Cambridge University Press, recently posted a blog asserting "whilst the sales and circulation of individual monographs were unquestionably challenged, there was no reason on earth why the supply of long-form research, properly written and professionally published, need dry up." He pointed to technological innovations such as print-on-demand that have "prove[d] the monograph's salvation," as well as "the massive expansion in long-form research outputs of the past thirty years," especially among young scholars (a.k.a. dissertation writers) around the world.[1]

Fisher also argued that "the publication format which seemed to have retained its circulation best of all, namely article publication in major humanities journals. . ., ought to be the aspiration for more scholars than seemed currently to be the case, and that an ever-increasing emphasis on books as the key to career and tenurial advancement was not, necessarily, doing the historical profession any great favors" (ibid, note 3.). If we expand his point beyond the humanities to the social sciences, that leads to my second observation, about the growth in journal publications.

According to one metric, "published article output has grown 3.5% to 4% per year since 1990," due to both an increasing number of journals and an increasing number of articles in established journals. If the 124 members of the Association of Research Libraries' purchases of journals is indexed at 100 in 1990, they bought 315 journal subscriptions on average by 2010 (these data were not available for the social sciences only).[2] Another analysis shows that "the growth rate for SSCI [Social Science Citation Index] for the period 1987–2006 has been found to be 1.6% per year . . . for All Sources and 2.0% per year . . . for Journal Articles. The corresponding doubling times are 44 and 37 years." SSCI covered about 1700 journals in 1998 and 2700 in 2009, but the authors of this analysis doubt that SSCI coverage is complete. They also offer my favorite concluding

[1] "Guest Post: Richard Fisher on The Monograph: Keep On Keepin' On*, Part One," *The Scholarly Kitchen*, Nov. 10, 2015. http://scholarlykitchen.sspnet.org/2015/11/10/guest-post-richard-fisher-on-the-monograph-keep-on-keepin-on-part-one/

> Another blog post on Scholarly Kitchen argues that monograph publishing continues apace, but points to a a crisis looming for the monograph that will make the current problems seem minor. Many monographs are now made available in both print and digital versions, each requiring payment. You can choose to purchase not the whole book but individual chapters in digital format. The monograph is the scholarly development of an argument over 250 pages or more, backed up by the careful use of evidence. The integrity of the book as a whole is why it plays such an important part in the process and communication of research. If people buy individual chapters that integrity is lost, and the monograph will go the way of the music album when iTunes facilitated purchasing of individual tracks. This is the real crisis looming for the monograph and it greatly worries me.

This is an important subject, and relevant to dissertation writers, but a bit too far afield to discuss here. The quote is by Geoffrey Crossick, and is in Alison Mudditt, "Age of Challenge and Opportunity: The HEFCE Report on Monographs and Open Access," *Scholarly Kitchen*, October 19, 2015. http://scholarlykitchen.sspnet.org/2015/10/19/guest-post-alison-muddit-interviews-geoffry-crossick-on-an-age-of-challenge-and-opportunity-the-hefce-report-on-monographs-and-open-access/

[2] Kent Anderson, "Have Journal Prices Really Increased Much in the Digital Age?" *Scholarly Kitchen*, Jan. 8, 2013. http://scholarlykitchen.sspnet.org/2013/01/08/have-journal-prices-really-increased-in-the-digital-age/
The original report that this blog summarizes appears to have been taken down from the Internet.

paragraph: "These conclusions may not be helpful. It is not clear what should be done in the future."[1]

That concluding paragraph seems right, at least for current purposes; I do not have good evidence on whether journal publishing in the social sciences is increasing at a faster rate than the number of social scientists writing dissertations, how that rise varies across disciplines and subdisciplines, how the rise in open access publishing affects access to journal slots for graduate students and junior faculty, how many of the new journals have peer review or other strategies for quality control, and so on. Perhaps some or all of this information exists, and it would be worth tracking it down in order to understand how journal publishing relates to the future of dissertations in social sciences.[2] Here I can only offer three points: 1) journals do not seem to be declining in number or reach, as scholarly monographs perhaps are; 2) an increasing share of Ph.D. students, at least in political science, are aiming to publish articles out of their dissertation rather than a book; and 3) if electronic publication of articles goes in parallel with or substitutes for print publication, the content of dissertations may change substantially. Electronic publication could deepen the range and nature of evidence offered in a dissertation, to include everything from datasets to video clips, maps, interactive graphics, snatches of music, or taped speeches or interviews. Dissertations could also, however, become narrower in scope and content if articles increasingly substitute for books as the goal of a published dissertation.

My final issue with regard to the future of dissertations focuses on the increasing drive toward data transparency and replicability (or the interpretability of research evidence, to put the point in more qualitative-friendly terms). This is a highly controversial issue in political science at present, and I can talk more about the details at the meeting if others are interested.[3] The issue has not reached into history or anthropology, so far as I know, and is becoming salient in psychology. (Sociologists have issued an exhortation but not a mandate for data transparency, and I don't know about economists).

Exactly what is required in order to comply with mandates for data, analytic, and production transparency is contested; some scholars also express a deeper epistemological concern that the move toward transparency and replicability is intended

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[1] Peder O Larsen and Markus von Ins, "The rate of growth in scientific publication and the decline in coverage provided by Science Citation Index," *Scientometrics*, September 2010. 84 (3): 575-603. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2909426/

[2] Other points worth pondering, although they do not related directly to the future of dissertations: the average number of citations per article from 2000 through 2010 in the social sciences other than economics was under 4 ("Citation averages, 2000-2010, by fields and years," *Times Higher Education*, March 31, 2011. https://www.timeshighereducation.com/news/citation-averages-2000-2010-by-fields-and-years/415643.article.

About a third of social science articles receive no citations in the first five years after publication, and 10 percent account for half of all citations after two years . Vincent Larivière, Yves Gingras, and Éric Archambault, "The decline in the concentration of citations, 1900–2007," *Journal of the Association for Information Science and Technology*, 2009. 60 (4): 858-862.

Arguably, we have too many rather than too few journal articles being published.

[3] I am attaching, as an appendix, the Journal Editors Transparency Statement (JETS) that editors of about 30 political science journals have agreed to; implementation began in 2015 but is not yet complete. For evidence on the controversy within political science, see the DA-RT website (http://www.dartstatement.org/) and Dialogue on DA-RT (http://dialogueondart.org/), which includes a petition signed by almost 1300 members of the American Political Science Association opposing implementation of the JETS principles in the near future.

to impose an inappropriately rigorous, "scientistic," model on all social science empirical research. Some graduate students and junior faculty welcome the engagement with other scholars that the move toward research transparency may entail. But many who do qualitative or ethnographic research perceive a serious chilling effect. They fear that they cannot promise confidentiality to interview subjects, that the tasks of making public their transcripts or field notes will be onerous and expensive, that they will need to release their evidence for others' use too soon, and that journal editors will reject qualitative work because they cannot devise clear rules about compliance. In my view these concerns are probably exaggerated, and the move toward transparency is likely to produce better research. But any disincentive to engage in qualitative research for a dissertation is worrisome. So the future of dissertations in some of the social sciences may reinforce a deeply destructive split between (high status and "rigorous") quantitative research and (low status and "soft") qualitative work.

Appendix

Data Access and Research Transparency (DA-RT): A Joint Statement by Political Science Journal Editors

In this joint statement, leading journals commit to greater data access and research transparency, and to implementing policies requiring authors to make as accessible as possible the empirical foundation and logic of inquiry of evidence-based research. Please visit dartstatement.org for more information

Transparency requires making visible both the empirical foundation and the logic of inquiry of research. We agree that by January 15, 2016 we will:

*Require authors to ensure that cited data are available at the time of publication through a trusted digital repository. Journals may specify which trusted digital repository shall be used (for example if they have their own dataverse). If cited data are restricted (e.g., classified, require confidentiality protections, were obtained under a non-disclosure agreement, or have inherent logistical constraints), authors must notify the editor at the time of submission. The editor shall have full discretion to follow their journal's policy on restricted data, including declining to review the manuscript or granting an exemption with or without conditions. The editor shall inform the author of that decision prior to review.

*Require authors to delineate clearly the analytic procedures upon which their published claims rely, and where possible to provide access to all relevant analytic materials. If such materials are not published with the article, they must be shared to the greatest extent possible through institutions with demonstrated capacity to provide long-term access.

*Maintain a consistent data citation policy to increase the credit that data creators and suppliers receive for their work. These policies include using data citation practices that identify a dataset's author(s), title, date, version, and a persistent identifier. In sum, we will require authors who base their claims on data created by others to reference and cite those data as an intellectual product of value.

*Ensure that journal style guides, codes of ethics, publication manuals, and other forms of guidance are updated and expanded to include improved data access and research transparency requirements.

Rethinking the Dissertation in Science

Alan I. Leshner

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There has been much discussion of late about the need to reexamine the way we educate graduate students in science. The need to rethink how we train students comes about because of the convergence of a series of trends within the broad fields of science and impinging on the scientific enterprise generally. The dissertation is only one part – albeit a central one – of graduate education but cannot be discussed productively without considering the broader context. In the first case, there is some discrepancy between the underlying approach to graduate education and the eventual career paths taken by today's students, and that may mean that we are not doing a very good job providing students with the education they need. All available evidence suggests that over 60% of new Ph.D.'s in science in the United States will not have careers in academic research, yet graduate training in science has followed the same basic format for almost 100 years, heavily focused on producing academic researchers. This system has served most stakeholders well to this point, including the broad scientific enterprise, the research institutions that train students, and the federal agencies that help provide support for graduate education through either research fellowships or research assistantships tied to research grants. The one, and most important, stakeholder who might be much less well served is the graduate student herself. The situation does vary somewhat by discipline and institution, but as a generality, a very large proportion of students will not go on to academic research careers. So, is our current model of graduate education in science the right one?

Another trend affecting graduate education emerges from an evolution in the way science is being done. Historically, science was a relatively solitary enterprise. Individual scientists worked in their own laboratories with perhaps a few graduate students as apprentices. But over time, science has become much more a team activity. Many of the most interesting and important scientific questions require multidisciplinary approaches to tackle them, and virtually no single individual has all the needed expertise. Therefore, it is essential that modern scientists be able to work productively in teams, and that they have some experience doing that before they go off into the field themselves. Graduate schools need to find some way to integrate those experiences into the curriculum.

What do these kinds of trends mean for the dissertation? Why do we have dissertations in science anyway? The dissertation was initially designed to ensure that future academic researchers had proved themselves able to be significant contributors to the scientific knowledge and theory base. Put another way, they had to prove they could be like their mentors. That fundamental concept still drives the majority of dissertation formats required by graduate programs, although there is substantial variation in what constitutes a dissertation in the various fields of science and across universities. Some universities require the same form of dissertation that they required 50 years ago – usually a long, expositive tome that includes a long introductory section that meticulously builds the case for testing an important theory or hypothesis and then a series of studies described in great detail to do the testing. This is followed by an

extensive discussion section that speaks both about the manifold implications of the work and discusses all the potential flaws or other problems that could diminish the work's impact. These can run to hundreds of pages, and the question is regularly asked whether anyone other than the student and his/her committee bothers to read or otherwise use the dissertation. Other institutions require mostly that the student has conducted a series of publishable experiments and then, in effect, the student can submit a relatively straightforward compilation of those papers or studies. The dissertation is subjected to scrutiny by a committee of the faculty and then the student needs to "defend" the dissertation, usually in an oral format.

Whichever format is used within a field or institution, it is time ask just how well the dissertation is serving the training needs of today's students – or even serving the advancement of our scientific enterprise? Asking those questions is, of course, complicated by variation across fields and the diverse career goals and career paths students are pursuing, but we need to have those discussions. I offer some core issues for consideration.

- In the context of today's science and graduate education, is there still a need for a "culmination of training" project or final test that a graduate student has been appropriately educated (let's call it a "dissertation" for simplicity's sake)?
    - If so, what's the best format? Should there be a universal format or variation by discipline and institution?
- What do we really want the student to be showing or proving through the dissertation? Is the format attuned to that goal?
    - E.g., Is the goal to make a substantial contribution to the discipline and/or to prove one can behave like the student's mentor(s)?
- By the time students get to the dissertation stage, their career goals will be fairly clear. Should the format of the dissertation be tailored to the student's goals or should the format be uniform? If it should be tailored, who gets to decide the focus and direction?
- How much of a student's training should be directed at that project or test as opposed to other activities or experiences?
- How can the dissertation be adjusted to reflect the fact that science is much more being carried out in teams?
    - How can we best evaluate a student's ability to work in a team?
    - If the work is done in teams, how can we measure the contributions of the individual?

These kinds of questions surely have been considered within institutions and likely within disciplines. Moreover, only some are specific to science; others are generic to graduate education. Nonetheless, a national dialogue on these issues, I believe, would serve both graduate education and the scientific enterprise well.

Reshaping Graduate STEM Education for the 21st Century

The National Academies of Sciences, Engineering, and Medicine

Overview

This paper discusses two items of relevance to the conference. The first section provides an overview of a planned National Academies study of the future of STEM graduate education, including initial thoughts about the potential focus of such a study. The second section offers some ideas on how the dissertation might be reconsidered in light of the changing nature of graduate education.

A Proposed National Study

The National Academies of Sciences, Engineering, and Medicine is exploring a project that would involve an intensive study of graduate-level education in science, technology, engineering, and mathematics (STEM) in the U.S., revisiting and updating a similar study that was published 20 years ago by the National Research Council.[1] The purpose is to determine how well the current graduate education system is serving the needs of the various sectors and stakeholders, and to propose new guiding principles, models, programs and policies that might be adapted to local needs and contexts. Among the possible activities are these:

- Conducting an overall systems analysis of graduate education, with the aim of identifying policies, programs and practices, and the interactions among them, that can better meet the changing education and career needs of an increasingly diverse population of graduate students over the next 20 years (at both the master's and Ph.D. levels)--and also aimed at identifying deficiencies and gaps in the system that could improve graduate education programs. By "systems analysis," we mean a comprehensive examination of all of the elements of the graduate education enterprise in the U.S., including students, faculty, universities, research labs, employers, business and industry, federal and state policymakers and funding agencies, and others with a stake and an influence in graduate education.
- Identifying core principles and strategies to improve the alignment of graduate education courses, curricula, labs and fellowship/traineeship experiences for students with their career aspirations, with the current and projected needs of prospective employers, and with the new realities of the workforce landscape for holders of advanced degrees in STEM. These include careers not only in colleges and universities but also increasingly in private industry, government at all levels, and non-profit organizations. Consistent with the suggestions in PCAST (2012), this analysis also will include an examination of careers for M.S. and Ph.D. graduates that often are not classified as traditional STEM careers but that require deep and broad STEM knowledge and skills. A key task will be to learn from employers how STEM graduate education must continue to evolve to anticipate future workforce needs and how those employers might more effectively contribute to educating graduate students.

[1] *Reshaping the Graduate Education of Scientists and Engineers* (1995). Washington, DC: National Academies Press.

- Investigating the many new models and interventions that currently are influencing graduate education and are likely to do so in the future. These include digital learning and data collection and mining applications, greater attention to convergence among disciplines (e.g., NRC, 2009, 2014), increasing numbers of alternative providers of M.S. and Ph.D. degrees, and opportunities to secure credentials through multiple sources.

Even as we consider the focus and work plan study, we are mindful that in moving toward new models for graduate education, it is essential to find ways to preserve, as much as possible, those aspects of the current system that have served the nation and its scientific and medical enterprise so well. The focus is not on fixing a "broken system," but rather on identifying new challenges and ensuring that the system can be responsive in ways that maintain and enhance quality.

Rationale

Twenty years ago, a major NAS/NAE/IOM study, Reshaping Graduate Education of Scientists and Engineers (NAP, 1995), set forth a series of recommendations to revitalize graduate education in STEM across the U.S. The report, prepared under the auspices of the National Academies' Committee on Science, Engineering and Public Policy (COSEPUP), focused on steps that Ph.D.-granting institutions could take to offer STEM graduate students a broader range of academic options to prepare them for both academic careers as faculty and researchers and for non-academic careers in both the private and public sectors. The report called for stronger information and guidance available to graduate students (including better career counseling), and also called for the creation of a national human resource policy for advanced scientists and engineers. Many graduate schools embraced the recommendations and took important steps to enhance their course, laboratory and internship offerings, providing students with opportunities to develop a wider set of skills. But there was less action on the other recommendations regarding career guidance and the development of a national policy for the funding and structuring of graduate education.

A recent editorial in Science by CEO Emeritus of AAAS and National Academy of Medicine member Alan Leshner captured the need to revisit with some urgency the state of STEM graduate education in the United States:

"All available evidence suggests that over 60% of new Ph.D.'s in science in the United States will not have careers in academic research, yet graduate training in science has followed the same basic format for almost 100 years, heavily focused on producing academic researchers. Given that so many students will not join that community, the system is failing to meet the needs of the majority of its students. Many academic, governmental, and professional leaders and organizations have lamented this disconnect and have suggested worthwhile adjustments, but most of these have been minor changes in graduate course offerings. It is time for the scientific and education communities to take a more fundamental look at how graduate education in science is structured and consider, given the current environment, whether a major reconfiguration of the entire system is needed." (Science, July 25, 2015).

Since more than half of all STEM Ph.D. graduates now go on to careers outside academia, it is important to assess the nature of those graduates' readiness for an increasingly global and interdisciplinary work environment. As noted above, the current range of coursework, labs, internships and other graduate level experiences in our nation's Ph.D.-granting institutions, while perhaps well-suited for the preparation of Ph.D.'s for careers in academia, may not be adequate for preparation for non-academic careers. "Although most PhD programs focus on training future professors and researchers to become highly proficient in research practices (Amsen, 2011; Cadwalader, 2013; June, 2011), our analyses showed that performing work unassociated with R&D in nonacademic careers is common, particularly among female STEM PhD holders. As a result, PhD students lack training in areas that may feature strongly in their career pursuits." (AIR, 2014).

There is also a compelling *public policy* component to this proposed initiative. Even while there is considerable debate in Congress and in states about stabilizing and even reducing overall public investments in higher education, there does seem to be a re-awakening of a national dialogue around the importance of more strategic investments in higher education and research that can increase the nation's economic and social well-being. According to Lamar Alexander, chair of the Senate Committee on Health, Education, Labor and Pensions, which oversees federal higher education policy, "Our research universities, along with our national laboratories, have been the key to developing the competitive advantages that help Americans produce 25 percent of the world's wealth. They are our secret weapons for innovation, and innovation is our secret weapon for competing in the 21st century global economy." (Alexander, 2013). In addition, the American Academy of Arts and Sciences has just issued a landmark report on public universities and their value to our nation's social and economic health, stating: "Universities foster research- and innovation-based relationships with business, industry, the non-profit sector, and government....Many universities have created innovation accelerators that encourage a culture of entrepreneurship by sponsoring start-up competitions, providing seed funding, or offering catalyst grants, while serving as magnets to business and industry." (AAA&S, 2015). As they fuel economic and social advancement, universities draw upon all aspects of their community—but graduate students are usually at the forefront of such efforts, and their roles as innovation leaders and engines of social and economic change are likely to increase in the future. The challenge is to identify strategies that can further catalyze the roles of masters and doctoral students as not only participants in this important process but as leaders and pioneers in this work—especially in STEM fields. From a public policy perspective, the key question is as follows: How can smart, strategic investments in STEM graduate education and research spur the kind of innovation necessary to encourage a more vital role for masters level, and especially Ph.D.-level, students in discovery and applied research such that both our society and the students themselves benefit?

A Brief Note on the Dissertation

What might all of this mean for the future of the dissertation? If indeed the set of experiences that students will need in graduate school will be different in the next 5-10 years than it was 10 years ago or even today, then it may be important for the dissertation to reflect that change as well. No detailed prescriptions are offered here, but rather, the following trends in the nature of "career readiness" for graduate students should be considered in any discussion of how the dissertation might be re-shaped:

Convergence: If, as employers suggest, success in future careers (in science and engineering, to be sure, but probably in all fields) is enhanced by interdisciplinary and trans-disciplinary experiences in graduate school, shouldn't the dissertation requirements also reflect interdisciplinarity? A 2014 National Academies report (NRC, 2014), for example, suggested that graduate level experiences should foster rich and deep interdisciplinary learning that gives students opportunities to develop proficiencies in :

- developing the intellectual capacity to deal with complex problems;
- building confidence and willingness to approach problems from multiple perspectives;
- strengthening abilities to communicate with scientists from other disciplines;
- developing abilities to make decisions in the face of uncertainty (reflective judgment);
- helping understand strengths and limitations of different disciplinary perspectives.

Professional Skills or "Non-Cognitive Skills." A recent New York Times article—aptly entitled "What You Learned in Preschool is Crucial at Work"--captured the importance of the so-called non-cognitive skills or employability skills to success in the workplace:

For all the jobs that machines can now do — whether performing surgery, driving cars or serving food — they still lack one distinctly human trait. They have no social skills. Yet skills like cooperation, empathy and flexibility have become increasingly vital in modern-day work. Occupations that require strong social skills have grown much more than others since 1980, according to new research. And the only occupations that have shown consistent wage growth since 2000 require both cognitive and social skills.

Further, the ability to communicate one's research, points of view, or persuasive arguments are becoming increasingly important in the workplace, and particularly for graduate students in the sciences and engineering, communication skills are often not sufficiently developed or practiced. It may be asking too much of the dissertation to support the development of these professional skills, but there could be significant benefits to students if indeed this could be achieved.

Leadership. To what extent can the dissertation experience contribute to the development of leadership skills in graduate students? Because many new hires with M.A., M.S., and Ph.D. degrees may be expected to supervise and manage staff early in their careers (and possibly right out of graduate school), can the dissertation experience be shaped in a way that requires students to develop, even at a basic level, their leadership skills—even through the inclusion of reflective experiences? Can the dissertation requirements challenge students to consider and evaluate personal characteristics and social skills that are essential to effective leadership, such as honesty, integrity, creativity, the ability to inspire others, and strong communication abilities? Or again, is this asking too much of the dissertation experience?

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Dissertations and Books in Science and Engineering Fields: An Editor's Perspective

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Abstract

This paper argues for a better alignment between published scholarly output and the interest of the public in science, quantitative social science, and engineering research.

Context

As publishers of peer-reviewed, monographic scholarship, university presses play a distinct role in the larger landscape of scholarly communication and occupy a unique (if small) niche in the publishing world. Their mission is to develop and disseminate authoritative scholarship that has been evaluated for quality and selected for its contribution to existing knowledge in specific fields. University presses offer authors a range of services including peer review, editorial development, copy-editing, design, print production, digital production in multiple formats, sales distribution, publicity, and marketing. Many presses receive little or no direct funding from their parent institutions, though most receive valuable in-kind support.

University presses have traditionally found it possible to fund their publishing activities through the sale of books, journals subscriptions (if they have active journals programs), and subsidiary rights. A number of trends have converged to make this more difficult than in the past. One is a well-documented, dramatic, and devastating 30-year decline in monograph purchases by academic libraries. A second is the loss, over roughly the same period, of the most profitable university press journals to commercial academic publishers. A third and less remarked development is the large output of books in humanities fields. This, combined with the abundant information and entertainment options now available to those with disposable time and income, ensures that humanities scholarship competes for attention in an increasingly saturated marketplace of ideas.

As a result of these developments, presses depend heavily on a consumer marketplace to fund their publishing activity, and they do so at a moment when serious nonfiction is hard to sell to scholars, students, and general readers. It follows that acquisitions editors at university presses spend time and energy seeking commercially viable work to offset the costs of their core (mission-related) activities, which include the development of monographs by junior scholars. Since all publishers, including trade publishers, seek profitable projects, it should come as no surprise that competition for broadly appealing and accessible manuscripts is fierce. These works might be entirely out of reach for university press editors, who are constrained by rigorous and protracted review and approval processes and by limited funds for royalty advances. Editors have grown used to seeing their most successful authors signed up by literary agents, who auction the next (typically still unwritten) book to trade publishers for outsized sums. By far the most lavish offers go to scientists willing and able to write accessibly about their own research.

Supply and demand in the two cultures

Although 75% of doctorates in the United States are awarded in science and engineering (S&E) fields, their associated dissertations almost never see publication in book form. The high level of specialization required to read these works, and the narrowness of the questions they investigate, would seem to explain why S&E

dissertations are so rarely revised for wider, book reading audiences. The explanation falters, though, when we consider that humanities dissertations also engage focused questions and demonstrate high levels of specialization. Despite this, some humanities dissertations do see revision and eventual publication in book form.

A more likely reason for this scenario has to do with the nature of knowledge creation in science. The advancement of science requires the rapid dissemination of current research in a form that can be readily accessed, assimilated, and built upon. Accordingly, doctoral work seeking to impact S&E fields should be vetted and published quickly, with its associated data, and without the need to command an audience beyond specialists. With its length, breadth, and longer time to publication, the book is not the vehicle to drive discovery in science—even if, as I would argue, it remains a major vehicle for informing and educating a wider public about science. Recognizing this, the movement in some S&E fields to accept peer-reviewed, multiply-authored journal articles in place of longer, monographic dissertations is a welcome development that aligns with the reality of discovery in fast moving S&E fields.

For post-doctoral researchers in these fields, few incentives exist to invest time in writing books or revising dissertations. Strong disincentives deter junior faculty members, whose energies must be directed to teaching, research, fundraising, and publishing in peer-reviewed journals. Books that do see publication in S&E fields are likely to be produced by researchers working from the safe side of a tenure line; but in the absence of other incentives, even senior faculty members may find it difficult to set aside other commitments in order to write books. Even those with extensive research careers on which to draw often do not find the time to write about their work until retiring from active research and teaching.

The manuscripts our editors do have the chance to consider and publish in S&E fields tend to be worthy ones that, with review and editorial development, result in influential books. Their authors have made the time to write at length, not because of any expectation or requirement to do so, but because they have something significant to say in this format and to a wider public; or because they are effective teachers who have gathered their pedagogy into what could become a widely adopted text. Those too are influential and valuable books, written to support other teachers and instruct students beyond the author's own campus and classroom.

The demand for trade books and textbooks in science fields — suggested by the lavish offers they command from commercial publishers — also suggests they are worth encouraging. The public's need for translational works about science is now partly met by science journalists, who fill a gap left by scientists themselves. The work of talented science writers is essential in such an environment. It too commands high prices from magazine and book publishers. I believe it can complement — but cannot replace — the work of researchers with deep expertise in their fields.

Feast and famine

The different credentialing systems in science and humanities fields has produced imbalances in the public's perception of and access to research and scholarship in these fields.

MIT Press acquisitions editors in humanities and qualitative social science fields face what appears to be an entirely different set of challenges from those confronted by their colleagues acquiring in science and quantitative social science fields. For humanities

editors, each day brings new projects to consider. The e-mail in-boxes of these editors overflow with proposals, including many by first-time authors seeking publication. Even though most US university presses have strong humanities programs and emphases, competition for these projects is much less intense than for projects in the sciences.

The task of humanities editors is to sift and evaluate this enormous influx of material using external peer review and their own experience and knowledge of which projects stand to impact their fields. These editors are also on the lookout for commercially viable works by highly regarded senior scholars and public intellectuals with existing platforms, but much of what they sign up is not commercially successful or even economically viable. This mission-critical work will not recover its publication costs through sales. It will, however, go on to earn citations and review coverage. It is very likely to win awards and other recognition. It will impact its fields.

A proposal

That the old divide between the sciences and humanities persists in their credentialing systems should be a cause for concern. It is reasonable to wonder whether this contributes to the devaluing of the humanities at a moment when they are badly needed—when social and environmental problems demand the expertise of humanists and productive collaborations across disciplinary divides. Intractable problems also call for a scientifically informed public. The public may not be well served by system that emphasizes research over teaching and publication in journals at the expense of other forms of public engagement — including the publication of books for non-specialist audiences.

One way to begin to address this imbalance is to create more incentives for scientists, engineers, and quantitative social scientists to write books, or at least to begin thinking about doing so earlier in their careers. Why not ask doctoral candidates to prepare a book prospectus that would translate the key findings of dissertation related research for a wider readership? University press editors could be asked to evaluate such proposals and offer advice. This will not solve the current scholarly publishing crisis, but it would encourage young scientists and engineers to begin thinking about the public interest in their work and making the valuable connections needed to publish that work at some point in the future. As a reminder of the public's interest in science and engineering, the exercise of writing a book proposal would also align with efforts to encourage ethical practices in those fields.

Questions to consider

- What costs are associated with a publish-or-perish system in the sciences?
- Should scientists be rewarded for efforts other than the kind of headline-grabbing research that top ranked journals will publish?
- How can doctoral students and post-doctoral researchers in science fields support the important work of testing the results of prior research? The current reproducibility crisis suggests the public might benefit if scientists were recognized and rewarded for efforts to reproduce the results of others—as well as for pushing the frontiers with the sort of original research that can be published in high-impact journals.

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