

## 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 20<sup>th</sup> 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 charisma 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”<sup>1</sup> are light-hearted 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.

---

<sup>1</sup> <http://news.sciencemag.org/people-events/2015/05/announcing-2015-dance-your-ph-d-contest>

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**

I would like to thank Vincent Larivière and Blaise Cronin for substantive comments on earlier drafts of this manuscript.

### **CITED REFERENCES**

- Andraos, J. (2005). Scientific genealogies of physical and mechanistic organic chemists. *Canadian Journal of Chemistry*, 83, 1400-1414.
- Anonymous. Racial discrimination in science (2011). *The Economist*. Retrieved from: <http://www.economist.com/node/21526320>
- Bowman, T.D., Tsou, A., Ni, C., & Sugimoto, C.R. (2014). Post-interdisciplinary frames of reference: Exploring permeability and perceptions of disciplinarity in the social sciences. *Scientometrics*, 101, 1695-1714.
- Chawla, D. S. (2015). Digital badges aim to clear up politics of authorship. *Nature*. Retrieved from: <http://www.nature.com/news/digital-badges-aim-to-clear-up-politics-of-authorship-1.18443>
- Clark, W. (2006). *Academic charisma and the origins of the research university*. Chicago, Illinois: University of Chicago Press.
- Council of Graduate Schools and Educational Testing Service. (2012). *Pathways Through Graduate School and Into Careers*. Report from the Commission on Pathways Through Graduate School and Into Careers. Princeton, NJ: Educational Testing Service.
- Council of Graduate Schools and Educational Testing Service. (2010). *The Path Forward: The Future of Graduate Education in the United States*. Report from the Commission on the Future of Graduate Education in the United States. Princeton, NJ: Educational Testing Service.
- Cronin, B. (2001). Hyperauthorship: A postmodern perversion or evidence of a structural shift in scholarly communication practices? *Journal of the American Society for Information Science & Technology*, 52(7), 558-569.
- EUA. (2007). *Doctoral programmes in Europe's universities: Achievements and challenges: Report prepared for European universities and ministers of higher education*. Brussels, Belgium: European University Association.
- Girves, J. E., & Wemmerus, V. (1988). Developing models of graduate student degree progress. *Journal of Higher Education*, 59(2), 163-189.
- Hakkarainen, K., Hytönen, K., Makkonen, J. & Lehtinen, E. (2016). Extending collective practices of doctoral education from natural to educational sciences, *Studies in Higher Education*, 41(1), 63-78. DOI: 10.1080/03075079.2014.914910
- Larivière, V. (2012). On the shoulders of students? The contribution of phd students to the advancement of knowledge. *Scientometrics*, 90(2), 461-483.

- Larivière, V. (2013). Phd students' excellence scholarships and their relationship with research productivity, scientific impact, and degree completion. *Canadian Journal of Higher Education*, 43(2), 27-41.
- Larivière, V., Desrochers, N., Macaluso, B., Mongeon, P., Paul-Hus, A., & Sugimoto, C.R. (under review). Contributorship and division of labor in knowledge production.
- Larivière, V., Sugimoto, C.R., Tsou, A., & Gingras.(accepted). Team size matters: Collaboration and scientific impact since 1990. *JASIST*.
- Larivière, V., Zuccala, A., & Archambault, A. (2008). The declining scientific impact of theses: Implications for electronic thesis and dissertation repositories and graduate studies. *Scientometrics*, 74(1), 109-121.
- Malmgren, R.D., Ottino, J.M., & Amaral, L.A.N. (2010). The role of mentorship in protégé performance. *Nature*, 465(7298), 622-626.
- NSF. (2006). Time to degree of U.S. research doctorate recipients. Retrieved from: <http://www.nsf.gov/statistics/infbrief/nsf06312/>
- Patton, S. (2013). The dissertation can no longer be defended. *The Chronicle of Higher Education*. Retrieved from: <http://chronicle.com/article/The-Dissertation-Can-No-Longer/137215/>
- Rennie, D., Yank, V., & Emanuel, L. (1997). When authorship fails: A proposal to make contributors accountable. *JAMA*, 278(7), 579-585.
- Sugimoto, C.R. (2014). Academic genealogy. In: Blaise Cronin and Cassidy R. Sugimoto (Eds). *Beyond Bibliometrics: Harnessing multidimensional indicators of scholarly impact*. Cambridge, MA: MIT Press, 365-382.
- Sugimoto, C.R. (2011). Collaboration in information and library science doctoral education. *Library & Information Science Research*, 33, 3-11. doi: 10.1016/j.lisr.2010.05.003
- Sugimoto, C.R. (2012a). Are you my mentor? Identifying mentors and their roles in LIS doctoral education. *Journal of Education for Library & Information Science*, 53(1), 2-19
- Sugimoto, C.R. (2012b). Initiation, Cultivation, Separation and Redefinition: Application of Kram's mentoring framework to doctoral education in Information and Library Science. *Journal of Education for Library & Information Science*, 53(2), 98-114.
- Sugimoto, C.R., Li, D., Russell, T.G., Finlay, C., & Ding, Y. (2011). The shifting sands of disciplinary development: Analyzing North American Library and Information Science (LIS) dissertations using Latent Dirichlet Allocation (LDA). *Journal of the American Society for Information Science & Technology*, 62(1), 185-204. doi: 10.1002/asi.21435
- Sugimoto, C.R., Ni, C., Russell, T.G., & Bychowski, B. (2011). Academic genealogy as an indicator of interdisciplinarity: An examination of dissertation networks in Library and Information Science. *Journal of the American Society for Information Science & Technology*, 62(9), 1808-1828. doi: 10.1002/asi.21568
- Sugimoto, C.R., Russell, T.G., Meho, L.I., & Marchionini, G. (2008). MPACT and citation impact: Two sides of the same scholarly coin? *Library & Information Science Research*, 30(4), 273-281.
- Weissman, J. (2013). How many Ph.D.'s actually get to become college professors? *The Atlantic*. Retrieved from: <http://www.theatlantic.com/business/archive/2013/02/how-many-phds-actually-get-to-become-college-professors/273434/>
- Yoels, W. C. (1971). Destiny or dynasty: Doctoral origins and appointment patterns of editors of the *American Sociological Review*, 1948-1968. *The American Sociologist*, 6(2), 134-139.