

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.”

http://www.hanken.fi/sites/default/files/atoms/files/2015_01_20_composite_thesis_exs15.pdf

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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