Designed Research:
Publishing Designs as Scholarship

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Abstract

Scholarly publications are a primary means for researchers in any field to foster and support a shared discourse. As design researchers debate what forms their scholarship might take, this author suggests looking to examples from other, transdisciplinary academic fields that have long traditions in publishing designed research, or scholarship that enacts its argument through design. The author offers cases of several online journals in the sciences, arts, and humanities that publish designed research of various types, including one example from digital writing studies, which shares design researchers' interests in collaborative, process-based, rhetorical practices. By considering alternative modes of publishing design research through *designed* research, the shared discourses of scholarly practice can serve as a pedagogical site of knowledge-building for the field.

Keywords

Design; Digital scholarship; Scholarly Multimedia; Publishing; Research

For the October 2013 symposium Critiquing the North American Design PhD, moderators Laurene Vaughan and Cameron Tinkelwise, PhD design faculty at Carnegie Mellon University, asked prominent scholars and design researchers from around the globe to respond to a series of provocative questions that would facilitate the one-day discussion. The first question they posed – What is design practice as research? – included the following passage as part of its description:

> If designing happens as a kind of researching, does the lack of formality of its creative-solution-oriented process still invalidate it with regard to the requirements of academic research? … Or, does academicizing the research processes deployed in designing make them too undesignerly? Perhaps it is academic research that should change to accommodate more creative or productive research like designing. (Vaughan & Tonkenwise, 2013a, p. 3)

Each moderator answered the question in the briefing papers, then turned the questions over to respondents. Vaughan's multi-part answer included her definition of research as it should be practiced within practice-based design PhDs:

> Research is only research within the frameworks of the academy when it is disseminated - published, exhibited, performed or screened. Undertaking fieldwork, experiments or reflective inquiry in the studio, the library or the lab are the acts of research but they are not deemed to be academic research until critically appraised by peers and placed within their appropriate context for [peer-reviewed] dissemination. (p. 4)

Tonkenwise complicated Vaughan's response by adding that the relationship between design practice and design research "must be chiasmatic" in that the practice-based "[d]esign PhD must be established as a deliberate anomaly that affords transformation of the university" (p. 5) and, as I argue here, its research products. Moderators and respondents alike continued this line of discussion by invoking the need for different forms and formats for design research as it is presented for theses and dissertations as well as how it is

disseminated to other design researchers through design scholarship. Hugh Dubberly listed the ways in which designers disseminate artefacts to each other through manufactured artefacts but also through proposals, cases, process maps, model diagrams and other more process-based methods. He noted that in the design research literature, there is very precious few of these design thinking artefacts, which has to make design researchers question how designers reflect on and create new knowledge-making practices and methods in the field (Vaughan & Tonkenwise, 2013b, pp. 6-8). As Anne Burdick put it, "Any practice-based design PhD has not only the opportunity, but I would say the responsibility, to model (and invent new forms of) multi-modal and cross-disciplinary scholarly production, interpretation, curation, exhibition, discourse, and community/ies" (Vaughan & Tonkenwise, 2013b, pp. 12-13). Indeed, wouldn't more distribution of these knowledge-making, design-literacy practices enhance the connection between design research, as a necessary component to PhDs in design, and design pedagogy, as one reason for PhDs in design is to become teachers of practice and subsequent research?

It seems that the call for different forms of design research, as Lisa Grocott pointed out in her response, is not only necessary but a conversation whose time has come and gone. In their historiographic literature review of design research methods, Lois Frankel and Martin Racine (2010) noted that conversations about the relationship between design and research have been ongoing for decades and include discussions about the form that design research takes. In summarizing the varied forms that design research can take, Frankel and Racine wrote that

> "the answers are translated into form, colour, and the objects that surround us. This affords practitioners, students, and educators with the challenge to produce discipline specific knowledge that may be communicated by drawings, sketches, models, and other visual representations embodying non-verbal codes or messages as well (Cross, 2007a; Dörner, 1999; Downton, 2003; Lawson, 2003; Stappers, 2007)." (p. 8)

It is an agreed-upon statement that design research can take the form of designed products and designerly processes, but where are these products and processes counted *as* research, in the sense of peer-reviewed scholarship? What does a form of design research—one that takes into consideration, as Vaughan (2013a) wrote in her response to the PhD colloquium, the designerly relationship of "evidence through form" and aesthetics in "support of the argument" (pp. 19-20)—look like? Andrew Morrison noted in his response that "[d]esign inquiry demands multi-literacies," which is "increasingly realised through multimodal, electronic communication and tools" (Vaughan & Tonkenwise, 2013b, p. 21-22), while Pelle Ehn remarked that this kind of scholarly, designerly reflection is "harder to perform" (p. 20). I argue here that this kind of designerly, multimodal, scholarly research has been and continues to be performed in another interdisciplinary area: digital writing studies, which values Richard Buchanen's (1985) concept of design-as-rhetoric in its uptake of designed research (Eyman & Ball, 2014). The majority of this paper turns to examine the history of scholarly designed research in digital writing studies as well as what the future of *remediating* (Bolter & Grusin, 1999) design research into designed, digital scholarship might look like.

An overview of designed research across fields

Digital scholarship has existed for as long as there has been the Internet, as scientists first began passing scholarly information to each other through information communication technologies such as Usenet groups. This transmission of digital scholarship became more structured when formalized peer review was introduced to this process, so that the informal scholarly network became one primary outlet of new, academic knowledge presented by a field. Although the sciences generally predate the humanities' uptake of the Internet as a

scholarly outlet, focusing on the humanities in this paper is more relevant to design studies' interest in designed research, as the humanities has been the leader of digital publishing in this respect.

For instance, *Postmodern Culture* (PMC), a humanities journal focusing on cultural studies, began publishing peer-reviewed scholarship through an email list in 1990. It is considered the first peer-reviewed electronic journal in the humanities. In 1994, it moved online to provide a hypertextual version of the journal (Unsworth, 2004), which also includes multimedia elements today ("Postmodern Culture Author Guidelines", n.d.), although the multimedia inclusions are typically only still images and figures that supplement the long, linear text. PMC is, essentially, traditional scholarship moved online for the purposes of wider (and sometimes quicker) dissemination. So, despite its first-place status in online, scholarly publishing, this kind of digital scholarship is no different than most peer-reviewed scholarship readers find in library databases now: It does not take advantage of the multimodal, designerly arguments that rethinking the form–content relationship within academic research affords design researchers. Thus, digital scholarship in this traditional format—that is, print-based scholarship put online for the purposes of dissemination—is not the focus here.

On the scale of multimediated research, The Journal of Visual Experiments (JOVE) fares slightly better. JOVE is becoming a well-known example of an online science journal that publishes multimedia, primarily videos of lab experiments. However, for design researchers, I would not hold up JOVE as a great example to emulate given its aesthetic of an animated PowerPoint with voiceover (see Fig. 1) and its simple cinematic qualities (see Fig. 2). It is a perfunctory use of multimedia to present research, but it is not a highly considered designerly one.

Figure 1. Screenshot from JOVE showing a typical opening screen to a video article, which can last anywhere from 5 minutes to 17 minutes.
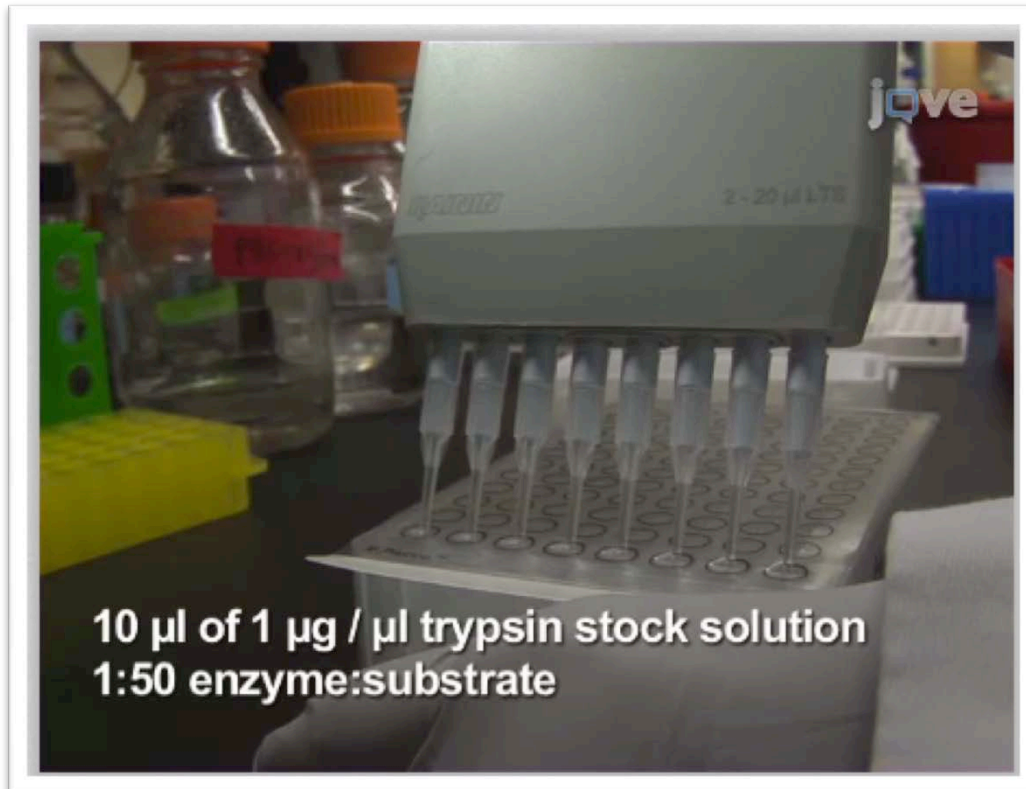
Figure 2. JOVE video articles edit an experiment down to its basic segments, which are quickly presented on-screen (usually in a few seconds) with informational titles. The production quality of videos is minimal and functional at best.

In the sciences, these video articles take on the feel of a TED talk, which presents a potentially glossy mash-up of scholarly and popular genres—an effective way of communicating difficult, scientific methods and information to an audience in easily digestible formats that mimic the static infographics of data presented in newspapers. However, like TED talks, these videos can run counter to the closed, high-discourse communities and academic values of traditional scientific research articles and gloss over research that might need more depth that only writing can provide (see Schaberg, 2014). This is not to say that multimedia in research isn't useful, but to remind readers that multimedia *done well, done rhetorically* is as difficult, if not more so, than writing a traditional research article, and that the choice of multimedia needs to be well-considered. This concept is de facto for designers, so I will not go into details here about the rhetorical and aesthetic appropriateness of multimedia content in designed research (see Ball, 2004, 2012, 2014; Ball & Moeller, 2008).

Humanities and social science journals still publish relatively little multimedia content, although that number is on the rise in the U.S., Europe, and Australia. In one of the very few examples of multimedia scholarly publishing in design, *FormAkademisk*—an online, peer-reviewed journal based out of Oslo and Akershus University College in Norway—has published some articles with embedded videos. In the article shown in Figure 3, for instance, Jon Olav Eikenes (2010) argued that "motional form may be connected to interface actions," which he shows through a design-experiment technique called "motion sketching" (p. 80). The difficulty of showing motion, as a crucial multimodal component to understanding this design concept, in a print or print-like journal article is ameliorated by the author's ability to include a video of his motion sketching in the online article itself.

Video 2: Interface action: browse between several media items. 4 experiments, named 2.1, 2.2, 2.3, and 2.4. (Click to play.)

In Experiment 2.1, the camera is placed above the centre of a circle onto which images are placed. For producing this sketch, the images were placed on a sheet of paper and rotated in front of the still-standing camera. However, in the final movie, the camera is perceived as rotating in a manner that in film language is described as a 'pan'. The arrangement of the camera and the media items, combined with the motional form of the pan, *places the user* in a three-dimensional spatial environment. It could be argued that the meaning potential of the pan has a basis in our experience of turning our head from one side to another, inviting us to investigate and compare the images that are sequenced in the circle. Consequently, the pan

Figure 3. Screenshot of article with video embed (pointing to a link on Vimeo) in *FormAkademisk*.

It should be noted that inclusions of video components such as the one represented in Figure 3 are extremely rare, even in journals that are amenable to multimedia content[1]. So, then, if the cliché of a picture being worth a 1,000 words is true, and video, perhaps, is worth 10,000 words, why then is the peer-reviewed scholarship in design limited primarily to linear,

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[1] As an author of designed scholarship myself, I peruse the submission guidelines of new online journals in my field frequently, to see if they accept screen-based research. Journals relevant to my field, such as *Fibreculture* and *Digital Humanities Quarterly*, say they accept such content, but rarely if ever publish such content. Of course, they have to receive such content to be able to publish it, and the reasons why scholars may not submit this type of work is directly related to the scholarly and social inrastructures—that is, the acceptable and valued forms of scholarship—of their discourse communities (Eyman & Ball, 2014).

print-based, linguistic argumentation strategies such as that presented in *Design Studies* and *Design Issues*? Further, video articles are only one example of the possibilities for designed research. The *Journal of Artistic Research* might be the best example for what design research might strive to publish as an alternative to traditional, print-based articles. As its opening webpage (n.d.) stated:

> The Journal for Artistic Research (JAR) is an international, online, Open Access and peer-reviewed journal for the identification, publication and dissemination of artistic research and its methodologies, from all arts disciplines. With the aim of displaying practice in a manner that respects artists' modes of presentation, JAR abandons the traditional journal article format and offers its contributors a dynamic online canvas where text can be woven together with image, audio and video. These research documents called 'expositions' provide a unique reading experience while fulfilling the expectations of scholarly dissemination. (http://www.jar-online.net/index.php/)

JAR's focus is on "expositions" or multimodal scholarly productions, which means that journal editors and readers start from the assumption that all modes of communication can be designed in ways appropriate to scholarly communication. Artist–researchers can design scholarship in ways that respect the methodologies and methods of art *and* research at the same time.
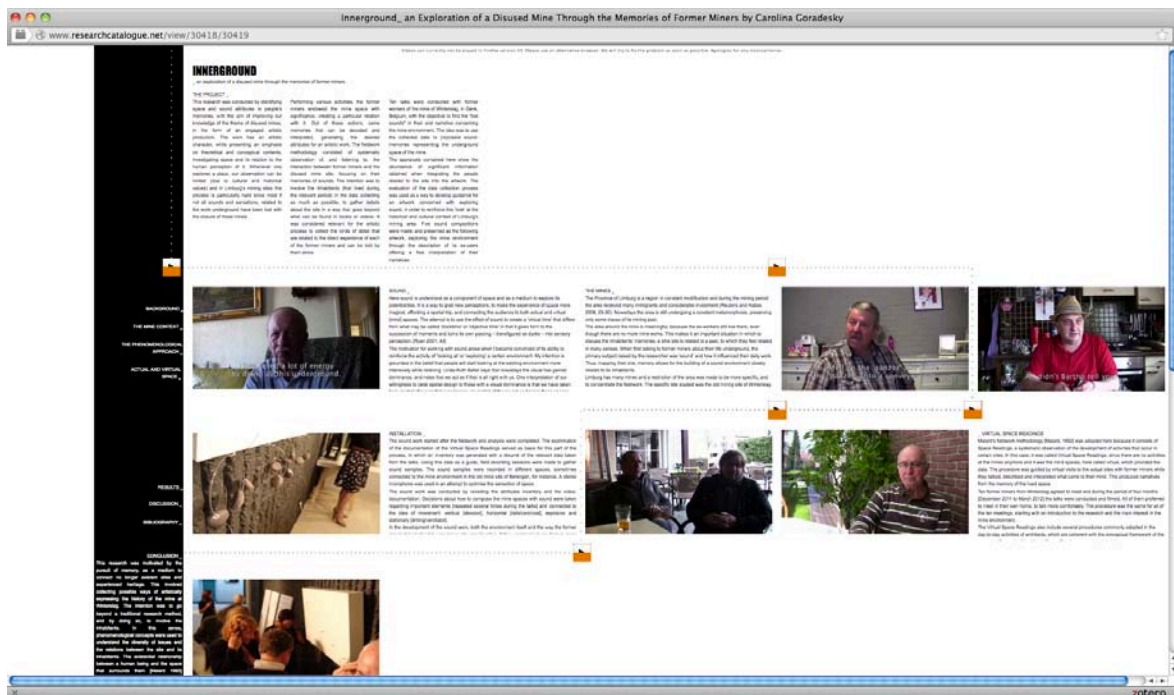

Figure 4. This screenshot from a JAR exposition shows, in zoomed-out fashion, how an author juxtaposes scholarly contextualization and analysis (via the linguistic or written portions of the text) and multimodal elements (in the videos that contain oral history elements of the study's subject participants).

The exposition represented in Figure 4 explores a "disused mine through the memories of former miners" (Goradesky, 2013, http://www.researchcatalogue.net/view/30418/30419). As the author notes in her introduction, "The work has an artistic character, while presenting an emphasis on theoretical and conceptual contents, investigating space and its relation to the

human perception of it" ("The Project"). She focused particularly on the mode of sound as a way to "endow the minespace with significance", and the exposition includes scholarly moves typical of print-based articles, such as providing background information, contexts for the research, a description of her methodological approach, and a discussion of her results. However, she provided this scholarly infrastructure alongside her collection of oral histories, the importance for which she described in the following way:

> The fieldwork methodology consisted of systematic observation of, and listening to, the interaction between former miners and the disused mine site, focusing on their memories of sounds. The intention was to involve the inhabitants (that lived during the relevant period) in the data collecting as much as possible, to gather details about the site in a way that goes beyond what can be found in books or videos. ("The Project")

Indeed, this exposition—as with many expositions in JAR—"goes beyond what can be found in books or videos" because of the juxtaposition between scholarly research and design. In JAR's short existence (three issues since 2011, as of this writing), some expositions are better than others at fulfilling what Pelle Ehn called the "paradox" of designers having to "perform the compositions and participate in making and enacting the networks in designerly ways and being practicing reflectioners" all at the same time (cited in Vaughan & Tonkenwise, 2013b, p. 20). But this is true of all scholarship, no matter the medium and mode used: Only some of JAR's scholarship is successful at this dual mission of "re-negotiat[ing] art's relationship to academia and the role and function of research in artistic practice" (JAR, "About"). But, practice makes (slightly closer to) perfect—an adage that the field of digital writing studies has taken to heart in the nearly 20 years it has been publishing designed digital scholarship through its half dozen prominent (and growing annually) online, multimedia journals.

Designed research in digital writing studies

You might ask why digital writing studies is relevant to a discussion of design research, so let me start by explaining the role of multimodal communication and design practices that are prevalent in 21st-century writing research. In brief, writing studies scholars research textual practices much broader than the linguistic communicative modes that the word "text" might have previously suggested. Writing scholars have begun to recognize that multiple modes— such as those that the New London Group (1996) described as linguistic, visual, aural, spatial, and gestural modes of meaning-making—are instrumental to any communicative process. Multimodal literacy theorists such as Bill Cope and Mary Kalantzis (1999), Gunther Kress (2010), Kress and Theo van Leeuwen (2001), Carey Jewitt (2013) and others have suggested that texts are *designed*, not 'just' written, and there is much scholarship within rhetoric and composition (the uber-field for digital writing studies) that addresses the application of multimodal theories within writing pedagogy and writing research. (An October 2013 search of CompPile, an index for all scholarship published since 1923 in writing studies and related fields, returns hundreds of hits for "multimodal".)

In addition to writing studies' uptake of multimodal theories, it has long been invested in studying workplace writing—what in the U.S. is a disciplinary field called technical or professional communication (Getto, Potts, Salvo, & Gossett, 2013) focused on interface design, ethics, information architecture, design, visual rhetoric, usability, and communication related to service design. The combination of these areas—multimodality, rhetoric, technical communication, among others—has given rise to what is now called digital writing studies (WIDE, 2005).

While the name of this disciplinary field expands and adjusts with the times, one thing that digital writing studies has been consistently successful at promoting and publishing is

scholarship designed in ways that enacts an author's argument. The terminology used to describe such scholarship has shifted along with the field's name over the last two decades, reflecting how genres change according to social, cultural, and historical contexts (Miller, 1984). Elsewhere, I have articulated the differences between digital scholarship as represented by PDFs and *new media scholarship* as online scholarship that "has a necessary aesthetic component because of its designed, multimodal elements" such as "audio, video, images, and/or animation in addition to written text [used] to make meaning" (Ball, 2004, p. 404). The term *new media* has mostly fallen out of favour within digital writing studies circles, in favour of *multimodal* (see Lauer, 2009), and online journals that publish multimodal scholarship variously call this work *scholarly multimedia* or *webtexts*, the latter of which is used by the oldest, continuously publishing journal of its kind—*Kairos: Rhetoric, Technology, and Pedagogy* (http://kairos.technorhetoric.net), which I have edited since 2006.

Rhetoric and composition graduate students[2] at several U.S. universities started *Kairos* as a peer-reviewed hypertext journal in 1996 to serve as a venue for writing scholars who wanted to implement the growing body of hypertext theory in their scholarship. *Kairos* is an open-access, independent journal with no university affiliation and no subscription fees. Its mission is to "publish scholarship that examines digital and multimodal composing practices, promoting work that enacts its scholarly argument through rhetorical and innovative uses of new media." *Kairos* publishes at least two issues a year, with an average of 9 webtexts per issue, and has a 10% acceptance rate. Its server hosts over 25,000 media files for the more than 800 webtexts the journal has published in almost two decades of existence. Additionally, the journal has over 50,000 unique readers who hail from over 180 countries.

Kairos isn't the only journal in digital writing studies, or more broadly in media studies, that publishes webtexts. Other journals have been in or more recently joined this publishing field, such as *Computers and Composition Online* (published from 1996–1999 and 2001–present), which is the strongest contender to *Kairos*. *Vectors Journal of Culture and Technology in a Dynamic Vernacular* (published from 2005–2007, and again from 2012) is a prominent scholarly multimedia journal in media studies, and from which the term *scholarly multimedia* originates within these disciplinary circles (McPherson, 2004). These are the primary scholarly multimedia journals in the humanities, with a collective publishing experience of over 40 years.

With the exception of *Vectors Journal* (for which authors have historically collaborated with professional web designers), scholarly multimedia authors are responsible for designing their own webtexts, and revisions are done in consultation/mentorship with the editors (see Ball, 2014). For *Kairos*, self-design and mentorship reinforces the process-based pedagogies inherent in the scholarship and practice of digital writing. Indeed, the field is based on the concept that writing is a collaborative process, not just a product that is created by a genius out of nothing (Ede & Lunsford, 1990; Murray, 2004). This mantra will likely sound familiar to designers and design researchers, who understand that contemporary design processes are multitudinous and extend far beyond the old, limited concept of "shape gurus" in design.

For instance, in an upcoming issue of *Kairos*, interaction design researchers Einar Sneve Martinussen, Jørn Knutsen, and Timo Arnall (2014), PhD students from the Oslo School of Architecture and Design, will be publishing a peer-reviewed webtext that showcases the design-process methodologies they used to construct a project called "Satellite Lamps." As Martinussen (2013) explained on his research blog, the team explored and visualized "how GPS takes place in urban environments. The team has looked at the relationships

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2 The staff is no longer primarily graduate students. As the field of digital writing has "grown up," the staff demographics have also changed, although working with and publishing "junior scholars" is still a fundamental component of the journal's mission.

between urban space, time and satellite-geometry, and design and has developed instruments and techniques for visualising the presence and the fluctuations of satellite signals." Figure 5 is a screenshot of the opening video that shows how the team's time-lapse film methodology works to visualise these signals. The three authors worked together to produce the video, curate the multiple slideshows from their photographic archive, research additional scholarly materials for the literature review, write the linguistic (written) content, and design the webtext in Ruby (which they had to transfer to HTML for *Kairos*'s archival purposes).
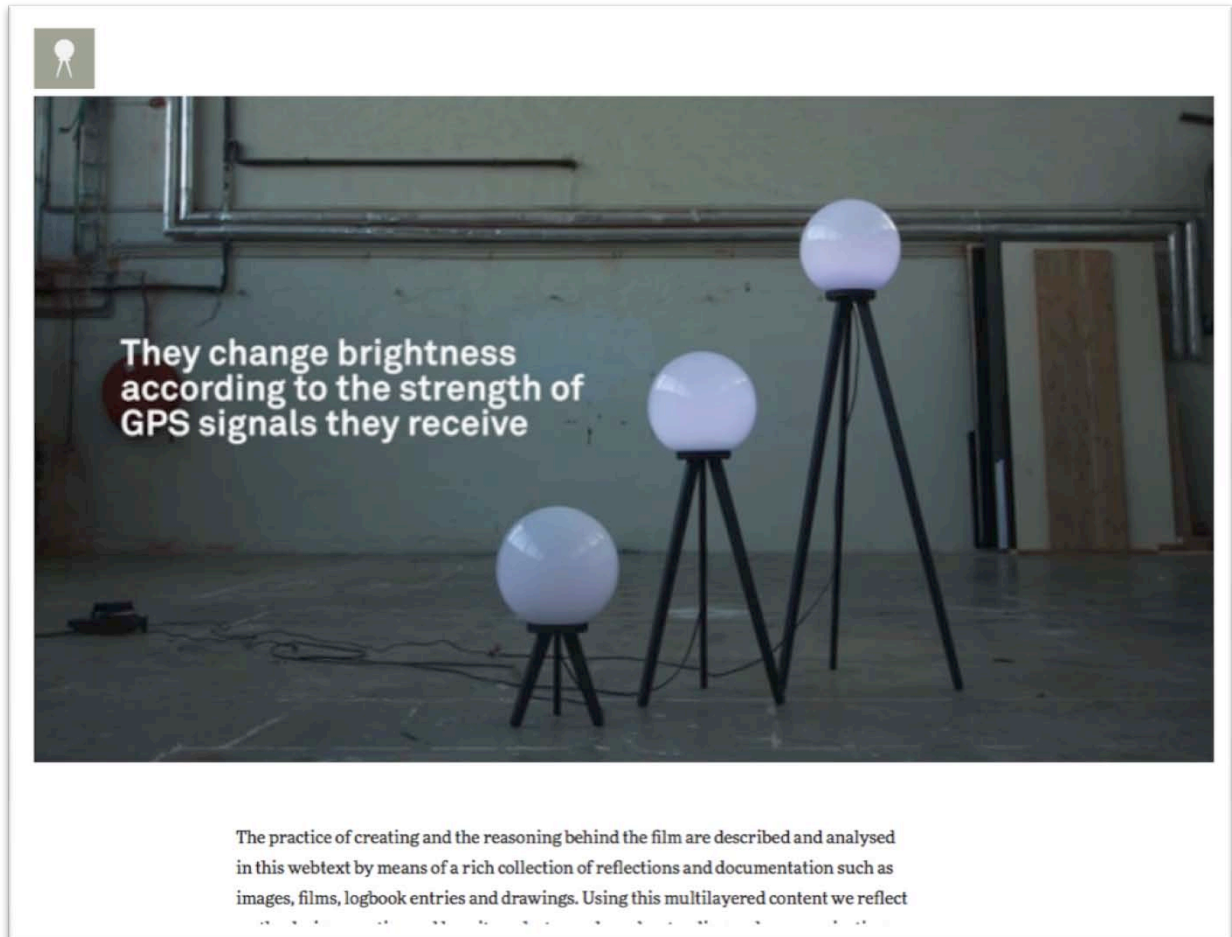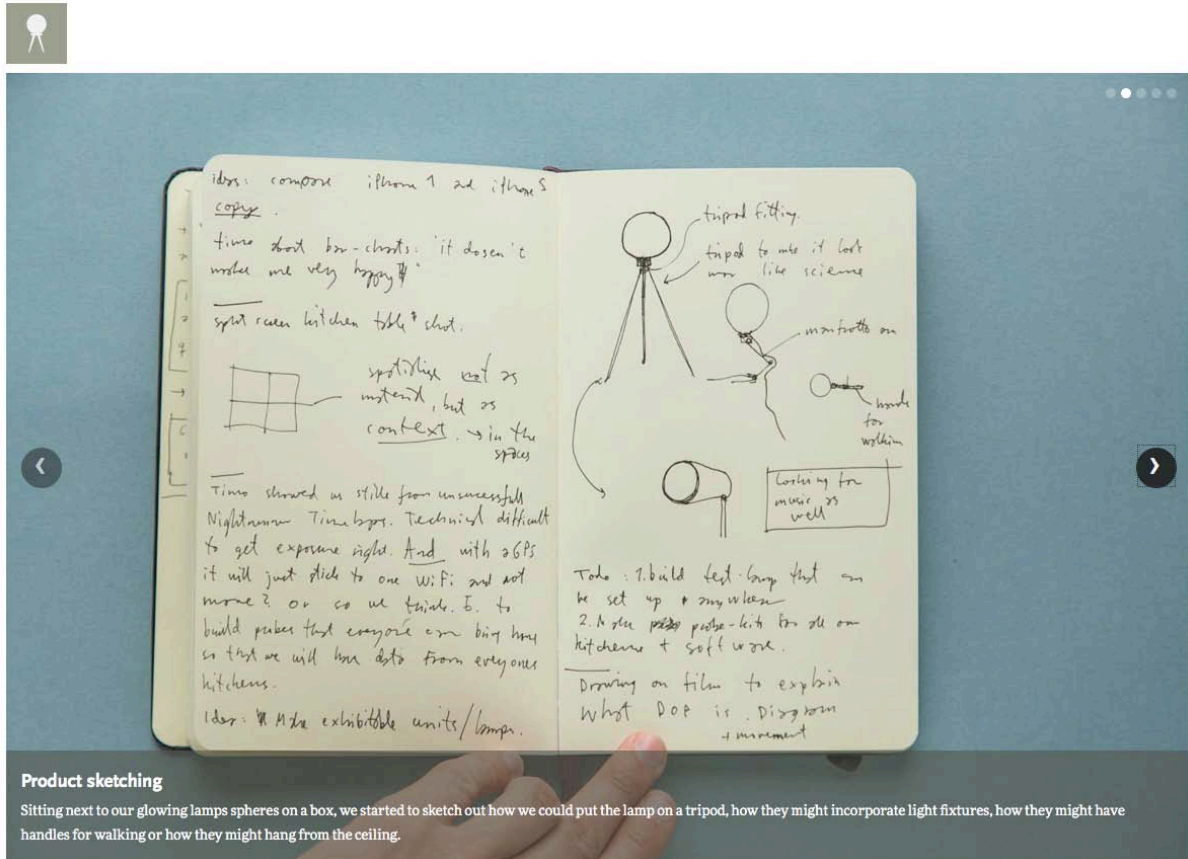

Figure 5. A screenshot of the "Satellite Lamps" video embedded within the webtext that explains the researchers' design process. The satellite lamp icon in the upper-left corner is a mouseover navigation menu that leads to ten different sections in this extra-large webext.

The webtext contains an archive of documentation that shows readers the design processes (successful and not) that the team undertook to construct a working iteration of a satellite lamp. Such an annotated and interactive archive (see Fig. 6), which includes photographs, illustrations, and video complements the authors' literature review (with visuals) on the history of GPS and, combined, forms an argument as to why making satellite signals visible to users of the networked city is important for understanding the role and interplay of otherwise invisible information communication technologies in our urban (and rural) lives today. The benefit to publishing this work as a webtext instead of as a print-like article is obvious when readers see the multitude of annotated, color photographs and videos that are presented as equal scholarly arguments to the written content. In addition, the content as a

whole—both written and multimedia—is far more rich and detailed than would ever be allowed in a print-based or even print-like journal. "Satellite Lamps," like several previous, large, collaborative webtexts *Kairos* has published, presents as a book-length treatise, not an article-length one, signaled as well by the navigation terminology that refers to sections as chapters (see Fig. 7).

Product sketching
Sitting next to our glowing lamps spheres on a box, we started to sketch out how we could put the lamp on a tripod, how they might incorporate light fixtures, how they might have handles for walking or how they might hang from the ceiling.

Figure 6. The authors present multiple slideshows (such as this one) of their process documents, curated and annotated from among the 1000s of photographs they took throughout the multi-year research project. Having these kinds of documents described within the design process can be an invaluable teaching tool.
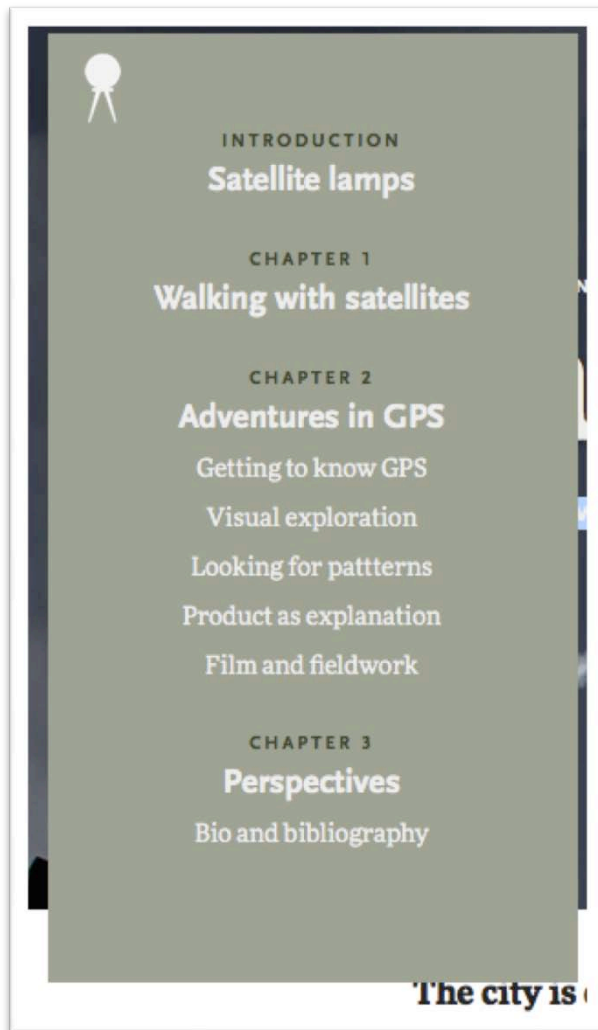
Figure 7. When the small lamp icon is moused over in "Satellite Lamps," the above menu appears.

This webtext is speculative design research that is important to share with design colleagues, yet it is published in a digital writing studies journal interested in design because there's not currently any design journal that can or will publish webtextual work. It adds to scholarly knowledge in design through maps, models, and processes—the artefacts Dubberly (in Vaughan & Tonkenwise, 2013b) called for more of, particularly as the number of design PhD schools increased and design pedagogy becomes an ever more important component to the field.

Design research and *designed* research

A connection between digital writing studies and design research may be useful as the latter considers ways to "experiment with how to perform a rhetorics of the speculative that acknowledges the place of the conjectural in design inquiry" (Morrison, in Vaughan & Tonkenwise, 2013b, p. 23). Cameron Tonkenwise has reminded us that

What is a particular to 'design thinking' is multi-modality: being able to sense material

qualities through a drawing; being able to analyze the usability of an interaction from a video-sketch; capturing the experience of form in well-chosen neologistic title. It is not just that design research should be conveyed to designers using their own communication forms; it is that designerly research only exists multimodally, in between texts and artefacts, texts-as-artefacts and texts-as-texts. (Vaughan & Tonkenwise, 2013a, p. 20)

Kairos and other scholarly multimedia journals in the humanities already do this, already have been doing this work for decades. But, whereas digital writing studies has had to argue for many years that design can function rhetorically as scholarly research (Ball, 2004; Eyman & Ball, 2014; Purdy & Walker, 2012; Walker, 2006)—through the intellectual rigor of designing interfaces and arguments for webtexts, as clunky and DIY as those may sometimes be when the authors are not designers by disciplinary practice—design researchers can already assume this shared understanding as part of their field's scholarly infrastructure. Designed research, such as webtexts, is a potential methodology and method of design research that can connect designers and researchers through literacy practices already embodied in the field's histories and practices and, further, can be a site ripe for design pedagogy as teacher–researchers model for and collaborate with students in disseminating the work of the field.

What is not addressed in this paper is what happens to turn a design into designed research, which is in part a question of pedagogy. There is very little research on the authorial practices of turning design research, as presented in the video that the "Satellite Lamps" authors produced to showcase their work, into a webtext that upholds the academic traditions of scholarship in one's field[3]. In part, this question must remain unanswered here, or, rather, must be answered within each discipline that takes up designed research as a methodology and method of practice-based research. For instance, in the fourteen years I've worked with *Kairos* (since becoming a section editor in 2001), I can name only two webtexts that successfully provide literature reviews that are *not* in written form: Multimedia as a method of situating an author's argument within the field is not often appropriate for a field such as writing studies whose history relies on the written word for the majority of its scholarship, practice, and inquiry. This is likely not true of design as a (multitudinous) field.

What is also not addressed in this paper is what happens once a piece of designed research such as "Satellite Lamps" enters the production cycle of a webtextual scholarly journal, that is, after it has been deemed by an editorial board (trained to evaluate such scholarly webtexts) to meet the standards of scholarship in a field. Scholarship about the editing process of digital media texts is nonexistent, although in practice it is a robust process at journals like *Kairos*, where we implement an eight-stage copy- and design-editing process to ensure that, for instance, the typo in Figure 7 is caught before the issue is published in August 2014. Yet, despite the seemingly cryptic nature of some developmental and production processes behind webtextual journals (which are beyond the scope of this paper), the impetus to start such a journal in design is present and represents a shift in the conversation about what counts as design research, not only for scholars already in the field but for students working on or towards thesis-by-publication. In other words, by presenting designs-as-arguments, scaffolded by or embedded within or linked to those design's theoretical exigence, we begin to model for newer scholars the breadth of making and doing and researching that design truly is.

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[3] In many ways, it is not surprising that there is little research on this topic, given the nascency of designed research. But, for two examples of editor–author interaction during the webtext design process—using what I call an *editorial pedagogy*—see Ball, 2012 and 2014.

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