Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016)

Jordan Beck, College of Information Sciences and Technology, The Pennsylvania State University, E374 Westgate Building, University Park, PA 16803, USA
Laureline Chiapello, Université de Montréal, Faculty of Environmental Design, 2940 Côte-Sainte-Catherine Road, Montreal, Quebec H3T 1B9, Canada

Donald Schön was one of the most influential scholars in the design field; his work was and still is among the most highly cited. But how and why do scholars cite Schön's work? In this paper, we present a content analysis of 120 texts published at the last four DRS conferences in order to understand the function of citations of Schön's work. We find scholars primarily cite Schön either to support their research topics, methods or methodologies, and arguments or to credit Schön for concepts or ideas. We observe few instances of citations that engage critically with Schön or build on his ideas. Our conclusions suggest that a deeper understanding of citation function would be an interesting and important project.

Keywords: citation function, communication, design education, design research, research methods

The design research community has long been engaged in discussions and debates focused on its research practices. These discussions have addressed a range of topics, including the nature of research (Durling, 2002; Frayling, 1993; Friedman, 2008), constructing arguments in scholarly writing (Friedman, 2015a), and doctoral education in design (Durling & Friedman, 2000; Margolin, 2016). One reason underlying many of these discussions seems clear: the design discipline seeks to establish its own intellectual culture, 'acceptable and defensible in the world on its own terms' (Cross, 2001: p. 55).

Scholarly research and writing practices in general can be seen as important aspects of an intellectual culture. In this paper, our aim is to focus on an element of academic research and writing that has received less attention in design research, which is citation function in scholarly publications. Similar to Petrić, we believe 'source use and citation skills ought to receive more attention' (2007: p. 238). Building on a previous study (Beck & Chiapello, 2016), in this article we analyze how authors publishing at Design Research Society

Corresponding author:
J. Beck
jeb560@psu.edu

www.elsevier.com/locate/destud
0142-694X *Design Studies* ■■ (2017) ■■–■■
https://doi.org/10.1016/j.destud.2017.10.005

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

(DRS) conferences cite the work of Donald Schön. Using a citation function framework developed by Harwood (2009), we analyzed 299 unique citations across 120 papers published at the last four DRS conferences (2010, 2012, 2014, 2016).

We find a tendency among papers in our corpus to cite Schön in order to support their own research topics, methods or methodologies, arguments *or* to credit Schön for his concepts or ideas. We observe fewer instances of critical engagement with (or building on) Schön's ideas. What do these findings reveal about scholarly writing practices in design? What kind of knowledge are we generating? How are we conversing with the scholars and scholarship that came before us? And how are we shaping conversations for current and future scholars?

1 Context

Citation function has been studied in other research communities, including: information science, English for academic purposes, applied linguistics, bibliometrics, and natural language processing. For example, Hyland has studied 'the contextual variability of citations' with the goal of investigating 'the [distinct] ways knowledge is typically negotiated and confirmed within different academic communities' (Hyland, 1999: p. 341).

Many reasons have been proposed for studying citation function. For example, it has the potential to provide insight into the relationship between publications and, thus, the transfer and interplay of knowledge (Teufel, Siddharthan, & Tidhar, 2006: pp. 80–81). Jörg invokes Garfield's establishment of the Science Citation Index and reminds readers that citation counts 'have matured towards a serious means of assessing impact of scholarship' (Jörg, 2008: p. 31). She goes on to argue that 'a better understanding of citation function [could] be the seed for a citation ontology, which [would be] useful for machine learning tasks' (2008: p. 31). Moreover, it has been suggested that a deeper understanding of citation function can improve the efficacy of citation indices, such as CiteSeer (Teufel, Siddharthan, & Tidhar, 2006: p. 80).

Citations thus would seem to be more than an attribution of knowledge. They are complex and meaningful. In some cases, citations credit sources for concepts or text. However, they may also demonstrate researcher competence, fluency in a topic, or the validity of a method or methodology. Harwood describes citations as complex knowledge objects (2009: p. 514) and, similar to Ziman (1968), goes on to suggest that citers' *motivations* are complex. Ziman stated that 'many citations are done out of politeness (towards powerful rival approaches), policy (by name-dropping and argument by authority), or piety (towards one's friends, collaborators, and superiors)' (Teufel, Siddharthan, & Tidhar, 2006: p. 81).

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

Existing citation analyses in design research have examined the number and co-occurrence of citations in articles published in *Design Studies* (Chai & Xiao, 2012). In addition, Friedman has discussed referencing and citation practices and provided useful frameworks for strengthening current citation practices (Friedman, 2015a, 2015b). To our knowledge, there have been fewer studies of citation function in design research (Beck & Chiapello, 2016). Yet, such studies could yield crucial details about citations and thus complement Chai and Xiao's work.

Chai and Xiao (2012) affirm the significance of Donald Schön scholarship in the design research community. Through an extensive citation analysis of 15 years' worth of *Design Studies* articles, they found Schön to be the most highly cited scholar in that journal. Indeed, Per Galle has characterized *The Reflective Practitioner* (Schön, 1983) as a 'landmark' in the field (Galle, 2011: p. 82). He has claimed that Schön's book, along with Simon's *Sciences of the Artificial* (1969) and Krippendorff's *Semantic Turn* (2005), can be interpreted as having 'initiated or at least epitomized a design research paradigm, in Kuhn's sense' (Galle, 2011: p. 82).

Chai and Xiao describe highly cited authors like Schön in terms of 'popularity' within the research community where popularity appears to be synonymous with likability or validity. But they also acknowledge 'the accuracy of [their] findings depends on how and why authors cite references' (2012: p. 39). Thus, if it turns out that scholars who cite Schön are highly critical of his work, then he may not 'truly be "popular"' (Chai & Xiao, 2012: p. 39). Knowing *how and why* researchers cite Schön's work becomes interesting and important.

More broadly, understanding the how and why of citation practices could illuminate ways in which contemporary scholars in the design research community think about knowledge. Should it be accepted uncritically? Or should it be engaged with and built upon? Is the status quo of knowledge work acceptable? Or, to modify Simon's (1969: p. 111) famous apothegm about design, do we need to attempt to make the existing situation (of referencing and citing Schön) into a preferred one?

2 Research design and implementation

Our work can be interpreted as an 'idiographic study,' (Larsson, 2013) which seeks to describe a phenomenon in a particular context and, therefore, it does not seek to be generalizable to the design discipline or field. In contrast, a 'nomothetic study' seeks to discover generalizable laws or principles. An idiographic study may still have broader implications, but its outcomes are qualified. This is one reason why we chose to frame our work as an examination of *contemporary* citation practices as opposed to a historical or comprehensive

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

study. We analyze the conference proceedings from the past four DRS conferences: Brighton (2016), Umea (2014), Bangkok (2012), and Montreal (2010).

Out of 666 publications, we found 120 citing Schön's work. Our sample is made up of a diverse set of publications authored by a wide variety of scholars from different disciplinary affiliations in many different university and professional settings around the world. Equally important, these scholars address a diverse set of topics, including: research through design, student characterizations of designing, design culture, education and learning, analyzing written texts visually, and informal peer critique, among many others. The variety of authors and topics can partially ground the claim that our corpus has what Wolcott called 'a capacity for generalizability' (Larsson, 2013: p. 46).

Schön's work is seemingly relevant to a wide variety of research projects. When we say 'Schön's work' we mean any text where Schön played an authorship role (e.g. first or second author and individual or collaborative publications). Our corpus contains references to 20 of Schön's publications,[1] which is interesting since Schön authored over 100 publications during his career.

Once we identified the publications citing Schön, we performed a content analysis (Krippendorff, 2012; Rourke, Anderson, Garrison, & Archer, 2001; Stemler, 2001) in order to determine the function of each citation. By 'citation' we mean in-text references to Schön (or his scholarship) that point readers towards source material in the bibliography. If a text named Schön *without also pointing to an item in the bibliography* (Figure 1), then we excluded it from our analysis. Using this approach, we distinguished 299 unique citations. In Montreal (2010) we counted 28 citations, in Bangkok (2012) there were 91, in Umea (2014) there were 77, and in Brighton (2016) there were 103.

We developed an a priori coding scheme using a framework that describes 11 different citation functions developed by Harwood (2009) in the field of language studies. Following is our paraphrasing of the 11 citation functions. For the full original descriptions, see pgs. 501–510 in (Harwood, 2009).

1. SIGNPOSTING citations direct readers to other sources in order to (i) help/interest less informed readers; (ii) to keep the argument on track; and (iii) to save space.
2. SUPPORTING citations help authors justify (i) the topic of their research; (ii) the method and/or methodology employed; and/or (iii) the authors' claims.
3. CREDIT citations acknowledged authors' debt to others for ideas or methods.
4. POSITION citations allowed authors to (i) identify representatives and exemplars of different viewpoints; (ii) explicate researchers' standpoints in

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

Citations	*"It is also congruent with the model of the "reflective practitioner" described by Schön (1983, 1987)"* (Gentes, Renon, & Bobroff, 2016, p. 562) *"[other scholarship] builds on the work of Schön who introduced the value of 'frames' (Schön, 1983) and 'generative metaphors' (Schön, 1993) to design practice" (Munro, 2016, p. 2234).*
***Not* Citations**	*"As Schön describes, through both classroom and personal critique sessions, the instructor guides students using a series of 'telling' and 'demonstrating' while students learn by 'listening' and 'imitating'" (Kwan, 2010, p.837).*

Figure 1 Distinguishing citations from other references to Schön's work (Gentes et al., 2016, Kwan, 2010, Munro, 2016)

detail; and (iii) trace the development of a researcher's/field's thinking over time.

5. ENGAGING citations appear when authors are in critical dialog with their sources.

6. BUILDING citations are found when authors use sources' methods or ideas as foundations, which they then develop further.

7. TYING citations aligned authors with (i) other sources' methods/methodology; (ii) specific schools of thought/disciplinary traditions; or (iii) debates on specific issues. The first extract discussed is multifunctional.

8. ADVERTISING citations alerted readers either to the author's earlier work, or to the work of others.

9. FUTURE citations served to establish future research plans.

10. COMPETENCE citations helped underscore writers' expertise by displaying (i) knowledge of their field; and (ii) their ability to conduct research.

11. TOPICAL citations allowed writers to show they and their research were concerned with state-of-the-art issues.

Harwood developed this framework through a qualitative, semi-structured interview study with computer scientists and sociologists, in which he asked them to explain 'what function each citation had [in a publication of their choosing]' (2009: p. 501). From these interviews, Harwood created transcripts and emergently coded 11 citation functions. These were developed without the input of his interviewees, which means we do not know whether the participants agreed or disagreed with Harwood's findings. But Harwood perhaps anticipates this criticism when he explains 'the terminology used to describe each function is derived from the informants' words rather than from the researcher' (2009: p. 501).

Using his participants' terminology to 'describe each function' is one way of attempting to present valid findings. Harwood could have translated his interviewees' remarks into his own words to describe each function. But staying true to the interviewees' descriptions strengthens his validity claim that the functions accurately represent the interviewees' intentions. Another way of

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

validating his framework is in its accordance with 'the functions identified by previous citation studies, despite some terminological differences' (Harwood, 2009: p. 511). So, we might say that Harwood's framework is valid because it reflects the subjective experience of his participants, *and* other scholars have looked at the same phenomenon and seen the same thing.

Since we do not interview the authors of any of the papers in our corpus, we cannot make any claims about agreement between our coding and their motivations for citing Schön. Yet, as Harwood points out,

> '[Studies] have shown that citers' motivations may be complex, [and so] it would seem sensible not to debar authors from identifying multiple citation motivations and functions [for a single citation]' (2009: p. 498).

We do not know, for example, whether the authors in our corpus who cite Schön in support of their claims might also view such citations as demonstrating competence *or* as tying their work to a particular body of scholarship. Existing studies of citation function acknowledge citing authors' complex motivations as well as the *polyfunctional* nature of individual citations. As Harwood points out, 'Over half of the [496] citations discussed by [participants in his study] were attributed more than one function' (2009: p. 514).

Harwood embraces polyfunctionality when he characterizes the different citation functions in his framework as non-exclusive. For instance, a crediting citation might also function as a demonstration of competence *and* as a signpost. The functions are not designed to serve as discrete categories, which may account for some of the difficulty we encountered when we conducted our analysis. We made the decision to apply only one code to the most evident function of each citation in order to adhere to standards of rigor in conducting a content analysis. However, we disagree with Harwood's suggestion that, absent discussions with citing authors, 'the analyst must resort to guesswork' (2009: p. 516) to determine citation function.

We engaged in reasoned debate and discussion about the application of his framework throughout our analysis. And we followed the practice of heightening our intersubjectivity through initial conversations about distinguishing between different codes. These activities improved our capacity to distinguish *primary* functions from others. But they also revealed both the limitations of our approach and the possible limitations of Harwood's framework.

For instance, we found it challenging at times to distinguish between closely related functions like tying and supporting. And we found it challenging to identify the 'boundaries' of a citation function. For example, if a citation appears at the beginning of a paragraph and an author engages critically with the cited material at the end of the same paragraph then is this an engaging

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

citation? We made the decision to exclude such cases for the sake of simplicity and consistency. Moreover, apart from a handful of extreme cases, which we resolved through discussion, we found the framework to be an effective tool for studying citation function based solely on the text without direct input from an author. Moreover, it provided the lens we needed to see a lack of engaging and building citations of Schön's work.

3 Findings

Our coding yielded the following results:

The two most highly occurring functions are credit (108) and supporting (83). Signposting, (35), position (30), tying (19), and competence (18) hover in the mid-range of our findings. We found the fewest instances of engaging (3) and building (3) citations. And we found no instances of advertising, future, or topical citations (see Figure 2).

3.1 Credit

Credit citations acknowledge authors' debt to other scholars for ideas or methods. For instance, Godin and Zahedi (2014), writing about reflective practice, describe two different 'timeframes' in which reflection might occur. And since Schön distinguishes two types of reflection that operate in two different 'timeframes' the authors credit Schön with originating the concept. 'Reflexive [sic] action can also occur in two different timeframes (Schön, 1983)' (Godin & Zahedi, 2014: p. 1674).

Credit citations do not challenge or extend ideas. They simply give credit for ideas where the authors perceive credit is due. And we note a significant difference between the number of crediting citations and the next most voluminous category. There are 25 *more* instances of crediting citations than there are of supporting citations.

3.2 Supporting

Supporting citations help authors justify (i) the topic of their research; (ii) the method and/or methodology employed; and/or (iii) the authors' claims. For instance, Bang, Friis, and Gelting (2014) write:

> ' Design students are special in the sense that they are trained to use the power of conjecture (Lawson, 2006) for instance through sketching and visualizing possible solutions (Schön, 1983; Cross, 1995)' (Bang et al., 2014: p. 1116).

This quote appears in the authors' 'theoretical foundation' section, in which they seek to establish a base upon which to discuss their research question of how design students learn from visualizing theory in design education. Their

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

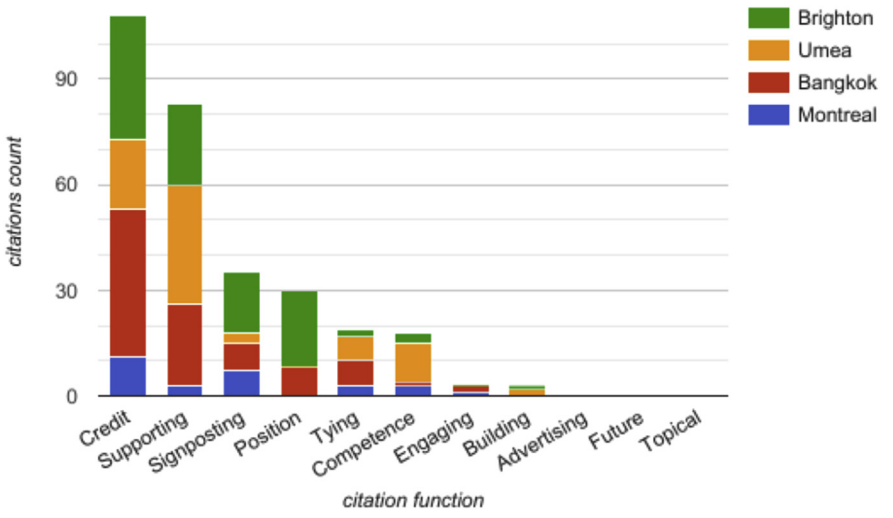

Figure 2 Total number of each citation function

use of Schön can be seen as a justification at least for the topic of their research, if not the claims they make in this section of the paper.

3.3 Signposting

Signposting citations direct readers to other sources. Harwood (2009) suggests that they do so for three main reasons, namely (i) to help/interest less informed readers; (ii) to keep the argument on track; and (iii) to save space. In analyzing this corpus, we found that identifying signposting citations for their 'helpful' and 'space saving' qualities tended to be more straightforward than determining the ways in which they keep the argument on track, unless it could be said that they keep the argument on track by virtue of not taking up space.

Baule and Caratti illustrate signposting when they write:

> 'The values that focus research within the plurality of interrelation and reference technologies are numerous and sometimes interconnected, and include … critical reflection (Baule & Bucchetti, 2012; Dunne & Raby, 2001; Maze & Redström, 2007; Schön, 1983; Senger et al., 2005) …' (Baule & Caratti, 2016: p. 1052).

This quote demonstrates authors (1) providing support in the form of relevant readings to less informed or interested readers, (2) keeping their argument on track, and (3) saving space by summarizing a family of thought. In signposting citations, since the details of the cited source material are not given, we do not have a sense of what the various, nuanced lines of thinking within each text might be and which line – if any – may align with the author's work.

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

3.4 Positioning

Harwood describes the positioning function as:

> '[allowing] authors to (i) identify representatives and exemplars of different viewpoints; (ii) explicate researchers' standpoints in detail; and (iii) trace the development of a researcher's/field's thinking over time' (Harwood, 2009: p. 505).

Taneri and Dogan model positioning when they write:

> 'Simon (1973) defines design as a problem solving activity where the actual 'state' is structured through 'analysis' and solved with a proposition of a preferred one by 'synthesis'. Counter to Simon, Schön saw design as construction of steps of changes in the given situation by 'reflection in action' followed by 'reflection on action'. Designers construct and impose a coherence of their own that guides subsequent moves' (Taneri & Dogan, 2012: p. 1817).

The authors position Schön's perspective on designing in opposition to Herbert Simon's, a position which Schön himself assumed in *The Reflective Practitioner* (1983: pp. 45–48) and *The Design Process* (Schön, 1990: p. 110). One could interpret this positioning as the identification of different 'exemplar' viewpoints of designing. But it could also be seen as an act of tracing the development of the design field's thinking about designing *if* Simon and Schön could be seen as initiating paradigm shifts (Galle, 2011: p. 82) in the way the field thought about designing.

3.5 Tying

Tying citations align authors with (i) other sources' methods/methodology; (ii) specific schools of thought/disciplinary traditions; or (iii) debates on specific issues. Tying citations may seem to take a form similar to signposting citations in the sense that they might appear as multiple sources in a single reference. For example, Feast (2014) writes:

> 'This insight connecting reflection and dialogue [in my work] corroborates significant research within the literature concerning Reflective Practice (Dorst & Dijkhuis, 1995; Schön, 1983; Valkenburg & Dorst, 1998)' (Feast, 2014: p. 186).

We can compare this quote with our previous signposting example. In their use of a signposting citation, Baule and Caratti gloss 30 years of research on critical reflection. They do not discuss the specifics of this work or how their work relates to it. For instance, they do not say whether their work adopts a similar approach to, corroborates, critiques, or adopts a methodology grounded in

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

this existing work. If their aim was to 'tie' their research with others, then this would be a necessary step. By contrast, Feast ties his work to specific schools of thought on the relation between reflection and dialog.

3.6 Competence

Competence citations 'underscore writers' expertise by displaying (i) knowledge of their field; and (ii) their ability to conduct research' (Harwood, 2009: p. 510). Many citations could be interpreted *partly* as demonstrating competence, and so it was challenging for us to identify competence as the most evident function of a given citation.

In fact, we disagreed on our initial coding of competence and so we had a discussion to resolve the issue. We determined that competence could be the most evident function if (1) a given citation did not reference a specific idea or claim, (2) it did not clearly advance the argument or provide support for other rhetorical or methodological choices, and (3) it could not be construed as tying the author to a specific idea from Schön's work. Competence citations could therefore be seen as a demonstration of the author's awareness of a relevant citation but where the details (e.g. specific claims or ideas) of the citation remain ambiguous.

For example, as part of their discussion of designerly ways of thinking, Kaya and Rust (2010) distinguish Schön's scholarship as part of 'the major works' on this topic:

> '"There exists a designerly way of thinking and communicating that is both different from scientific and scholarly ways of thinking and communicating and as powerful as scientific and scholarly methods of enquiry when applied to its own kind of problems" (Archer, 1979). This ontological proposition has been widely cited and studied and it has also been the basis of some of the major works of Cross (2006, 2007) and Schön (1983).' (Kaya & Rust, 2010: p. 777, p. 777)

Kaya and Rust do not refer to a particular concept in Schön's work. Instead, they refer to the interplay between Archer's claim about a designerly way of thinking and one of Schön's texts. This particular citation is different from tying in that it does not align the authors with or disavow some aspect of Schön's work. We interpret it as a demonstration that the authors know that Schön's scholarship is canonical in the discourse on designerly ways of thinking.

3.7 Building

We found three instances of building citations in our corpus. Building citations appear to use source material as foundations to build on or develop. For example, Gray (2014) wrote of Schön's work on critique,

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

> 'While Schön (1983, 1987) modelled reflection primarily through verbal interaction in a desk crit, other forms of reflection might encourage other forms of evaluation to occur, moving the locus of interaction out of the classroom into a more regular, self-initiated act' (Gray, 2014: p. 1136)

Gray could thus be seen to 'build on' Schön's work on reflection by expanding upon the forms (e.g. verbal, visual, etc.) reflection might take. Gray does not challenge Schön's existing work per se, but he does use it as a starting point for proposing a more nuanced understanding of the forms of reflection and the implications for those different forms of evaluation in and out of the design studio.

3.8 Engaging

'Engaging citations appear when authors are in critical dialog with their sources. This criticality can be more or less marked …' (Harwood, 2009: p. 506). We found only 3 citations that could be interpreted as engaging in a critical dialog with Schön's work. However, we found some critiques that could be described as *indirect* or *secondary* engaging citations wherein citing authors critique Schön's work by invoking existing critiques. For instance, Wallis and Williams write:

> 'Usher, Bryant, and Johnston (1997) dispute the coach/student relationship described by Schön as the learner does not need to take responsibility or ownership in reframing the project problem, as the coach will eventually demonstrate' (Wallis & Williams, 2012: p. 1976).

In this case, Usher, Bryant, and Johnston – not Wallis and Williams – engage in a critical dialog with the way Schön characterized the coach/student relationship. Wallis and Williams cite *other* examples of critical engagement with Schön's work without necessarily engaging Schön's work. They let existing work do the engagement for them. However, they also engage in a direct, first person style with Schön when they write:

> 'It also seems that the use of 'co-experimentation' by Schön does not represent a contemporary understanding of 'facilitation' where working with the student to allow them to recognize their learning process' (Wallis & Williams, 2012: p. 1976).

We would describe this as an instance of what Harwood might call 'less marked' engagement. The critique that Schön's use of 'co-experimentation' is anachronistic with regard to 'facilitation' could be construed as a minor flaw. Wallis and Williams do not argue that Schön was wrong nor do they push their claim to reveal any other kind of major flaw, such as: lack of empirical support, weak empirical support, or incommensurability with other

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

aspects of Schön's work on design studio pedagogy. They *do* imply that an aspect of Schön's work is outdated, which is a kind of critical engagement.

A direct, first person engagement citation means that the authors, *not* their secondary sources, engage in a critical dialog with Schön *and* cite the idea, claim, method, or text they are criticizing. For example, Spencer and Hilton (2010) critique Schön's account(s) of practice in *The Reflective Practitioner* and *Educating The Reflective Practitioner* when they write:

> 'Schön describes the good reflective practitioner as being willing to enter into new confusions and uncertainties, but does not provide a good account of states of confusion or the experience of uncertainty and how these affect reflective inquiries. The conversations that Schön presents (1983 & 1987) focus upon illustrating how naming, framing, making moves toward solutions, and evaluating through reflection develop through dialogue, focusing upon design content and action …' (Spencer & Hilton, 2010: p. 1386, p. 1386)

Spencer and Hilton critique Schön for a crucial lack of clarity and empirical support for (1) the concepts of confusion and uncertainty and (2) the way these concepts interact with reflective inquiry. The directness (and plainness) of their critique is anomalous. Few authors seem to engage in a critical dialog with Schön. This could mean that contemporary design researchers are less concerned with the limitations or inconsistencies in Schön's work and, thus, to the consequences of such things. Schön's work tends to be intuitively accepted without much additional explanation or discussion.

3.9 Advertising, future, and topical

We found no instances of advertising, future, or topical citations in our corpus. Does this mean that Schön's work cannot be topical in the sense that it is concerned with state-of-the-art issues? Or that it cannot be used to establish future work plans? We might expect to find future citations where there are engaging and building citations since, presumably, engaging and building can transcend a single publication. But a deficit of engaging and building citations may also reduce the presence of future citations. Finally, identifying advertising citations might require deeper knowledge of authors' *motivations* for citing Schön. Although we can interpret different citations *partly* as advertising Schön's work, this seems to be a secondary function. And, as we discussed in a previous section, we made the decision to apply one code to each citation in accordance with the methodological rigor of a content analytic approach.

4 Discussion

Our findings suggest that contemporary DRS publications are skewed towards *uncritical* use of Schön's work. They do not challenge his claims or

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

methodologies, and they do not build on or extend his work. Instead, they cite him primarily to credit him for ideas or methods and, secondarily, to justify topics, methodologies, and conclusions.

Of course, Schön's work is not beyond criticism. Scholars in other research communities have written substantive critiques of his work (Forester, 1988; Gilroy, 1993; Usher et al., 1997). And we did find a few texts (n = 3) in our corpus that could be construed as critically engaging with Schön's work.

The lack of criticism in our corpus could be seen as preliminary affirmation of Chai and Xiao's (2012) claim that Schön's high citation count is a reflection of his popularity *if* popularity refers to 'widespread favor or approval' ('Popular,' 2017). But this might also be a limited interpretation of popularity. Should popularity only refer to scholars or scholarship that enjoy some form of endorsement and validation? Could widespread critical engagement also be a barometer for popularity in a scholarly research community?

The high volume of supporting and credit citations and the fact that most of these citations do not elaborate on Schön's concepts or texts could be seen as grounds supporting an interpretation of Schön's work as 'intuitively resonating' (Galle, 2011) with contemporary design researchers.

Galle uses the notion of intuitive resonance in his discussion of criteria for developing and evaluating definitions of design. He writes that a particular definition of design 'should resonate intuitively with the use of the word "design" in common parlance, as well as in relevant professional, educational, and research organizations' (2011: p. 93). We interpret this to mean that a definition should meet with consensus and agreement in an almost instinctive way within a group — a way that *by definition* does not require conscious reasoning.

It is possible that the high volume of supporting and crediting citations *without additional explanation or description* of Schön's work happen as a consequence of authors' beliefs that this work is intuitively resonant with other members of the design research community. If an author believes that a reader will understand a concept *without the need for additional explanation or description*, then they may provide only the requisite bibliographic information in a citation in order to keep the argument on track and conserve limited page space. We found citation parsimony to be common among supporting and crediting citations *especially* when referencing Schön's concepts of 'reflective practice" and "reflection in [or] on action.'

Many references to reflective practice include only the words 'reflective practice,' and lack any additional explanation. This makes sense in some cases. Authors need not clarify or expand on *every* citation. Papers would quickly become unwieldy and impossible to write. But in other cases, expanding on

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

specific references is necessary. For example, if 'reflective practice' is important to a topic of study, research design, or analysis of findings.

Friedman encourages scholars to use 'precise, fine-grained references … [since] fine-grained references allow the reader to examine, question, challenge, and learn from cited sources' (2015b: p. 104). They do this by making the interconnections between texts more visible.

Most of the supporting and credit citations in our corpus *do not* constitute fine-grained references. These citations thus potentially undermine readers' efforts to 'examine, question, challenge, and [ultimately] learn from [them].' How can scholars in the design research community assess whether an author (who does not expand on or describe reflective practice) understands what Schön intended the concept to mean? Is it wise to assume that an author who cites 'reflective practice' can speak to it accurately and effectively?

Moreover, if an author uses reflective practice in a way that *diverges* from Schön's intended meaning, then there seems to be even greater onus to (1) articulate the revised meaning of the concept, (2) argue for this revised meaning, and (3) state the consequences of this revision. Such an approach would better position readers to, as Friedman notes, examine and learn not only from the cited material *but also* from the author's treatment of it. In short, it would enhance the efficacy of scholarly communication.

An issue related to effective scholarly communication is the preservation of the integrity of knowledge. By 'integrity of knowledge' we mean the degree to which it is an accurate account of the intellectual work of a research community. Misquoting Schön or misattributing his concepts to other scholars potentially undermines the integrity of knowledge produced.

For example, in their paper, *Drawing Out*, Sadokierski and Sweetapple (2012) write:

> 'Donald Schön discusses the notion of a conversation between designer [sic] and their sketch (Schön, 1983). Goldschmidt (above) calls this 'backtalk'' (Sadokierski & Sweetapple, 2012: p. 1652).

The authors thus frame Goldschmidt as the originator of the idea of backtalk when in actuality Schön introduced it in *The Reflective Practitioner* (Schön, 1983: pp. 131–132).

Using Goldschmidt's research is a useful and potentially important way to provide context and insights about Schön's concepts. But this kind of citation, which is an example of Harwood's 'positioning' function, should also provide

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

an accurate picture of the relationship between these scholars and thus an accurate picture of knowledge production in the design research community.

Citing Goldschmidt as the source frames 'backtalk' as one of *her* contributions and constructs a picture of knowledge work where there is none. We are *not* saying that Goldschmidt made no knowledge contributions in the text cited by Sadokierski and Sweetapple. We are saying that Goldschmidt did not coin the term backtalk to capture the conversation between a designer and a sketch. We believe Goldschmidt would agree since she attributes the concept of backtalk to Schön in her text (2003: p. 72).

There are other examples in our corpus of misattributions or misrepresentations of knowledge contributions and knowledge growth related to Schön's work. And it seems like there could be a tendency amongst authors to criticize Schön's work without providing precise citations, which burdens the reader with inferring *from limited details* the nature and quality of the critique.

These examples raise some important questions about the practice of citing Schön's work in contemporary DRS publications. For novice researchers in particular, using citations to support arguments, credit sources, position work, and demonstrate competence are important.

DRS conference publications provide one set of texts through which scholars model and acquire knowledge of citation practices. With regard to citing and referencing Schön in particular, our findings suggest that we are modeling and thus potentially learning citation practices that may not lead to a 'preferred' future state of citing and referencing, where there are more fine-grained references and more explanation or description of source material where appropriate.

We recognize Schön's name when we read the design research literature. And we recognize terms like 'reflective practice,' 'reflection-in-action,' and the like. But just because we recognize the terms does not mean we can explain their intended meaning nor does it mean we know in a concrete way what the authors who cite those terms mean.

Good referencing in the form of fine-grained references and additional explanation or description of source material can help address these issues. These practices may yield the substance readers need to evaluate our own and others' understanding of a recognizable name or concept. Following Friedman, we believe this is an important step toward 'improving the intellectual quality of the field' (2015a: p. 17).

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

5 Conclusion

Contemporary DRS publications cite the work of Donald Schön in a number of different ways. Using a framework describing 11 kinds of citation function (Harwood, 2009) to analyze a corpus of 120 texts collected from the past four DRS conferences (2010, 2012, 2014, 2016), we found that publications most often cite Schön in order to credit him for ideas and to support their scholarly decisions. We found very few citations that critique or build upon his work. Moreover, where supporting and credit functions are concerned, we found that scholars tend not to expand on or discuss the concepts or works they cite. For example, 'reflective practice' or 'reflection-in-action' may appear in a text with no additional explanation or discussion.

The value of referencing and good citation practice has been championed in the design research community (Friedman, 2015a, 2015b). However, while citation function has been discussed in other research communities (Hyland, 1999; Petrić, 2007; Teufel, Siddharthan, & Tidhar, 2006), it has received less attention in the design research community (Beck & Chiapello, 2016).

It would be worth thinking more about why we observed the patterns we did in our analysis. Is it possible that these patterns are common in conference proceedings? Does a lack of critical engagement and building mean that the scholars publishing at DRS conferences are *less* interested in argumentation or cumulative knowledge building? Should we expect to see more critique and building in journals and/or book chapters? It would be interesting to apply Harwood's framework to the corpus of *Design Studies* publications examined in (Chai & Xiao, 2012) and to compare the outcome with our analysis. Our hypothesis is that we might see more critique and building in journal articles than we do in conference proceedings.

Galle's (2011: p. 82) interpretation of *The Reflective Practitioner* provides another possible explanation for the patterns we found: texts that serve as the foundation of a paradigm may be treated as unproblematic and thus only subject to critique when they cease helping scholars confront issues or solve problems. But even this explanation requires more examination since it is not necessarily clear what sorts of intellectual issues or problems Schön's texts help scholars confront! Without more explanation and discussion around his contributions, readers are left to make assumptions about how/why Schön's texts are useful to a given research project.

We believe that analyzing citation function is especially important in allowing us to understand the connections that we forge with other scholars. We are convinced that the quality of the knowledge we produce as design researchers is partly a consequence of these connections.

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

Appendix A. Schön's Texts

This list summarizes which of Schön's texts are cited in our corpus. This list should not be read as an indication that all of the references in our corpus are consistent or correct. For instance, we found references to multiple versions of *The Reflective Practitioner*, several of which were incomplete or inaccurate (e.g. wrong year, wrong publisher information, and/or *missing* publisher information).

1. Argyris, C. and Schön, D. (1974) *Theory in Practice: Increasing professional effectiveness*. San Francisco: Jossey-Bass.
2. Argyris, C. and Schön, D. A. (1978) *Organizational Learning: A theory of action perspective*. Reading, MA: Addison-Wesley.
3. Argyris, C. and Schön, D. A. (1978) *Organization Learning II: Theory, Method and Practice*. Reading, MA: Addison-Wesley.
4. Argyris, C. and Schôn, D. (1987) Reasoning, action strategies, and defensive routines: The case of OD practitioners. *Research in Organizational Change and Development* 1(1), 89–128.
5. Schön, D. A. (1980). *Policy Planning as a Design Process: A Seminar*. Centre for Human Settlements, University of British Columbia.
6. Schön, D. A. (1983) *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books.
7. Schön, D. (1984) Problems, frames and perspectives on designing. *Design Studies* 5(3), 132–136.
8. Schön, D. A. (1984) Design: a process of enquiry, experimentation and research. *Design Studies* 5(3), 130–131.
9. Schön, D. A. (1985). *The Design Studio: An Exploration of its Traditions and Potentials*. London: RIBA Publications for RIBA Building Industry Trust.
10. Schön, D. (1987) *Educating the Reflective Practitioner*. Jossey-Bass, USA.
11. Schön, D. (1988) Designing: Rules, types and words. *Design Studies* 9(3), 181–190.
12. Schön, D. (1988) Toward a marriage of artistry & applied science in the architectural design studio. *Journal for Architectural Education* 41(4), 4–10.
13. Schön, D. A. (1990) The design process, in, *Varieties of Thinking*, 110–141.
14. Schön, D. A. (1992) Designing as reflective conversation with the materials of a design situation. *Research in Engineering Design* 3(3), 131–147.
15. Schön, D. A. (1993) Generative metaphor: A perspective on problem setting in social policy, in Ortony, A (ed), *Metaphor and Thought*. Cambridge University Press.
16. Schön, D. (1995) Knowing-in-Action. The new scholarship requires a new epistemology. *Change* 27(6): 26–34.

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

17. Schön, D., and Wiggins, G. (1992) Kinds of seeing and their functions in designing. *Design Studies* 13 (2), 135–156.
18. Schön, D., and Rein, M. (1994) *Frame Reflection: Toward the Resolution of Intractable Policy Controversies*. New York: Basic Books.
19. Schön, D. (2001) *Displacement Of Concepts*. Oxford: Routledge.
20. Rein, M., and Schön, D. (1996) Frame-critical policy analysis and frame-reflective policy practice. *Knowledge and Policy* 9(1), 85–104.

Notes

1. See Appendix A for a complete list of Schön's scholarship cited in our corpus.

References

Bang, A. L., Friis, S. A. K., & Gelting, A. K. G. (2014). Designerly ways to theoretical insights: Visualization as a means to explore, discuss, and understand design theory. In K.-Y. Lim, K. Niedderer, J. Redström, E. Stolterman, & A. Valtonen (Eds.), *Proceedings of DRS 2014: Design's Big Debates, Vol. 1* (pp. 1109–1121).

Baule, G., & Caratti, E. (2016). Towards translation design a new paradigm for design research. In P. Lloyd, & E. Bohemia (Eds.). *Proceedings of DRS 2016: Design + Research + Society – Future-Focused Thinking, Vol. 3*, 1047–1060.

Beck, J., & Chiapello, L. (2016). Schön's legacy: Examining contemporary citation practices in DRS publications. In P. Lloyd, & E. Bohemia (Eds.). *Proceedings of DRS 2016: Design + Research + Society – Future-Focused Thinking, Vol. 1*, 17–30.

Chai, K.-H., & Xiao, X. (2012). Understanding design research: A bibliometric analysis of design studies (1996–2010). *Design Studies, 33*(1), 24–43.

Cross, N. (2001). Designerly ways of knowing: Design discipline versus design science. *Design Issues, 17*(3), 49–55.

Durling, D. (2002). Discourses on research and the PhD in design. *Quality Assurance in Education, 10*(2), 79–85.

Durling, D., & Friedman, K. (Eds.). (2000). *Proceedings of the Conference Doctoral Education in Design: Foundations for the Future*. Staffordshire University Press.

Feast, L. (2014). Creating organizational knowledge through strategic business model design. In K.-Y. Lim, K. Niedderer, J. Redström, E. Stolterman, & A. Valtonen (Eds.). *Proceedings of DRS 2014: Design's Big Debates, Vol. 1*, 181–194.

Forester, J. (1988). *Planning in the Face of Power*. Berkeley: University of California Press.

Frayling, C. (1993). *Research in art and design*. Royal College of Art London.

Friedman, K. (2008). Research into, by and for design. *Journal of Visual Art Practice, 7*(2), 153–160.

Friedman, K. (2015a). *Reference, Argument, and Evidence. How Good Referencing and Citation Serve Design Research and Professional Design Practice*. Melbourne, Australia: Centre for Design Innovation, Swinburne University of Technology. (Revised Reprint).

Friedman, K. (2015b). *Research Writing Workshop*. Tongji University. Retrieved from. https://www.academia.edu/2953871/Friedman._2015._Research_Writing_Workshop_Slides.

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

Galle, P. (2011). Foundational and instrumental design theory. *Design Issues, 27*(4), 81–94.
Gentes, A., Renon, A., & Bobroff, J. (2016). Design and Interdisciplinarity: The improbable introduction of 'fundamental physics' in a design school. In P. Lloyd, & E. Bohemia (Eds.). *Proceedings of DRS 2016: Design + Research + Society – Future-Focused Thinking., Vol. 2*, 555–567.
Gilroy, P. (1993). Reflections on Schön: An epistemological critique and a practical alternative. *Journal of Education for Teaching, 19*(4), 125–142.
Godin, D., & Zahedi, M. (2014). Aspects of research through design. In K.-Y. Lim, K. Niedderer, J. Redström, E. Stolterman, & A. Valtonen (Eds.). *Proceedings of DRS 2014: Design's Big Debates, Vol. 1*, 1667–1680.
Goldschmidt, G. (2003). The backtalk of self-generated sketches. *Design Issues, 19*(1), 72–88.
Gray, C. M. (2014). Locating the emerging design identity of students through visual and textual reflection. In K.-Y. Lim, K. Niedderer, J. Redström, E. Stolterman, & A. Valtonen (Eds.). *Proceedings of DRS 2014: Design's Big Debates, Vol. 1*, 1135–1156.
Harwood, N. (2009). An interview-based study of the functions of citations in academic writing across two disciplines. *Journal of Pragmatics, 41*(3), 497–518.
Hyland, K. (1999). Academic attribution: Citation and the construction of disciplinary knowledge. *Applied Linguistics, 20*(3), 341–367.
Jörg, B. (2008). Towards the nature of citations. In *Poster Proceedings of the 5th International Conference on Formal Ontology in Information Systems* (pp. 31–36).
Kaya, C., & Rust, C. (2010). Knowledge transfer from designers to home crafts makers: Negotiating methods to study actions in context. In D. Durling, R. Bousbaci, L.-L. Chen, P. Gauthier, T. Poldma, & S. Rowarth-Stokes, et al. (Eds.), *Proceedings of DRS 2010: Design & Complexity* (pp. 776–790).
Krippendorff, K. (2005). *The Semantic Turn: A New Foundation for Design*. Taylor & Francis.
Krippendorff, K. (2012). *Content Analysis: An Introduction to its Methodology*. Sage.
Kwan, K. B. (2010). A proposal for the Web 2.0 revolution in online design education: Opportunities for virtual design learning using social networking technologies. *Proceedings of DRS 2010: Design & Complexity* 835–854.
Larsson, S. (2013). Generalizability. In B. Dennis, P. Carspecken, & L. Carspecken (Eds.), *Qualitative Research: A Reader in Philosophy, Core Concepts, and Practice* (1st ed.). (pp. 38–56) New York: Peter Lang Publishing Inc.
Margolin, V. (2016). Design research: What is it? What is it for? In P. Lloyd, & E. Bohemia (Eds.), *Proceedings of DRS 2016: Design + Research + Society – Future-Focused Thinking, Vol. 1* (pp. 1–16).
Munro, T. (2016). Appreciative co-design: From problem-solving to strength-based re-authoring in social design. In P. Lloyd, & E. Bohemia (Eds.), *Proceedings of DRS 2016: Design + Research + Society Future-Focused Thinking, Volume 6* (pp. 2221–2240).
Petrić, B. (2007). Rhetorical functions of citations in high-and low-rated master's theses. *Journal of English for Academic Purposes, 6*(3), 238–253.
Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Methodological issues in the content analysis of computer conference transcripts. *International Journal of Artificial Intelligence in Education, 12*, 8–22.
Sadokierski, Z., & Sweetapple, K. (2012). Drawing out: How designers analyse written texts in visual ways. In Israsena, P., Tangsantikul, J., & Durling, D. (Eds.). *Proceedings of DRS 2012, Vol. 4* (pp. 1646–1659).

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005

Schön, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. Basic Books.

Schön, D. A. (1990). The design process. In V. A. Howard (Ed.), *Varieties of Thinking: Essays from Harvard's Philosophy of Education Research Center* (pp. 110–141). New York: Routledge.

Simon, H. A. (1969). *The Sciences of the Artificial*. Cambridge, MA: The MIT Press.

Spencer, N., & Hilton, K. (2010). The value of stimulated dissatisfaction. In *Proceedings of DRS 2010: Design & Complexity* (pp. 1594–1603).

Stemler, S. (2001). An overview of content analysis. *Practical Assessment, Research & Evaluation, 7*(17), 137–146.

Taneri, B., & Dogan, F. (2012). How architectural students characterize design. In Israsena, P., Tangsantikul, J., & Durling, D. (Eds.). *Proceedings of DRS 2012, Vol. 4* (pp. 1813–1823).

Teufel, S., Siddharthan, A., & Tidhar, D. (2006). An annotation scheme for citation function. In *Proceedings of the 7th SIGdial Workshop on Discourse and Dialogue* (pp. 80–87).

Usher, R., Bryant, I., & Johnston, R. (1997). *Adult Education and the Postmodern Challenge. Learning Beyond the Limits*. New York: Routledge.

Wallis, L., & Williams, A. (2012). Researching the one-on-one from a learning and teaching perspective. In Israsena, P., Tangsantikul, J., & Durling, D. (Eds.). *Proceedings of DRS 2012, Vol. 4* (pp. 1971–1983).

Ziman, J. (1968). *Public Knowledge: An Essay Concerning the Social Dimension of Science*. Cambridge, UK: Cambridge University Press.

Please cite this article in press as: Beck, J., & Chiapello, L., Schön's intellectual legacy: A citation analysis of DRS publications (2010–2016), Design Studies (2017), https://doi.org/10.1016/j.destud.2017.10.005