Knowledge Creation in Design-based Research Projects: Complementary Efforts of Academics and Practitioners

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For some time I have been troubled by the often wide divide between the academic and practitioner communities, even when jointly doing applied forms of research such as design-based research (DBR). While the distinction is vulnerable to stereotyping, practitioner communities (most commonly those teaching or training at various levels) differ in important ways from academic communities (those doing research in higher-ed and government). Failure to address differences in the two cultures can lead to anti-intellectualist responses stance from practitioners and insularity and elitism from academics. Much of my recent work aims to address issues surrounding our work as academics and professionals (Wilson, 2013) within the field of instructional design and technology (IDT). This paper provides an opportunity to reflect on how design-based research can help lessen the divide.

Education is a messy field of inquiry – in David Berliner’s (2002, p. 18) words, the “hardest science of all.” In a field full of “wicked,” intractable problems and nested layers of complexity, dogmatism about research methods is surely the last thing needed. Yet in messy fields, insecurity often leads to a “scrupulosity” toward method, that is, an unhealthy, near-obsessive attention to rigor and orthodoxy and adherence to prescriptive rules, in an attempt to over-compensate for obvious shortcomings in our ability to understand and control outcomes.

Design-based research (DBR), also known as educational design research, grew out of researchers’ concerns about the relevance of our research in education. More a stance or guiding framework than a specific method, DBR brings together researchers and practitioners to work on projects addressing challenging problems of practice (McKinney & Reeves, 2012). Interventions gradually take shape through cycles of mutual inquiry and collaboration in response to the needs and challenges encountered in the field. While collaborative teams distribute decision-making in various ways, the research reports resulting from such collaborations inevitably have a researcher bias: Reports tend to be written by and for academics and funding sponsors, using frames and discourse norms accepted within research communities. This slant or bias is to be expected of course, because of the nature of academic writing and peer review. Nonetheless questions remain about how DBR projects serve the needs of both researchers and practitioners and reflect their mutual contributions.

In response to these concerns, I examine in this paper DBR’s knowledge-generating function in terms of participants’ respective communities. After reviewing how new knowledge is generated using a variety of forums and practices, I offer some suggestions for strengthening DBR’s use of crossing over different forums and discourse.
communities, which would lead in turn to stronger knowledge creation and sharing, and potentially greater impact of research findings.

Knowledge Creation Happens Everywhere

Both researchers and practitioners engage in activities resulting in new knowledge and capacity, and both groups find ways to share that new knowledge. Each community\(^2\) has developed norms for exploring problems, garnering resources, and generating knowledge relevant to educational problems, and then sharing that knowledge with others. Students of course represent a third primary constituency; their knowledge-generating activity has also been noted (e.g., Scardamalia & Bereiter, 2006; Tan, Ow, Chai, Teo, & Yeo, 2014). Specialized knowledge is demonstrated by working teachers on a routine basis. Planning lessons, engaging learners, observing and adjusting one’s teaching based on unfolding interactions – the expertise and cognition of effective teachers have long been considered to be a complex cluster of skills, knowledge, dispositions, and professional attributes (Berliner 2002). As an instructional designer trained in workplace performance analysis, I recall an idea by Tom Gilbert (1978) called the Potential for Improving Performance (PIP): the space or gap between exemplary performance and routine or typical performance of individual performers. In jobs with a large observed PIP – where exemplary performers yield much higher outcomes than peers – the potential for improvement is great and hence worthy of further inquiry and intervention. If the variation is smaller, then workers may all be more or less applying the same expertise and obtaining a similar performance outcome. This way of thinking has contributed to an entire business method known as continuous quality improvement.

With teacher-effectiveness legislation just now taking effect, we are on the threshold of learning more about K12 teaching PIPs. Most analysts agree that education broadly and teaching in particular are areas with significant PIPs: a master teacher’s outcomes will be considerably higher than the norm. The same could be said, I believe, for instructional designers or principals or many other educator roles. And given the high stakes involved in education, a closer look at professional knowledge is warranted. Even when accounting for varying circumstances, individual expertise can have a substantial impact on learning outcomes (Shulman, 1987).

Where is the Knowledge?

Knowledge is typically thought of as a mental state – a belief that is true, with good supporting reasons or evidence (Ichikawa & Steup, 2013). Knowledge can also be construed more broadly as relating to a general capacity to act competently. So for our discussion, a preliminary question: Where exactly is the knowledge required to do education successfully? Is it in the hands (and minds) of individual teachers and other role-players? The “where” question places knowledge within a time-and-place reference, at least metaphorically, but the answer is best left open: Educational knowledge is found in a lot of places, e.g.:

- Educators’ heads (at both neural and mental levels)
- Their hands and habits (and body)
- Artifacts both material (classrooms, schools, textbooks) and virtual (software, networks, and online resources) – see Pahl and Rowsell (2010)
- Language and culture
- Real-time patterns of engagement in the material world
- Groups and communities engaged in educational activity

In other words, in a broad sense knowledge is distributed in different ways and combinations, and knowledge is always “stored,” used, and transmitted within a complex web of interrelated resources and people. Knowledge is not simply in the head, but also in the artifacts and practices built up over time. Our answer to the where question is, “all of the above.”

**Knowledge-related Discourse**

Following Habermas (1981) and others, people engage in different types of discourse with respect to knowledge creation and sharing. I propose below four kinds of knowledge-creating discourse used by educational researchers and practitioners:

- **Professional** discourse reflects the canons of a particular field of work or practice. It is geared to supporting that practice and provides the vocabulary and schemas to make sense of the work. Depending on the sub-field in education, professional discourse may be finely tuned to new knowledge creation – or less so in well established, slower-changing areas. Professional knowledge is often prescriptive, referencing standards of conduct and suggesting ways for improving practice and quality. And note: professional discourse will tend to vary depending on the setting – conversation around the water cooler and in the teacher lounge will differ markedly from practitioner journals and conference presentations.

- **Academic** discourse is most commonly found in refereed academic journals, but also in academic conferences and even some blogs and listservs. Academic discourse relies on technical/theoretical terms with typically more precision; its claims are more casually-driven and abstract than everyday discourse.

- **Pedagogy-in-action** discourse is the kind of talk that teachers engage in with their students, intended to build knowledge and expertise in the learner. The typical setting is a course, face-to-face or online, although similar discourse can be found in interest groups and in the blogosphere.

- **Public** discourse is intended for broad sharing and conversation among non-specialists, intended for the working out of values and political positions and for general understanding of the world. This discourse can serve as a valuable reality check for those working in specialized knowledge cubicles. Politicians, journalists, and TED speakers tend to adopt public discourse patterns in their public presentations.

These discourses are not fully orthogonal of course: we cross boundaries all the time and engage in varied forms of discourse depending on the situation. Each of us is “multilingual” in the sense that we can adjust our discourse to fit the norms and schemes common in a given setting. While researchers tend to privilege academic discourse over
others, we engage in all four types. Likewise practitioners value professional discourse, but also engage in (at least as lurkers and consumers) all four forms, and others as well. My point is that (1) we all “talk” (speak, write etc.) in different ways depending on audience, setting, and purpose (2) our adjustments confirm to preexisting patterns of discourse; and (3) in each form of discourse, we may engage in knowledge-producing activity.

As a research method, DBR is an activity whose specific purpose is knowledge creation and advancement. Scientific research can claim a special status as a knowledge-creation activity, but we should remember its non-exclusivity (that is, other kinds of human activity also lead to knowledge creation) and its human foundations (inevitably fraught with some degree of error, mixed motives, and bias).

**Knowledge-creating Forums**

Table 1 outlines a number of spaces or “forums” where knowledge-creating discourse can happen – research and practitioner journals, conferences, webinars, workshops, courses, and so forth. About half of them didn’t exist 15 years ago in their current form, indicating the overall continued growth of knowledge-creating discourse. Some of the discourse forums tend to reinforce existing structures while others lean toward innovation and change. While radical innovation rarely is rare, nearly all of the four discourse types (professional, academic, pedagogy-in-practice, and public) contributes some kind of knowledge, if nothing more than fitting old understandings to current circumstances.

<table>
<thead>
<tr>
<th>Forum</th>
<th>Examples</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Blogs and social media</td>
<td>Blogs (e.g. Will Richardson, George Siemens) Microblogging (Twitter, Instagram) Social portals (Facebook, LinkedIn)</td>
<td>Bottom-up knowledge validation through viewer response, being noticed – often weaker validation Noted for its immediacy, brevity, and surface-level trend-watching</td>
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<td>Webinars and workshops (online and f2f)</td>
<td>Broadcast presentations with limited interaction; many are for profit; others connected to professional organizations</td>
<td>Stronger on dissemination, weaker for original knowledge creation Back-channel conversations facilitate knowledge creation</td>
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<td>Professional conferences – meetings and activities</td>
<td>ISPI, AECT, ISTE, and AERA are examples; often a “home portal” for various knowledge-building resources and activities</td>
<td>Cohesive communities (of practice, learning, or inquiry) are critical for knowledge creation These organizations are key players in advancing knowledge in a field; depend heavily on volunteer labor</td>
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<td>Practitioner journals</td>
<td><em>Performance Improvement</em>; <em>Leading and Learning w/Technology, Innovate</em></td>
<td>Many open-access journals – strong on access and sharing Quality can vary considerably Knowledge is optimized for practitioner</td>
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DBR and Knowledge Creation

| Research journals | In educational technology: *ETRD, IRRODL, BJET, CJLT* | Higher standards of precision
Revision process leads to better product
Specialized language and theory use
Negatives:
Risk of fragmentation and silo effect, limiting cross-community conversation
Time lag in peer-review and publication process
Access and content control/ownership |
|-------------------|------------------------------------------------------|--------------------------------------------------|
| Popular-press books | Daniel Pink, David Brooks, Malcolm Gladwell | Academic discourse translated to more accessible forms
Bridges across disciplines and specializations |
| Courses, including degree and certificate programs | Workplace or higher ed; online or face-to-face | Good for individual knowledge transfer and skill building
Safe practice environments
Limited learner control over the experience
Quality assurance through reputation, institutional accreditation |

As a research method, DBR projects will surely involve publication in refereed journals and related academic forums. The team consultations within DBR projects will likely take on a mixed kind of discourse, somewhere between professional and academic. This kind of mixing is a particular strength of the method, since in these crossings and mixings insights and innovations can surface. A number of other forums above (workshops, popular writing, conferences, blogs, etc.) may very well be used for DBR sharing and conversation. One advantage to acknowledging and using different knowledge forums would be more specific inclusion of practitioner forms of discourse and knowledge creation.

**Practitioner-empowering Inquiry**

So how do the discourse forums in Table 1 differ with respect to processes? *Speed* is a clear differentiator. Whereas academic journals may take a year or two to see a paper published, blogs and tweets are much more responsive, sometimes instantaneous. And whereas refereed judgments are sequenced:

- Judge quality
- Publish

The sequence is a reverse for web forms of discourse:

- Publish
- Judge quality (by the blogging community and the larger world)
This is a key point of interest because of the serious investment in the scientific method made by formal researchers. Web-generated knowledge differs in its vetting process, but it does have means of weighing the value of knowledge contributions. Collaborative filtering is a direct measure of worth by readers; hits or views or cross-links or Google rankings are other forms of validation.

The style of reasoning can also differ across discourse communities. Academic discourse tends toward the Cartesian style of hypothetico-deductive reasoning that privileges abstract or quantitative models, expressed and measured using mathematics and formal causal relations among isolated factors (Toulmin, 2001). Academic discourse tends to specialize and “go deep,” patiently delving and probing into a relatively stable subject matter. By contrast, Web-based discourses are more ephemeral and reactive to immediate local conditions (Siemens, 2005). They rely more on abductive reasoning – identifying patterns of similarity in problems and cases, rather than traditional logics of deduction and induction (Ryder, 1997, 2010). In general I believe Web discourse is more responsive to problems encountered in everyday practice, although academic knowledge production can also be driven by practical problems. The Web seems better suited to idea generation and innovation, whereas academic discourse may be more trustworthy in the evaluation and validation functions.

Among the appropriate lessons to draw from the present review of knowledge forms is that all knowledge-related discourse or originates in human conversation (Li, Clark, & Winchester, in press), often in dialogue with the material world (Fenwick & Edwards, 2010; 2005; Nardi & O’Day, 1999). The human roots of scientific knowledge production are highlighted by the sociology of knowledge, a field that seeks to understand the practices of scientists, academics, and other knowledge producers (Zammito, 2004). The field of cultural studies also examines a broader range of knowledge participants including religion, mass media, and popular culture (Lee, 2003). As much as we might prefer to think otherwise, knowledge is best viewed as contingent on a particular time, place, and context. I think most people understand this, but we don’t always act as if our knowledge is contingent. Knowledge seekers who understand its contingency and tentativeness would more likely remain open to a wide range of evidence and witnesses and a wide range of discourse forms and methods, and avoid narrow dogma and ideological purity. This is consistent with Cobb’s notion of “humble theory” within DBR – that is, theory with a small “t” aimed at furthering understanding and improving practice but not pretending to be a grand or comprehensive explanation (Cobb et al., 2003; DiSessa & Cobb, 2004).

In this context, DBR can be seen as perhaps a bit more humble than the prevailing practices. “Humble” theories and principles would co-exist comfortably with other forms of knowledge generated by other means. I see DBR as one of several inquiry methods inclusive of practitioner perspectives. My list would include:

- **DBR** – collaborative inquiry intended to create educational products and resources – programs, products, curriculum, instruction, or assessments – along with accompanying design principles or other theoretical contributions
- **Action research** – inquiry by practitioners themselves on educational problems, designed to improve practice and share solutions with others (e.g., Wilson & Linder-VanBerschot, 2012; Hathaway & Norton, 2013)
• *Blogging, journaling, and reflection* – individual reflection and self-reporting on practice, usually engaging outside audiences (e.g., the reflections in Spector (2007)

• *Interest and professional communities* – professional learning communities (PLCs) or interest-driven communities on the Web; intended to share interests and expertise and strengthen professional knowledge

• *Proof-of-concept studies* – early demonstrations of a new tool or concept, testing out its affordances and limitations in a concrete way (e.g., Randall, Harris, & West, 2013)

• *Evaluations* – local studies designed to assess progress or impact, or improve programs and services

These forms of knowledge creation differ from more formal methods. Contrary to reputation, they are not entirely divorced from theory. Granted, the modes of inquiry listed above may not be as fully framed in terms of a theoretical framework. A conceptual framework or literature review may be an *outcome* of inquiry rather than an essential element at the front end. Especially when addressing practitioner concerns, these alternative inquiry forms can be useful in conveying and advancing professional knowledge.

Commensurate with those practitioner concerns, I would like to see research findings (formal or otherwise) evaluated using criteria such as:

• *Relevance* – does it relate to compelling problems currently faced by educational practitioners?

• *Usability* – does it lead to action?

• *Equity and social justice* – does it lessen the divide between haves and have-nots – or aggravate those differences?

• *Sustainability* – can it be implemented in a timely and feasible way, with reasonable costs and resources?

• *Impact* – does it make a real difference in improving valued educational outcomes and practices?

• *Empowerment* – does it send messages of value and respect toward students and educators – or lessen their sense of agency and control?

These criteria should stand alongside the traditional expectations of rigor and internal validity. In fact, DBR stands as something of a mediator or bridge between academic and professional interests; adopting a number of different forums for creating and sharing knowledge within DBR projects can strengthen the overall knowledge created and better support the multiple uses for that knowledge.

**Improving Knowledge-related Practices**

This section provides a number of recommendations for improving DBR in particular – and improving the overall relevance and value of research for educational practitioners.
Acknowledge and respect knowledge creation in all its diversity. A fundamental first step is to acknowledge and give full value to the diversity of knowledge-creation forums and activities. Formal academic research has an important place – but so do the variety of non-formal inquiry methods discussed above.

Put impact first. Academics may sometimes feel constrained by the research funding and tenure-granting systems, and decide to narrow their focus and “play the game” by grinding out publications along safe and undemanding lines of inquiry, but with little practical impact. In such cases, academics are writing exclusively to other academics and not even attempting to influence practice in any meaningful way. DBR challenges that place of complacency and is among a family of methods specifically designed to have a larger impact on professional practice.

Look for cross-conversations at every stage. Knowledge-creation activity is challenged and stretched when additional participants are invited to the table. Formal research is almost always enriched by direct participation of workers in the field. This is true at every stage, from inception to dissemination. With diverse composition or teams, individual team members can work from their strengths and contribute substantially through forums common to their respective community.

Diversify the product line. Refereed journal articles are the coin of the realm for most academics – yet DBR’s quality and impact are strengthened by a more diverse set of products, intended for dissemination but also to further knowledge creation. Specific time and attention should be given to a “diversified product line” – articles in both refereed and practitioner journals, presentations in research and practitioner conferences, a web presence through portals, blogs, and other social media. These alternate forms of communication may require planning and resources (time, expertise, and budget), but can contribute enormously to the overall success of the research project.

Think systemically as well as technically. Instructional design and technology (IDT) was founded on systems theory but struggles to integrate systems/complexity thinking into our otherwise technical problem-solving stance. Yet that uncomfortable tension – between holistic/systems thinking and more linear problem fixing – is the fertile ground upon which real impacts on practice can be found. For DBR to prosper for all participants, we need to be able to traverse both systemic and linear-causal ways of seeing situations and addressing problems. Because narrower forms of linear thinking tend to predominate in both academic and professional communities, a return to more holistic, systemic understandings can help achieve a better balance.

Engage in contingent reasoning and ad hoc design. John Seely Brown (2008) talked about tinkering as a form of knowledge production. Related ideas include makeshift assembly, the maker movement, and bricolage design. The point is that practical problems are often best addressed through non-
traditional problem solving or creative or eclectic design processes. A sense of imagination, innovation, and even playfulness can open up possibilities that no formal research finding could produce. Through its commitment to concrete designs and real-time engagements, DBR affords more opportunity for that kind of physical, embodied, situated reasoning and design thinking.

*Don’t be embarrassed by social values.* Researchers steeped in scientific methods may feel uncertain or even disapproving of bringing social values into their inquiry. Unfortunately, education stripped of social values can lead to stale or barren or soul-deprived instruction. Again through its concrete development of programs and products, DBR can legitimately raise issues of equity, privilege, access, and social impact – ideas that have already gained ascendency within the educational research establishment. The Aristotelian values inherent in practical wisdom become relevant (Flyvbjerg, 2001; Hall, 2010). The discussion of values need not be orthodox or homogenized in any way; against-the-grain critiques and principled resistance to established norms should be fair game when designing and building interventions.

*Get past your inhibitions.* A more holistic look at systems in context should be open avenues for topics and treatments often thought to be taboo for orthodox researchers: aesthetics, style, politics, spirituality, embodiment, and human touch, for example. By their very exclusion these topics could be seen as fruitful avenues – at least for mention and initial inquiry – through DBR inquiry.

**Concluding Thoughts**

In my 30+ years as an academic and professional in instructional design and technology (IDT), I have observed trends in scholarly and professional discourse. Perhaps more than in education generally, I have witnessed the gradual breakdown of influence and control exercised by the academic community, and the commensurate rise in influence of practitioners. The long trend, discernible over decades, is a shift away from systematic, monolithic theory and toward more contingent, ad hoc kinds of knowledge creation and sharing. Consultants and specialists working independently of universities, for example, are important sources of practical knowledge. Commercial interests have always helped shape our discourse, and that participation is increasing as education has turned to the private sector in search of resources and partners in reform. The Web is accelerating this trend, breaking the monopolistic hold of universities as guardians and conveyers of professional knowledge and making OER resources available on a much broader basis.

Where does a person go to find new and exciting ideas relating to instructional design and educational technology? How does a person keep up with ever-changing fads and notions, procedures and personalities? I hope to have made a case for a pluralistic answer to this question. Design-based research plays an important role through its dual status – as both an *orthodox* and a *disruptive* method of educational inquiry. Through its own boundary crossings, DBR has the potential to contribute more substantially to challenging problems of practice. Knowledge in the conventional cognitive sense is created, but so
are artifacts and resources of various kinds that are meant to support competent practice. In this sense DBR is more fully engaged in knowledge creation than traditional research methods through its broader range of artifacts – programs, products, courses, services etc. In so many ways these broader creations are poised to better meet the needs of academics and professionals – and students.

References


Sutcliffe, K. (2013). Ed Tech issue


1 This paper began with a presentation at an AERA-sponsored symposium on design-based research, Athens GA, September 2013, organized by TJ Kopcha and Cory Buxton. Portions are adapted from an earlier paper, Wilson (2010).

2 I use community in a broad sense, suggesting common participation in a large group sharing common discourse practices – not a specific community where people know each other personally.

3 The logic of abductive reasoning comes from Charles Sanders Peirce, a 19th century American pragmatist. See Ryder (2010) for some links to his thinking. Gregory Bateson (1972) was another articulator of its value to scientists and practitioners. The form (from Wikipedia) goes something like this: Rule: All the beans from this bag are white. Result: These beans [oddly] are white. Therefore the Case: These beans are from this bag.