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Dialogue

More Enduring Questions in Cognitive IS Research: A Reply

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1. An Enduring Cognitive Epistemology of the IT Artefact

We welcome Browne and Parsons' extension to our work on "Enduring questions in cognitive IS research" because it confirms our strong belief that cognitive research in IS has a bright future, and it demonstrates the usefulness of our framework. Browne and Parsons stepped out of our historical view of cognition in IS research to demonstrate a complementary use of our framework in the case of systems analysis and design. Our goal was to generate insight into the future; we synthesized our enduring questions from historical reflection as signposts to this future. In particular, the enduring questions led us to identify cognitive qualities of IT that withstand the rapid pace of change in technology. While we welcome new enduring questions, we caution that casting such questions too narrowly may not summarise history as well, nor evidence new and interesting cognitive qualities. We discuss these issues below in the hope that it will further illuminate the pathway to a vibrant future for cognitive research in IS.

Fundamentally, we were and are motivated by a concern "principally with questions that have implications for the design and use of IS" (Davern Shaft, & Te'eni, 2012, p. 274). Epistemologically this meant our enduring questions typically arose in the generic form of "How can IT design address something cognitive or respond to some cognitive issue?". In contrast, Browne and Parsons appear to take a reverse but complementary approach. Browne and Parsons consider how cognitive issues create IS issues. Consider for example the comparison of enduring questions shown in Table 1 below:

Table 1. A Comparison of Enduring Questions

Selected Davern et al. enduring questions	Selected Browne & Parsons' enduring questions
HCI-RQ1. How do IT interfaces impact cognition and performance?	1. How do the memory structures of users and analysts impact requirements determination and systems development?
DSS-RQ2. How do DSS design characteristic impact user cognitive processes and performance?	2. How can the different mental models of problem spaces and analysts be reconciled to improve requirements elicitation?
DEV-RQ3. How can software development tools, techniques and boundary objects facilitate distributed cognition among development teams, users and managers?	3. What is the impact of cognitive stopping rules through systems development (and other areas of IS, such as web search)?
	4. How can conceptual modelling grammars be designed to facilitate better understanding of and communication about domain semantics? What implications do better modelling grammars have on the quality of information systems?

Of Browne and Parsons' first four enduring questions, only the fourth exhibits a design-for-cognition imperative as opposed to a cognition-to-design perspective. Interestingly, this double-barrelled question includes aspects that appear to be purely IS and not cognitive (i.e., "what implications do better modelling grammars have on the quality of information systems?").

Another notable epistemological difference is that we synthesized our enduring questions from our historical analysis as a means to organize a history of cognitive research in IS and derive a set of cognitive qualities of IT that we expect will play prominently in future IS research. As we note in our original paper, "These questions motivate long-standing areas of inquiry" and further "while perhaps unapparent to the authors cited, become evident when one adopts an historical perspective" (p. 273). Thus, for example, we would not have included a question on stopping rules as Browne and Parsons did; not because stopping rules are unimportant (they are), but because such a question has not yet been an area of long-standing inquiry in the three streams of research we examined.

Similarly, given our historical perspective, we specifically chose to focus on "software development" rather than "systems analysis and design". Activities such as requirement determination, while clearly a crucial aspect of the overall systems development process, was not the primary focus of early IS research, let alone early cognitive IS research. Instead, building from the historical roots of cognitive research in systems development, we saw the focus as issues arising in studies of the cognitive processes of programmers. Whereas Browne and Parsons date interest in requirements determination to Davis (1982), interest in cognitive processes of programmers dates back to the late 1960s (e.g., Sackman, Erikson, & Grant, 1968; Weinberg, 1971) and continues to current times (e.g., Balijepally, Mahapatra, Nerur, & Price, 2009). Given the necessary bounded scope of our work and an already lengthy paper, Browne and Parsons' expansion in this regard is most welcome. Likewise, given the scope and purpose of our work, we were only able to make limited reference to studies of cognition around conceptual modelling grammars (e.g., Shanks, Tansley, Nuredini, Tobin, & Weber, 2008, Burton-Jones & Meso, 2008) and concur wholeheartedly with Browne and Parsons that this has been an active area of cognitive research in IS since at least the 1990s (see, for instance, Wand & Weber, 1993).

We presented "An organizing framework for exploring cognition with Information Systems" (see Figure 1 in Davern et al., 2012). That Browne and Parsons sought to "open what were essentially black boxes" in our framework is exactly the sort of research activity we hoped our paper would stimulate. Indeed, we see further opportunities for expanding on detailed aspects of our framework. Consider Browne and Parsons' discussion of cognitive heuristics and biases in systems analysis and design. Now consider our distinction between the two levels of use - the task level and the tool level. A number of interesting research questions arise: How do these heuristics and biases play out at the task level of use? How do these heuristics and biases or errors play out at the tool level of use? While there is research addressing these questions within a specific level (e.g. tool: Galletta et al., 1993; task: Kydd, 1989), there is clearly scope for further research. More broadly, we know little of the interplay between the effects of these heuristics and biases at the tool level and behaviour and performance at the task level – an area ripe for future research.

Disappointingly, Browne and Parsons did not address the cognitive qualities of IT we identified (interactivity, fit, cooperativity, affordances). While we developed our enduring questions as landmarks for navigating our historical journey, the cognitive qualities we developed were aimed at informing future cognitive research in IS. We hope that future research will take heed of these cognitive qualities of IT, explore them, debate them, critique them, and expand on them.

In one final regard, we are of one voice with Browne and Parsons because we echo their desire to "increase awareness of the importance of cognitive research in the information systems field". As history has indicated, cognitive research in IS has played a significant role in the field, much greater than can be covered within the constraints of one or two papers. We look forward to future significant contributions of IS cognitive research. Indeed, we expect any historical analysis of IS cognitive research in the future will identify an even broader range of contributions than either we or Browne and Parsons have illuminated thus far.

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