Cognitive Load Theory as the spark for igniting Kuhnian Learning Paradigm Revolutions

Juhani Tuovinen - Australian Institute of Business

Conventionally the cognitive load theory has been used as a learning theory to describe how the human cognitive architecture processes information, and predominantly to describe implications of such insights to improving learning conditions and presentations, i.e. improving instructional design in general (Sweller, Ayers & Kalyuga, 2011, pp. v; van Merriënboer & Sluijsmans, 2009). This work has resulted in a number of empirically evidenced instructional effects, such as split-attention effect (Tarmizi & Sweller, 1988), redundancy effect (Chandler & Sweller, 1991), the expertise reversal effect (Kalyuga, Chandler & Sweller, 1998) and numerous others (Sweller, 2010).

However, the recent work on biological evolutionary perspective of cognitive load theory (e.g. see Sweller & Sweller, 2006) and the consequences of such a perspective have opened up new ways of applying cognitive load theory to uncharted domains. One area that has been explored using this approach recently and is being applied currently, involves examining and charting the development of research agendas and research programmes. For example, the development of the cognitive load theory itself, as well as other research developments, such as the work-applied learning model (Abraham, 2012) were discussed recently (Tuovinen, Abraham & Sweller, 2016). The work-applied learning program development is being more thoroughly investigated in evolutionary cognitive load theory terms in a forthcoming paper (Tuovinen & Abraham, in progress).

The key idea here is that the comprehensive perspective of the evolutionary-based cognitive load theory gives coherence and meaning to the knowledge development and learning inherent in research developments, especially long-term research programs following strong, related themes. The distinction between biologically primary and secondary knowledge, the acquisition and development of information via the borrowing and reorganisation principles, and randomness as genesis principle, and similar insights (Sweller et al., 2011) help to make sense of such disparate aspects of research program developments as creative thinking, the academic apprenticeships of doctoral programs, and the hard work involved in new ideas development which is evident especially in paradigm challenging research (Kuhn, 1970). It seems that Kuhn's ideas on paradigms and their stability, as well as the nature of the ways they get overthrown, link very profitably with the evolutionary cognitive load perspective and suggest ways to break through barriers of conventional thinking and tunnel vision often present in typical research agendas, but which may be profitably enlarged by the introduction of creative ideas, i.e. as described by the random generate and test principle (Sweller et al, 2011, pp.32-33). These ideas are then the explosive dynamite that blows away the previously accepted paradigm shackles and open new ways of viewing the world and approaching issues that are not amenable to conventional solutions.