# Evidence-based software engineering methods for development, analysis and evaluation of data structures

**Heather D. Pfeiffer, PhD   &**

College Assistant Professor
Klipsch School of Electrical and Computer Engineering
New Mexico State University
hdp@cs.nmsu.edu

**Emma Tonkin**

Research Officer
UKOLN
University of Bath
e.tonkin@ukoln.ac.uk

**ABSTRACT:** Each theoretical research field has a preferred set of data structures for modeling its set of conceptual information; for example, some focus on meta-data structures, while others prefer a strictly structured ontological model. This poster takes an analytical perspective on some engineering methods that bridge these, ostensibly quite dissimilar, data structures. It will be the result of this investigation, to attempt to link knowledge management, cataloging structures, and user perceptions of data models, seeing these as both related and complementary in nature.

First, we examine the role of evidence from user-centred studies; for example, card sorting. These demonstrate individual user perceptions in a given area and how these perceptions tailor the collection of input data. Evidence from collaborative studies may also be evaluated regarding development of the underlining data structures. These can be applied to many evidence areas; such as, evaluation of fit between user perception of a task or topic area and the interpretation offered by an automated system.

Secondly, we examine evidence from the analysis of the data sets themselves, guided in part by initial user input; this may be used as supporting evidence for evaluation purposes. This type of analysis can provide evidence of how, collaboratively, users' starting perceptions are *shaped* by past experiences, others' experiences and suggestions by automated systems.

Lastly, we consider the evidence in the evaluation of linkages of the data sets from an ontology and the development of the data structures of a conceptual module, feeding into a more theoretical although evidence-led discussion of the relation between language, structure and evidence grounded within grounded data and user perceptions. All of these approaches together can be used as sources of information for eventual development of functional application elements, including ontological and meta-data structures, and data structures in a more general sense.