

“Pre-ontology” Considerations for Communication in Construction

John Lee* and Dermott McMeel†

*†School of Arts, Culture and Environment
and *Human Communication Research Centre
University of Edinburgh

Communication in construction: the context

- Main question: what are ontologies *for*?
 - how can they help with *communication*?
- Construction as an example, presumably also somehow representative of other urban contexts
- Focus on on-site activity ...
- Large projects:
 - succession of specialised contractors
 - coordinated by main contractor
 - often assembly of parts manufactured off-site
 - many details may need resolution
 - discussion/negotiation commonplace;
between strangers ...

Difficult. The solution?

- Superficially, it seems:
 - standardise vocabularies
 - standardise the subject-matter
(components and operations)
 - standardise communication tools
 - formalise human relationships
- Neat ...

“...the industrialised process can only have its full effect within a system of all pervasive order and standardisation” — Konrad Wachsmann, *The Turning Point of Building*, 1961.

But building sites are messy ...

QuickTime™ and a
decompressor
are needed to see this picture.

... and in more ways than one ...

- *Communication* is not neat and tidy:
 - McMeel, D., Coyne, R., and Lee, J. (2005) Talking Dirty: Formal and Informal Communication in Construction Projects. CAADFutures. Vienna.
 - argument that in fact the smooth operation of construction projects is dependent on slippage between formal communications
 - “rituals” and practices abound that are not easily captured in formal mechanisms
 - “dirt” in the system allows for creativity and local responses to unexpected problems

Some observations

- People often do not find it easy to cope with construction communication
- Formal procedures are often circumvented by e.g. informal sketches and the use of mobile phones
- The main contractor can have a difficult job mediating between various subcontractors
- In theory, some formalisation should help, but:
 - should not be at too specific a level
 - should accommodate differing understandings in use (which means different practices and behaviours ...)

A related perspective

- Communication occurs between groups that each develop their *own conventions* ... 
- (even when they share the *same task**)
- ... if not of terms, then *interpretation* of common terms
- Smooth when intra-group; often fails between groups
- (Maybe a go-between: nice example of Italian building squads)
- *Process* of interaction reveals misunderstanding
- But then *negotiation* of understanding is required
- Can think of formalised ontologies as a means of revealing these differences ...
- ... rather than of abolishing them

* Garrod, S., & Doherty, G. (1994). Conversation, co-ordination and convention: An empirical investigation of how groups establish linguistic conventions. *Cognition*, 53, 181--215.

Emergence of conventions

Study involving “pictionary”-like task:

communicating single-word concepts with drawings

Manipulation of degree of *interactive feedback*

Observe convergence and reduction (simplification) of drawings –
more and faster if more feedback

Extension to “virtual communities”:

compares with Garrod et al results on language

Cartoon:



Clint Eastwood:



Poverty:



A useful process

- Negotiation is a valuable problem-solving process
- Standardising on the “lowest common denominator” increases generality; solutions often need to be more specific
- Apparent wastefulness in expression is actually important redundancy
- Re-expression/re-representation → innovation
- So can we exploit (or subvert) the use of ontologies to promote this process?

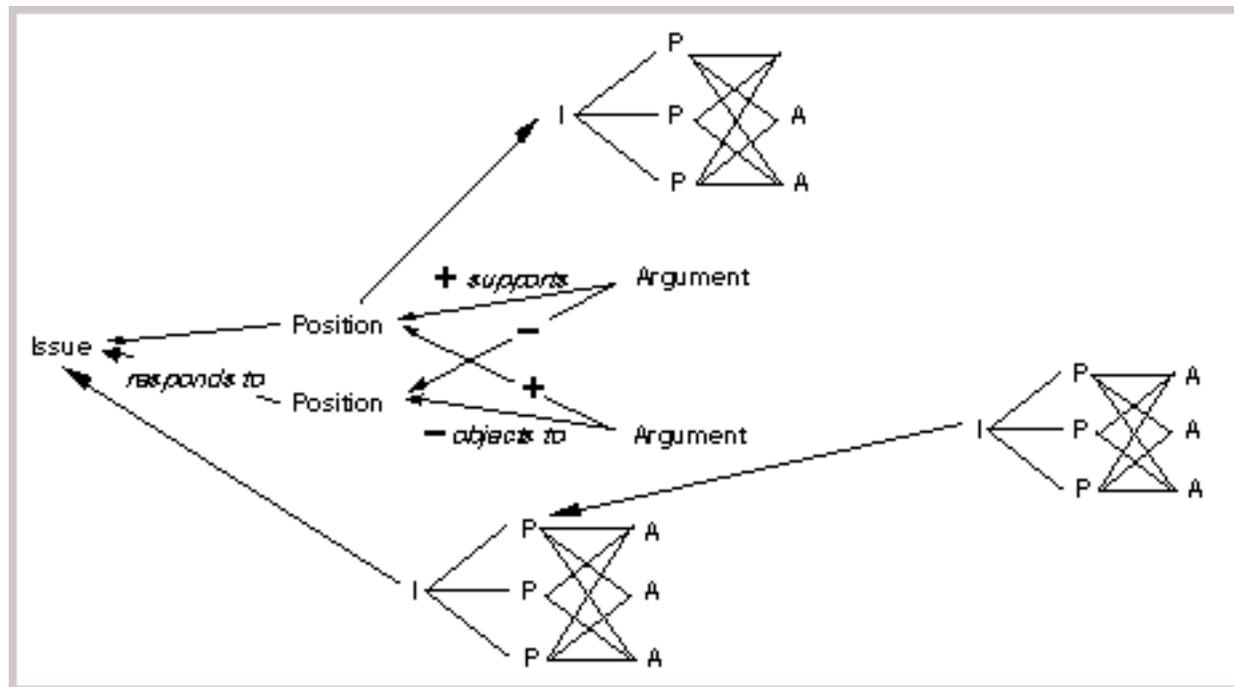
Purposes of ontologies

- There seem to be various things that we might want ontologies to help with:
 - Consistent specification of products
 - Product data exchange
 - Assembly processes
 - Communication ...
- These may not have the same implications for design and use of ontologies
- Existing work not clearly driven by communication objectives (cf, useful overview by Catarina and Anne-Francoise)
- ... can be rather “Platonist”
- Perhaps we need e.g. ways to capture argumentation/negotiation as part of a (local) “concept history”?

Possible direction

- Examine role for methods of capturing “rationale”
 - e.g. perhaps IBIS/gIBIS (Conklin & Begeman) etc. 
- Integrate with ontology to develop flexible system that tracks local convention and concept development
- Apply to construction sites and other specific contexts where communication and practice are crucial
- (At a higher level, might integrate with systems that map between ontologies ...)

gIBIS



From: Buckingham Shum, S. (1997). Representing Hard-to-Formalise, Contextualised, Multidisciplinary, Organisational Knowledge. AAI Spring Symposium on [Artificial Intelligence in Knowledge Management](#) (Mar. 24-26, 1997), Stanford University, Palo Alto, CA, AAI Press.

Conclusion

- An important role for ontologies:

to reveal, capture and structure
disagreement and confusion

(so that communication can be
informed)