APPENDIX C. FRSAD MODEL AND OTHER MODELS

C.1 The Importance of the THEMA-NOMEN Model

As early as 1923, Ogden and Richards[46] published a famous triangle of meaning that illustrated the relationship between language, thought content, and referent. The graph (Figure D.1) implies that the referent of an expression (a word or another sign or symbol) is relative to different language users. The theoretical foundation of it can be traced back to Aristotle, who distinguished objects, and the words that refer to them, and the corresponding experiences in the *psyche*. Equally, Frege distinguished between two types of meaning: thought content and referent, in his essay *Über Sinn und Bedeutung*. It is not enough to try to understand what a thing is, based on its name, because it may have been named in ancient times, and the name reflects only what the name-givers thought was the nature of reality then. Therefore multiple terms may refer to the same object or idea, a single term may refer ambiguously to more than one object or idea, and outdated terms may be confusing [47].

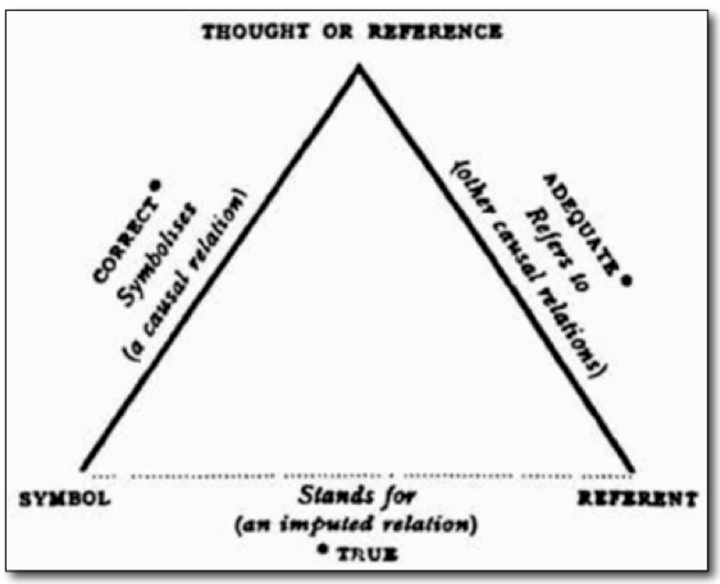

Figure D.1 Ogden's Semiotic Triangle. (Ogden and Richards, 1923,[48] p.11)

Ogden's model was also adopted by researchers in library and information science as the basis for building subject authority systems[49,50].

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[46] Ogden, C. K., and Richards, I. A. (1923). *The Meaning of Meaning: A Study of the Influence of Language Upon Thought and of the Science of Symbolism*. London: Routledge & Kegan Paul.
[47] Frege, G. (1892). Über Sinn und Bedeutung. *Zeitschrift für Philosophie und philosophische Kritik, NF 100.* 1892, S. 25–50. Available at: http://www.gavagai.de/HHP31.htm (accessed 2009-05-22).
[48] Ogden and Richards. *op. cit*.

The importance of the *thema-nomen* model for subject authority data is to separate *subjects* from what they are known as, referred to, or addressed as. Among the efforts to achieve global sharing and use of subject authority data, some efforts have focused on *nomen*, e.g., translated metadata vocabulary, a symmetrical multilingual thesaurus, or a multi-access index to a vocabulary. However, most efforts have focused on the conceptual level, e.g., mappings between two thesauri or between a classification scheme and a thesaurus. Such efforts usually encounter much greater challenges because they are concerned with the subject mappings in terms of their meaning as well as the relationships among the subjects.

C.2 Mapping the FRSAD Model to Other Models

This *thema-nomen* conceptual model matches well with encoding schemas such as SKOS Simple Knowledge Organization System (SKOS) and OWL Web Ontology Language (OWL), which provide models for expressing the basic structure and content of knowledge organization systems (KOS) such as thesauri, classification schemes, subject heading lists, taxonomies and other similar types of controlled vocabularies, as well as ontologies. SKOS defines classes and properties sufficiently for representing the common features found in a standard thesaurus and other KOS structures. The SKOS model is based on a concept-centric view of vocabulary, where primitive objects are not labels; rather, they are concepts represented by labels. As an application of the RDF (Resource Description Framework), SKOS allows concepts to be composed and published on the World Wide Web, linked with data on the Web and integrated into other concept schemes. Each SKOS concept is defined as an *RDF resource* and each concept can have *RDF properties* attached. These include: one or more preferred terms (at most one in each natural language); alternative terms or synonyms; and, definitions and notes with specification of their language[51]. Each of these can be matched to what have been defined in the FRSAD model in terms of *thema, nomen,* and their attributes. SKOS also has specific properties to represent all of the semantic relationships that are described in Chapter 5.

Regarding issues of complexity and granularity of the *themas* and comprehensive semantic relationships between and among *themas* that FRSAD attempts to cover, OWL has even better matches. OWL ontologies provide classes, properties, individuals, and data values and are stored as Semantic Web documents[52]. OWL 1 mainly focused on constructs for expressing information about classes and individuals. OWL 2, the newest

[49] Dahlberg, I. (1992). Knowledge organization and terminology: philosophical and linguistic bases. *International Classification*. *19*(2):65-71.
[50] Campbell et al., *op. cit.*
[51] *SKOS Simple Knowledge Organization System Reference* (2009). Eds. Miles, A. and Bechhofer, S . W3C Candidate Recommendation 17 March 2009. Available at: http://www.w3.org/TR/skos-reference/ (accessed 2010-01-20).
[52] *OWL 2 Web Ontology Language Structural Specification and Functional-Style Syntax.* (2009). Eds. Motik, B, Patel-Schneider, P.F. and Parsia, B. W3C Working Draft 21 April 2009. Available at: http://www.w3.org/TR/owl2-syntax/ (accessed 2010-01-20).

W3C working draft, offers new constructs for expressing additional restrictions on properties, new characteristics of properties, incompatibility of properties, properties chains, and key properties[53]. OWL 2 provides axioms (statements that say what is true in the domain) that allow relationships to be established between class expressions, including: SubClassOf, EquivalentClasses, DisjointClasses, and DisjointUnion. More importantly, in OWL 2, classes and property expressions are used to construct class expressions, sometimes also called *descriptions*, and, in the description logic literature, *complex concepts*. It provides for enumeration of individuals and all standard Boolean connectives: *AND, OR,* and *NOT.* The ObjectIntersectionOf, ObjectUnionOf, and ObjectComplementOf class expressions provide for the standard set-theoretic operations on class expressions. The ObjectOneOf class expression contains exactly the specified individuals.

When the DCMI Abstract Model became a DCMI Recommendation in 2007, its one-to-one principle (i.e., each DC metadata description describes one, and only one, resource) was recognized or followed by other metadata standards. According to the DCMI model, a record can contain *description sets*, which may contain *descriptions* composed of *statements*, which use *property-value* pairs.[54] This results in information that can be processed, exchanged, referred to, and linked to at the statement level. When a record contains descriptions of the resource, the individual descriptions also can be linked to the authority data that manages the values associated with those properties (e.g., the subject authority data, the property name authority data, or the geographic authority data). Such an information model is independent of any particular encoding syntax and facilitates the development of better mappings and cross-syntax translations[55]. The conceptual model proposed by the FRSAR Working Group corresponds to this abstract model by allowing any *thema* to be independent of any *nomen*, including any syntax that a *nomen* may use. Therefore this conceptual model will facilitate the sharing and reuse of subject authority data amongst not only the subject authority systems themselves, but also metadata resources.

C.3 Conclusion

Putting the subject authority data within the context of the Semantic Web developments, especially from the perspective of the Web of Data, subject authority data that are modelled based on FRSAD and encoded in SKOS and OWL will be able to become part of linked open data and contribute to the further development of the Semantic Web.

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[53] *OWL 2 Web Ontology Language New Features and Rationale*. (2009). Eds. Golbreich, C. and Wallace, Evan K. W3C Working Draft 21 April 2009. Available at: http://www.w3.org/TR/owl2-new-features/ (accessed 2010-01-20).
[54] *DCMI Abstract Model*. (2007). Eds. Powell, A., Nilsson, M., Naeve, A. Johnston, P. and Baker, T. Available at: http://dublincore.org/documents/abstract-model/ (accessed 2010-01-20).
[55] *Ibid.*