Toward a Framework for Visual *Nomen*

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1. Background

With the development and publication of the International Federation of Library Associations and Institutions (IFLA) Library Reference Model (LRM) (Riva et al., 2017), previous specifications from the conceptual family of models emanating from the Functional Requirements for Bibliographic Records (FRBR) were harmonized. Definitions for entities within the model were refined, including the definition of the entity *Nomen* (LRM-E9). A *nomen* is an "association between an entity and a designation that refers to it" (p. 31), in which an arbitrary appellation, designation, or combination of signs or symbols is assigned to an instance of an entity (any *Res*, or thing) on the basis of a cultural or linguistic convention. In traditional bibliographic description, the use of a *nomen* often takes the form of a name composed as *nomen string*, which is an attribute of a *nomen* using a string of characters as a way to refer to an entity—such as an instance of an *agent* or *work*—through an act of naming (such as authority control) (Riva, 2018). Different *nomen* may also refer to the same entity within particular contexts, such as the case of a subject term, a classification number, and an identifier (e.g., ID code or URI) all variously referring to the same concept in contextually different forms and ways. The LRM specifications make explicit how linguistic and multilingual references to

entities can be structured through the use of attributes describing such aspects as *Language* (E9-A7) and *Script* (E9-A8). However, it does not make explicit how non-linguistic or non-alphanumeric signs or symbols can be assigned as *nomen* to identify entities. In addition, details that might be relevant to describing non-linguistic or non-alphnumeric *nomen*, such as their attributes and contexts for assignment, will be necessary to understand their integration into information systems

2. Aims

This investigation seeks to examine aspects that would be salient in the consideration of supralinguistic ways of referencing entities through the use of visual *nomen.* Visual *nomen* are symbolic representations of entities encountered through visual perception in which the representation of entities is not dependent solely on linguistic or alphanumeric features or conventions. Examples would include symbols, logos, representative images, video or motion picture depictions, or visual elements which are assigned to reference, designate, or elucidate the specific identity of any *res.*

3. Relevant Literature

The history of the *nomen* entity in the universe of bibliographic description and underlying conceptual models arose from the development of the Functional Requirements for Subject Authority Data (FRSAD) (Zeng et al., 2011). By recognizing the inherent semiotic relationships present in subject conceptualization, FRSAD separates a *thema* (or subject) from the *nomen* which is used to refer to it. Thus, multilingual representation (different *nomen*) for a concept (same *thema*) is supported. With the consolidation of the FR models and the development and further definition of the *nomen* entity in LRM, the idea of the *nomen* as a

separate entity from the thing to which it refers (*thema*, later *res*) was strengthened not just by the semiotic implications, but also by the conceptual and technical needs that an entity would have attributes unto itself (Žumer & Zeng, 2016), a vital component of its use in information systems (i.e., authority control). The ability to put *res* and *nomen* into relationships with one another, and independent of one another, recognizes useful distinctions necessary when different types of entities are being described or designated at different levels or connected in different ways (Gemberling, 2016). The LRM is thus flexible enough to allow conceptual space to include a discussion of signs and symbols of designation which do not rely on language or alphanumeric encoding.

4. Theory and Methods

This research was built on an exploratory, qualitative instrumental case study design (Creswell & Poth, 2018) using multiple (or comparative) cases (Yin, 2018). Using the IFLA LRM conceptualization of *nomen* as the basis, this research explored the similarities and differences between the LRM definition and use of non-lingustic and non-alphanumeric "strings" for visual *nomen* to represent a *res*.

5. Main Findings and Underlying Work

The findings of a conceptual analysis of multiple cases of visual references to entities involved identification of dimensions and their alignment with or elucidation of LRM attributes for *nomen* entities. The first attribute of visual *nomen* would be their potential categorization (LRM-E9-A1) as visual, or more broadly, supralinguistic *nomen*. Other categories, as follows, could also be structured as categorical attributes, but benefit from more detailed description or as distinct attributes.

The second dimension of visual *nomen* involved their formal nature, in which *nomen* were found to be somewhere on a continuum from direct to abstract. This formal dimension dealt with how directly visual language (Panofsky, 1939) was employed in depicting or representing a *res*, perhaps closest to the "isness" of information representation (Hjørland, 2017). Examples of this attribute demonstrated at its most fundamental level include colors (Berlin & Kay, 1969/1999; Kay & McDaniel, 1978; Kay & Regier, 2006), followed by systems of pictograms. Pictograms are based on their resemblance to their real-world physical referents; relevant examples include some international signage (Hassan, 2015) or emoticons/emoji (Giannoulis & Wilde, 2020). Ideograms represent more abstract concepts than pictograms, and while more formally complex and language-independent, they still tend to rely on either physical similarity or conventional use of visual elements to communicate concepts. This is perhaps best evidenced by numbers and other mathematical symbols, currency symbols, alchemical symbols (Newman et al., 2009), and Western zodiac symbols (Pentzlin, 2012).

Greater abstraction was also found in notation systems, such as chemical structural formulas, musical notation, or dance notation. Furthermore, the isness of a visual representation as a *nomen* at a level of greater abstraction may rely increasingly on depiction or interpretation ("ofness" or "aboutness") to be used as an appellation, such as the use of an image of Judas kissing Jesus Christ to represent the concept of betrayal or the image of Buddha under the Bodhi tree to represent enlightenment. Constituent formal aspects or attributes of visual *nomen* which may affect their adoption/appellation or their interpretation may also be relevant.

These last abstract examples brought to light a cultural or contextual dimension, in which the nature of the reification (Riva, 2018) of the relationship between *nomen* and *res* may be determined by cultural, domain-specific, or sometimes personal, convention. These are not always necessarily full linguistic systems, but they are also not always determined by general contexts of use, as signs could be used in different ways within a domain as well as in cross-domain (and thus cross-cultural) appellation. The codified use of hand gestures as *nomen* exists for designating, and thus communicating, concepts in various sports domains (i.e., umpire, base coach, and catcher hand signals in baseball; referee signals in any number of sports like American football, rugby, or water polo) and in forms of sign language, which may become used in non-sports or non-signing contexts (use by non-Deaf of hard of hearing persons), respectively.

Even within the same context of use, *nomen* may be applied or interpreted differently, further elucidating the relationships between *nomen*, *nomen string*, and *res*. Nautical flags, for instance, refer to letters of the alphabet as well as communicate seafaring activities and conditions. Corporate logos are used to represent an organization and may also represent aspects of their brand, such as consumer feelings or social critiques (e.g., the corporate America protest flag developed by Adbusters). Consideration of original contexts, adapted contexts, and conditional contexts, and how to represent those contexts, are germane to this discussion.

Typicality or the basic levels of the representative nature (Hajibayova, 2013) of visual *nomen* was another observed dimension. This would perhaps accord most with "isness"—and perhaps "ofness" (Panofsky, 1939; Hjørland, 2017)—when an image (still or moving) of a phenomenon or concept is used to stand in for a (linguistic) representation. Reification and

typicality thus have functional overlap in these visual *nomen*. For example, images in visual

dictionaries, illustrated glossaries, or instructional videos for dance choreography which are

themselves depictions *of* things, become *nomen* for those objects on the basis of their

assignment by an agent and the agent's evaluation of the image to act, in context, as

representative (or definitional) of the thing itself. Representations could be created (such as

illustrations) or obtained from the real world (i.e., captured, preserved, photographed), which

overlaps conceptually with Buckland's (2018) views of "made as" documents and "made into"

or "considered to be" documents. An example of the latter case is demonstrated by the

"Representative Images" provided in the Getty Vocabularies in the Art and Architecture

Thesaurus. Another is the use of photographic images to represent medical conditions in the

aid of their diagnosis and treatment.

Technical attributes of visual *nomen* include physical media types, the presence of still

or moving images, file types, and extents, dimensions, and/or durations. The ability to integrate

visual *nomen* into linked data systems and datasets will be important for multilingual

applications, to move beyond a reliance on linguistic controlled terminology representation,

and to support computer vision. Information systems will need to be enabled to allow users to

search beyond words or terms as *nomen*, such as the symbol browsing function

(http://numismatics.org/ocre/symbols) of the Online Coins of the Roman Empire project.

Ethical considerations exist in the use of visual *nomen* and the application of related

attributes in terms of enabling systems for representing context, cultural hospitality, and user

choice (Coladangelo, 2021). Users may have or need to be able to express preferences for

certain types of *nomen* or attributes of *nomen* in networked systems. This is especially vital

within linked data environments, in which semantic infrastructures can be used to enable solutions to allow visual *nomen* to be meaningfully linked to any *res*. Ultimately, a framework for understanding the dimensions of visual *nomen* is necessary to mitigate limitations presented by solely linguistic *nomen*.

6. Relevance to Conference Themes

Although the conceptual aspects of this work help elucidate the challenges and opportunities presented by visual *nomen*, those aspects are particularly salient to the conference in light of their practical implications for technical and ethical implementation. Understanding the properties of visual *nomen* and how they exist in relation to *res* (things) suggests that particularly networked solutions within Semantic Web environments are well-suited to enable systems in which users can leverage visual *nomen* in similar ways to browse (and possibly search) functions, which would normally be displayed as a given list of terms. From an ethical standpoint, visual representation of concepts improves accessibility for multilingual systems which will not need to rely on traditional *nomen*—that is textual or linguistic representation—to represent concepts. Those unable to read or speak a language would be less limited in browsing a system if visual representation of concepts was enabled. Enabling user choice and provision of greater context to the representation of concepts in information systems also has ethical and social implications.

Furthermore, the technical ability to represent visual *nomen* as entities with semantic/ontological relationships and properties would help not only in the semantic annotation of digitized material for the presence of particular *res* identified by visual *nomen*, but would also allow visual *nomen* (i.e., images, videos, graphical representations) to be

structured using URIs in support of linked data applications. This work suggests that once a framework for understanding the dimensions of visual *nomen* is developed, construction of a linked data KOS, such as an ontology, for describing visual *nomen* would be the next step. Formal specifications for types of visual nomen, their relationships to the concepts they represent, and their requisite properties in a KOS would allow visual *nomen* to be labeled, notated, documented, organized, and linked, as well as reused across systems.

7. References

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