An Expertise Ontology for Cooperative Extension

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ABSTRACT

This poster details an ontology to describe expertise resources within the national Cooperative Extension system.

1 EXTENDED ABSTRACT

The national Cooperative Extension System is a non-formal educational network with a mission of advancing agriculture, the environment, human health and well-being, and community economic development that is coordinated through and distributed across the state land-grant universities. At present there is no easy way to query knowledge assets across individual extension organizations with respect to expertise, accomplished projects, or successful interventions. In collaboration with the umbrella organization eXtension.org, we have developed a prototype ontology for describing expertise across the extension network. This ontology aims to provide a framework enabling linking experts, projects, organizations, competencies, digital resources, and other related assets. This ontology is available for download at *https://github.com/adhollander/eexp/*.

There are 12 major classes in this ontology: persons, roles, organizations, programs, projects, networks, competencies, subject domains, issues, activities, information resource types, and audience types . All these classes are anchored in the Basic Formal Ontology (Arp, 2015). (See Figure 1). Other ontologies used for these classes are FOAF (Graves et al., 2007), SKOS (Miles et al., 2005), the VIVO Ontology for Researcher Discovery (Mitchell, 2018), AgriVIVO, an extension of VIVO for agricultural research (Global Forum on Agricultural Research, 2018), and the ASI Sustainable Sourcing Ontology (Hollander, 2018). Table 1 lists these major classes and the ontologies these are drawn from. These classes fall into several categories. A couple of these classes such as information resources and subject domains tie into existing taxonomies, for instance subject domains being drawn from the National Institute of Food and Agriculture's Manual of Classification for Agricultural and Forestry Research, Education, and Extension (U.S. Department of Agriculture, 2005). Other classes here are intended to support development of databases of instances, for instance directories of persons and organizations with information on subject domain expertise and competencies. Finally, several of these classes occupy structural positions in the ontology, for instance role serving as a class that links persons and organizations. A total of 197 classes are presently defined in the ontology, including those enumerated from various taxonomies. Properties for this ontology have been drawn from the Relations Ontology (Mungall, 2018) and VIVO (Mitchell, 2018), as well as a newly created set of object properties for the expertise types.

We distinguish in this ontology between expertise types and competencies. The object properties for expertise types (See

Class Name	Source
Person	FOAF
Role	BFO
Organization	FOAF
Program	This ontology
Project	VIVO
Network	AgriVIVO
Competency	This ontology
Subject Domain	SKOS
Issue	ASI
Activity	This ontology
Information Resource Type	VIVO
Audience Type	This ontology

Table 1. Major classes in expertise ontology

Figure 2) are drawn from work by Harry Collins and Robert Evans (Collins and Evans, 2007) to describe general categories of expertise especially in science and technology, characterizing these in a taxonomy they call the Periodic Table of Expertises. This taxonomy has been translated directly into our ontology. Much of their discussion concerns distinguishing between linguistic knowledge of a domain and embodied practices. By contrast, competencies in our ontology refer to desired qualities that are specific to practitioners in the cooperative extension domain. These have been collated by reviewing lists of competencies from several different state extension organizations. These are illustrated in Figure 3.

Our development of this expertise ontology is part of a broader initiative to create a set of ontologies describing entities and interactions across the entirety of the food system, ranging from food production, impacts and linkages to the environment, to food consumption, nutrition, and human well-being. Figure 4 outlines some of the major ontologies that will be joined together or developed in this multi-ontology framework.

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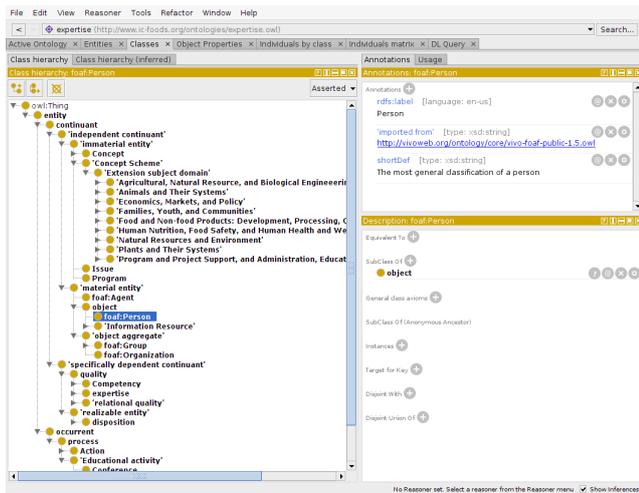
**Fig. 1.** View of classes in expertise ontology showing BFO anchoring.
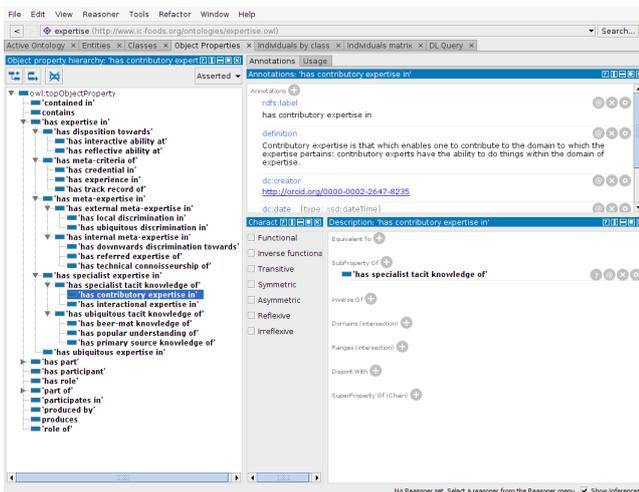
Fig. 2. View of object properties describing expertise types drawn from Periodic Table of Expertise in Collins and Evans, 2007.
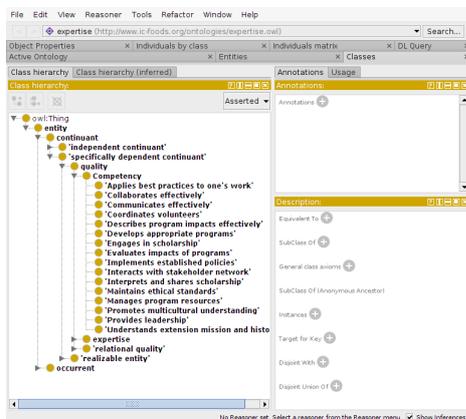

Fig. 3. View of subclasses describing cooperative extension competencies.
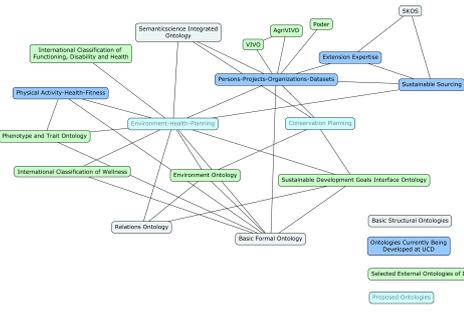
Fig. 4. Food-environment-health multiontology framework.

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