

Ontological Domains for Representing Scholarship

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Ontological Domains

Ontologies should focus their representations on their domains. The VIVO Ontology focuses on the domain of scholarship. As an early effort in representation (2007), the VIVO ontology required representation of domains related to, but outside the domain of scholarship. A recent analysis of the VIVO ontology identified several such domains. Each could, and in some cases has been, represented ontologically by a focused effort. New ontologies are proposed to address gaps in representation. Each meets criteria established for using ontologies from other domains.

Using Ontologies from other Domains

Based on significant project experience, we find that for ontologies to be reused productively, they should be 1) actively maintained; 2) open license; 3) BFO-based; 4) OBO-compliant; and 5) domain-focused. Few ontologies can meet these criteria. In future work, the VIVO ontology will focus on representing the people, organizations, processes, and works of scholarship. Related domains will be represented in separate ontologies that work well with the VIVO ontology. Related ontologies and their terms will typically be referenced rather than used directly.

The VIVO Ontology represents entities from various domains to represent scholarship. Some of these entities are outside the domain of scholarship.

Dates

The W3C Time Ontology¹ provides semantics for dates and times, including intervals and instants. A complete set of date RDF data is available on-line with open license².

Locations

Gazatteer³ (GAZ) is an OBO-compliant, actively maintained, BFO-based, ontology with over 90,000 locations of the world including continents, countries, provinces, and cities.

Journals

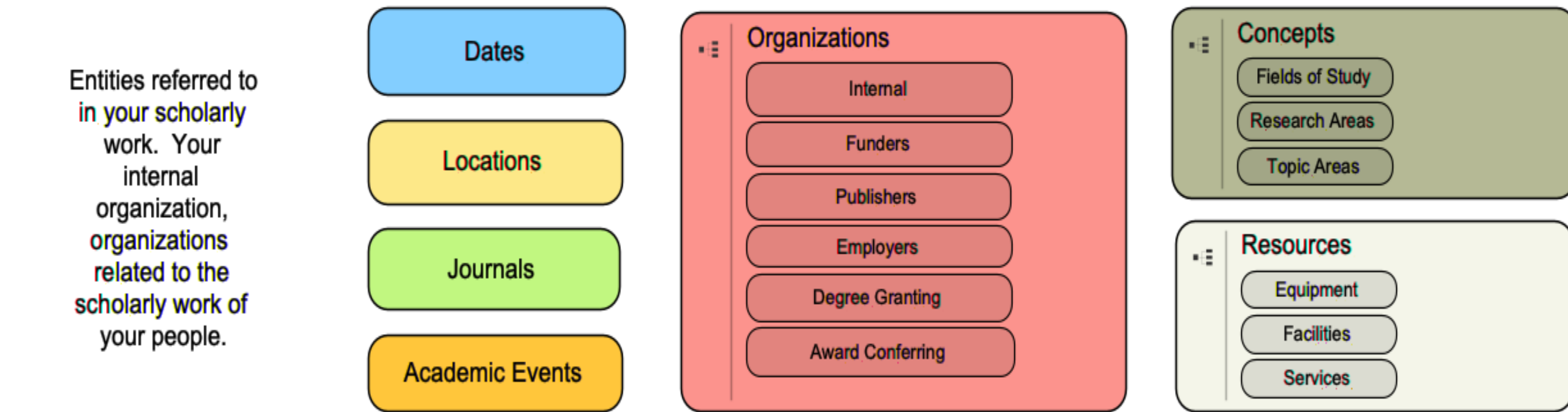
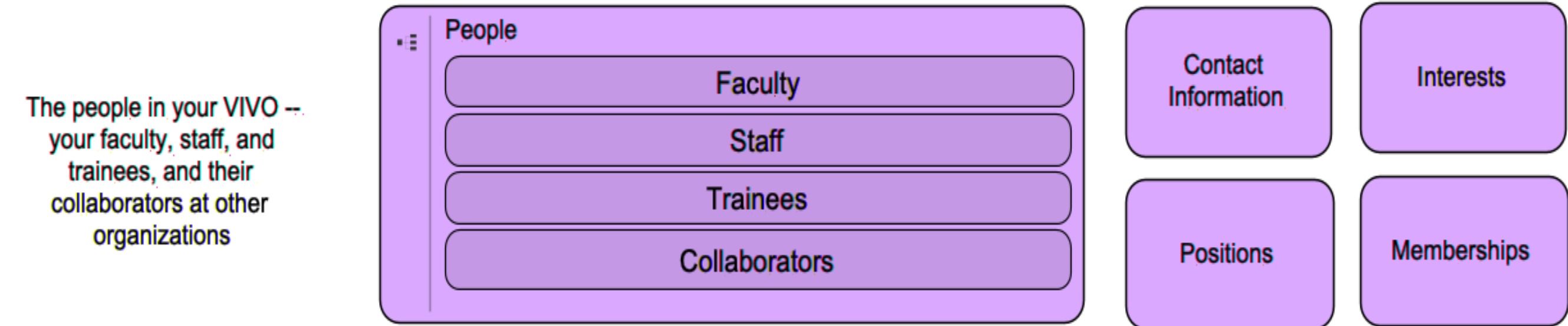
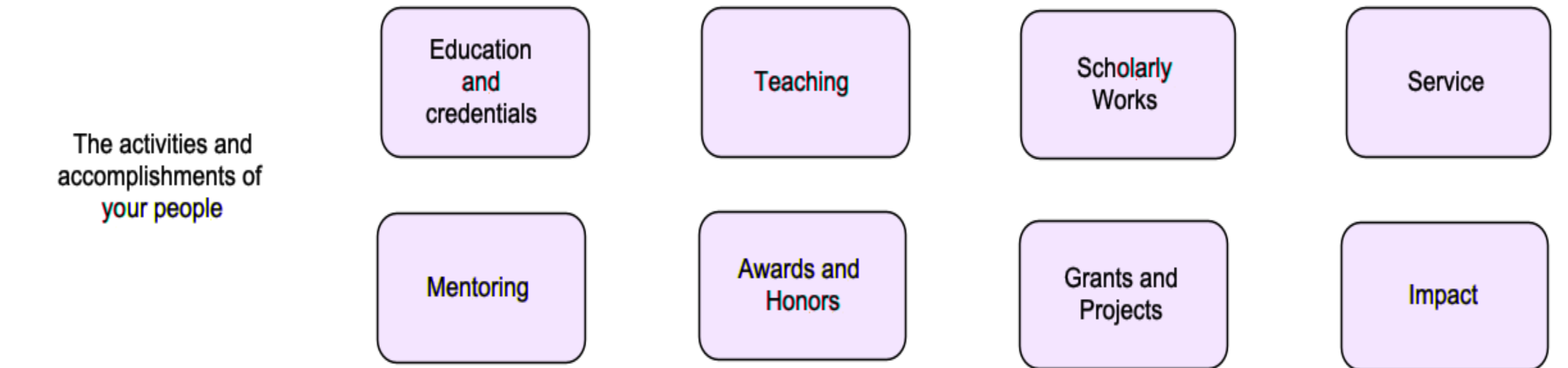
JOURNAL is a proposed ontology providing a controlled vocabulary of journals with ISSN, EISSN. OpenVIVO⁴ created a preliminary version of JOURNAL.

Research Impact

RIO is a proposed ontology for presenting the impact of research in policy, scholarship, economics, practice.

Academic Events

AEON⁵ is a proposed ontology for representing events such as conferences, and workshops, and their processes, participants, outputs.



Upper Level Ontology

VIVO uses the Basic Formal Ontology²⁰ (BFO) as an upper level ontology. The upper level ontology is outside the domain of scholarship and used by VIVO to align its classes with those of BFO and ontologies using BFO.

Academic Degrees

ADO⁵ is a proposed OBO-compliant, actively maintained, BFO-based, ontology providing a controlled vocabulary of degrees with simple classification -- doctoral, masters, bachelors, associate, others.

Languages

The Language Ontology⁶ is an OBO-compliant, actively maintained, BFO-based, ontology based on ISO 639⁷, and CEFR⁸, providing a controlled vocabulary of the languages of the world for use in describing works and language competencies.

Additional Ontologies

The Information Artifact Ontology¹⁴ (IAO), Ontology for Biomedical Investigations¹⁵ (OBI), and the Software Ontology¹⁶ (SWO) all have clear domains, are actively maintained and are BFO-based.

References

1. Time Ontology in Owl. <https://www.w3.org/TR/owl-time/>
2. UK Reference Data. See eg: <http://reference.data.gov.uk/id/gregorian-instant/2006-01-01T00:00:00>
3. Gazatteer Ontology. <http://www.obofoundry.org/ontology/gaz.html>
4. Ilik, et. al. OpenVIVO: Transparency in Scholarship. <https://doi.org/10.3389/frma.2017.00012>
5. Early Thoughts on Representing Academic Degrees in VIVO. <http://bit.ly/2Jo4ws9>
6. Early Thoughts on Representing Language Capabilities in VIVO. <http://bit.ly/2Rbi8XY>
7. ISO 639. https://en.wikipedia.org/wiki/ISO_639
8. Common European Framework of Reference for Languages. <http://bit.ly/2YE8LXC>
9. Early Thoughts on Representing Organizations in VIVO. <http://bit.ly/2YHIMQt>
10. Research Organization Registry. <http://ror.org>

References continued

11. Global Research Identifier Database. <http://grid.ac>
12. Contributor Role Ontology. <http://www.obofoundry.org/ontology/cro.html>
13. MARC Contributor relators. <http://id.loc.gov/vocabulary/relators.html>
14. Information Artifact Ontology. <http://www.obofoundry.org/ontology/iao.html>
15. Bandrowski, et. al., Ontology for Biomedical Invest. <https://doi.org/10.1371/journal.pone.0154556>
16. Software Ontology. <http://www.obofoundry.org/ontology/swo.html>
17. Eagle-i Resource Ontology. <http://www.obofoundry.org/ontology/ero.html>
18. Faceted Application of Subject Terminology. <http://bit.ly/2N06b7z>
19. Simple Knowledge Organization System. <https://www.w3.org/2004/02/skos>
20. Basic Formal Ontology. <http://www.obofoundry.org/ontology/bfo.htm>

Interested? Have ideas for ontology to represent scholarship? All are welcome at the VIVO Ontology Interest Group. See <http://bit.ly/vivo-oig>