

Taming semantic disconnects in the educational information landscape

Kennisnet uses TopBraid Enterprise Data Governance–Vocabulary Management (EDG–VM) to facilitate semantic mapping across key educational information standards

“*Today, organizations in every industry, including Education, are challenged to achieve critical information integration across data silos. Use of standards makes it easier for us to share data within the context of a specific process. However, individual data standards are typically narrowly focused and do not facilitate a “360 degree integrated view” of diverse information. TopBraid EDG–VM is helping us to address this challenge by enabling Kennisnet to make significant progress toward our goals –where all kinds of systems are integrated and all information needed for delivering education tailored to an individual student is available to everyone.*”

— **Jeroen Hamers, standardisation expert, Kennisnet/Edustandaard**

PRODUCTS USED

TopBraid Enterprise Data Governance–Vocabulary Management (EDG–VM) is a flexible, web-based system for managing semantic information models. It enables business stakeholders to collaborate on defining and linking enterprise vocabularies, taxonomies, thesauri and ontologies used for information integration, navigation and search. EDG–VM is also available as the Vocabulary Management package within the broader TopBraid Enterprise Data Governance solution.

relatively homogeneous yet adaptable set of concepts and concept schemes.

- EDG–VM’s easy customizable interface provide all that is needed to keep track of all changes and background information needed for proper governance.
- Customizable reports enable efficient maintenance of the ever-growing web of interrelated concepts and matching resources.
- Using TopQuadrant’s SPARQL Web Pages (SWP) and SPARQL Inferencing Notation (SPIN) technologies, Kennisnet, supported by Taxonic, is able to create tailored viewers for various stakeholders that show relations between standards, e.g., by displaying related concepts and definitions side by side.

BENEFITS

- By choosing EDG–VM, Kennisnet is now able to transform and map a number of so-called semantic sources (XSD’s, VDEX’s, CSV’s etc. and also non-machine readable sources), thus creating a

Background on Kennisnet

Kennisnet (Knowledge Net) is a Dutch public (semi-governmental) organization dedicated to innovation for primary and secondary education and vocational training. Kennisnet provides educational content and information to teachers, pupils and parents. It also stimulates the use of information technology in educational processes by providing technical and practical support for several innovative educational aids.

Challenges

In 2014, a special Dutch government task force established that educational institutions and other education-related organizations in the Netherlands should work towards a common information management approach. These organizations, however, use a variety of standards for the information they produce and receive, for example: (see *Figure 1 for a legend that describes each of the respective standards*).

- learning material (e.g. learning goals, learning levels and subjects described using metadata standards like NL LOM¹)
- learning results (described using standards such as UWLR², QTI³, SCORM⁴ and others)
- student files that are exchanged when a student switches schools (described, depending on the schools involved, using different application profiles of OSO⁵).

Overlap frequently occurs in these information specifications. For example, the information element “level” (as in the level of a course or training, or level of proficiency attained by a student) occurs under different names in all the above specifications — sometimes meaning exactly the same, sometimes meaning the same but with a different scaling metric implied, and sometimes meaning something slightly (or completely) different.



TopQuadrant helps organizations succeed in data governance. Its flagship product, TopBraid EDG, delivers easy and meaningful access for all data stakeholders to enterprise metadata, business terms, reference data, data and application catalogs, data lineage, requirements, policies, and processes. TopBraid Enterprise Data Governance–Vocabulary Management (EDG–VM) supports business stakeholders who need to collaborate on defining and linking enterprise taxonomies, ontologies and thesauri. They use these to improve search, enhance content navigation and align the meaning of data across data sources.

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Ask us about scheduling a demo to explore how TopBraid EDG–VM meets your specific requirements.

Legend of Educational Information Standards

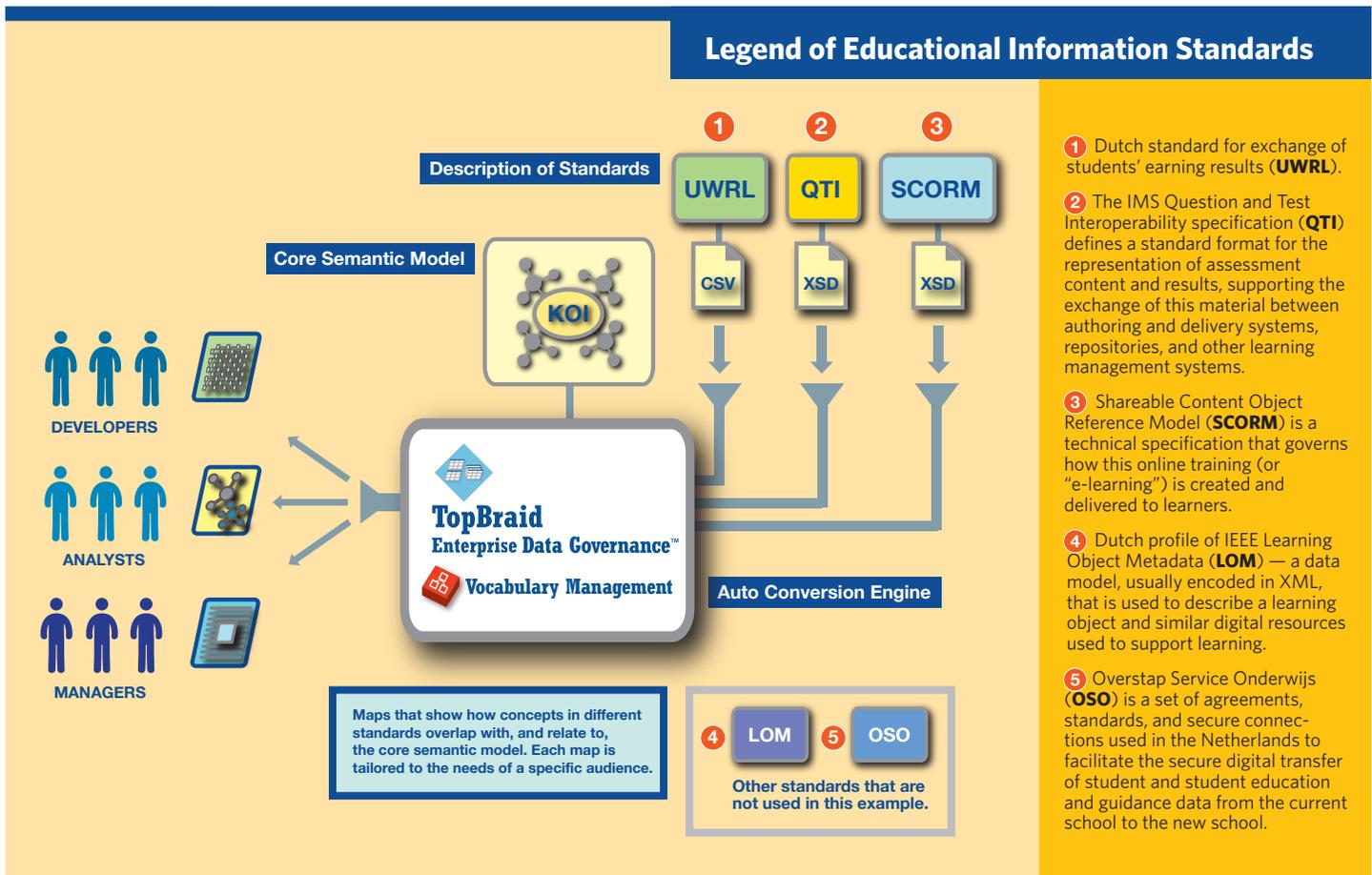


Figure 1: TopBraid EDG-VM prospective standards

Increasingly, organizations need to provide a combined overview of the education information. For instance, combining learning goals in a curriculum and the average progress that a group of students has made in a specific period. This means that information models defined by different standards need to come together. However, due to the problems described above bringing information together proven to be very difficult.

Solution

After a few test cases it became clear that aligning semantics of information described using different standards required a combination of tools, methods and experts. Kennisnet decided to use TopBraid EDG-VM to maintain business vocabularies that explain all the concepts in the relevant standards and to provide tools for the users who need to decide how to bring information together.

In 2016, Kennisnet developed and deployed a knowledge base that explains and aligns concepts in the multitude of standards used to create and share education-related information. To accomplish this, XSDs and other technical artifacts from the relevant standards were imported into TopBraid EDG-VM to create vocabularies of business concepts. The business concepts were enriched by adding information about what they mean (i.e., definitions, descriptions) and by adding relations to other concepts — either in the same or a different standard. The individual elements from each standard were linked to the business concepts.

Specialized browsers of the knowledge base visualize relations in a tabular way, so that users needing to compare two standards, can easily get an overview of concepts that are unique to each standard and concepts that occur in both, and for the latter category, see if they mean the same thing in each case or not.

Kennisnet then offered the core semantic-model (KOI), as part of the reference architecture for education (ROSA), to Edustandard for continuing governance. Edustandard is a standardization board that brings together all parties in the field of education to make agreements. These agreements include, for example, finding digital learning material through established concepts, or transferring student data from one system to another.

Kennisnet provides additional support to help all involved organizations in their combined effort to create what they have come to call a semantic landscape for education.

Results

The ability to create customized viewers on data structures of different shapes and sizes has enabled Kennisnet to support semantic discussions about the use and possible further development of information standards used in educational software. The introduction of those customized viewers increased the awareness of overlap and differences between the semantics of separately developed standards. This awareness boosted the demand for even more insight on semantic relations between concepts used in educational context. Information about students, for instance, is currently exchanged using at least six different specifications for several different processes. One of these specifications specifically addresses privacy issues. By relating the concepts used in the different specifications, we instantly created a shortcut for the privacy discussions. Going forward, we anticipate creating such shortcut mappings as they are needed for the other specifications.