

Wikiwijs: Using OER as Driver for Maturation

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Wikiwijs, a Nation-wide Initiative on OER

Wikiwijs was designed as an environment in which all teachers of the Netherlands, ranging from primary education to higher education, can (co-) develop, share, rework and use digital learning materials, published under an open licence. On December 14, 2009, the Minister of Education of the Netherlands, Ronald Plasterk, launched the first version of Wikiwijs.

Digital learning materials are more than digital textbooks. The site and community are designed to support a variety of educational materials including tests, labs, simulations and practice materials.

One main principle of Wikiwijs is using the “wisdom of the crowds” (Wikipedia 2012). Therefore, Wikiwijs should become “for, from and by teachers.” As soon as possible, they must feel ownership of Wikiwijs, its content and functionality. This feeling of ownership is considered the most critical success factor for Wikiwijs.

Although Wikiwijs is seen to be for, from and by teachers, other potential target groups for contributing to Wikiwijs are not excluded. Potentially interested groups could be, among others, former teachers, students, parents, teacher trainers and scientists.

A second main principle of Wikiwijs is that the learning materials should be openly accessible. “Open” in this context refers to the four rights a user of the learning materials has: re-use as-is; redistribute; rework; and remix with other open learning materials (Wiley 2007). This was in line with the advice of the Educational Council of the Netherlands (the counselling body of the Dutch Government) in 2008. They published the result of research they had conducted on the use of digital learning materials in the Netherlands. Their conclusions focused on the use of *open* learning materials because, in their opinion, this has the most impact on innovation in education using digital learning materials.

This conclusion was motivated by the freedom to rework and/or remix openly licensed content and applications for use in a wide variety of contexts. These characteristics give teachers the possibility to arrange and create their own lesson content, thereby directly affecting the core of education.

Some policy goals to which Wikiwijs has to contribute pertain to the quality and accessibility of education. Wikiwijs is expected to efficiently support and help create more flexible learning paths and support the professional upgrading of teachers. The availability of open learning materials will be a necessary pre-condition to reach this.

More information about Wikiwijs can be found in Schuwer and Mulder (2009).

Infrastructure as a Prerequisite for Wikiwijs

Before the launch of Wikiwijs, several components of a national infrastructure already existed. The components that Wikiwijs made use of were:

- a national standard for labelling learning materials with metadata; and
- a harvester of metadata for learning materials gathered into several collections that can be accessed through the Internet.

A third component at the start of Wikiwijs, was the use of learning trajectories for structuring learning materials. Each of the components is described below.

Two Dutch organisations play an important role in the remainder of this paper. For primary, secondary and vocational education, Kennisnet is a public knowledge centre providing independent advice and services to support and inspire educational institutions in the effective use of information and communications technology (ICT) in continued improvement in the quality of learning (<http://about.kennisnet.nl>). For higher education, SURF is the collaborative organisation for higher education institutions and research institutes in the Netherlands (www.surf.nl/en/oversurf/Pages/Introductie.aspx), aimed at breakthrough innovations in ICT.

Standard for Metadata

In 2003, a metadata application profile (LoreLOM) for learning materials in Higher Education was formulated (<http://wiki.surffoundation.nl/display/standards/LORElom>). This was followed by another application profile for primary, secondary and vocational education in 2006, called the *Content ZoekProfiel* (Content Search Profile; <http://standaarden.wiki.kennisnet.nl/Content-zoekprofiel>). Both were application profiles based on the IEEE LOM (Learning Object Metadata) standard (<http://ltsc.ieee.org/wg12/>). A body, *Edustandaard*, was created to manage the profiles and co-ordinate further developments. The metadata profiles consisted of conventions on:

- mandatory, recommended or voluntary fields;
- lists of values (vocabularies) to choose from for several fields; and
- the type of data to fill in and constraints on it (e.g., maximum number of characters) when no vocabulary is attached to a field.

The vocabularies for the *ContentZoekProfiel* (CZP) are in machine-readable format, accessible from a central database (www.edustandaard.nl/vocabulaires/vb).

Harvester for Metadata

Having a metadata standard and profile makes it possible to encourage owners of collections with digital learning materials to describe their materials according to common standards. When the descriptions of all collections are accumulated, this will result in an extensive list of descriptions, which can be used to search for learning materials. This accumulation is done by a harvester. Already in 1997, MERLOT (<http://taste.merlot.org/howmerlotstarted.html>) started developing and implementing a harvester to unlock several collections with learning objects. Another Canadian initiative, LORNet (www.lornet.ca/), started in 2003, consisted of many research activities around digital learning materials. Among them was the development of a harvester to collect metadata from collections from the partner institutions.

These existing harvesters were not suited for use in the Netherlands because they were not targeted at content for primary and secondary education or at learning materials in the Dutch language, and they did not adhere to the CZP or LORENet metadata profile. Therefore, both Kennisnet and SURF decided to start development of a dedicated harvester for the Dutch educational field.

Kennisnet started their service Edurep as a proof of concept in 2007. Edurep is a harvester for metadata from learning materials, residing in collections and described in accordance with the CZP profile. About 15 organisations with a collection of learning materials received grants to add metadata to their learning materials and to provide a technical interface based on the open OAI-PMH protocol (Open Archives Initiative Protocol for Metadata Harvesting). This interface makes it possible for Edurep to harvest the metadata periodically and add it to a central metadata repository. During the same period, SURF started to implement LORENet. LORENet was also a proof of concept for a harvester, aimed at cataloguing learning materials in higher education, to which metadata compliant with the LoreLOM profile was added. About 15 collections were connected to LORENet, also using an OAI-PMH target.

Learning Trajectories

The Netherlands government has formulated learning goals to be reached for primary and secondary education. Secondary education in the Netherlands has three levels, with each level divided into two sub-levels (the first two or three years and the second two or three years). At the end of the second sub-level, each student has the option to take a national exam in order to graduate. For secondary education, the learning goals are formulated for each subject, level and sub-level.

The learning goals are formulated on a high level. This level is too high to be workable for a teacher or a group of teachers who want to develop learning materials aimed at covering the whole or part of the learning goals. It is at this point that commercial publishers bring in a lot of experience in developing curriculum plans (applying the high level learning goals of the government) and realising this in a teaching method. Teachers who are using these methods can be certain that their students have covered all subjects of the curriculum sufficiently. Therefore, commercial textbooks are *the* guide for the majority of teachers in the Netherlands.

The disadvantage is that these methods are in most cases not tailored to specific target groups (e.g., children with dyslexia) and specific situations (e.g., a school with a high percentage of allochthon children). Furthermore, actual events are not covered, because most of the teaching methods are fixed in non-digital textbooks that need to last for several years. These disadvantages are only partly solved by the publishers with their offering of access to digital learning materials, in addition to the printed textbooks.

A possible answer to these problems is to structure a set of learning materials according to “learning trajectories.” According to Strijker (2010), “A learning trajectory is a rationalized composition of learning objectives and subjects, leading to a specific learning goal.”

Around 2005, several experiments were initiated to develop (open) learning trajectories. The goals of these experiments were to get more insight into how learning trajectories might be visualised, to experience problems and to develop solutions to these problems. A specific goal was to get more insight into continuous learning trajectories for more easily making the transition between the sectors (e.g., primary to secondary education). In most of the experiments, SLO (the institute for curriculum development in the Netherlands) was involved (www.slo.nl/organisatie/international/). The Ministry of Education, being the principal lead in the development of Wikiwijs, ordered that working with learning trajectories should be one of the functions available in Wikiwijs.

Acceleration of Infrastructure Development

Development of Wikiwijs started in August 2009. It was decided to use the aforementioned components of the infrastructure. Technically, it was not the aim to create one large Wikiwijs repository, but to provide an interface in which users could search for learning materials residing elsewhere (i.e., a portal function). This first version of Wikiwijs was not aimed at providing services for higher education.

Because of the time constraints, it was not possible to realise this. The consequences of the development of Wikiwijs on the maturation of each of the components of the infrastructure are described in the next section.

Consequences of the Metadata Standard

Together, the announcement of Wikiwijs at the end of 2008 to create a platform for all educational sectors, the decision to use the harvesters that were already available, and the promise of continuous learning trajectories seemed to offer an easy transition among the different sectors. This led to the insight that a single metadata standard for all educational sectors was necessary to make this realisable within Wikiwijs. Kennisnet and SURF therefore started a project to come to one overall standard for metadata profiling, to replace the current profiles, CZP and LORELom.

Version 1 of this new profile, NL-LOM, was published in June 2010, followed by a slightly altered version (1.01) in July 2011. This profile was implemented in the harvesters and Wikiwijs, and became available in October 2011. The NL-LOM is set up in such a way that metadata previously described in collections and implemented using one of the previous profiles do not need to be changed in order to comply with the new standard.

Consequences for Harvesting

Already during the test phase for the first version of Wikiwijs, it became clear that the harvester Edurep could not handle the expected growth in demand. The technical architecture was not scalable, mainly because the initiative was set up only as a proof of concept. Furthermore, after the launch of Wikiwijs, the quality of the metadata harvested turned out to be insufficient. This resulted in many complaints by the users of Wikiwijs. Two types of actions were undertaken. First, Edurep was redesigned and rebuilt to be able to handle large amounts of concurrent access. Also, collection organisers were encouraged and supported to improve their metadata. The latter activity was a joint effort of Edurep and Wikiwijs and it is still running.

For teachers, the overarching complaint was that adding metadata to learning materials was a tedious job, impeding them in their desire to share their learning materials. In response, the team started to redevelop Edurep. The automatic insertion of metadata and the combination of different sources of metadata were two of the functions being developed. By early 2012, this functionality became available for users of Wikiwijs. This now makes it possible to add additional metadata to learning materials. This is useful, for example, to describe experiences of the use of content and applications in specific contexts.

And lastly, both harvesters Edurep and LORENet are being combined into one virtual harvester. This makes it possible to search for content across the boundaries of different sectors, including higher education. Also, a smaller harvester targeted on “green education” is integrated into Edurep. Currently Edurep is one of the largest European harvesters in terms of the number of learning objects it can access (>750,000).

Consequences for Learning Trajectories

The Dutch Ministry of Education demanded that Wikiwijs provide an opinion on what structuring learning materials using learning trajectories actually meant, and how it could be implemented. In the same period, because of the launch of Wikiwijs, the ministry became aware that learning trajectories could offer many advantages to teachers looking for more than just materials for a single lesson.

As a result, several initiatives were started, both by Wikiwijs and by other organisations such as SLO and Kennisnet. These initiatives led to adaptations on the CZP metadata profile (transferred to the current NL-LOM standard) and the development of standard vocabularies to describe the learning materials available in a learning trajectory. Currently, the metadata for learning trajectories are seen to be essential to bridge the gap between open and closed learning materials. According to Blockhuis et al. (2011), 85 per cent of teachers in primary and secondary education use commercial products as the main source of content for their teaching. Most of them look for alternative learning materials to replace small parts of these products (e.g., a paragraph). By labelling these commercial products and open learning materials with the same metadata for learning trajectories, appropriate learning materials for a given part of the content can be found (covering the same learning goals and treating the same subjects). In the fall of 2011, experiments with this application of learning trajectory metadata were initiated.

Conclusion

When the idea of Wikiwijs was launched, it was not immediately clear the influences it could have on components of an infrastructure already available. Wikiwijs accelerated the development of the infrastructure, both direct (in the case of the learning trajectories) and indirect. Because of Wikiwijs, the use of and interest in (open) learning materials increased and led to greater demand on the infrastructure. In other words: the elements discussed reached a mature level, influenced by the demands Wikiwijs had put on them.

Of course, this is only a means to reach an important target for Wikiwijs: realising growth in using, developing and sharing open learning materials. Several research efforts are underway that should provide more insight into the influence of Wikiwijs on the motivation of teachers to use digital learning materials (Van Acker et al. 2011; Vermeulen et al. 2012).

It is too early to have hard evidence on the direct influence of Wikiwijs. Indirect evidence that Wikiwijs has a growing influence on the creation and use of digital learning materials is provided by several quantitative measures. Table 12.1 summarises for 2010, 2011 and 2012 (estimated) the development in number of uploads to the Wikiwijs repository, the number of downloads from Wikiwijs, the number of visits, and the number of remixes assembled with the remix tool of Wikiwijs. The numbers for 2012 are an estimate, based on the results until June. All figures are per year.

Table 12.1: Development in use of Wikiwijs, 2010 to 2012

	No. uploads	No. downloads	No. visits	No. remixes
2010	488	140,000	222,209	75
2011	806	345,000	345,241	425
2012 (est.)	1,800	500,000	365,000	750

Currently, 40 open learning trajectories are being made available through Wikiwijs. From 532 external websites (mostly virtual learning environments [VLEs]), more than 28,000 links to learning materials can be found available in Wikiwijs.

From this experience in the last two years, the following lessons can be learned:

- Having an infrastructure as described accelerates development of a national platform like Wikiwijs. (In fact, one can even question the feasibility of such a platform without there being such an infrastructure.)
- Parallel improvements in the infrastructure are required if delays in development of a platform like Wikiwijs are to be avoided.
- In other projects working at improving their infrastructure, Wikiwijs is an important stakeholder but not a participant. The infrastructure can also be used for other activities, and the organisations responsible for the components of the infrastructure have to balance the demands of Wikiwijs with those of the other stakeholders. In cases of delay, Wikiwijs is not able to influence this.

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