

EDULOD

An Education and Community Platform for Linked Open Data

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Summary

The Swiss Open Government Strategy 2014-2018¹ aims at fostering the development of the information society by making official data available to the public in machine-readable and open formats for free use. Switzerland thus follows the general trend that more and more datasets become public as so-called Open Data and can be retrieved via dedicated Web pages, e.g., for Open Data from Switzerland², the UK³, or the EU⁴. Obviously, the benefits of Open Data depend crucially on the ability of people to actually make use of this data, e.g., for specific data analysis⁵ such as neighborhood statistics or visualization of tax expenditures. From a technical point of view and according to Tim Berners-Lee⁶, the best data format for publishing Open Data is Linked Data⁷. Unfortunately, learning the appropriate technical skills for working with Linked Open Data (LOD) requires significant efforts, and the major benefits of Linked Open Data are only available when mastering several of the underlying technologies.

The EDULOD project will therefore develop and provide an online platform that facilitates teaching and learning the skills required to use LOD. While students now typically have to learn various data formats, programming languages, interfaces and tools before they can write applications accessing the data, EDULOD will offer an easy way to quickly get started with LOD and be able to write the first applications. A unified development experience and a set of exercises, examples, and tutorials of increasing complexity will allow students to get acquainted with the relevant technologies and standards. Through EDULOD, Students will acquire general background knowledge on LOD such as the relevance of so-called five-star Open Data⁸, get to know the relevant data model RDF⁹ and data formats such as Turtle¹⁰, investigate methods to integrate data from different sources, and learn how to query and visualize LOD.

EDULOD aims to attract not only Computer Science students that use the platform in their courses, but also students and scientists doing research in different data-centric application domains, including sociology, economy, as well as environmental and medical sciences.

¹ <https://www.admin.ch/opc/de/federal-gazette/2014/3493.pdf>

² <http://data.admin.ch/>

³ <https://data.gov.uk/>

⁴ <https://open-data.europa.eu/en/data>

⁵ <https://data.gov.uk/apps>

⁶ <http://www.w3.org/DesignIssues/Semantic.html>

⁷ <http://www.w3.org/standards/semanticweb/data>

⁸ <http://5stardata.info>

⁹ <http://www.w3.org/RDF/>

¹⁰ <http://www.w3.org/TR/turtle/>

Project Outline

Open Data goes beyond the transparency principle in that the data is not just provided to an interested party on request but is readily available via a digital self-service infrastructure. The goal is not only to improve the transparency of the governments and its institutions but also to enable the creation of added value and of innovative business models and services. In addition to governmental data, scientific data such as medical data¹¹ and general data of interest such as Wikipedia content¹² is already available as Linked Open Data. It is foreseeable that the amount of available data sets will continue to grow rapidly as argued, e.g., by a Deloitte Analytics report¹³.

Naturally, the benefits of Open Data depend crucially on the ability of people ability to use the data. At the Institute for ICT-Based Management at the Bern University of Applied Sciences, we have identified a clear lack of tools facilitating the teaching of the skills required for working with LOD: Traditionally, students need to acquire deep technical knowledge about several data formats, tools (e.g., for modeling, storing, and integrating data), languages for querying data (e.g., SPARQL) and implementing applications (e.g., Java and JavaScript). For this, typically at least one dedicated and highly specialized course for Computer Science students on a bachelor or even master level is necessary (4-6 hours per week). Representative courses are offered, e.g., by the University of Innsbruck¹⁵ or the Wright State University¹⁶. For Computer Science students who lack (or do not want to invest) the necessary time budget or for students from other disciplines, this hurdle often proves too much. Consequently, the number of students and consequently professionals with LOD skills is rather small on the one hand. On the other hand, not many universities offer the required courses.

EDULOD addresses this gap: It will provide an integrated, education-oriented platform where students can learn about Open Data technologies and at the same time explore them by means of simple, self-developed Open Data applications that can be tested and improved incrementally. Thus, EDULOD will offer general documentation, walkthrough tutorials, and a selection of tools and implementation resources (i.e., libraries and code samples). Furthermore, EDULOD will be an online community where students, teachers, and other interested persons can make experiments and share code, data, success stories and questions. For this purposes, we will also prepare several self-contained sample applications that illustrate different technical aspects with increasing complexity. The platform that can therefore be used both in traditional courses, blended learning settings, as well as for self-learning contexts. EDULOD thus aims at being a facilitator for education, technology adoption, and further research in the technological as well as in data-related fields of study.

The idea for such an integrated and Web-based learning environment is inspired by similar and very popular offerings for other Web technologies such as the w3schools¹⁷ for Web basics or jsFiddle¹⁸ for JavaScript.

¹¹ <http://www.w3.org/wiki/TaskForces/CommunityProjects/LinkingOpenData/DataSets>

¹² <http://wiki.dbpedia.org/>

¹³ <http://www2.deloitte.com/content/dam/Deloitte/uk/Documents/deloitte-analytics/open-data-driving-growth-ingenuity-and-innovation.pdf>

¹⁵ <http://www.sti-innsbruck.at/teaching/curriculum/semantic-web>

¹⁶ <http://www.semantic-web-book.org/page/KR4SW-12>

¹⁷ <http://w3schools.com/>

The project is significant as it fills a gap in the available teaching tools and as it provides an essential complement to the governmental Open Data strategy, by facilitating dissemination of applications of the data and ensuring the required skills of tomorrow's professionals. While the primary addressees are in the field of Computer Science, its low-level entry architecture and its link to interesting data from relevant sources shall also invite researchers and students in other fields to use the platform for building their own application, or for using the applications built by others. It is thus our hope that EDULOD will provide a place for interdisciplinary collaboration.

As a first step, the resulting EDULOD platform and sample applications will be used for educating Computer Science students at the BFH (Bachelor Computer Science and Medical Informatics¹⁹) during the regular course on databases. Traditionally, this course is focused on relational databases and has a very tight schedule that does not allow to address Open Data-related topics with the currently required depth. In contrast, EDULOD will allow us to quickly introduce the technological background and get students started for first applications. We further plan to showcase the project results to other Swiss universities as well as to the general public via events such as the Open Data Hackdays²⁰.

Work Plan

The project shall follow agile methodologies and build the software and its associated documentation and usage examples incrementally. The duration of the funded development is 9 months and includes different evaluation and dissemination activities towards the end of the project. The work will be carried out by BFH's research staff member Reto Gmür with a constant work load of 50% for the purpose of the project. The set goals and timeframe are ambitious but given the provided expertise realistic.

After the project's proposed ending date, the software will be mature enough so that platform can be used for teaching on a regular basis and provides a unified and well-documented usage experience to other interested users. All sources developed within the project will be released as open source under an Apache 2.0 license²¹. Based on our experiences with related open source projects²², we hope for a growing community that will ensure the ongoing development of the platform so that EDULOD stays up to date when for example new libraries are being released.

¹⁸ <http://jsfiddle.net/>

¹⁹ <http://www.ti.bfh.ch/en/bachelor.html>

²⁰ <http://make.opendata.ch/>

²¹ <http://www.apache.org/licenses/LICENSE-2.0>

²² <https://clerezza.apache.org/>

Below we give a release plan for the project including the expected outcomes for each release.

2016-03-01: Start of the project

2016-04-01: Release 1

- Website describing the project's goals
- Code repository
- First prototype version allowing for simple applications on a chosen dataset.
- Documentation: the basic structure of the usage manual that will be completed with every iteration.

2016-05-01: Release 2

- Identify suitable datasets for example use cases.
- Describe example applications.
- Extend EDULOD to support more datasets.
- Provide 3 example applications running on EDULOD.
- Survey of libraries that are likely candidate to be used for browser-based LOD applications.

2016-07-01: Release 3

- Applications built on EDULOD can be shared via a unique URL.
- Applications can be modified, the modified versions becomes a new Application with a new URL.
- Articles describing EDULOD on blogs to announce the open source project.

2016-10-01: Release 4

- Applications visualizing data using libraries like D3²³ run on EDULOD.
- Growing list of preconfigured data sources.
- A tutorial complements the usage manual giving step by step instruction on how to get started with EDULOD.

2016-12-01: Release 5

- The UI design is finalized to harmonize the front-end of the various features.
- As a complement to the tutorial EDULOD is presented with a screencast.
- Evaluation of the platform within a course for Computer Science and Medical Informatics students at the BFH.
- EDULOD is presented to other Swiss universities.
- A press release as well as articles for relevant blogs and websites publicize EDULOD.

²³ <http://d3js.org/>