Making Germanic Cultural Heritage accessible to students: a proposal for a case study

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ABSTRACT (ENGLISH)

This poster presents a proposal for a case study involving two User Interfaces (UIs) that present Italian and Germanic Cultural Heritage (CH) to a diversified audience. More specifically, this proposal is designed to be applied with students of Germanic Philology and Linguistics and shows how the two UIs can be employed to investigate and visualize data about Germanic CH in Italy in an accessible way. **Keywords:** Linked Open Data; Semantic Web; Aggregators; FAIR data; Germanic Philology.

ABSTRACT (ITALIANO)

Rendere il patrimonio culturale accessibile alle e agli studenti: una proposta per un caso di studio. Questo poster presenta una proposta per un caso di studio che coinvolge due interfacce utenti che presentano il patrimonio culturale italiano e di origine germanica a un pubblico diversificato. Più nello specifico, questa proposta è pensata per essere messa in pratica con studenti e studentesse di Filologia e linguistica germanica e mostra come le due interfacce possano essere usate per indagare e visualizzare dati sul patrimonio culturale germanico in Italia in modo accessibile.

Parole chiave: Linked Open Data; web semantico; aggregatori; dati FAIR; Filologia Germanica.

1. INTRODUCTION

The aim of this poster is to present a proposal for a case study involving two UIs that collect Germanic and Italian Cultural Heritage resources and make them accessible to a diversified audience. In the present contribution, the sense of the keyword accessibility is understood as spelled out in the FAIR acronym: the resources presented in the two UIs involved in the case study are appropriately identified through hyperlinks; they are described through standard metadata and are open. Moreover, we understand accessibility also as presenting data to a non-expert audience, according to the Faro Convention.¹ Opening data to a non-expert audience is a first step in making data more inclusive and democratic; this step is aided and supported by the digital paradigm, which provides the good practices at the basis of the present proposal for a case study.

In Section 2, we will present the two UIs, and in Section 3 we will present a proposal for a case study consisting in the application of the two UIs in a didactic environment. Section 4 concludes the contribution.

2. THE CHIt AND ONTOVE-SAMPO UIs

Both UIs were developed by reusing existing tools and models and aggregate resources found in different online repositories through the same platform. The projects behind the two UIs presented are respectively CHIt "Cultural Heritage of Italy" and OntoVE "Ontologies for the description of Germanic Cultural Heritage in Veneto within the perspective of the European Open Science Cloud (EOSC)".

Both UIs adhere to the FAIR principles (Wilkinson et al. 2016); in particular, they exploit already existing resources and make CH Findable and Accessible. Moreover, the resources are interoperable and can dialogue with national and international similar initiatives. The two UIs were developed independently of each other, but the CHIt interface moreover presents a subset of OntoVE data through a dedicated thematic path,² referred to here as CHIt-OntoVE. Given the fact that both projects reuse open-source tools and models, the workflow adopted in both, and the workflow that led to the creation of the CHIt-OntoVE thematic path, can be potentially applied to other domains of CH. In the following, we describe the two UIs

¹ <u>https://www.coe.int/en/web/culture-and-heritage/faro-convention</u>

² For the sake of simplicity, we call the path presenting the OntoVE data the CHIt-OntoVE thematic path. More precisely, the OntoVE data can be accessed both by selecting OntoVE as provider in the CHIt interface, and this is what we refer to as CHIt-OntoVE thematic path, and the OntoVE data will also be accessible through the thematic path aggregating Lombard and Gothic CH.

and the CHIt-OntoVE thematic path in particular, and briefly describe the main goals of the CHIt and OntoVE projects in order to contextualize the present contribution.

The CHIt project, Cultural Heritage of Italy, consists in the creation of an aggregator of CH items produced in Italy. The research behind the CHIt aggregator started from the observation that there does not seem to exist a common methodology in the creation of cultural Heritage aggregators (cf. for example Siqueira and Martins 2021 or Smith 2022). It would be beyond the scope of this contribution to discuss in depth previous research on aggregators, but it suffices to note that data aggregation and integration still offers some challenges in terms of reusability or interoperability of data, as different projects usually create their own workflow and models to aggregate and describe their data. One of the outcomes of the CHIt project is therefore the development of a methodology that can be replicated and applied to different domains of interest, especially because it reuses open-source tools and models.

CHIt reuses the Muruca framework (Aiola and Lombardo 2022), developed with a three-layer architecture comprising a backend, a middleware and a frontend. For the CHIt-UI, the Muruca source code was adapted to the specific goals of the projects. The digital objects retrieved by CHIt are already available on the web, but scattered on different websites. Muruca allows for their recovery and reorganization within a platform that makes them homogeneous and interoperable. The metadata of the resources are either stored in the backend by manual addition (for stand-alone projects and GitHub) or retrieved via API (for Europeana and Zenodo) or via a SPARQL query (for OntoVE) directly from the middleware. From the backend, the items are sent to the middleware, where the business logic runs. Once the metadata are all in this central layer, they are mapped according to an output schema that makes them interoperable. This schema adheres to the DCMI. The mapping of the metadata into a uniform format proved useful, among the other things, for the creation of thematic paths. In fact, these are created by aggregating resources according to e.g. the provenance of the data. Figure 1 shows how resources are aggregated from different providers, among them the OntoVE SPARQL Endpoint,³ mapped in the middleware and sent to visualization.



Figure 1. Aggregation of resources, mapping and visualization in CHIt

A further outcome of the project consists in the presentation of textual data to users, thanks to the addition of EVT3 (Cacioli et al. 2022) and the possibility for users to interact with the data. The CHIt interface is in fact enriched with the tool Pundit,⁴ a browser extension that allows to annotate and comment data, creating notebooks. This functionality is particularly relevant for the case study proposed, since it can be exploited by students to explore and annotate the data according to specific questions they need to answer and to cooperate, since notebooks can be shared among users.⁵

The CHIt-OntoVE thematic path collects a subset of data retrieved from the OntoVE Knowledge Base, namely archaeological findings produced by Germanic populations and related to the Veneto region (Figure 2); the data are displayed in the same way as the other resources aggregated through CHIt and can be annotated with Pundit. This thematic path enriches both projects, since it provides more data for the CHIt interface, and makes the OntoVE data comparable to the data collected in CHIt that have a similar origin but are found outside of Veneto. A further thematic path relevant for the present proposal collects Italian CH items of Lombard and Gothic origin.

³ The OntoVE SPARQL Endpoint is built with Apache-Jena-Fuseki (<u>https://jena.apache.org/documentation/fuseki2/</u>, last accessed April, 7th 2025) and can be found here: <u>http://ontove-endpoint.chitontove.it/</u>, last accessed April, 7th 2025. The Endpoint is only accessible with a username and a password, for security reasons. ⁴ <u>https://thepund.it/</u>, last accessed April 7th, 2025.

⁵ The CHIt interface can be explored through this link: <u>https://chit.chitontove.it/risorse</u>; the OntoVE-Sampo-UI can be retrieved here: <u>https://ontove-ui.chitontove.it/it/</u>. Last accessed April 7th, 2025.

The OntoVE UI reuses the Sampo Model (Ikkala et al. 2022, Rantala et al. 2023) and presents the OntoVE dataset through specific "User Perspectives" that have at their center different kinds of CH items and their properties, and make these properties searchable through dedicated filters. The main goal of the OntoVE project is the creation of a Knowledge Base that collects CH items produced by Germanic populations and related to Veneto; the dataset is therefore composed of historical artefacts of various nature (archaeological findings, sites such as castles, written documents). The items of the dataset are already present in different online repositories. The OntoVE project reuses different domain ontologies in order to devise an ontological description of the items comprising the dataset in order to answer different competency questions seeking to highlight the relationship between the Veneto region and the Germanic populations that transited through it. It is not the goal of this contribution to review the choices behind the models reused, but the reader can consult the OntoVE specification page for more information.⁶

Casteldardo struttura di fortificazione

Metadati	Provider	Ontove
	URI in the ontology	http://www.semanticweb.org/utente/ontologies/OntoVE#6a938d2f-1d0d-4634-b464- ab69d2006cf6
	Identifier in the ontology	0500591273
	Title	Casteldardo struttura di fortificazione
	Location	Trichiana
	Link to the original source	https://catalogo.beniculturali.it/detail/ArchaeologicalProperty/0500591273
	Geographical coordinates	https://www.geonames.org/3219557/trichiana.html
	Item bibliography	http://www.semanticweb.org/utente/ontologies/OntoVE#075db212-3a28-4e0F-abe9- 1f8ed5487775
	Full bibliography	https://catalogo.beniculturali.it/detail/ArchaeologicalProperty/0500591273
	Archaeological property in the ontology	http://www.semanticweb.org/utente/ontologies/OntoVE8d1d23b9b-a5bc-4e61-9ce2- 6b28bd1c5a2c

Figure 2. Visualization of one OntoVE resource through CHIt

This contribution focuses on the visualization of the OntoVE data. Whereas SPARQL is undoubtedly a very powerful way to query a Knowledge Base, the project also aims to offer different visualization outputs for users who do not have the relevant expertise.

To this end, two further visualization outputs are offered, namely the OntoVE-Sampo-UI and the thematic path provided by CHIt. The Sampo Model has been developed by the Semantic Computing Research Group (SeCo) at the Helsinki university; it is a reusable model, which has been tested on several Semantic portals built by the SeCo group. It allows to create portals on top of different RDF triplestores and is domain-agnostic. It provides different inspection tools, such as table-view, pie-charts or maps and allows users to select specific filters to further explore the data. The data are presented through so-called "search perspectives", i.e. aggregations of specific ontological classes and selected properties; at the basis of each search perspective lies a SPARQL query and a .json file with configurations for the filters to be visualized. The Sampo UI source code was reused in OntoVE to adapt it to the OntoVE dataset and seven search perspectives have been elaborated, each focusing on specific classes in the ontological modelling and related properties; at the moment, the OntoVE-Sampo-UI offers only table-view inspection and filtering function for the data, but we aim to implement it with interactive maps. For example, users can consult the Places perspective (Figure 3) and filter the texts produced by rulers of Germanic origin related to specific places in Veneto (or a historical administrative entity including Veneto). Instructions are provided on how to use the UI in a dedicated section and the portal is in English and Italian language.

⁶ The OntoVE specification can be consulted here: <u>https://w3id.org/ontove/ontology</u>, last accessed April 7th, 2025.

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Figure 3. The "Places" perspective in the OntoVE-Sampo-UI

As illustrated in this brief overview, the two UIs handle different datasets and offer different ways of interacting with the data. The CHIt interface presents Italian CH items retrieved from various providers and allow users to create (collaborative) notebooks. The resources can be filtered according to the provenance of the data, or the Cultural Scope they belong to and their metadata, including links to the original providers, are displayed following the DCMI module. CHIt moreover allows to visualize XML data thanks to EVT3.

The OntoVE UI is designed on top of an RDF triplestore; the data that can be visualized are only provided by the OntoVE Knowledge Base, and the resources are displayed through different perspectives that are inspired by the modelling of the data. In other words, heterogeneous data are first described within the OntoVE project in RDF format and the resulting graph is stored in the Apache-Jena-Fuseki SPARQL Endpoint. The OntoVE-UI then retrieves the data from the Endpoint and presents it through the designed search perspectives. The perspectives cater to audiences with different (research) questions. Users can select a perspective and filter the data, similarly to the CHIt frontend, and links to the original source for the metadata are provided, if users wish to know more about an object of specific interest. The filters and the data displayed all reflect the classes and properties of the OntoVE ontology. The OntoVE-Sampo-UI does not however allow to annotate the data and does not include text visualization. The two UIs are therefore different in terms of their design and in the way their data are aggregated and structured, but they both adhere to the FAIR principles and offer interoperable and reusable data.

3. CASE STUDY PROPOSAL

The two UIs presented above can be employed in order to make Germanic Cultural Heritage accessible to students of Germanic philology and linguistics at the BA level. Course programs and textbooks about Germanic philology usually discuss the Germanic populations of the Lombards and Goths and the impact they had in shaping Italian history and language (cf. Francovich-Onesti 2002, Saibene & Buzzoni 2006, Battaglia 2021, Zironi 2022). We propose an activity that would let students explore the relevant sources and the cultural heritage left by the Lombards in Italy through the use of CHIt, Pundit and OntoVE-Sampo-UI. As a first step, students are asked to find and annotate on a relevant collaborative notebook the documentary sources produced by the Lombards. This can be done by following the CHIt path about the Lombards and the Goths. By way of demonstration, Figure 4 shows the relevant findings for Lombard CH in Italy, while Figure 5 shows how students could annotate the information about the codices preserving the Edict of Rothari in a notebook. Students can add keywords previously individuated with the lecturer to describe their data appropriately.

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Figure 4. Lombard findings in the Lombard-Gothic thematic path in CHIt.

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Figure 5. Example of annotation on the entry for the Edict of Rothari.

As we mean to test this case study on the courses offered at the Ca' Foscari University of Venice, the students will then be asked to locate the relevant historical artefacts left by the Lombards in Veneto and mark the areas where these are found. Then, by reading the *Historia Langobardorum* by Paolo Diacono (Zanella 1991), they will have to annotate on their notebooks whether the areas where the artefacts are located correspond to the areas of Veneto mentioned in the *Historia*. The OntoVE data retrieved through CHIt (cf. Figure 2) can be annotated as illustrated for the Edict of Rothari in Figure 5. Students will then be asked to locate similar historical artefacts in areas outside of Veneto and annotate whether they present similarities or differences. Finally, by using the OntoVE-Sampo-UI students will consult the "Events" perspective and they will be asked to first individuate the relevant acts issued by Charlemagne after conquering the Lombard reign (Figure 6), and then filter the locations in Veneto mentioned in the documents through the Subject filter provided in the "Texts" perspective (Figure 7), comparing them again to the places mentioned in the *Historia*.

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Otto 3rd [7]				cession of immunity	Carlo Magno	Chiesa di Aquileia	Diplom		
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Figure 6. Filtering of events performed by Charlemagne in the "Events" perspective, OntoVE-Sampo-UI

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Figure 7. Visualization of the subjects contained in a selected single charter.

4. CONCLUSIONS AND FUTURE PERSPECTIVES

With this proposal, we have showed the potential of the CHIt and OntoVE-Sampo-UI for the inspection of Germanic CH by students. We argue that the two UIs presented let users visualize the information about CH items of their choice in an accessible way; since the original links to the resources retrieved through CHIt and described in OntoVE are provided, user can further broaden their research and visualize the information as provided in the original repository. The actual testing of the UIs and of the proposal with the students are left for future research. Despite the limited scope of the present proposal, our contribution shows how the OntoVE and CHIt resources can be easily retrieved, inspected and annotated in a collaborative way; especially through the CHIt interface and the CHIt-OntoVE thematic path, new activities for students can be devised. Moreover, we aim to add also the bibliographic data collected in OntoVE to the CHIt interface, to allow users to also annotate these data, and provide the OntoVE-Sampo-UI with maps, in order to offer a more dynamic visualization of the data. As far as the datasets are concerned, even though the OntoVE dataset is restricted to Germanic CH in Veneto, the OntoVE-Sampo-UI and the CHIt-OntoVE thematic path can be of interest to citizens and tourists willing to explore the history of the area. Finally, from the wider perspective of the methodology employed in both projects, we argue that the approaches to data aggregation, description and visualization can be applied to different CH domains, thus providing a shared, interoperable workflow and allowing to widen the pool of users interested in the UIs provided.

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⁷ PON, <u>http://www.ponricerca.gov.it/pon-ricerca/programme/</u>, last accessed April 7th, 2025.

⁸ ESF, <u>https://eur-lex.europa.eu/EN/legal-content/glossary/european-social-fund-esf.html</u>, last accessed April 7th, 2025.

⁹ REACT-EU, <u>https://www.europarl.europa.eu/factsheets/en/sheet/215/recovery-assistance-for-cohesion-and-the-territories-of-europe-react-eu-</u>, last accessed April 7th, 2025.

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