DaLiCo App

Author:
Ulrike Spree – HAW Hamburg

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

DaLiCo APP

PROJECT INFORMATION

PROJECT TITLE:
Data Literacy in Context

PROJECT ACRONYM:
DaLiCo

PROJECT NUMBER:
2019-1-DE01-KA203-005066

ERASMUS+ PROGRAMME:
KA2 Partnerships for Innovation and the Exchange of Good Practices

WEBSITE:
www.dalico.info

PARTNERS:

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

DaLiCo App

AUTHORS

Ulrike Spree (HAW Hamburg, Faculty of Design, Media, Information, Dept. Information)

CONTRIBUTORS

J. Alberto Conejero (Universitat Politècnica de València, Director of the Department of Applied Mathematics)
Christine Gläser (HAW Hamburg, Faculty of Design, Media, Information, Dept. Information)
José Luis Poza Lujan (Universitat Politècnica de València)
Judit Fazekas-Paragh (University of Debrecen and National Library, Head of Department at Education and Research Support Department)
Guido Ongena (Hogeschool Utrecht University of Applied Sciences)
Rüdiger Weißbach (HAW Hamburg, Faculty of Business & Social Sciences)

ABSTRACT

DaLiCo App is an integrated Web-application. It consists of a searchable collection of references of curated data literacy resources provided and regularly updated by the DaLiCo members. The resources are indexed with descriptors from a controlled vocabulary (DaLiCo Glossary) and assigned to categories from the DaLiCo Dimensions.

DATE: 31.10.2022

This document was written by partners of the "DaLiCo" project and is published as open educational resource. The project was funded through the European Commission. The content of this document exclusively reflects the opinions of the authors. The EU Commission and the National Agency at the DAAD assume no liability arising from the use of the information presented here.

Co-funded by the
Erasmus+ Programme
of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Contents

Introduction

The goal of IO1-The DaLiCo data literacy map (DaLiCo map) is to provide a survey of existing data literacy resources and activities with a focus on the four DaLiCo partners in order to make these resources discoverable and accessible. Included are physical and virtual infrastructure (like labs, digital libraries), resources (e-learning/hybrid modules or courses) and tools (DaLiCo Project Proposal 2019, p.81).

Development of the Output

The initial idea to provide a complete review and documentation of existing resources that could be relevant for selected aspects of data literacy was abandoned in favor of a focused and curated collection of data literacy resources recommended by the partners (for further details on the curation refer to IO1 Result Description Resources). The adjusted goal is to provide a curated collection of references for re-usable open educational resources, data literacy projects as well as experts for individual areas of data literacy education. As DaLiCo is also concerned with curriculum development in general (IO2 – Train-the-trainer, IO5 curriculum development) general resources on curriculum development like educational frameworks are also included.

With the aim of narrowing down the pre-understanding and the expectations of the partners of the field of data literacy the DaLiCo-team on the occasion of one of the regular international online meetings collected questions the DaLiCo map should answer and rated them according to importance. In the table below the questions that informed the concept of the DaLiCo App and the solutions we found to answer them are documented. In the last column we provide an assessment of the quality of the achievement (+++ - good, ++ - satisfactory, + - goal partially achieved)

Question	Solution	Goal achievement
	Collection of References	
What examples of good practice exist at the partner institutions? Where do I find (re-usable) teaching material on data literacy related topics at the partner institutions? What are strengths and specialisations in the field of data literacy education at the partner institutions? Where can I find useful resources on data literacy at the partner institutions? Where do I find (re-usable) teaching material on data literacy related topics at the partner institutions? Where can I find useful resources on data literacy at the partner institutions? Where can I find re-usable material for special domains? Where do I find tools related to data literacy tasks? Where can I get help on a specific data literacy task? Where can I find re-usable material focusing on special competencies?	Collection of references with free-text search, search for index terms from controlled vocabulary, filters for data literacy competencies, academic disciplines, organisational affiliation, document type, learning material	+++
Where can I find re-usable material for special domains?	filters for data literacy competencies and academic disciplines	+++

What examples of good practice exist at the partner institutions?	Filters for organisational affiliation. An explicit search for good practice is not possible	+
What are strengths and specialisations in the field of data literacy education at the partner institutions?	The collection gives an impression of the scope of information provided at the partner institutions however a full overview of strengths and weaknesses is not provided	+
What are relevant, innovative, prospective scenarios for data literacy?	The resources collected in the collection "Learning and Teaching material" can be browsed for inspiration	++
Where can find relevant standards and frameworks on data literacy, data management, data science, ...?	Collection of frameworks, standards and guidelines	+++
What are the top ten data literacy resources world-wide, in Spain, The Netherlands, Hungary, Germany?	The collection of bibliographies and resource collections grants an overview. It was found that the discussion of data literacy issues is rather international. A search for top ten national resources is not implemented.	++
What generic and specific competences do data literate university graduates need? How is data literacy reflected in European Competence frameworks (e.g. e-CF)?	Collection of frameworks, standards and guidelines	+
	DaLiCo Glossary and Dimensions	
What is the common understanding of Data Literacy shared by the partners? What distinguishes Data Science from Data Literacy?	Definitions and/or scope notes for key concepts as understood by DaLiCo Team and additional definitions from other communities.	+++
Which stakeholders use which definition of Data Literacy? Aims at identifying gaps between different understandings (for business, for higher education, the 'general' citizen, critical data literacy) What does data literacy mean in different contexts or disciplines?	Definitions and/or scope notes for key concepts as understood by DaLiCo Team and additional definitions from other communities. An ontology would be needed to systematically record and assign definitions and their stakeholders.	+
What are the main data literacy tasks?	The DaLiCo Dimensions and the mapping to other frameworks	+++
	Questions not considered for further work	
What data literacy related events are taking place at which institutions?	The idea to provide an up-to-date event calendar was soon ruled out as too labour-intensive and not very useful as only a small choice of events would be of interest to all partner universities.	0

Table 1: Questions DaLiCo map should answer

To allow for a simple and time-saving process for curating the resources we set up a collection at the cloud-based free and open-source reference management software Zotero. In a first step with the aim to quickly achieve a 'critical mass' of collected resources all partners were asked to enter suggestions for resources in our Zotero library. Based on the collected resources, it was possible to narrow down the final collection focus for DaLiCo References, to determine the document types of the curated resources and develop a metadata schema. We decided on collecting the following types of material:

Name of subcollection	Description	Example
1. Bibliographies – resource collections – research overviews	The collection includes general bibliographies, seminal works on data literacy that serve as kind of bibliographies, web-based link lists and repositories	Zhang, Yingting (2022). Research Guides: Data Literacy: Introduction." *Rutgers University Libraries*. https://libguides.rutgers.edu/data_literacy/introduction.
2. Learning and teaching materials on data literacy topics	Online accessible learning and teaching materials (preferably with an open licence) on data literacy competences	European Journalism Center and Google News initiative (2020). The Data Journalism Handbook 2. *DataJournalism.Com*. https://datajournalism.com/read/handbook/two.
3. Frameworks – standards - guidelines	Frameworks, standards and guidelines as well as bodies of knowledge (BOK) that support curriculum development (guidelines for processes, defining competencies and learning outcomes, national an international qualification frameworks).	Bellinga, Pim (2017). Creating a Curriculum to Help Civil Society Become More Data Literate. *Medium*, 20 Feb. 2017, https://medium.com/ihatestatistics/creating-a-curriculum-to-help-civil-society-become-more-data-literate-6b0649c0f31a.
4. Experts (from the partner institutions) who can be consulted on specific topics	List of experts in the field of data literacy	Ongena, Guido. *Profile: Guido Ongena Hogeschool Utrecht*. https://www.hu.nl/onderzoek/onderzoekers/guido-ongena. Accessed 17 Feb. 2022.
5. Projects and infrastructure facilities	Collection of projects and infrastructure facilities related to data literacy at the partner institutions	Gilanyi, Attila, et al. (2017) "Virtual Reality Laboratory - Virtual reconstruction of a medieval church." *Debreceni Egyetem*, http://ieeexplore.ieee.org/document/8268257/.
6. DaLiCo outcomes	All DaLiCo deliverables	DaLiCo Team (2022). *Course: DaLiCo - Data Literacy Learning Space*. https://viamint.haw-hamburg.de/course/view.php?id=271.

Table 2: Subcollections of DaLiCo References

The editorial team in Hamburg unified and supplemented the formal metadata.

Structure and Features

The DaLiCo Map consists of the following interconnected deliverables,

1. a glossary of data literacy terms (for details refer to IO1-Result Description DaLiCo Glossary,
2. a suggestion of a facetted structure for the description of data literacy competencies (for details refer to IO1-Result Description DaLiCo Dimensions)
3. a collection of literature references of useful data literacy resources assembled with the reference management software Zotero. The intellectual outcomes like teaching and learning materials developed during the DaLiCo in Context project are also made accessible via the collection. The resources are indexed with keywords from the DaLiCo Glossary and assigned to one or more facets from the DaLiCo Dimensions (described in this IO1-Result Description DaLiCo References).
4. The integrated tool DaLiCo App (described in this result description) makes the DaLiCo Map available online.

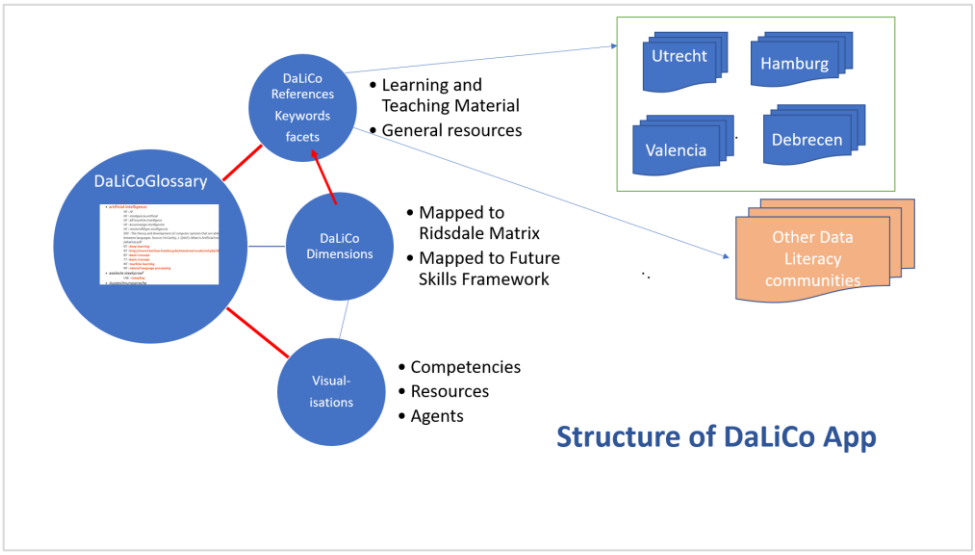

Figure 1: Components and structure of DaLiCo App

DaLiCo App is a searchable and browsable reference data base accessible via a web interface. The search can be accessed via a keyword search across the entire index or via the hierarchy structure of the DaLiCo Glossary. The actual user interface is shown in figure 2.

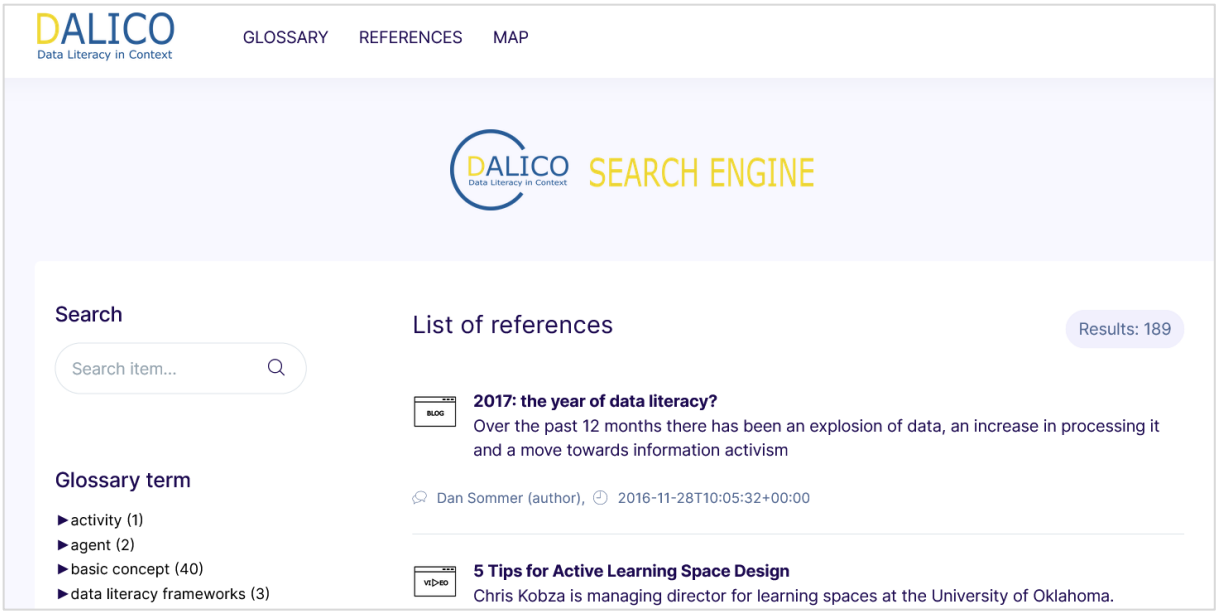

Figure 2: Prototype of DaLiCo App

The display of individual resources is limited to the basic metadata. Each resource is described by a short abstract that supports the decision whether the resource could be relevant.

Figure 3: Display of individual resource

The administration backend allows the easy update of the glossary terms via the API to the DaLiCo Glossary in Tematres as well as the update of the resource collection from Zotero.

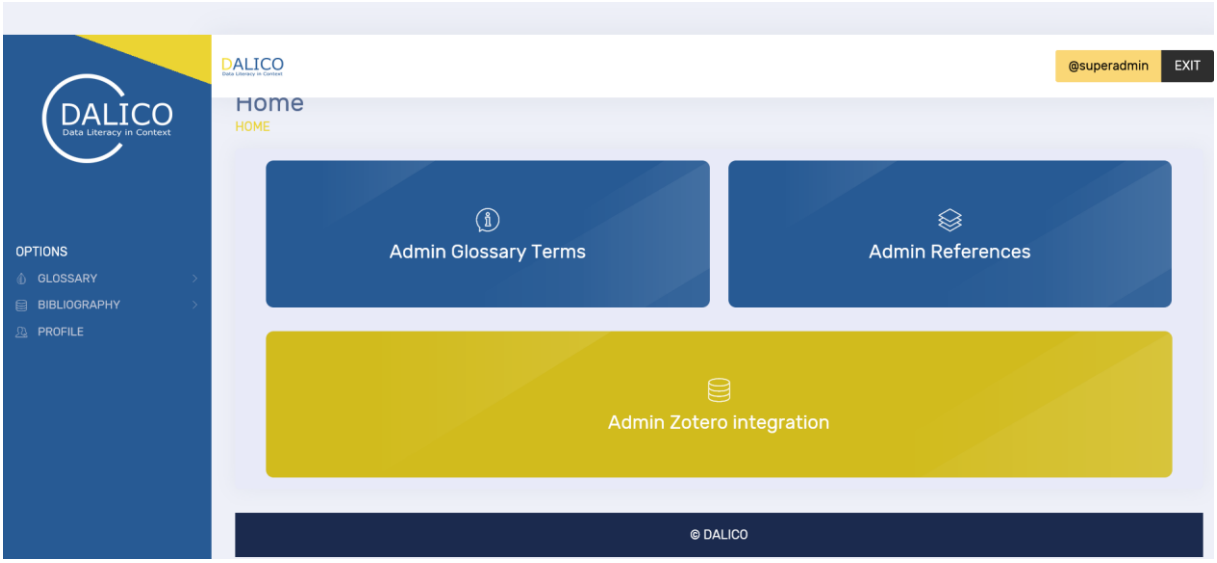

Figure 4: Administration Backend for DaLiCo App

Technical Documentation

The DaLiCo App was built using the MEAN framework to differentiate the frontend from the backend and allow the creation of interactive, efficient and well-organized web applications. It runs on a Linux infrastructure on cloud servers. The integrated technologies are the NoSQL database system MongoDB, ExpressJS, AngularJS and NodeJS.

Elements of an existing application (Valencia_UPV IGEM) were reused and the necessary parameterization implemented. This included updating the dependent libraries to ensure browser compatibility and preventing security vulnerabilities and implementing security validations in the queries. The existing DaLiCo website was used as a model for the development of the views in order to ensure a recognizable project appearance. An authentication token was used for integration with Zotero, so queries can be performed by using the application token, and web scraping functionalities were configured to process requests via API. API queries were performed in the same way for integration with the DaLiCo glossary. Since the API has no GETALL functionality, a script with up to four queries had to be configured to load information. Another complexity solved in the application is the tree structure with a tree with roots with different information terms.

Contrary to what was initially planned, the visualization of the data is not yet achieved in the form of maps, but via the navigable glossary. The integration of further visualizations, which will be generated from the data of the DaLiCo glossary that are available in the semantic format SKOS, is planned. Successful experiments have already been carried out (Figure 5). In addition, we are currently still working on the implementation of a visualization system based on the D3 library, which enables the dynamic creation of vector images.

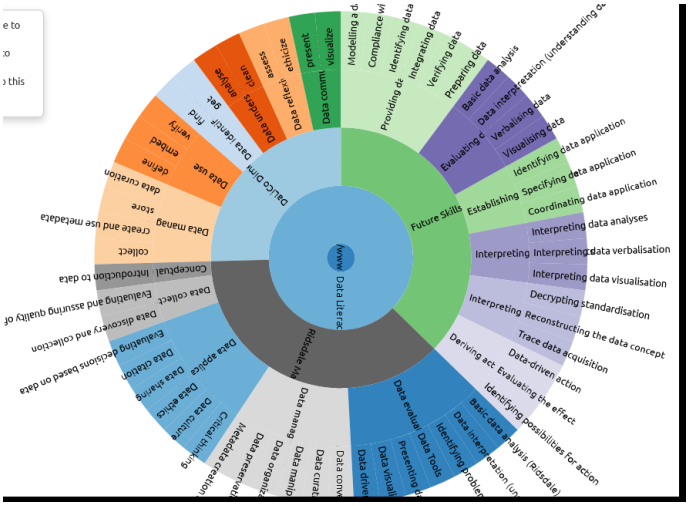

Figure 5: Visualisation of DaLiCo Dimensions using SKOS in Skos Play

Target group

The DaLiCo App is a standalone application and is accessible via the internet. It is also included in the DaLiCo Learning Space in Viamint as well as the MOOC in Valencia and the Train-the-Trainer-Handbook.

External target groups

Relevant target groups are

1. educators who are either looking for general information on various aspects of data literacy education, re-usable teaching materials as well as support for curriculum development,
2. learners from institutions of higher education who wish to get an overview on data literacy issues, who are looking for learning material to improve specific competencies or who are looking for data sources to use in their own data projects,
3. multipliers for data literacy
    a. The information is passed on via word of mouth to interested colleagues at the partner institutions. In Hamburg this are for example the colleagues from several departments (social work, economics) who cooperated in the requirements analysis phase of the project.
    b. The information on the resource collection is also passed on to university-wide facilities that support digital literacy as well as data literacy like Komweid.
    c. It is used for the application activities within the DaKo Nord consortium[1]

Learning outcomes

The resources collected concern all learning outcomes addressed within the DaLiCo project.

[1] Komweid 2022

Data literacy competencies

The competencies concern all data literacy competencies addressed within the DaLiCo project (expressed in terms of the DaLiCo dimensions the following six competence-fields are addressed: Data identification, Data understanding, Data use, Data reflexivity, Data managing, Data communication). A focus of the collection is on general resources that address general data literacy competencies that are applicable for various subject areas. Detailed subject or domain specific competencies as well as advanced competencies from various field of data science are less represented.

Usage and Impact

Further outlook and possible cooperation

The Hamburg DaLiCo team is currently contributing the experience gained in the DaLiCo project to the DaKo North project. DaKo Nord is an association of Hamburg/ Schleswig-Holstein/Brandenburg regions universities and data centers. The German Federal Ministry of Education and Research is funding the DaKo Nord project in the 1st phase of the program to establish data competence centers. By the end of April 2023, DaKo Nord will develop a full proposal to advance the coordinated and cross-thematic development, strengthening and communication of data competencies along the data lifecycle in an interdisciplinary perspective.[2]

Dissemination

The DaLiCo App will be published under a free license on the website of the University of Applied Sciences Hamburg.

It will be disseminated within different higher education communities like DaKo Nord and and CARPE, the European consortium on applied research and professional education[3] and DaKo Nord[4]. It is also disseminated outside the university context in various communities such as Code for Hamburg[5].

[2] DaKo Nord. Online: https://www.hcds.uni-hamburg.de/en/news/20221114-dako-nord.html
[3] Carpe Consortium. Online: https://carpenetwork.org/about-carpe/
[4] DaKo Nord. Online: https://www.hcds.uni-hamburg.de/news/20221114-dako-nord.html
[5] Code for Hamburg. Online: https://codeforhamburg.org/#/

Sources

DaLiCo Team (2022). *DaLiCo Glossary*. Online, Retrieved: 2022-11-07: https://www2.bui.haw-hamburg.de/tematres/vocab/.

Komweid (2022). Komweid (**Kom**petenzen **wei**terentwickeln im **d**igitalen Wandel (engl. developing competencies in the digital transformation) is a project of the Vice President for Studies, Teaching and Equal Opportunities, Prof. Dr. Monika Bessenrodt-Weberpals and Prof. Dr. Olga Burkova, Vice President for Digitalisation at the University of Applied Sciences Hamburg. It is funded by the Foundation for Innovation in Higher Education from 1.8.2021 to 31.07.2024 as part of the programme Strengthening Higher Education Teaching through Digitisation. Online: https://www.haw-hamburg.de/qualitaet-in-der-lehre/komweid/. Retrieved: 2022-11-22

Skos Play! (2022). Skos Play!: an application to render and visualise thesaurus, taxonomies or controlled vocabularies expressed in SKOS. Francart, Thomas (developper). Online: https://skos-play.sparna.fr/play/. Retrieved: 2022-12-12

Tema Tres (2022). TemaTres : *Manage, Publish, Share, Reuse. The open source way to manage formal representations of knowledge*. Online: https://vocabularyserver.com/web/. Retrieved: 2022-11-07

University of Applied Sciences Hamburg (2019). *Data Literacy in Context. Application Call 2019 Round 1 KA2 - Cooperation for innovation and the exchange of good practices. KA203 - Strategic Partnerships for higher education. FormId KA203-FAEC1BD3*