



DaLiCo Summer School Concept

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ABSTRACT

Three summer schools were conducted as Learning-Teaching-Training (LTT) Events within the DaLiCo project. The results and lessons learned are presented in form of a concept for transfer. This concept can be used by other HE institutions to plan data literacy training events.

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Contents

INTRODUCTION.....1

DEVELOPMENT OF THE OUTPUT1

CONCEPT FOR TRANSFER4

 PROTOTYPICAL PROGRAMME AND SCHEDULE5

SOURCES7



Introduction

According to the DaLiCo project proposal three Summer Schools were conducted as within the DaLiCo project. These Learning-Teaching-Training (LTT) events were conceptualized as virtual events due to the pandemic situation.

The Summer Schools offered the possibility for practical implementation of data literacy training and functioned as a test bed for teaching concepts and learning experience within the project. The underlying concept was continuously developed and expanded based on the experiences, evaluations, and learnings.

This result is a conceptual framework for data literacy trainings organized in the format of a summer school. These results are supplemented by templates that support the planning, implementation, and documentation of a summer school.

Development of the Output

As outlined in the DaLiCo project proposal the three DaLiCo Summer Schools differed in contexts of data, disciplines, and competencies:

- 2020 Summer School I - Open Government Data
- 2021 Summer School II - Advancing digital and data skills in the health sector
- 2022 Summer School III - Exploring Research Data Management

A first implementation of the holistic approach was the DaLiCo Summer School, “Doing cool things with Open (Governmental) Data”. It was addressed at PhD, Masters and advanced Bachelor students from the partner universities and took place virtually in 2020.

The didactic approach was inspired by the Carpentry movement¹ providing hands-on practice, feedback, and a positive learning experience. In four teams – each coached by a project member – the participants worked on data projects and finally developed stories inspired by the data from the World Happiness Report².

The data project team assignments were contextualized and framed by hands-on lectures on data analysis and critical thinking, open data infrastructures, data visualization, data ethics, and research data management.

The experiences of the first summer school were evaluated. The basic ideas described in the proposal have proved themselves, this includes the consideration of multiple aspects of data literacy, the interactive learning approach, and the emphasis on using open content.

¹ <https://datacarpentry.org/>

² <https://worldhappiness.report/>

Virtual Summer School 2020 28.09. - 02.10.2020 – Open Government Data					
	Monday, 28.09.	Tuesday, 29.09.	Wednesday, 30.09.	Thursday, 01.10.	Friday, 02.10.
9:00 - 10:30	Welcoming Keynote Prof. Olof Sundin (Lund University)	Open Data – Data Analysis + Critical Thinking	Open Data – Data Visualization	Open Data – Data Ethics	Open Data – Research Data Management
11:00 - 12:30	Introduction into Open Data				Data Project – Presentation
12:30 - 14:00	LUNCH	LUNCH	LUNCH	LUNCH	Conclusions / Farewells
14:00 - 16:00	Open Data – Infrastructures	Data Project	Data Project	Data Project	
16:30 - 18:00	Data Project				

Keynote
 Input + Workshop
 Team work on Data Project

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Figure 1: Timetable Summer School 2020

(Source: <https://dalico.info/summer-schools/open-governmental-data-virtual-summer-school/>)

The successful concept elements of the didactical design like hands-on-training (tools, data carpentry, data processing), integration of keynote speakers into the programme, data sprints with mixed teams (different degrees of expertise) and findings were transferred to the following Summer School. As provided for in the project proposal the second Summer School in 2021 had a closer reference to a specific professional context. Different from what was initially planned the chosen topic was health instead of environmental data – pollution, traffic, mobility. The decision to change the topic was due to excellent connections of the Utrecht partner to practice partners who work in the field of data-driven health applications. Additionally, driven by the pandemic, recent developments in the application of artificial intelligence technologies have been particularly evident in the field of health sciences. Therefore, they seemed an ideal showcase for the second DaLiCo Summer School.

The experiences and results with the second Summer School pointed to, that in addition to subject-specific data aspects, generic data competencies (like data access, data management, data communication) are always important for the participants. In addition, the second Summer School integrated machine learning / artificial intelligence functions. The integration of the Data Science platform Dataiku³ facilitated the understanding of these specific data competencies.

The successful concept elements were also adopted into the third Summer School in 2022. Here, the specific context of research data literacy was addressed, and the focus was on data management competencies.

³ <https://www.dataiku.com/>

It became apparent that, in terms of sustainability, it was important for the participants to be able to take concrete results home with them. Therefore, already for the first Summer School a web platform was set up for the presentation of the results of the participants of all the Summer Schools.

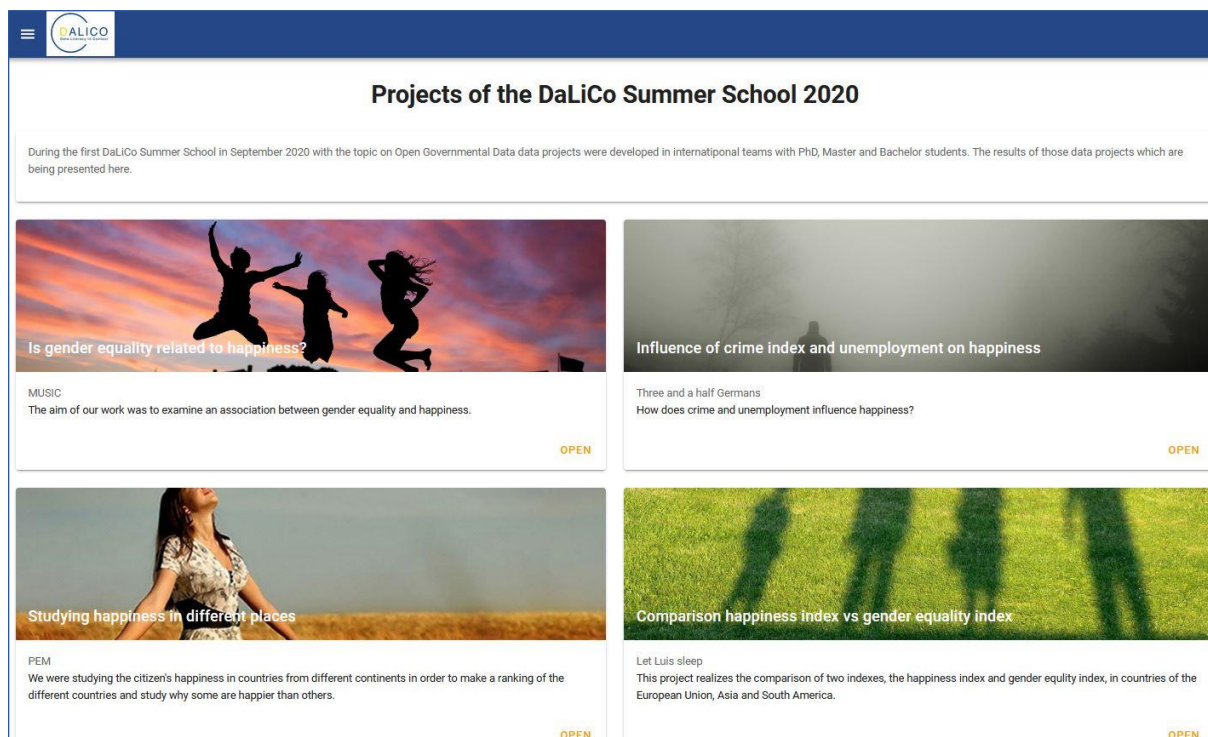


Figure 2: Data Projects as results from summer school participants (Source: <https://projects.dalico.info/#/2022/>)

The overall positive experiences from the Summer Schools provided valuable insights for our data literacy activities. Especially in regard to the train-the-trainer-programme, the data literacy learning space, and the curriculum development.

Through these activities we gained deeper insights regarding choice of topics, competencies to be addressed and appropriate research questions, the didactic approach, suitable learning environments, and prerequisites for embedding data literacy education into local university curricula.

The results from the evaluation of the participants as well as the reflections of the teachers form the basis for discussing the meaning of the experiences with the Summer Schools.

Concept for transfer

As success factors of learning experience for participants during the summer school were identified:


- Choice of topic, which should be relevant and motivating to the participants. This was the case for the chosen different contexts of the three summer schools. The World Happiness Report for the first summer school turned out to be an emotional and a motivational topic. At the second summer school the participants brought in their own research topics with the health domain, this was closely linked to personal learning goals. This motivation applied also for the third summer school, where the students also connected to their personal research as e. g. PhD thesis topics, however with a stronger focus on methodological issues.
- The selection of competencies to be addressed should enable a holistic data experience. In all three data projects, attention was paid to addressing the process elements of the data life cycle from access to data up to communication of data products.
- Formulating appropriate research questions appeared to be a key factor for successful data projects. This guided the work with the data projects. Special focus was paid to the research question within the coaching by the teachers.
- The didactical approach of guided learning as well as passing over responsibility for the learning process to more experienced learners proved successful with the mixed teams. More experienced students helped others with less knowledge, the working atmosphere in the teams was positive. The strategy of learning-by-example (assisted by templates for example in connection with data analysis) supported the mixed teams. Also, the combination of self-directed projects and coaching proved successful.
- Students' interest for ethical aspects of working with data turned out to be big. Integrating critical thinking and ethical questions right from the start into the conveyed competence topics and practical data projects turned out to be most relevant for participants as the respective effects of the data use became evident and comprehensible for the participants.
- Virtual environments for facilitating input and practical sessions should be well planned and designed for the different purposes. A Learning Management System like Moodle offers a central platform but proved too little flexibility in terms of interactivity. MS Teams as central platform offered interactivity but offered less structured storage options for the project results. With Dataiku a further platform for practical data project work was integrated. From these experiences with different systems the requirement for more integrated implementation was derived. The platform should enable synchronous training sessions, organizational information, allow interactivity and communication, and file storage.

Prototypical programme and schedule

Based on the developments of the DaLiCo summer school concepts a prototypical programme and schedule is proposed. It contains established components of different character:

- Social and organisational part (green colour)
- Data project part (blue colour)
- Data competencies part (brown colour)
- Keynote (grey colour)

Virtual summer school concept



	Monday	Tuesday	Wednesday	Thursday	Friday
Morning I	Welcoming	Data competencies hands-on lecture	Data competencies hands-on lecture	Data competencies hands-on lecture	Presentations of Data Projects
	Keynote				
Morning II	Intro: Data Project				
Break	LUNCH	LUNCH	LUNCH	LUNCH	Conclusions Farewells
Afternoon I	Data competencies hands-on lecture	Data project Coaching	Data Project Coaching	Data Project Coaching	
Afternoon II	Team Building Social Event		Social Event		
Evening					

Figure 3: Prototypical time and content planning pattern

These learnings / success factors and the planning pattern can be (re-)used as building blocks for the concept of a data literacy summer school training.

In addition, standards for planning and implementation were developed during the planning and implementation process, which were further iteratively elaborated.

Process results:

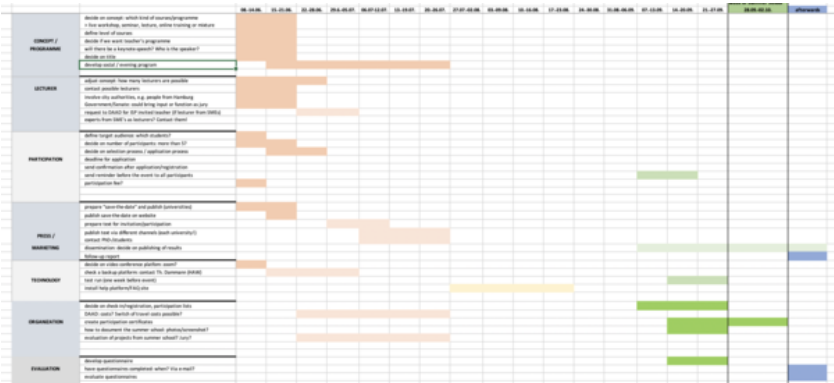


Figure 4: Planning document for organizing the event

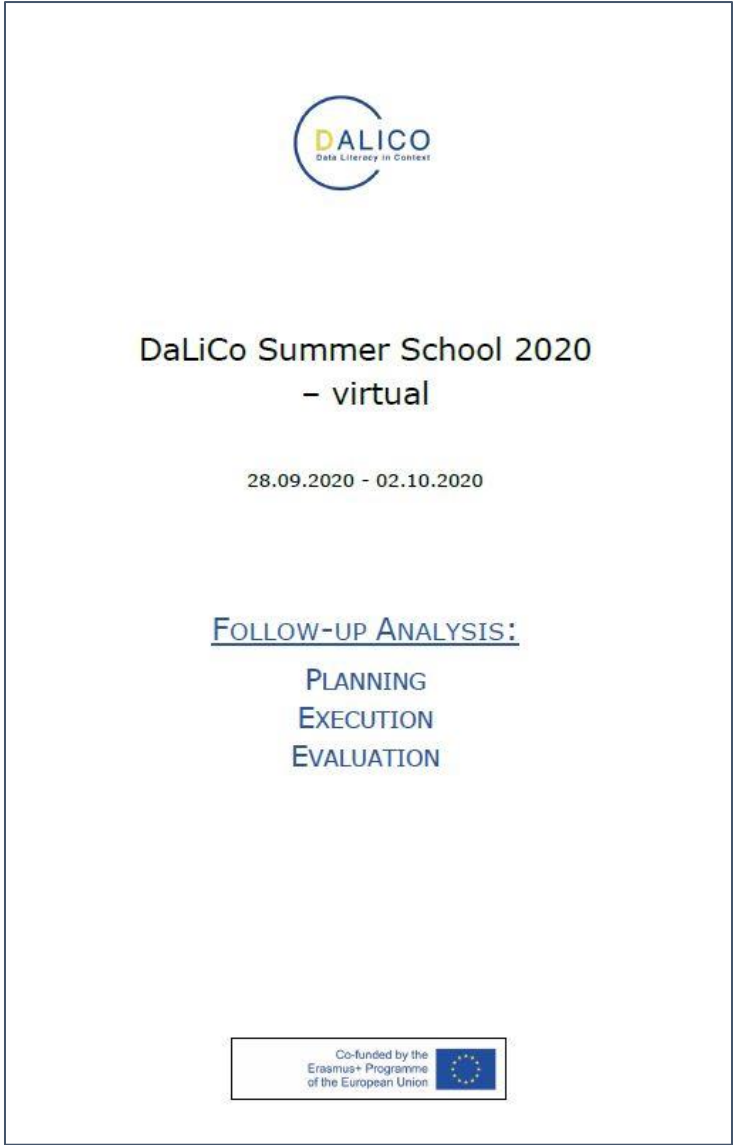


Figure 5: Document structure for the documentation of the events.

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