



# Data Literate

Digital Data Literacy for Education



# DataLiterate Handbook



## Contents

Introduction.....	3
Glossary.....	3
1. About DataLiterate project .....	4
1.1 Intellectual Output #1 .....	6
1.2 Intellectual Output #2.....	7
2. Successful case studies of data literacy application in schools .....	8
2.1 Example from School: I.T.E.T. “G. CARUSO” .....	9
2.2 Example from School: AESG.....	10
2.3 Example from School: Vilnius Jesuit Gymnasium .....	11
2.4 Example from School: Virolai.....	12
3. Use of DataLiterate project resources .....	13
4. Data literacy recommendations.....	15
4.1 Individual level recommendations.....	15
4.2 School level recommendations .....	15
4.3 Policy level recommendations .....	17
Conclusion.....	18

## Introduction

DataLiterate project had a mission to capacitate educators in Digital Data Literacy (DDL) through a hands-on, collaborative approach which would allow School Communities (including teachers, students, and school leaders) to increase their Digital Competences, particularly those related with Data Literacy for Education. The project included several Continuous Professional Development (CPD) initiatives to ensure the long-term viability of the project, as well as its dissemination and propagation to other schools after the end of the project.

All the results of the project are not just addressed to the educative institutions involved in the consortium, but also stakeholders and other European schools. During the testing stages of the project, students and teachers provided positive feedback about the project results, therefore laying a solid foundation to believe that other end-users will have a similar, positive, experience by learning and including these contents in their learning agendas and curricula.

This Handbook aims at providing instructions how to use the Data Literate project resources, methodologies, materials and training approach, to make them applicable and transferrable to other schools in the European Union. Also, it sets a goal to offer recommendations for school communities on how to become data literate.

Integrating partners from 4 countries, this consortium was chosen considering the expertise in fields that are strategic to the project and essential to its objectives: know-how on teachers training; on data literacy & data science; and schools. Having such diversity allowed the project to heavily foster interdisciplinary synergies and networking between institutions that differ in nature and face distinct challenges in a pandemic but that all work with a mission of cultivating education. The consortium was lead by Vilnius University and it included two companies specialised in digital and data training programmes (INOVA+ and Dataniņa), and 4 secondary schools from Lithuania, Portugal, Spain and Italy.

## Glossary

### **DATA**

A sequence of one or more symbols given meaning by specific act(s) of interpretation. Data as a general concept refers to the fact that some existing information or knowledge is represented or coded in some form suitable for better usage or processing. Data is measured, collected and reported, and analyzed, whereupon it can be visualized using graphs, images or other analysis tools (Wikipedia).

## **DATA LITERACY**

The ability to read, understand, create, and communicate data as information. Much like literacy as a general concept, data literacy focuses on the competencies involved in working with data. It is, however, not similar to the ability to read text since it requires certain skills involving reading and understanding data.

## **DIGITAL COMMUNICATION**

Communication using digital technology. Various modes of communication exist, e. g. synchronous communication (real time communication, e. g. using skype or video chat or Bluetooth) and asynchronous ones (not concurrent communication, e.g. email, sms) using for example, one-to-one, one-to-many, or many-to-many modes.

## **DIGITAL COMPETENCE**

Digital competence can be broadly defined as the confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society. Source: DigComp Framework <https://ec.europa.eu/jrc/digcomp>

## **DIGITAL ENVIRONMENT**

A context, or a “place”, that is enabled by technology and digital devices, often transmitted over the internet, or other digital means, e.g. mobile phone network. Digital environments are usually used for interaction with other users and for accessing and publishing user-created content. Records and evidence of an individual’s interaction with a digital environment constitute their digital footprint.

## **DIGITAL TOOLS**

Digital technologies used for a given purpose or for carrying out a particular function of e.g. information processing, communication, content creation, safety or problem solving.

## **EDUCATIONAL RESOURCES**

Resources (digital or not) designed and intended to be used for educational purposes.

# **1. About DataLiterate project**

DataLiterate project had a well-defined and very specific mission to capacitate educators in Digital Data Literacy through continuous professional development initiatives and hands-on, collaborative approach which would allow not just teachers,

but also school leaders and students to increase their Digital Competences, in particular those related with digital data literacy for education.

Having to transition to distance learning from day to night, schools faced the pandemic as a quintessential adaptive and transformative challenge which highlighted previously deep-rooted existing gaps. On one side, it showed sharply the importance of digital learning and the need for high-quality teachers' continuous professional development. On the other side, COVID19 called renovated attention to specific digital competences, including Digital Data Literacy. Even before the pandemic, it was already well set that is impossible not to recognize that data is essential for everyday life, since nearly everything is digital, and those digital things produce and consume data. The evidence clearly showed not only the importance of data literacy within the context of a digitalized society, but also highlights its relevance to education. With COVID19, "the demand for digital skills will grow with skills in demand (...) including (...) data literacy (...)" (Digital Education Action Plan). With the rapid schools' shift to online learning, not just teachers, but also students and school leaders needed to critically approach, filter and assess information, to identify disinformation and to manage the overload of information. Teachers and school leaders should nimbly use the information that is available to them to support student learning. Knowing how to communicate, marshal resources and tailor practice to student need are the same skills teachers need in a regular classroom setting but have taken on new urgency during COVID19. Becoming data literate is thus a skill set that educational communities must acquire and nurture increasingly.

Simply put, and addressing the abovementioned needs, DataLiterate project had a mission to capacitate educators in DDL. Aligned to such mission, the specific objectives were:

- To raise awareness of DDL relevance in an increasingly digital world.
- To build capacity on DDL applied to educational purposes.
- To create a CPD course under the DDL topic for educators.
- Build digital education readiness (through DDL) and thus mitigate the impact of COVID19 in education.
- Ensure that teachers know how to communicate, marshal resources, and tailor practice to student needs, especially in a digital context.
- Promote, support, and motivate quality, ongoing teachers' CPD that is based on DDL use to improve instruction.
- Contribute to a cultural change at the participating institutions regarding attitudes towards DDL and openness.
- Significantly increase teachers' and student's data competencies and thus increase their academic success and qualify them for a successful career by

adapting to the growing needs for DDL competencies in the increasingly data-driven job markets.

- To strengthen the capacity of school leaders to deepen understanding of student and school data.

Such objectives were reached through the development of the main outputs of the project:

**IO1:** Creation of a Capacity Building Programme for Data Literacy, including a MOOC for teachers and school leaders' CPD, supported by a piloting scheme which actively involved students.

**IO2:** Design of a DDL Roadmap for Schools; consisting of a Strategic Plan for schools, a Co-Design protocol and a co-designed, tailored institutional Strategic Plan for each school; as well as the Data Literate Handbook, a compendium of project resources, methodologies, materials, and training approaches.

By actively contributing to teachers' high-quality CPD in the field DDL and through a holistic, collaborative approach which brought together school communities, as well as training & data literacy experts, the project not only tackled specific European education challenges brought up by COVID19, but at the same time addressed the Commission proposes to consolidate ongoing efforts and further develop the European Education Area along with dimensions number 1; 3 and 4; Contribute to Digital Education Action Plan strategic priority number 2, and finally, Data Literate has the added value of addressing both DigComp and DigCompEdu.

The objectives of the project were met thanks to the efforts of the project consortium and the beneficiary entities, which worked together in the elaboration. The next section further elaborates the achievement of these outputs.

## 1.1 Intellectual Output #1

The first Intellectual Output of the project focused on the design of the educators training approach at three main levels: firstly on the definition and development of a capacity building plan and the development of the educators training course which included a MOOC and supporting materials; the deployment of the teachers and school leaders training; and lastly, the operationalization of the pilot stage in schools. Such activities were developed within the framework of the following tasks:

- Task 1.1 Development of the Capacity Building Plan
- Task 1.2 Development of the Educators Training Course Contents
- Task 1.3 Training of the educators from partners schools
- Task 1.4 Piloting in classrooms

IO1 stood heavily on meaningful capacity building processes and the aim was to provide the necessary knowledge, skills, and support to teachers, but also school leaders and students, allowing them to significantly increase their competences on digital data literacy for education. As such, the first intellectual output answered and contributed to narrowing the gap of teachers urgent and well-documented need for continuous professional development in ICT, namely in digital data literacy. A need accentuated by the rapid schools' shift to online learning models. Furthermore, IO1 contributed to specific teachers' competences development needs framed in DigComp and DigCompEdu. IO1 additionally contributed to competence development of students (significantly increase the ability to articulate information needs; to locate and retrieve digital data, information, and content; to judge the relevance of the source and its content; to store, manage, and organise digital data, information, and content) and school leaders (develop the capacity to deepen understanding of student and school data).

The innovative nature of the activities lied in the holistic and collaborative approach which involved partners experts in data literacy and data science, as well as training, and partners which were education active actors (schools). Moreover, elaborating a whole training programme which is continuous (not an isolated event) and based on digital data literacy for education, following the principles of data-driven instruction, was for itself innovative since this is rarely a topic schoolteachers CPD.

## 1.2 Intellectual Output #2

This Intellectual Output focused on the development of strategies, processes and resources for schools to nimble and effectively implement their own Digital Data Literacy Strategic School plans. Additionally, this IO went further and converged efforts into producing a Data Literate Handbook which contains instructions for school communities on how to become Data Literate, how to use the Data Literate project resources, methodologies, materials and training approach. Moreover, the handbook also included recommendations to policymakers on how to valorise, implement and exploit data literacy in education. Through the following tasks, project partners were able to successfully develop and implement all the envisaged IO2 results:

- Task 2.1 Development of Schools' Digital Data Literacy Co-Design protocol
- Task 2.2 Development of the Digital Data Literacy Strategic Plan for Schools
- Task 2.3 Co-designing of schools' institutional strategic plans
- Task 2.4 Development the Digital Data Literacy Handbook

IO2 also fostered the gap narrowing of teachers urgent and well-documented need for continuous professional development in ICT, namely in digital data literacy, as well as students and school leaders competences development in digital data literacy. IO2



contributed to such needs through the hands-on approach which implied that all the mentioned targets jointly collaborate in working groups in the development of their schools' individual strategic plans. Furthermore, IO2 also covered the need of schools to have an effective and well-structured strategy for digital data literacy, which naturally contributed not only to the final implementation of Data Literacy in the school, but also to the detailed mapping and recording of the schools' community needs, challenges and opportunities in terms of digital data literacy in education, and how these can effectively contribute to mitigating challenges of the 21<sup>st</sup> century like the pandemic.

IO2 foresaw a co-design process that actively called the participation of the mentioned targets in working groups to jointly foster a more data literate school community. Although many countries and schools have already adopted digital action plans, they often lacked insights on the importance of digital data literacy for education. Furthermore, using the theory of change approach, an innovative message was conveyed: that working alongside teachers, intelligent digital learning systems don't just teach students science, but can simultaneously observe how they study, the kind of tasks and thinking that interest them, and the kind of problems that they find boring or difficult.

The Digital Data Literacy Strategic Plan for Schools was a document elaborated by the entire consortium of the Data Literate project that supported school leaders and teachers to make data-driven decisions and to implement DDL culture in their institutions. The content provided was based on the Behavioural Change (BCM) Methodology (KPMG). The document provided different aspects: definition of data roles (Data Believer; Data User; Data Scientist; Data Leader) with 5 digital data literacy competence levels developed and matched to such roles; profile for data literate teacher, for school data literacy leader and for a data literate student; line of action for school leaders, teachers and another for students which suggested activities and ways in which they can implement data literacy in the school settings; strategy on how to evaluate the school community digital data literacy competences and a capacity building roadmap for schools' leaders and teachers and students based on the IO1 experiences and approach.

## **2. Successful case studies of data literacy application in schools**

Schools play a strategic role in preparing the younger generation for the new digital and technological society, and a better understanding of DDL is strategic in the educational context. There are several main challenges to face, in order to spread relevant competencies among learners and teachers. In particular, the recent





pandemic has intensified these challenges and forced us to employ probabilistic reasoning; the statistical illiteracy in schools is today the consequence of the widespread diffusion of incorrect information known by the term "fake news".

Society would improve if the fundamental ideas of probability theory and statistics were taught in schools because students would grow the capacity of reasoning; a strong means to evaluate and analyse the information surrounding them. Mastering DDL will help both teachers and students to spread digital pedagogical skills, make decisions based on data analysis and face the challenges in the use of new technologies.

Below you will find two successful examples of data literacy application in four schools of the DataLiterate consortium.

## 2.1 Example from School: I.T.E.T. "G. CARUSO"

<b>Class title:</b>	A survey of knowledge of IRS & Economics topics among students in a target group at our school		
<b>Knowledge area / subject:</b>	Law & economics		
<b>Date of the Piloting Session:</b>	April/May 2022		
<b>Responsible:</b>	Maria Gervasi		
<b>School:</b>	I.T.E.T. G. CARUSO	<b>Country partner:</b>	ITALY
<b>Nr. of teachers involved:</b>	1	<b>Nr. of students involved:</b>	18
<b>Class/Year of the students involved:</b>	3rd-year class	<b>Age of the students involved:</b>	16-17 years old
<b>Brief description of the pilot:</b>	<p>The class group carried out the topic of law and taxation, and students who were passionate about the topic decided to investigate it further.</p> <p>After being trained on some of the DDL topics, the students decided to conduct a survey on the awareness of law and tax in businesses. The students created a questionnaire that was administered to a target group between the ages of 14 and 20. First, they collected the results from the respondents, second, they worked on checking and cleaning the spreadsheet, and finally, they made graphs, analyzed the results, and drew a conclusion about the survey.</p>		



<b>Required previous knowledge:</b>	English level A2(CEFR)	<b>Required materials:</b>	Computer Science Lab Videos on YouTube Microsoft and Google suite programs
<b>Observations</b>	The DDL (Digital Data Literacy) approach proved to be very welcome and urged the students to learn English and in learning more about educational robotics because it allowed them to use the foreign language for an authentic, concrete and living task. They were very interested and curious about obtaining the research data because they felt they were investigating something that belonged to their world through a new methodological tool. This approach also allowed students to improve their language skills and expand their vocabulary in a very short time.		

## 2.2 Example from School: AESG

<b>Class title:</b>	What are the values of the characteristic quantities of a battery?		
<b>Knowledge area / subject:</b>	Physics/ Electricity (Understand the function and characteristics of a generator and determine the characteristics of a battery in an experimental activity, evaluating the procedures and communicating the results).		
<b>Date of the Piloting Session:</b>	April-May 2022 (several classes)		
<b>Responsible:</b>	Aníbal Alves		
<b>School:</b>	AESG	<b>Country partner:</b>	Portugal
<b>Nr. of teachers involved:</b>	1 + 1	<b>Nr. of students involved:</b>	27
<b>Class/Year of the students involved:</b>	10 <sup>o</sup> C / 10 <sup>th</sup>	<b>Age of the students involved:</b>	15-17
<b>Brief description of the pilot:</b>	<p>Methodology:</p> <p>To be done in small groups:</p> <ul style="list-style-type: none"> <li>Analyse the documentation related to the experimental activity;</li> <li>Outline an experimental activity that allows to take the required readings;</li> <li>Run the experimental activity;</li> </ul> <p>Create a scientific poster and a video that describes the experiment and presents results and conclusions.</p>		

	Present the experiment in the English class (to classmates and physics and English teachers).		
<b>Required previous knowledge:</b>	All notions related to the fundamentals of physics (electricity).	<b>Required materials:</b>	Two 9V batteries (one new and one used); Electrical connection wires and connectors; Switch; Ammeter; Voltmeter; Rheostat; Graphic calculator; Cell phone (to record the experiment); Personal Computer (Excel, "PowerPoint", video editing software and/ or other that students deem necessary for required presentations).
<b>Observations</b>	It was also possible to deepen/apply in practice the notions that data always have errors and the way to treat (and minimize) these errors, as well as the way to present the data. These notions are learned through the treatment of the subjects covered and not through theoretical teaching of the modules.		

## 2.3 Example from School: Vilnius Jesuit Gymnasium

<b>Class title:</b>	What is data and how do we find it. The group project aims and requirements		
<b>Knowledge area / subject:</b>	Natural Science		
<b>Date of the Piloting Session:</b>	2022-05-06		
<b>Responsible:</b>	Paulius Narušis		
<b>School:</b>	Vilnius Jesuit High School	<b>Country partner:</b>	Lithuania
<b>Nr. of teachers involved:</b>	1	<b>Nr. of students involved:</b>	26
<b>Class/Year of the students involved:</b>	5	<b>Age of the students involved:</b>	11-12



<b>Brief description of the pilot:</b>	<p>What is data and how do we find it – presentation of DL Training Module 1 (translated to Lithuanian)</p> <p>Misleading graphs and importance of correct data presentation – Video “How to spot a misleading graph”</p> <p>Presenting group project:</p> <p>Aim – to choose a problem (preferable about healthy lifestyle) that you want to gather data on. 1 group (2-3 students) – 1-2 question with or without answer choice.</p> <p>Expected result – a simple graphic, presenting the results of the questionnaire. 1 group – 1 or 2 graphics.</p>		
<b>Required previous knowledge:</b>	<p>Healthy Lifestyle Basics</p> <p>Computer Basics</p> <p>Statistics Basics (Comparison, Simple Graphic Creation and Reading of Graphics)</p>	<b>Required materials:</b>	<p>Data Literacy Training Module 1</p> <p><a href="#">Video from TedEd “How to spot a misleading graph”</a></p>
<b>Observations</b>	<p>Needed time – 90 mins: 45 min to present the theory and project goals, 45 mins to help develop good questions and make questionnaires (if possible, the latter part could be implemented by consulting student groups after lessons).</p> <p>We used a single Google Form for multiple questions of different student groups to simplify the process of data collection for those asked to fill in the forms. We asked the school community (students and teachers) to fill in the form via the Teams virtual environment. Several student groups decided to question their friends face-to-face.</p>		

## 2.4 Example from School: Virolai

<b>Class title:</b>	Introduction to Data		
<b>Knowledge area / subject:</b>	What is Data?		
<b>Date of the Piloting Session:</b>	20/04/2022		
<b>Responsible:</b>	Suzanne Davis / Maria José Miranda		
<b>School:</b>	Escola Virolai	<b>Country partner:</b>	Spain



<b>Nr. of teachers involved:</b>	2	<b>Nr. of students involved:</b>	30
<b>Class/Year of the students involved:</b>	ESO 4	<b>Age of the students involved:</b>	15-16
<b>Brief description of the pilot:</b>	<p>Students were introduced to the project with a bespoke powerpoint detailing:</p> <ul style="list-style-type: none"> <li>• Definitions of Data</li> <li>• Reliability of data / data sources (data verification)</li> <li>• Data Sourcing</li> <li>• Data Analysis.</li> </ul> <p>Students' current knowledge of data was assessed with the realization of a simple practical data collection / analysis exercise</p>		
<b>Required previous knowledge:</b>	none	<b>Required materials:</b>	A computer (per student) a projector (for teacher)
<b>Observations</b>	It was tricky to give an overview of the dense modules we had studied over the last year and condense it into an "introductory powerpoint". It was quite a lot of information for the students. Perhaps it would have been better to have divided this part into 2 sessions.		

### 3. Use of DataLiterate project resources

The DataLiterate project was built to allow the most efficient and resultative knowledge transfer within a limited amount of time (project duration). The IO1 and IO2 were organised to allow learning, training and capacity building processes be implemented in a timely and efficient manner. However, to allow wider project result dissemination and wide exploitation of project deliverables, further possibilities are explored.

The most prominent project results will remain available after the project ends and are designed (as described in the IOs section) thinking about their transferability to other users, including schools, schools' leaders, teachers, local community, public bodies managing schools, public authorities and policy makers in the field of education, teachers and representative structures (associations, unions), Teachers Training centres. The outputs are available here: <https://www.dataliterateproject.eu/> Also, MOOC lessons are available here: <https://www.dataliterateproject.eu/lessons/>

This transferability, especially of MOOC, is almost automatic for schools who wish to innovative their teaching and learning practices related Digital Data Literacy. All the results will be kept after the project conclusion, following one of the main aims of the project, which is to produce and make available open access resources in multiple

languages to be further used and multiplied. These results, namely the MOOC and support materials, the DDL (Macro) Strategic Plan for Schools and the Data Literate Handbook) have a transferable profile and can be adapted to other levels of education (i.e. primary school, higher education, VET education and even adult education) and to other countries.

All partners from the consortium have seriously committed to keep sharing the results, presenting the project when possible and using Data Literate as an example of a successful project in terms of the Data Literacy in Education. Therefore, consortium partners can be reached out when support of DataLiterate project result usage is needed.

The list below represents several anticipated actions for further dissemination and transferability, which are not limited to those listed. Also, the specific partner sustainability strategies are listed in the following section, which allows even greater project result transferability in its width and breadth.

- The capacity building programme complied with CPD quality standards, ultimately consolidated in a powerful 12 weeks and 96 hours [full course](#), can be accredited and used as a training tool from CPD authorities responsible for Inservice teachers training.
- The intrinsic nature of MOOCs (free, open for all, available online) allows its exploitation, sustainability and transferability to other schools. Data literacy skills should be developed during teacher training and continue throughout teacher's career. Unfortunately, only a small proportion of teachers attended DataLiterate data literacy course. The aim is that more teachers who come to the project will be exposed to the MOOC and further develop their competences.
- The training programmed was outlined in such a way it can easily be transferred to other levels of education, namely, basic, VET and even higher education.
- Two of the main results of IO2, namely the Digital Data Literacy Strategic Plan for Schools and the Digital Data Literate Handbook for Schools are available [online](#) and are drafted as general reference documents which are developed to serve baseline for any school which is interested in data literacy. The Handbook has the main objective to easily convey the transferability of the project methodology and the schools' personalization of their own individual strategic digital data literacy plans.

## 4. Data literacy recommendations

### 4.1 Individual level recommendations

1 Recommendation: take initiative to familiarise with the MOOC course, available [online](#) in different languages.

Data Literate project had a well-defined and very specific mission to capacitate educators in Digital Data Literacy, through continuous professional development initiatives and hands-on, collaborative approach, which would allow not just teachers, but also school leaders and students to increase their digital competences (in particular those related to digital data literacy for education). By actively contributing to teachers' high-quality CPD in the field DDL and through a holistic, collaborative approach which brings together school communities, as well as training & data literacy experts, the MOOC course intended not only to tackle specific European education challenges brought up by COVID-19, but at the same time, to address the Commission's proposals to consolidate ongoing efforts and further develop the European Education Area along with dimensions to improve basic skills, including digital competences, that may be useful for other aspects of their professional lives. Following this line, the Digital Literacy Course was elaborated to support teachers and school staff to become Data Literate, and later, to adapt these skills to their schools and spread the behaviour among the school community. The consortium and the teachers involved seemed to be extremely satisfied and positive about the training sessions and the next steps of the project, involving the piloting stage. It is very advantageous to involve interested teachers and school leaders dedicated to the participation and implementation of the Data Literate results in their school community.

2 Recommendation: make usage of other examples of data literacy. Not only it is important to acquire data literacy skills and knowledge, but also it is crucial to build positive attitude towards data literacy among individuals. Individual experience is the strongest variable which influences person's attitudes, therefore, it is important to familiarise people with positive examples and data literacy case studies. Also, one can get to know user guides to replicate the others' work on information literacy, in order to make communities even more open to data literacy competence acquisition.

### 4.2 School level recommendations

1 Recommendation: make full use of the MOOC course, generated in the project and available [online](#) in different languages. The course is divided into the following modules:

1. Module 1 - What is Data Literacy
2. Module 2 - Understanding your Data



3. Module 3 - Learning and Teaching Analytics
4. Module 4 - Explore data literacy resources already available
5. Module 5 - Educational Data
6. Module 6 - Draft your DDL Plans

Each module has specific topics and learning outcomes, created for schools and teachers. The content was presented in the course in a PowerPoint format, with a dynamic and simple visual identity, supported with videos, images, graphics, news, etc., to make the learning process energetic and inclusive. After the implementation of the Training Course, there was a self-assessment questionnaire, to test the competencies and skills acquired by the participants. Overall, the general assessment of the course gathered by the online survey was very positive.

**2 Recommendation: create and apply Digital Data Literacy Roadmap for Schools,** available as one of Dataliterate project deliverables. This document aimed at supporting school leaders and teachers to make data-driven school management decisions. It is created as a reaction to teachers' needs for Continuous Professional Development in Information and Communications Technology, specifically Digital Data Literacy. The document provides a template where schools can provide information based on their experience and context in every chapter. It is important to highlight that along the document, some examples from schools are also presented, just as an inspirational way to know how to implement and fulfill every aspect/chapter of the template. Also, in every chapter there is an italic quote, which is a simple explanation of what the schools responsible for the Strategic plan should insert in terms of content. In general, the consortium of the project DataLiterate prepared this document with the intention to support schools to make data-driven decisions and to implement DDL culture in their institutions. The content provided is based on the Behavioural Change (BCM) Methodology (KPMG) and will prepare the schools to become Data Literate throughout an organizational methodology, reached from the preparation and implementation of their own Strategic Plan and Roadmaps.

**3 Recommendation: use Dataliterate project Digital Data Literacy Strategic Plan for Schools and templates to become data literate.** The purpose of this project was to integrate co-design in the implementation of digital data literacy in classrooms and during the process of co-designing of school's institutional strategic plans. The Digital Data Literacy Strategic Plan for Schools is a document elaborated by the entire consortium of the DataLiterate project that aims at supporting school leaders and teachers to make data-driven decisions and to implement DDL culture in their institutions. The content provided is based on the Behavioural Change (BCM) Methodology (KPMG). The Digital Data Literacy Strategic Plan for Schools presents the main aspects of Co-design and its implementation in schools and classrooms,

providing guidelines for any educational institution involved in the next steps of the project. Also, the methodology can be useful to prepare the trainers/teachers and secondary students to manage the increasing amount of information that the society constantly provides, especially in a technological world.

**4 Recommendation: arrange internal and external encouragement measures to improve teachers and students data literacy.** Use digital tools, establish partnerships with other data users. Recognize competencies achieved. Data usage is awarded and the usage of different sources of information, open data is encouraged.

**5 Recommendation: put efforts to decrease the scepticism among school communities and build consensus on data literacy importance.** Data literacy is still considered to be a competence which requires a considerable effort to acquire, and even greater effort to apply in everyday's life. Therefore, there is still a widespread resistance of its training, particularly due to the fact that many people consider still do not directly using data. However, this understanding evolves from the misconception that data is only a particular set of information, and not information that can be retrieved from various sources – numeric, visual, text, etc. Therefore, it is important to widen the understanding of the advantages of data literacy, which can be done through various initiatives across school communities: project dissemination events, peer to peer training, case study presentations, etc.

### 4.3 Policy level recommendations

**1 Recommendation: create CPD data literacy course.** The work within the project has proven to be successful and the content – desirable among teachers in different EU countries. The data literacy competence is more and more frequently aspired by teachers in various school levels: primary, secondary, gymnasiums, VETs, etc. Therefore, it is strongly recommended for policy stakeholders to establish a competitive data literacy course, available as CPD option in various countries. For this, course content has to be constructed, and different deliverables of DataLiterate project can be used for this purpose (Digital Data Literacy Strategic Plan for Schools, Co-design protocol, MOOC). As such, formal CPD course would help to establish data literacy as a universal and accessible competence, thus, widening its acquisition and usage. This would help region become more competitive in data usage for various different purposes: academic, business, etc.

**2 Recommendation: provide a definition of Data Literate for Teaching and successful case studies.** Familiarisation with data literacy competences could be fostered by providing successful case studies of its applicability. Therefore, it is recommended for policy makers to search for case studies within countries and regions schools, so that

more schools could see positive examples of data literacy training and appliance. With this, it could be achieved that more schools express their interest in data literacy competence acquisition and by this, more students are exposed to data. The DataLiterate project provides a few of the successful examples how schools adapted their curricular and integrated data literacy, however, more specific examples in the regions are also desired.

**3 Recommendation: encourage data collection and open data usage among education community.** Balance the required information acquisition to avoid unnecessary burden on teaching professionals and organize additional support for schools to collect information required. In other words, to improve data literacy, use data. Make the full use of the information to draw data supported decisions, using formative and summative assessment, and also involve third party in data assessment, monitoring and evaluation.

**4 Recommendation: face challenges of new disruptive technology (AI) to generate data and adapt accordingly the teaching / assessment processes, homework assignation, etc.** It is crucial to recognize the importance of critical thinking and information literacy in the realm of new technological innovations and thus, critically assess the ethics and allowance of its usage. Also, it is important to involve student and parent communities in using new technologies, so that the wider school community reaches the same understanding and consensus of its usage.

## Conclusion

DataLiterate project aimed at capacitating educators from secondary schools in Digital Data Literacy, in order to identify disinformation and manage the overload of received information. To achieve that, the results of the project ensured that teachers and school leaders know how to use the information available to them and how to support student learning, improving their way of communicating, marshal resources and tailor practice to student need.

This Handbook is produced as the final deliverable of the project, to provide instructions for other school communities on how to become data literate using the resources, methodologies, materials and training. Also, it included definitions of data and data literacy, succesful case studies of data literacy in education, recommendations on how to integrate DL in CV (policy-oriented), recommendations to CPD authorities for the creation of 'Continuous Professional Development' (CPD)

courses in the topic of Data Literacy for Education and policy-making considerations to both national and international levels.