Digital Data Literacy for Education

IO1 Capacity Building Programme for Digital Data Literacy

DataLiterate Capacity Building Plan

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Consortium

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, data literacy & data science and schools.

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1. Data Literate Project

Data Literate project has 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 will 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 have 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 (CPD) in ICT. On the other side, COVID-19 called renovated attention to specific digital competences, including Digital Data Literacy (DDL). 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 shows not only the importance of data literacy within the context of a digitalized society, but also highlights its relevance to education. With COVID-19, "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 need 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 COVID-19. Becoming data literate is thus a skill set that educational communities must acquire and nurture increasingly.

Simply put, and addressing the abovementioned needs, Data Literate project has a mission to capacitate educators in DDL. Aligned to such mission, the specific objectives are:

- 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.

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- Build digital education readiness (through DDL) and thus mitigate the impact of COVID-19 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 will be reached through the development of two main outputs:

- Creation of a capacity building programme, including a MOOC for teachers and school leaders' CPD, supported by a piloting scheme which actively involves students.
- Collaborative creation of a DDL Strategic Plan for Schools, as well as the Data Literate Handbook.

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2. Capacity Building Plan

The Capacity Building Plan is the first step to elaborate the Capacity Building Programme for Digital Data Literacy. The plan will outline the core activities to be developed and delivered in order to achieve the main goals of the programme.

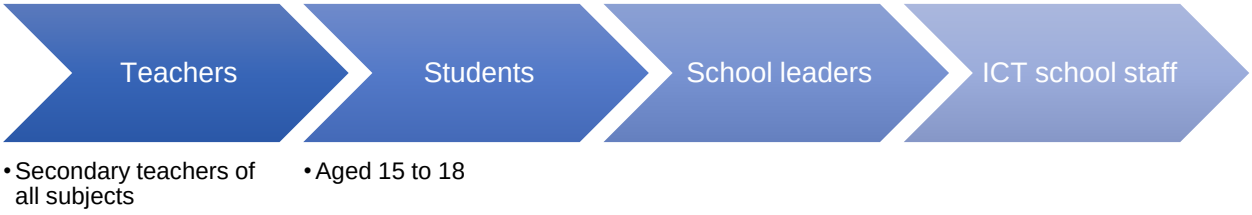
This document presents the objectives of the Capacity Building Programme for Digital Data Literacy, the target groups and the planned timeline. The methodology comprises developing the plan, the training contents and materials, deliver the training package to teachers and the following piloting in the classrooms. Ahead in the document, we will describe the course and each of its 6 modules along with the specific learning outcomes it is expected that participants acquire, the time effort, the schedule of the synchronous sessions and the assessment methodology.

Objectives

The definition and development of a capacity building plan aims to narrow 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, this plan will contribute to specific teachers' competences development needs framed in DigComp and DigCompEdu. Furthermore, the present Capacity Building Plan also has as main reference the study: "Data literacy on the road: Setting up a large-scale data literacy initiative in the DataBuzz project".

Target group

The Capacity Building Programme addresses **secondary school teachers of all subjects**. Inherently, Data Literate will address students aged 15 to 18 (ISCED 3), to significantly increase their data literacy competences. Additionally, the project aims to directly target school leaders and ICT school staff. It will also indirectly reach Data science and Data literacy professionals.



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Timeline

The capacity building plan is due in October 2021, alongside the preparation of the training course led by INOVA+ and Dataninja. The training course, with all its resources will be available at the beginning of December and the training for teachers is due to start in the same month, with the first synchronous session. The training for teachers is planned to be completed between December and February.

After completing the course, trained teachers will enter the piloting in the classroom stage which will run until June 2022. At this stage of the project, teachers will have the opportunity to put in practice the lessons learnt and empower their students in digital literacy.

	Apr /21	May /21	Jun /21	Jul /21	Aug /21	Sep /21	Oct /21	Nov /21	Dec /21	Jan /22	Feb /22	Mar /22	Apr /22	May /22	Jun /22
Capacity Building Programme for Digital Data Literacy															
1. Develop the capacity building plan															
2. Develop the educators training course contents															
3. Train the educators from partner schools															
4. Pilot in the classroom															

Table 1 – Training Timeline

Methodology

The Capacity Building Programme for Digital Data Literacy is divided into the following four tasks:

1. **Capacity building plan**

The main structure of the Teacher Capacity Building Plan will be drafted, including objectives, timeline, methodology, learning outcomes, key topics, training activities and training mentor role. The following identified competences will be taken into account:

- Access and gather relevant data from available sources;
- Synthesize and analyse diverse data;
- Know about and use student-level and other types of data beyond assessment data;
- Understand how to use different types of data;
- Use data to tailor instruction to diverse groups of students;
- Use one's own data;
- Facilitate student understanding of data;

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- Communicate about data with diverse stakeholders.

The Data Literacy Teachers' Fellowships, which consists of a group of teachers, will review the Capacity Building Plan in its draft version and provide their feedback based on a structured questionnaire developed to collect information on the quality and consistency of the plan. Based on the feedback collected, the project team will then produce the final version of the Capacity Building Plan.

2. Educators training course contents

The training course will consist in a MOOC, free, online and available for all. The draft version of the MOOC was tested online during two partners meetings, counting with project partners staff to validate its effectiveness, use and relevance. The MOOC will be user-friendly for the purpose of school environments and designed for twelve weeks duration, totalling 96 hours (average of 32 hours each month, which teachers can freely manage).

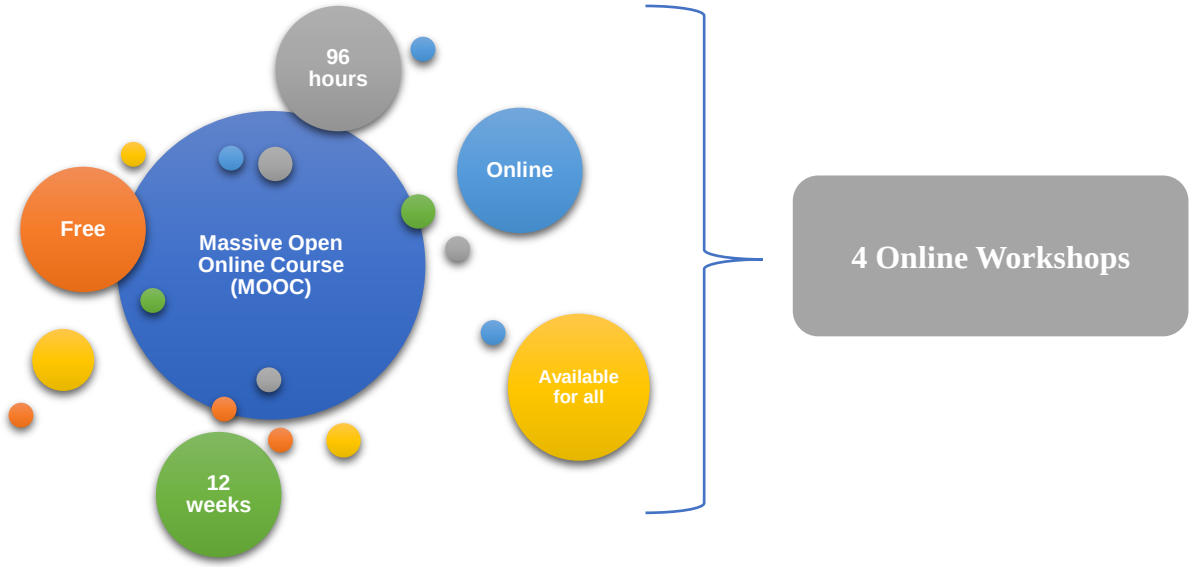
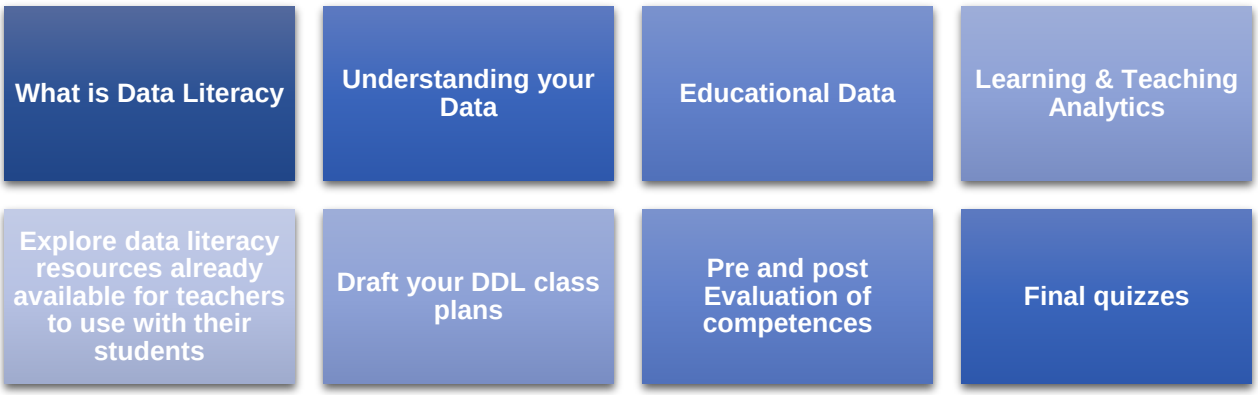
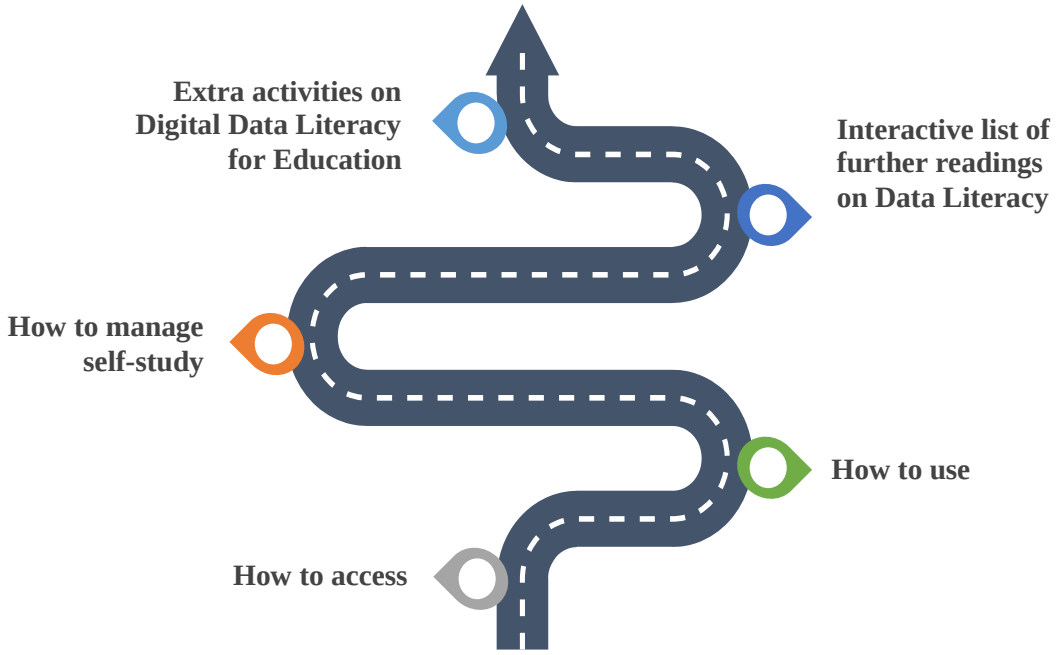


Table 2- MOOC Structure

Partners will consider the possible topics for the modules:



In order to support the MOOC, a pack of materials will be developed including a step-by-step guide:



3. Train the educators

The training will start by assigning the training mentors, which will be responsible for overseeing the training process, answering doubts, and providing support.

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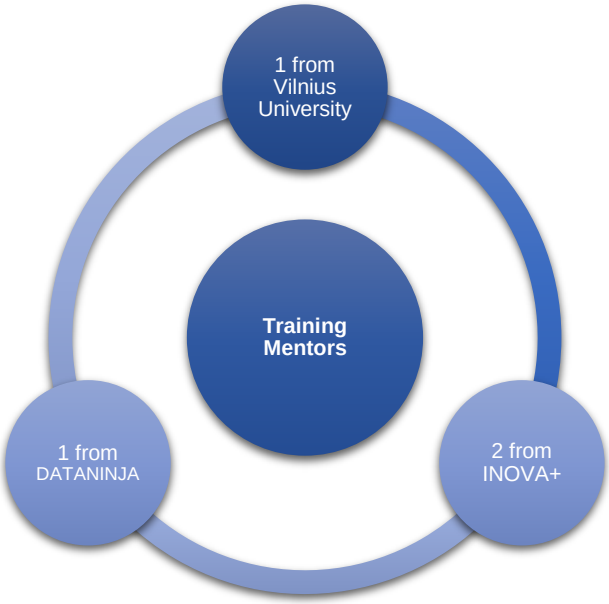
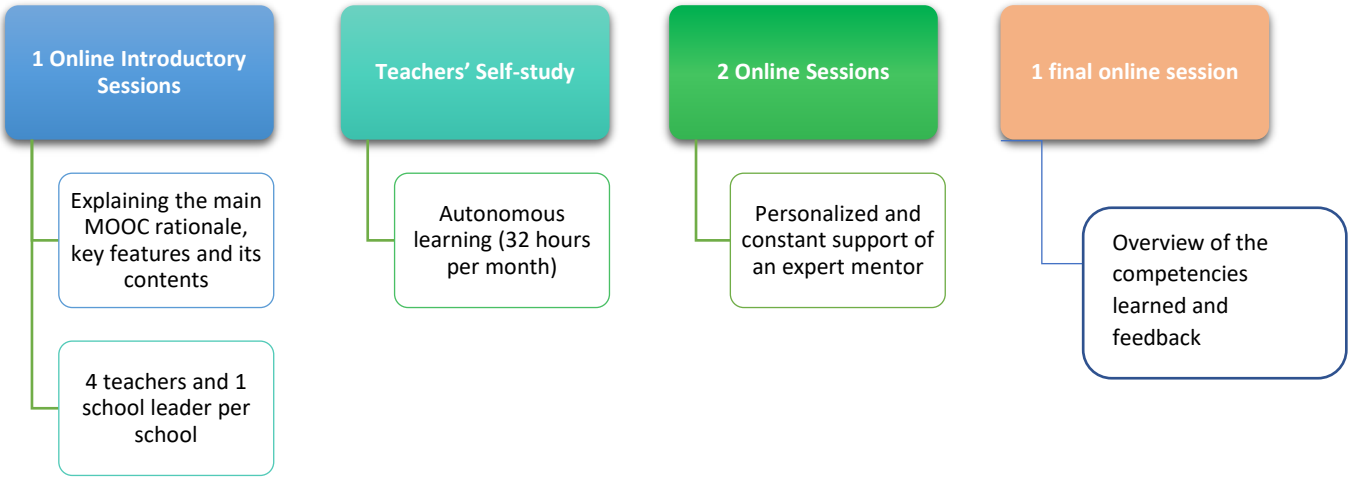


At its beginning, one online session with the partners will be organized for explaining the main MOOC rationale, key features and its contents. Schools will then involve at least four teachers and one school leader each in the online introductory session. Designed for 12 weeks duration and totalling 96 hours (average of 32 hours each month which teachers can freely manage), the training will rely on teachers' self-study but will also count with 4 synchronous online sessions throughout. Training mentors will assure that teachers and school leaders, although doing most of the work independently, can count with the personalized and constant support of an expert mentor.



The synchronous sessions are planned to take up to 2 hours each where more demanding subjects will be explained by training mentors.

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In total, there will be 8 hours of synchronized sessions aiming at providing tailored support to teachers in specific subjects. The first synchronized session will aim at presenting the team, introducing the course and its contents, duration and time effort expected and explain the assessment process. The next three synchronized sessions will be delivered in Modules 5 and 6 according to the following timetable:

Module/ Month	December 21	January 22	February 22
Introduction to the course	**Sync session 1** 15/12/21, 15h30		
1. What is data literacy?			
2. Understanding your data			
3. Educational data			
4. Learning and Teaching Analytics			
5. Explore data literacy		**Sync session 2** 28/01/2022, 15h	
6. Draft your DDL class plans			**Sync session 3 and 4** TBD

The synchronous sessions are not mandatory, but teachers are encouraged to attend or watch the recorded session afterwards, in case they are unavailable.
The final synchronised session will serve the purpose of allowing teachers to present their DDL plans and receive feedback from the group.

4. Pilot in the classroom

Teachers participating in the educators training course will pilot all the knowledge, methodologies and materials, which they worked on within their classes.

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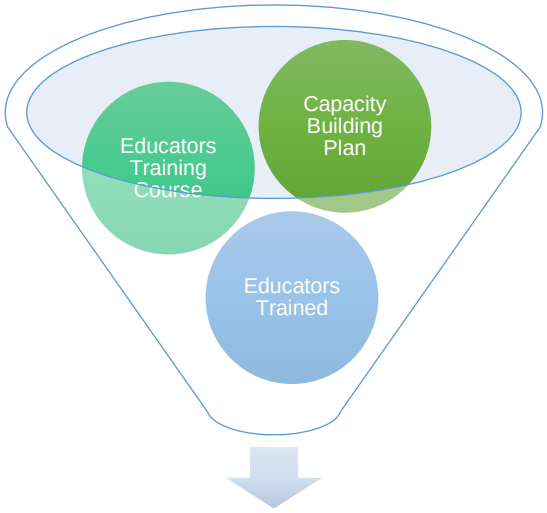

The aim is that the teachers put in practice the following actions:

- Use DDL for continuously, effectively, and ethically access, interpret, act on, and communicate multiple types of data from state, local, classroom, and other sources to improve outcomes for students in a manner appropriate to educators' professional roles and responsibilities;
- Develop their own digital data literacy class plans (2 per teacher).
- Promote the implementation of a DDL students projects (10 per school) which will be presented during multiplier events.

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The pilot will contribute to teachers' practical approach and development of DDL competences. Teachers will also foster student's DDL awareness and skills. In the end, each school should write a pilot report. After the pilot, the MOOC will be freely available and it is expected that at least 20 more teachers (outside the consortium) undertake the MOOC, during the project lifespan.

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3. Learning Outcomes

General outcomes

By the end of the Capacity Building Programme for Digital Data Literacy, teachers will be able to:

- Articulate information needs, to locate and retrieve digital data, information and content;
- Judge the relevance of the source and its content;
- Store, manage, and organise digital data, information and content;
- Use new teaching resources and skills on digital data literacy through CPD (Continuous professional development);
- Generate, select, critically analyse and interpret digital evidence on learner activity, performance and progress, to inform teaching and learning;
- Continuously, effectively, and ethically access, interpret, act on, and communicate multiple types of data from state, local, classroom, and other sources to improve outcomes for students in a manner appropriate to educators' professional roles and responsibilities.

Specific outcomes

- Perform well-defined searches to find data, information and useful content for teaching;
- Being able to select reliable sources of information;
- Select, organize and retrieve information regarding classes, students and evaluations in a confident manner, keeping data safe;
- Use data to tailor instructions to diverse groups of students;
- Adapt a variety of digital technologies in order to interact with students, catering for different learning styles;
- Facilitate student´s understanding of data;
- Plan and integrate learning activities and assignments which requires students to use digital technologies effectively;
- Acquire knowledge on different tools and digital resources available to address specific learning objectives, according to the competence level of the students

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- Identify possible restrictions to the use of digital resources (copyright, file type, legal provisions, accessibility)
- Communicate about data with diverse stakeholders.

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4. Modules and Key Topics

Module 1: What is Data Literacy

Understanding what digital data means, its importance and applicability to classrooms is the first topic in the course. Teachers will be invited to think about data searching as a useful tool to support planning and delivery of their classes. At the same time, teachers who are able to collect, organize and analyse data will be in a better position to provide their students with detailed feedback on their progress and grades but, most importantly, the information gathered through homework, assignments and tests can be used to tailor and plan lessons according to student's needs.

Teachers are expected to dedicate 15 hours to this module including time for self-study and reading of support materials, attending a synchronous session and complete a quiz, at the end of the module.

Module 2: Understanding your Data

In this module, teachers will learn about different types of data and understand when to apply it, being able to evaluate accuracy and transform information into action plans, e.g. into adjusted lesson plans. This module will also provide teachers with an overview of how to present information and what tools /resources can be used to manage and interpret data.

Data, qualitative or quantitative, must be interpreted from within a particular content domain for it to make sense and be connected to subsequent teaching practices. Teachers must interpret the data while considering relevant learning progressions or similar content specifications within the domain. As they develop instructional plans, teachers will keep in mind the data, their knowledge of the pedagogy that is specific to their content area, and their understanding of how students can best learn that content.

Within the subject of understanding data, it is of major importance to be aware of topics such as data ethics and privacy, licences and copyright laws, which this module will focus on. Another disposition is using data responsibly and ethically. This means understanding how to protect student privacy and confidentiality, which is becoming a major issue in education. Even well-intentioned educators may inadvertently engage in data breaches. If two teachers discuss

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a student in public and they are overheard, that would be a breach of student data privacy. All educators must be well-versed in responsible data use.

To conclude this module, teachers must dedicate 15 hours to self-study and reading of support materials and complete a final quiz.

Module 3: Learning & Teaching Analytics

Teaching Analytics has been gaining prominence within school educators due to its potential to identify optimal ways to enhance teaching performance. Teaching analytics entails a new theoretical approach, which combines teaching expertise, visual analytics and design-based research to support teacher's diagnostic pedagogical ability to use data and evidence to improve the quality of teaching.

Teachers need to equip themselves with the knowledge necessary to understand the complexity of teaching and the learning environment. Providing teachers access to analytics associated with their teaching practice and learning outcome can improve the quality of teaching practice.

In this module, teachers will get familiar with many tools that help with analysing and describing data. For instance, visual representations such as dashboards can be used to present teaching data to help teachers reflect and make appropriate decisions to inform the quality of teaching.

Due to the technical content of this module, teachers will have more time available to complete the learning, which adds up to 20 hours of self-study. At the end of the module they must complete a quiz.

Module 4: Explore data literacy resources already available for teachers to use with their students

Using technology for education provokes student's curiosity, boost their engagement, and leads to better learning and comprehension. These factors are a priority for every effective teacher and today they can be easily achieved by using digital tools in classroom.

During this module, teachers will improve their knowledge on resources and digital tools already available to teach. Teachers will also gain knowledge on diverse digital tools they can

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use to deliver interesting and dynamic lessons, focused on increasing student´s motivation and interest. The theoretical part of this module will provide teachers with an overview of the most relevant, free and easy to use apps and software for collaborative learning, for instance, Padlet, Mentimeter, Kahoot, Google Classroom, Quizlet, Socrative, Storybird, Prezi and many others. The main goal is to offer teachers the information on some of the most useful tools, but also encourage them to try them and explore other resources available online.

This module requires 15 hours of self-study and completing a final quiz.

Module 5: Educational Data

Data is one of the most powerful tools to inform, engage, and create opportunities for students along their education journey—and it‘s much more than test scores. Data helps us make connections that lead to insights and improvements.

Teachers and Education Institutes deal with a lot of data related to students marks, demographics, observations, attendance and so on. Therefore, this module will focus on managing student´s data effectively and describe the advantages of doing so. In particular, the content of the module aim at enhancing teacher´s ability to:

- Using assessment results to pivot teaching and learning;
- Use digital resources to evaluate a broad range of competencies for diverse students and subjects;
- Perform predictive analytics using student´s information in order to include rather than exclude under represented students
- Gain knowledge on multiple resources and tools that support data use in an effective manner for teaching.

In line with the previous modules, the materials and exercises within the *Educational Data* module requires 15 hours of time effort. To complete this module, teachers must complete a practical exercise.

Module 6: Draft your DDL class plans

The last module of the course aims at challenging teachers to apply the knowledge and the skills developed throughout the course and draft their own digital literacy plans. Based on the

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content of the course, teachers will reflect on how to bring this information to students and make use of online tools to convey the message.

Each teacher will draft and present two plans, which must include 1) subject and learning objectives, 2) duration of the lesson, 3) methodology, 4) digital resources to use, 5) practical activities.

There will be two synchronised sessions, where training mentors will be available to support teachers with this activity. The last synchronised session will work as a sharing session where teachers will have the opportunity to present their DDL plans with other professionals and gather feedback.

This module requires an investment of 20 hours to prepare DDL plans that will later be applied to each teacher´s classroom.

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5. Training Evaluation

The training evaluation will have a quantitative and a qualitative component. The quantitative results/ grades will derive directly from the quiz results at the end of each module. In total, each quiz is scored with 15 points and teachers must answer correctly to at least half of the questions, otherwise they must go through the learning materials one more time and engage in a new attempt to complete the quiz successfully before moving on to the next module.

In order to complete modules 5 and 6, teachers must complete a practical exercise which entail building and analysing a small database and extract the main results.

In addition, the quality of the DDL plans will be evaluated considering the diversity and suitability of the digital resources planned to employ in the classes.

Assessment Criteria

Modules	Learning Outcomes	Evaluation method	Rating
1. What is Data Literacy?	○ Articulate information needs, locate and retrieve digital data, information and content ○ Judge the relevance of the source and its content, thus being able to select reliable sources of information ○ Acquire knowledge on where and how to find data	Quiz (Multiple Choice, True/False exercises)	15
2. Understanding your data	○ Store, manage, and organise digital data, information and content. ○ Identify possible restrictions to the use of digital resources (copyright, file type, legal provisions, accessibility). ○ Facilitate student's understanding of data.	Quiz (Multiple Choice, True/False exercises)	15
3. Educational Data	○ Store, manage, and organise digital data	Quiz (Multiple Choice,	15

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	○ Generate, select, critically analyse and interpret digital evidence ○ Continuously, effectively, and ethically access, interpret, act on, and communicate multiple types of data	True/False exercises)	
4. Learning and Teaching analytics	○ Acquire knowledge on different tools and digital resources ○ Continuously, effectively, and ethically access, interpret, act on, and communicate multiple types of data	Quiz (Multiple Choice, True/False exercises)	15
5. Explore data literacy resources already available	○ Select, organize and retrieve information regarding classes, students and evaluations in a confident manner, keeping data safe ○ Use data to tailor instructions to diverse groups of students	Practical Exercise (see assessment criteria below)	20
6. Draft your DDL plans	○ Plan and integrate learning activities and assignments which requires students to use digital technologies effectively ○ Adapt a variety of digital technologies in order to interact with students, catering for different learning styles ○ Facilitate students' understanding of data	Practical Exercise (see assessment criteria below)	20
		Total	100

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Assessment criteria for Module 5 – practical exercise

Evaluation criteria	Means of verification	Rating
The teacher is able to formulate a question and collect the information needed to answer that question or hypothesis.	Presents a question/ Hypothesis	4
The teacher is able to organize the information on a database.	Presents an organized database	4
The database is “clean” and consistent (e.g. there are no missing values, students are correctly identified).	Data is consistent and there are no missing values /errors	4
The teacher is able to analyse data and extract main conclusions	Presents main conclusions based on data analysis	4
The teacher is able to plan some actions based on the results of the data analysis	Presents, at least, 2 measures to cater for the needs pointed out by the data	4
		Total: 20

Assessment criteria for Module 6 – session plans

Evaluation criteria	Means of verification	Rating
The teacher presents 2 session plans to deliver a digital data literacy class to students	2 session plans prepared	8
The session plans show clear objectives, a methodology (activities) and specific learning outcomes.	The plan presents objectives, methodology (supported with activities) and learning outcomes	6
The methodology and the plan is adaptable to students with different characteristics	Plan must be easily adaptable to students with different needs	2
The plan provides a real opportunity for students to reflect on the advantages of being data literate	Plan should have, at least, one activity that promotes awareness on the importance of being data literate	2
The planned class promotes practical activities for students and fosters engagement	The plan offers, at least, one activity which encourages students to put in practice data literacy skills	2
		Total: 20

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6. Training Mentor Role

Mentoring is a term that describes a relationship between a less experienced person known as a mentee or protégé and a more experienced person known as a mentor. Mentoring has traditionally been defined as a dyadic, face-to-face, long-term connection between a supervisory adult and a novice student that encourages the mentee's professional, academic, or personal development (Donaldson, Ensher, & Grant-Vallone, 2000). It is vital to note that the term "mentor" is derived from the male guide, Mentor, in Greek mythology, and that this historical context has influenced traditional forms of mentoring.

A mentor must be able to successfully adapt to a variety of styles and grasp various points of view. The role of a mentor is to listen, provide constructive feedback, and assist their mentee in considering various options and prospects. Some fundamental talents and attitudes are required to become a mentor, including the ability to:

- Respect different perspectives without passing judgment;
- Establish a meaningful dialogue with others, maintaining active listening and eye contact;
- Be aware of all dimensions of communication with others: verbal and nonverbal communication, recognizing the power of your smile;
- Address intelligent questions;
- Make and keep a personal commitment to assisting others in being the best that they can be;
- Make and keep a personal commitment to helping others be the best they can be.
- Be open to other points of view;

Show respect for others and their ability to make decisions.

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