IO4 – Training resources and approaches for HE professionals

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1. Introduction

The key idea of DEDALUS is to promote data literacy as a transversal competence that all university students, no matter of which faculty they are enrolled in, should have the right to access and integrate in their study courses in order to increase their employability. To do this, the consortium developed an innovative and consistent approach to support universities towards the inclusion of data literacy courses across their faculties, taking into account the differences among HE institutions in terms of organisation of didactics, resources at disposal, number of students, connection with job market, etc.

The IO4 constitutes the conceptual backbone for including data literacy in academic courses, and it is composed by innovative study concepts and blended didactic resources for HE professionals, as course organisers, professors, lecturers, study programme designers.

IO4 components were developed on the results of the research conducted at the beginning of the project that provided details on experience, best practices, needs and expectations of the target groups and main stakeholders.

This is a core output that makes possible the inclusion of data literacy as cross-cutting subject for university students, providing not only concrete courses contents but also strategies for course organisers to tackle potential organisational issues.

At the moment HE professionals interested in this field don't have organic and complete resources to use for integrating the academic offer with modular data literacy contents to be offered to a wide range of students.

Through the learning event, the HE professionals will become also more aware of the job market views and demand in terms of competence and know-how of the future employees.

These IO includes:

- The design of data literacy common syllabus, to design modular university courses
- The contents for online class-based courses and resources on data literacy that were piloted by the university partners of the project
- The training materials used in the train of trainers event (C1), covering the main aspects of data literacy inclusion in HE, from the organisation and integration with other subjects to the concrete syllabus and the validation system to assess the competence developed by the students in data-related domains.

The syllabus deigned by the consortium members are reported in the next section. The online contents for the pilot have been made available in the DEDALUS learning platform (IO) at the following address:

https://moodle.level5.eu/course/index.php?categoryid=17

The training materials used in the train of trainers event (C1) have been also published on the DEDALUS learning platform (IO) at the following address:

https://moodle.level5.eu/course/view.php?id=6

2. Vilnius University - Reading and creating data classification or rules

2.1. Didactic Frame Pattern

- **Summary**

A student after the completion of this course should be comfortable with analysing different types of data, when reading and creating data classification or rules.

A competent person should also be able to see the similarities and differences within the data that can signal opportunities or threats and drive future decision-making. This course is designed for undergraduate students and gives them basic understanding on relevant aspects of reading and creating data classification or rules related to special tools and methods, evaluation strategies also using the respective computer programmes.

- **Target group**

Target group is IV year students of the VU faculty of Economics and Business Administration. The average age is about 22 years old. According to the study program they are writing the Bachelor's paper.

The Batchelor course has 240 credits, of which 120 credits is allocated to achieve the results of studies in the field of economics. Other fields are management, accounting and finance, statistics and research methods, etc.

- **Themes (content area)**
  - Introduction to data literacy
  - Data accession/sourcing
  - Data analysis
  - Reading and creating data classification or rules
  - Data presentation

- **Learning objectives**
  - **Knowledge:** The Learner...
    - knows how to read, interpret and create data classification and rules, how to use them in practice
    - knows how to compile data classification and produce rules for classification
    - knows the key components of the main data classification models (e.g. quantitative vs qualitative, discrete vs continues)
    - knows how and when to apply these models to make it useful
    - knows, what kind of unspecified data can fit his task/purpose

- **Skills:** The learner…
    - is able to apply a variety of data classification and rules tools and methods for different data sets
    - is able to develop own data classification and rules strategies
    - is able to anticipate new trends, based on the available information
    - Is able to identify available unspecified data sources, relevant to his purposes.
    - Is able to distinguish relevant data from the abundance of open data sources

- **Attitudes:** The learner…
    - has curiosity to analyze data and to seek evidence, being open to new ideas creating data classification or rules
    - has skepticism about creating data classification or rules that is not supported scientifically
    - has the humility to admit that his/her creation of data classification or rules may be wrong when facing new information, characteristics that states otherwise
    - has curiosity to seek new (sometime – unexpected) open data sources which were not specified before.

- **Methods/Activities**
    - Synchronous online lectures and seminars
    - Asynchronous moodle sessions
    - Workgroups and collaborative assignments
    - Individual assignments
    - Practical learning, learn by doing.

- **Resources and materials**
    - DEDALUS learning ecosystem
    - LEVEL5 learning suite
    - Competence profile app
    - Slide visualization tool (player)
    - Miro Boards

2.2. Action Field pattern

Project	**Reading and creating data classification or rules**
Context	A competent person should be comfortable with analysing different types of data when creating data classification or rules. A competent person should also be able to see the patterns within the data that can signal opportunities or threats and drive future decision-making.
Target Group	Undergraduate programme students in Economics, Faculty of Economics and Business Administration, Vilnius University
Aims	Understand the relevant aspects of reading and creating data classification or rules, be able to use special tools and methods, evaluation strategies and ways of results' processing including respective computer programmes.
Resources	PowerPoint slides Digital material Available data sets (open, subscribed and other data resources) Data processing tools (computer programmes)
Activities	In class presentations and discussions Workshops Individual assignments Evaluation Certification

2.3. REFERENCE SYSTEM – Reading and creating data classification or rules

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing what kind of unspecified data can fit his/her task/purpose and how: - to distinguish relevant data from the abundance of open data sources and how to transfer these data into other contexts; - what kind of unspecified data can fit his/her task/purpose and find the ways how to collect them (if there are'nt other ways how to get row data).	Developing, constructing, transferring	Being able to distinguish relevant data from the abundance of open data sources and develop strategies how to use that data in the new professional and personal contexts. Actively planning and creating new respective activities.	Incorporation	Having internalised reading/creating data classification or rules for data processing as a personal and professional key competence and the respective mindset. Being an inspiration for others in their respective data processing activities.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to apply suitable	Discovering acting independently	Deliberately searching for and selecting or adapting available data sets or new (even – unexpected) possible/available	Self-regulation, Commitment	Being open minded to new ideas for creating data classification or rules in the own environment.

		tools, data collecting/ distinguishing/analysis methods and models (ways of results' processing and anticipation of new aspects of available data) including respective computer programmes. To know how to develop new ways of classifying, analysing and evaluating various aspects of data from available data sets.		data collecting sources which could be used for the own professional and personal field including: • be able to apply a variety of data analysis methods for different data sets • be able to develop own rules and strategies for distinguishing of relevant data for specific purposes from available data sets, which were collected for other purposes • be able to classify data according known or newly created rules in a methodologically correct way for different purposes • be able to create new rules for data classification, based on the available information Discovering new tools and approaches for for time trending and forecasting.		Finding it important to be creative in this respect.
3	Knowing how		Deciding/ selecting		Motivation/	Valuing data in general including developed certain personal qualities:

		Knowing the theory of different approaches, techniques and instruments (including relevant computer programmes as data processing tools) related to: • reading and interpreting available data, and how to use them for specific purposes; • breakdown available amount of data to the relevant data clusters according known data classification rules; • key components of the main research methods; • ability to use at least one computer programme dedicated for data processing (e.g. Excel, IBM SPSS, STATA, R etc.)		Taking part in relevant data collecting, distinguishing and/or processing activities as they are offered by others in safe (undisturbed) contexts. Choosing singular tools, evaluation strategies and data analysis methods including respective software from a given (known) portfolio.	appreciation	• having curiosity to test information and to seek evidence, being open to new ideas of data collection, distinguishing and classification • having scepticism about reliability and validity of available data, if it is not supported scientifically or officially; • having the humility to admit that the way of data collecting, distinguishing and/or chosen data analysis methods may be wrong when facing new information, experience or evidence that states otherwise. Being motivated to develop own respective data processing literacy.
2	Knowing why (distant understanding)	Having basic understanding on data collection methods and tools; Having basic knowledge on data analysis methods and ways of results' processing including respective	Using, imitating	Occasionally taking part in non-structured activities related to data collection, distinguishing relevant data from available data sets (using / imitating specific tools and data analysis methods)	Perspective taking	Being curious and interested in certain aspects related to data collection or data distinguishing from available data sets and the respective computer programmes (as data processing tools).

		computer programmes (as data processing tools).		including respective computer programmes (as data processing tools).		
1	Knowing what	Understanding that collecting, distinguishing or/and analysis for all kinds of data must be based on data classification or rules	Perceiving	Be able to recognise, read and understand available data sets directly, without taking actions or reflecting on them and their potentialities.	Self-orientation	Perceiving available data sets without relating them to oneself.

2.4. Learning pathway

2.4.1. List of Learning Units at Vilnius University

Unit No.	Title	Components	Total envisaged Time
1	Introduction to data literacy	● Concept/EU-Project ● Introduction to data literacy ● The skills involved in data literacy ● Critical thinking for data ● Introduction to data ● Metadata	2 hrs
2	Data accession/sourcing	● Information and data search and management ● Information retrieval strategy ● Searching for information/data in data sources created and / or subscribed by the institution ● Ethical issues, citation ethics ● Introduction to international data sources/archives (OECD; Passport; Eurostat etc etc); ● Introduction to national level data sources/archives ● National statistical information tools	6 hrs
3	Data analysis	● Basic statistics concepts and methods ● Tools/computer programmes for data analysis ● Case studies	2 hrs

4	Reading and creating data classification or rules	• Primary *vs* secondary data: creating own strategy • Development of rules for own data collection strategy • Data collection (primary or/and secondary data) for own purposes • Data storage methods • Rules for selection of data classification and processing methods	2 hrs
5	Data presentation	● Individual work ● Presentation of own data collection results	22 hrs

2.5. Learning modules/pathway in the learning field

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing what kind of unspecified data can fit his/her task/purpose and how: - to distinguish relevant data from the abundance of open data sources and how to transfer these data into other contexts; - what kind of unspecified data can fit his/her task/purpose and find the ways how to collect them (if there are'nt other ways how to get row data).	Developing, constructing, transferring	Being able to distinguish relevant data from the abundance of open data sources and develop strategies how to use that data in the new professional and personal contexts. Actively planning and creating new respective activities.	Incorporation	Having internalised reading/creating data classification or rules for data processing as a personal and professional key competence and the respective mindset. Being an inspiration for others in their respective data processing activities.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to apply suitable tools, data collecting/	Discovering acting independently	sets or new (ev… possible/available data collecting	ment	…ded to new ideas for …g data classification or rules in the own environment.

Case Studies
Reports, Observations

		distinguishing/analysis methods and models (ways of results' processing and anticipation of new aspects of available data) including respective computer programmes. To know how to develop new ways of classifying, analysing and evaluating various aspects of data from available data sets.		sources which could be used for the own professional and personal field including: • be able to apply a variety of data analysis methods for different data sets • be able to develop own rules and strategies for distinguishing of relevant data for specific purposes from available data sets, which were collected for other purposes • be able to classify data according known or newly created rules in a methodologically correct way for different purposes • be able to create new rules for data classification, based on the available information Discovering new tools and approaches for for time trending and forecasting.		Finding it important to be creative in this respect. Reflection on teaching modes
3	Knowing how	Knowing the theory of different approaches, techniques and	Deciding/ selecting	Taking part in relevant data collecting, distinguishing and/or	Motivation/ appreciation	ding lities: test information and to seek evidence, being open to new ideas of data processing.

Scientific information, theory based approach to data collection, classification and development of rules/criteria for analysis

Reflection of progress in teams

Individual project

		instruments (including relevant computer programmes as data processing tools) related to: • reading and interpreting available data, and how to use them for specific purposes; • breakdown available amount of data to the relevant data clusters according known data classification rules; • key components of the main research methods; • ability to use at least one computer programme dedicated for data processing (e.g. Excel, IBM SPSS, STATA, R etc.)		processing activities as they are offered by others in safe (undisturbed) contexts. Choosing singular tools, evaluation strategies and data analysis methods including respective software from a given (known) portfolio. Feedback		• having scepticism about reliability and validity of available data, if it is not supported scientifically or officially; • having the humility to admit that the way of data collecting, distinguishing and/or chosen data analysis methods may be wrong when facing new information, experience or evidence that states otherwise. Being motivated to develop own respective data processing literacy.
2	Knowing why (distant understanding)	Having basic understanding on data collection methods and tools; Scientific information, theory analysis computer programmes (as data processing tools).	Using, imitating	Occasionally taking part in non-structured activities related to data collection, distinguishing relevant data from available data sets (using / imitating specific tools and data analysis methods) including respective computer programmes (as data processing tools).	Perspective taking	Being curious and interested in certain aspects related to data collection or data distinguishing from available data sets and the respective computer programmes (as data processing tools).

1	Knowing what	Understanding that collecting, distinguishing or/and analysis for all kinds of data must be based on data classification or rules	Perceiving	Videos Be able to recognise, read and understand available data sets directly, without taking actions or reflecting on them and their potentialities.	Self-orientation	Perceiving available data sets without relating them to oneself.

2.6. Sequence of Relevant Learning Modules

Learning Unit name: Introduction to data literacy

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
1a	Introduction to data literacy	Presentation of concept/EU-Project and Introduction to Data literacy	Obtaining a general knowledge of the field of study.	Watching video and discussion	English (Arizona State University):	Watch the videos and outline what DL means for different target groups.	0.5 hrs

					https://www.youtube.com/watch?v=yhO_t-c3yJY	How do you like the Arizona State University explanation on DL? What was known for You and what was new/unexpected?	
1b	The skills involved in data literacy	Overview of the different skills that are part of data literacy (finding data, collecting and/or selecting data, data analysis, critical thinking etc.)	Obtaining a general knowledge of the methodology needed to work with data.	Slides			0.5 hrs
1c	Critical thinking for data	What is *critical thinking* and why is it important to assess data collection and processing	Obtaining a general knowledge of the *critical thinking* and its importance in the field of study	Watching video and discussion	English (University of Guelph, Library): https://www.youtube.com/watch	Watch the videos and discuss, what "Thinking Critically About Data" means for You and Your final paper?	0.5 hrs

					?v=ogz4fbQhq4Y		
1d	What is data	Basic concepts related to data types: primary and secondary data	Obtaining a practical knowledge of what type of data is needed for data projects	Watching video and discussion	English (Tine Wade, VIA University College): https://www.youtube.com/watch?v=tyqLRPxxDEw	Watch the videos and outline which type of data best fits your research (final paper) purposes? Why?	0.25 hrs
1e	Metadata	What is metadata and why is it important to assess data quality.	Obtaining a practical knowledge of data documentation.	Slides			0.25 hrs

Learning Unit name: Data accession/sourcing

Step	**Title**	**Content**	**Learning objective**	**Method/Activity**	**Media**	**Assignment**	**Learning Time**

No.							
2a	Information retrieval strategy	- Search planning; - search models; - selection of keywords; - search execution	Obtaining knowledge how to organize Your search for theoretical background (theories, data classification rules, research results, presented by other researchers) for Your own research	Slides			1 hrs
2b	Searching for information in the VU sources	Finding information and data resources available for VU students	Obtaining a practical knowledge of how to use information and data resources available for VU community (VU virtual library, VU subscribed databases and other information sources/tools)	Slides, Online demonstration	Lithuanina/English Resources of Vilnius University (virtual library): https://virtualibiblioteka.vu.lt/primo-explore/search?vid=VU&lang=en_		0.45 hrs

					US&fromRedirectFilter=true		
2c	Ethical issues	- media and information literacy - citation ethics - citation styles	Obtaining information how to use data and other information ethically	Presentation of online tool for information literacy and etchics	Lithuanian (Vilnius University library tool for education ir information literacy and etchics): https://rastingumas.biblioteka.vu.lt/		0,15 hrs
2d	Introduction to *Open data*	Introduction to Open Data concept	Obtaining a general knowledge of the field of study.	Watching video	English (Arizona State University): (4) Finding Your Own Data: Study Hall Data Literacy #15: ASU + Crash Course - YouTube		0.15 hrs

2e	Introduction to international data sources/ archives	Overview of the most popular international data sources/portals/ archives	Obtaining a practical knowledge of where to find data (presentation of OECD; Passport; World Bank; Eurostat etc.)	Slides Online demonstration	https://www.oecd.org/ https://www.worldbank.org/ https://www.euromonitor.com/ https://ec.europa.eu/eurostat		1 hrs
2f	Introduction to national level data sources/ archives	Overview of national statistical data sources/portals/archives	Obtaining a practical knowledge of where to find data (LiDa; MIDAS; OSP; GIS; etc)	Slides Online demonstration	http://lidata.eu/en/index.php https://www.midas.lt/public-app.html#/midas?lang=en https://osp.stat.gov.lt		0.45 hrs

Learning Unit name: Data analysis

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
3a	Basic statistics concepts	Overview of basic concepts in statistics, such as the distribution, measures of central tendency, outliers, comparing groups and normalizing data.	Obtaining a critical and practical knowledge of how to interrogate data.	Slides			1 hrs
3b	Tools/ computer programmes for data analysis	Overview of tools/computer programmes for data analysis (Excel, IBM SPSS, STATA, R, Tableau)	Obtaining knowledge and comparison of alternative tools/computer programmes for data analysis	Slides			0.5 hrs

3c	Case studies	Meaningful examples of how to use statistics to find stories insights in data.	Obtaining a general knowledge of the possible real-world applications of data analysis.	Slides			0.5 hrs

Learning Unit name: Reading and creating data classification or rules

Step No.	**Title**	**Content**	**Learning objective**	**Method/ Activity**	**Media**	**Assignment**	**Learning Time**
4a	Primary *vs* secondary data: creating own strategy	Primary *vs* secondary data: creating own data collection/ classification strategy	Obtaining a critical and practical knowledge of how to plan own research based on theoretical background	Slides			0.5 hrs
4b	Development of rules for own data collection strategy		Obtaining a critical knowledge of how to develop rules for own data collection strategy	Slides			0.5 hrs

4c	Data collection	Data collection sources (primary or/and secondary data) for own purposes	Obtaining a practical knowledge of how to identify data sources for data collection/ distinguishing for own purposes	Slides			1 hrs
4d	Data storage methods		Obtaining a practical knowledge of how to storage data	Slides			
4e	Rules for selection of data classification and processing methods		Obtaining a critical knowledge of how to identify most relevant methods for data processing	Slides			

Learning Unit name: Data presentation

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
5a	Individual work	Data collection (or distinguishing from available data sets) and analysis for individual project	Obtaining a critical and practical knowledge of how to work with data and solve the main hurdles.	Learning by doing		Craft a short presentation to communicate insights from analysed data.	20 hrs
5d	Data presentation	Put your knowledge into practice	Obtaining skills for presentation of results of individual data collection and analysis project				2 hrs

3. University of Novi Sad - Electronic Business

3.1. Didactic Frame Pattern

- **Summary**

The University of Novi Sad, Department of Industrial Engineering and Management will deliver course »Electronic business« to the junior students of the study program Engineering Management. The course is scheduled for the spring semester of the academic year 2020/21. Apart from theoretical part, the students will learn how to analyze, visualize, and interpret data with spreadsheet software Microsoft Excel.

- **Target group**

180 undergraduate students with technical background from the field of Engineering Management.

- **Themes (content area)**

Reading and Creating Data Visualization

- **Learning objectives**

After completion of the course, students will be able to define and create data visualization.

- **Knowledge:** The Learner...
  - Knows how to read and analyze data through spreadsheet software MS Excel
  - Has the knowledge base of most common charts and mapping models to define the best option to visualize the available data
  - Knows the common rules of data visualization in terms of accessibility and communication
- **Skills:**
  - Is able to apply a variety of analysis techniques to explore data such as filtering, grouping and sub-grouping
  - Is able to merge data with other data in a methodologically correct way and with the aim of enriching information that can be extracted from data
  - I able to handle data visualization tools with the most common features to create the most effective visualizations
- **Attitudes:**
  - Has a critical approach to data visualization in terms of clarity, methodology and communication effectiveness
  - Is open to give and receive feedback about his/her outputs in order to improve it in clearer way

- Is determined to promote transparent and responsible data visualization

- **Methods/Activities**
  - Blended learning and coaching
  - Internal workgroups
  - Weekly Synchronous MS Teams sessions
  - Self-assessments (electronically, issuing competence profiles)
  - Collaborative via LMS (team presentations)
  - Design Thinking
- **Resources and materials**
  - MS Teams
  - LMS
  - LMS contents as described below
  - Videos and scientific literature

3.2. Action Field pattern

Project	**Digital Visualization**
Context	The University of Novi Sad, with around 50,000 students and 5,000 employees, is one of the largest educational and research centers in Central Europe. It belongs to the group of comprehensive universities, which are characterized by providing nearly all fields of science and higher education. The University of Novi Sad has a well-developed research infrastructure and great potential for innovation. According to the good practice with e-learning courses, the course of e-business will be adopted to provide part about data literacy (i.e., data visualization for students of engineering management)
Target Group	180 undergraduate students, spring semester, third-year students from study program Engineering Management at the course of Electronic Business
Aims	The project aim is to learn students how to work with different empirical data in the MS Excel
Resources	MS Teams LMS Practical guide with examples
Activities	Workgroups Workshops Explore how to read data Explore how to visualize data Explore how to interpret data

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3.3. Learning Field - Reference System pattern

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing how to help other organizations to successfully solve the problem with data in different fields of work.	Developing, constructing, transferring	Being able to apply Data Visualization strategies into new professional and personal contexts in order to create a new business plan or activities.	Incorporation	To be recognized as a person who the inspiration for others in their respective data visualization activities.
4	Knowing when (implicit understanding)	According to the situation to know which methods are related to solving these "problems" and how to interpret it in practice way.	Discovering acting independently	To know how to search and select respective data visualization techniques and instruments to be able to apply a variety of spreadsheet tools and techniques for different data sets or to be able to create and test different kinds of data visualization with the results of data analysis.	Self-regulation, Commitment	To be creative and pro-active in using and improving the data visualization and interpretation competence in a familiar environment.
3	Knowing how	Knowing how to use relevant computer programs related to reading and analyzing data and how to use them in practice.	Deciding/ selecting	Taking the role in the project to help their team in the creating strategy of data visualization in order to choose singular tools and methods, evaluation strategies, and data visualization models including respective software.	Motivation/ appreciation	Valuing data, in general, to be curiosity to test information, being motivated to develop one's own respective data visualization competencies, and being self-critical about one's own data visualization.
2	Knowing why (distant understanding)	Having a basic knowledge of existing relevant tools and methods of such as Google Spreadsheets, MS Excel, SPSS. Having a basic understanding of how different types of data representation have different properties.	Using, imitating	In some situations to do some related data visualizations action in respective computer programs.	Perspective taking	Being curious and interested in respective computer programs for data visualization.
1	Knowing what	Comprehension of data valuation and interpretation.	Perceiving	Recognizing the importance of data visualization and interpretations without taking action.	Self-orientation	Perceiving data visualization content without knowing how to use it in a professional and personal context.

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3.4. Reference system on Digital Visualization

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing how to transfer "Reading and Creating Data Visualization" concepts into other contexts. Knowing how to help other people to act successfully in different fields of work and life in this respect, including respective computer programs.	Developing, constructing, transferring	Being able to transfer "Reading and Creating Data Visualization" strategies into new professional and personal contexts. Actively planning and creating new respective activities.	Incorpora-tion	Having internalized data visualization as a personal and professional key competence and the respective mindset. Being an inspiration for others in their respective data visualization activities and promoting transparency and responsibility
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to apply suitable tools and methods and data visualization techniques (ways of visualizing data) including respective computer programs. To know how to analyze and evaluate various aspects of "Reading and Creating Data Visualization" also critically.	Discovering acting independently	Deliberately searching for and selecting appropriate data visualization techniques and instruments for one's own professional field and personal use including: • be able to apply a variety of spreadsheet tools and techniques for different data sets • be able to develop own data visualization strategies • be able to process in a methodologically correct way the results of the data analysis for different purposes • be able to create and test different kinds of data visualization with the results of data analysis Discovering new tools and approaches for data visualization.	Self-regulation, Commit-ment	Being determined and pro-active in using and improving data visualization competence in familiar environment. Finding it important to be creative in this respect.

3	Knowing how	Knowing the theory of different approaches, techniques and instruments (including relevant computer programs) related to: • reading and analyzing data and how to use them in practice • selecting the right subset of data to be visualized • key components of the main data visualization software, e.g. GIS, Datawrapper, Tableau Public, Microsoft BI, Google Data Studio, etc. and how to use it to visualize data	Deciding/ selecting	Taking part in relevant data visualization activities/courses and public debates as they are offered by others in safe (undisturbed) contexts: Choosing singular tools and methods, evaluation strategies and data visualization models including respective software from a given (known) portfolio.	Motivation/ appreciation	Valuing data in general and: • having curiosity to test information and to seek evidence, being open to new ideas of data visualization. • Being skeptical about data visualization not supported scientifically, with a clear methodology and the possibility to access raw data; • Being self-critical about one's own data visualization, especially when facing new information, experience or conflicting evidence. Being motivated to develop one's own respective data visualization competencies.
2	Knowing why (distant understanding)	Having a basic knowledge of existing relevant tools and methods of "Reading Creating Data Visualization", including respective computer programs. Having a basic understanding how different types of data representation have different properties.	Using, imitating	Occasionally applying non-structured activities related to data visualization (using / imitating specific tools and methods, evaluation strategies and data visualization models) including respective computer programs.	Perspective taking	Being curious and interested in certain aspects and the potential of data visualization and the respective computer programs.
1	Knowing what	Understanding the importance of data visualization not only as an information instrument but also as a way to better interpret data.	Perceiving	Recognizing the meaning of data visualization without taking actions or reflecting on them.	Self-orientation	Perceiving data visualization content without relating it to one's own professional and personal context.

3.5. Learning Pathway

3.5.1. List of Learning and development units at UNS

Unit No.	Title	Components	Total envisaged Time
1	Introduction to data visualization	Concept of the course The list of tasks Task: Discover the MS Excel	2 hrs
2	The basic level of data visualization	Learn how to make Line with Markers Learn how to make Pie Chart	2 hrs
3	The intermediate level of data visualization	Learn how to create basic PivotTable Lear how to create PivotChart Learn how to use Conditional Formatting	2-4 hrs
4	The advanced level of data visualization	Learn how to use Scenario Summary Learn how to create Gant chart Learn how to use Monte Carlo simulation Learn how to use advanced PivotTable	2-4 hrs
6	The basic level of data interpretation	Learn how to interpret trends on the chart Learn how to interpret changes on the chart	2 hrs
7	The intermediate level of data interpretation	Learn how to interpret simulation in Solver Learn how to interpret results from regression analysis Learn how to interpret PivotChart	2-4 hrs
8	The advanced level of data interpretation	Learn how to interpret Monte Carlo simulation Learn how to interpret IF – AND analyses Learn how to interpret Gant chart	2-4 hrs
9	Finalization Finish	Assignments Evaluation	2 hrs

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3.6. Learning modules/pathway in the learning field

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing how to help other organizations to successfully solve the problem with data in different fields of work.	Developing, constructing, transferring	Being able to apply Data Visualization strategies into new professional and personal contexts in order to create a new business plan or activities.	Incorporation	To be recognized as a person who the inspiration for others in their respective data visualization activities.
4	Knowing when (implicit understanding)	According to the situation to know which methods are related to solving these ...ret it in practice	Discovering acting independently	To know how to search and select respective data visualization techniques and strategies to be able to apply a variety of spreadsheet tools and techniques for different data sets or to be able to create and test different kinds of data visualization with the results of data analysis	...n, Commitment	...eative and pro-active in using ...proving the data visualization and interpretation competence in a familiar environment.
3	Knowing how	Knowing how to use relevant computer programmes related to reading and analysing data and how to	Deciding/ selecting	...elp their team in ...alization in order ...hods, evaluation strategies, and data visualization models including respective software.	Motivation/ appreciation	Valuing dat... to test infor... develop or... visualization competencies, and being self-critical about one's own data
2	Knowing why (distant understanding)	...nowledge of existing ... methods of such as Google Spreadsheets, MS Excel, SPSS. Having a basic understanding of how different types of data representation have different properties.	Using, imitating	In some situations ... visualizations action ... programs.	Perspective taking	...erested in ...ms for data visualization.
1	Knowing what	Comprehension of ... interpretation.	Perceiving	Recognizing the importance of data visualization and interpretations without taking action.	Self-orientation	Perceiving ... without knowing how to use it in a professional and personal context.

Project tasks, Reports, Essays

Learn how to interpret simulation in Solver

Learn how to interpret results from ...

Learn how to interpret Monte Carlo simulation

Teaching material

Discover the MS Excel

Learn how to make Pie Chart

Learn how to use Conditional ...

The list of tasks

Concept of the course

Concept of the course

3.7. Sequence of Relevant Learning Modules

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
1	Chapter 1	Cell referencing Functions over arrays	To learn how to make basic line marks chart	MS Excel exercise and discussion	Excel exercise - 1	Do exercises at the class and homework 1	1h and 30min
2	Chapter 2	Introduction of external data Analysis of comparable sets data	Learn how to create pie char and interpret data	MS Excel exercise and discussion	Excel exercise - 2	Do exercises at the class and homework 2	1h and 30min
3	Chapter 3	Loan budgets and payment deadlines credit Database analysis with help derived tables	Learn how to create and interpret Pivot Table and Charts	MS Excel exercise, video tutorial and discussion	Excel exercise – 3 and https://www.youtube.com/watch?v=R83_A3OCj38	Do exercises at the class, watch video and homework 3	1h and 30min
4	Chapter 4	Database management	Learn how to manage database	MS Excel exercise, video tutorial and discussion	Excel exercise – 4 and https://www.youtube.com/watch?v=1wGxXvaui-	Do exercises at the class, watch video and homework 4	1h and 30min

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
5	Chapter 5	Text editing Merge worksheets and edit database	Learn how to interpret results in the intermediate charts	MS Excel exercise, video tutorial and discussion	Excel exercise – 5 and https://www.youtube.com/watch?v=CVhIe6DADNk&feature=youtu.be	Do exercises at the class, watch video and homework 5	1h and 30min
6	Chapter 6	Scenario analysis Conditional formatting and formatting worksheet for printing	Learn how to interpret scenario analysis and how to use conditional formatting	MS Excel exercise, video tutorial and discussion	Excel exercise – 6 and https://www.youtube.com/watch?v=7BY14qxZVFs&feature=youtu.be	Do exercises at the class, watch video and homework 6	1h and 30min
7	Chapter 7	Regression analysis Gantt chart Working with advanced IF functions and "AND"	Learn how to create Gant chart Learn how to analyze regression analysis	MS Excel exercise, video tutorial and discussion	Excel exercise – 7 and https://www.youtube.com/watch?v=aBqNYEtyJcc&feature=youtu.be	Do exercises at the class, watch video and homework 7	1h and 30min

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
8	Chapter 8	Advanced database analysis with help of derived tables	Learn how to create and interpret advanced Pivot Table and Charts	MS Excel exercise, video tutorial and discussion	Excel exercise – 8 and https://www.youtube.com/watch?v=ctgR7dL1M8I&feature=youtu.be	Do exercises at the class, watch video and homework 8	1h and 30min
9	Chapter 9	Monte Carlo simulation	Learn how to interpret results from Monte Carlo simulation	MS Excel exercise, video tutorial and discussion	Excel exercise – 9 and https://www.youtube.com/watch?v=EoKDJQtWrL4&feature=youtu.be	Do exercises at the class, watch video and homework 9	1h and 30min

4. University of Alcalà - Information Literacy

4.1. Didactic Frame Pattern

- **Summary**

This program addresses the essential concepts and skills relating to identifying, searching, evaluating, organising and communicating online information not limited to a specific field but applicable to all those where information managements.

- **Target group**

The target group is composed of those degree and postgraduate students of UAH who need to work with digital information as part of their routine of practice in their disciplines. The group may include degrees in all scientific areas: engineering, science and health, social sciences or humanities.

- **Themes (content area)**
  - Determine what online information is needed to meet a particular requirement.
  - Search securely for online information using search engines and social media applications.
  - Critically evaluate information using a range of criteria.
  - Manage and organise information using a range of tools.
  - Plan, draft, review and deliver online information.
- **Learning objectives**
  - **Knowledge:**
    - Understanding the concept of Information Literacy and it's facettes.
    - Understanding the transfer of literacy on digital work/research
    - Determine what online information is needed to meet a particular requirement.
    - Search securely for online information using search engines and social media applications.
    - Critically evaluate information using a range of criteria.
    - Manage and organise information using a range of tools.
    - Plan, draft, review and deliver online information.
  - **Skills:**
    - Information concepts: key concepts, sources of information
    - Information searching: define the information need, search engine usage, social media applications usage.
    - Evaluate and organize the information
    - Communicate information: plan and draft the information, review and deliver information.
  - **Attitudes:**

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- Will to know and be able to spread the knowledge about the information, advantages and disadvantages and the necessary steps to search and use the online information.
- Know the purpose of different information sources and identify the best way to obtain information.
- Be capable to define the steps about the information need and develop searching strategy.
- Will to learn how correctly use a search engine and the existing elements to improve the search.
- Be curious about social media applications, how they work, privacy problems and potential risks they may present.
- Be curious about the effective way to evaluate and organize the information.
- Will to learn how to draft the information, review it and deliver it in a effective way.

- **Methods/Activities**
  - Blended learning and coaching
    - Video to reinforce the topic understanding and its discussion and comments
    - Individual practical exercises
    - Self-evaluation tests
  - Practice workgroups
    - Final exercise assignment
  - Final exam and certification
    - ICDL certification exam

- **Resources and materials**
  - Information Literacy ICDL module
  - Moodle/BlackBoard contents: videos, practical exercises, self-evaluation tests
  - Collaborate sessions
  - ICDL certification exam

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4.2. Action Field pattern

Program	**Information literacy as transversal course for degree students at UAH**
Context	UAH is a public university with a commitment to teaching and research excellence, which it delivers by adapting its training provision to social change and social demands and by attracting and retaining talent. Located in the historic city of Alcalá de Henares, 30 kilometers from Madrid, the University has 28,000 students, 2,000 teaching staff and 800 service and administration staff. Its three campuses – the Historic, the Science and Technology and the Guadalajara Campuses— play home to 40 undergraduate degree programs, 78 official postgraduate programs and a broad offer of lifelong training courses in all fields of knowledge. Students in all degrees should get at least 10% of credits from transversal courses to complete their degree workload. Those credits could come, among other options, from summer courses and the so-called extension courses.
Target Group	Degree and postgraduate students from all scientific areas of UAH Possible: other university students and graduates from other universities wanting to learn on information literacy and get the ICDL certificate
Aims	Students get the foundations on information literacy to be equipped to apply its principles to their own specialisation area
Resources	Team from Dept of Computer Sciences of UAH

	Blackboard platform (Aula Virtual) of UAH
Activities	Practical work in teams

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4.3. REFERENCE SYSTEM – Digital creation literacy

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing how to manage, protect and share digital content any apply it into other contexts (e.g. education, healthcare). Knowing how to help other people to use digital content to advance their business activities.	Developing, constructing, transferring	Being able to develop new digital content strategies and transfer them into "*unknown*" professional fields. Actively planning and creating new digital content creation subject to copyright.	Incorpora-tion	Have their own professional value in digital content creation. They are an inspiration for a new learner to improve their knowledge in digital content creation and protection of sensitive content and data.
4	Knowing when (implicit understanding)	Knowing when to create and edit digital content in different formats, to modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge. To know how to critically analyse and evaluate digital content.	Discovering acting independently	Independently discovering new tools for digital content creation for professional and personal use with respect to possible copyright restrictions to using, re-using and modifying digital content.	Self-regulation, Commit-ment	Has a determined and pro-active attitude to create and edit digital content in their own environment. Finding it important to be creative in this field.
3	Knowing how	Theoretically knowing different approaches, techniques and instruments related to: • Internet literacy • Media literacy • Copyright literacy	Deciding/ selecting	Taking part in official digital content creation with digital tools. Selecting different tools for creating different digital formats.	Motivation/ appreciation	Understand the significance of digital content creation. Being motivated to develop your own digital content and to protect it.
2	Knowing why (distant understanding)	Having a basic understanding of digital content creation related to writing, editing, publishing, and copyrighting.	Using, imitating	Occasionally taking part in activities related to digital content creation. Using Internet and other digital tools.	Perspective taking	Have a curious and interesting approach in according to the certain tools related to the creation of digital content.
1	Knowing what	Knowing that digital technologies can be used for finding content.	Perceiving	Perceiving and recognizing tools for digital content creation without taking action on them.	Self-orientation	Observing digital content creation without relating it to oneself.

4.4. REFERENCE SYSTEM – Data Visualization

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing how to apply data visualizations concepts to other contexts, even how to spread data visualizations methods and techniques among interested people such as learners or students.	Developing, constructing, transferring	Being able to transfer Data visualization competencies in other contexts for professional and personal purposes.	Incorpora-tion	Perceiving data related competencies as a key factor, inspiring others in their respective contexts.
4	Knowing when (implicit understanding)	Distinguishing when to apply techniques and methods of visualizing data in different situations on the base of available data	Discovering acting independently	Acting autonomously for: analysing data with common techniques and methods defining data visualizations strategies and representation outputs exploring new possibilities of visualising data with new tools and strategies.	Self-regulation, Commit-ment	Becoming a kind of ambassador of data visualizations principles in familiar and professional contexts
3	Knowing how	Knowing methods and tools to create data visualizations such as basic analytics techniques and most relevant computer programmes (spreadsheet, charting tools)	Deciding/ selecting	Being fully able to handle a data visualising process from analysing data to creating data representations	Motivation/ appreciation	Evaluating data in general as for: Being interested in using data to seek information evidences Being sceptical about data visualization without a methodologic and scientific support Being open to receive feedback on his own work
2	Knowing why (distant understanding)	Knowing most common tools and methods of data visualizations and distinguishing the effectiveness of different types of data visualizations	Using, imitating	Being able to apply basic skills on data visualizations related contexts such as using tools or evaluating strategies.	Perspective taking	Being interested in certain aspects and the potential of data visualization
1	Knowing what	Understanding the potential of a data visualization in terms of way of informing and instrument of interpreting data	Perceiving	Understanding information through reading data visualizations	Self-orientation	Agreeing with the relevance of data visualizations without a specific methodologic approach.

4.5. Learning pathway

4.5.1. List of Learning and development Units at UAH

Unit No.	Title	Components	Total envisaged Time
1	Information Concepts	1.1 Key Concepts 1.2 Information Sources Intro Videos Kahoot Self-assessment on competences of Unit 1	2 x hrs
2	Searching for Information	2.1 Defining the Information Need 2.2 Using a Search Engine 2.3 Using Social Media Applications Videos Kahoot Exercise assignment Self-assessment on competences of Unit 2	3 x hrs
3	Evaluating and Organising Information	3.1 Evaluating Information 3.2 Organising Information Videos Kahoot Exercise assignment Self-assessment on competences of Unit 3	2 x hrs
4	Communicating Information	4.1 Planning and Drafting Information 4.2 Reviewing and Delivering Information Videos Kahoot Exercise assignment Self-assessment on competences of Unit 4	3 x hrs
5	Final exercise assignment and evaluation	Final exercise assignment Certification test	5 x hrs

5. Learning modules/pathway in the learning field

This learning path is related to LEVEL5:

- Digital creation literacy: level 5.
- Data visualization: level 2.

5.1. Sequence of Relevant Learning Modules

Learning Unit name: Information Literacy

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
1a	Intro video on information literacy	The most important points on Information Literacy in this course	To get a first explanation on DL To become curious in the theme	Watching video and group discussion	Own development	Watch the video and discuss the main points	15min
1b	Content explanation	Information concepts	1.1 Key concepts 1.2 Information sources	Lecture	Own	-	1h 15min
1c	Game	Kahoot	Reinforce the concepts	Game	Kahoot – own development-	Play together	10 min
1d	Self-Assessment	Self-assessment	To check if every topic have been correctly understood	Questions	Own	Answer the questions	20 min
2a	Video	Searching for information	To understand most important concepts To become curious in the theme	Watching video and group discussion	Own development	Watch the video and discuss the main points	15 min
2b	Content explanation	Searching for information	2.1 Defining the Information Need	Lecture	Own	-	2h 15min

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
			2.2 Using a Search Engine 2.3 Using Social Media Applications				
2c	Game	Kahoot	Reinforce the concepts	Game	Kahoot – own development-	Play together	10 min
2d	Self-Assessment	Self-assessment	To check if every topic have been correctly understood	Questions	Own	Answer the questions	20 min
3a	Video	Evaluating and organizing information	To understand most important concepts To become curious in the theme	Watching video and group discussion	Own development	Watch the video and discuss the main points	15 min
3b	Content explanation	Evaluating and organizing information	3.1 Evaluating Information 3.2 Organising Information	Lecture	Own	-	1h 15min
3c	Game	Kahoot	Reinforce the concepts	Game	Kahoot – own development-	Play together	10 min
3d	Self-Assessment	Self-assessment	To check if every topic have been correctly understood	Questions	Own	Answer the questions	20 min

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
4a	Video	Communicating information	To understandmost important concepts To become curious in the theme	Watching video and group discussion	Own development	Watch the video and discuss the main points	15 min
4b	Content explanation	Communicating information	4.1 Planning and Drafting Information 4.2 Reviewing and Delivering Information	Lecture	Own	-	2h 15min
4c	Game	Kahoot	Reinforce the concepts	Game	Kahoot – own development-	Play together	10 min
4d	Self-Assessment	Self-assessment	To check if every topic have been correctly understood	Questions	Own	Answer the questions	20 min
5a	Final exercise assignment and evaluation	Assessment	Apply all learned topics	Written activity	Search information/apply search engine filters to filter the information/draft the result	Written activity on learning unit	3h
5b	Certification test	Exam	ICDL Data literacy module	Exam	Own	Exam	2h

6. University of Southampton - Digital Literacy Learning Programme

6.1. Didactic Frame Pattern

- **Summary**

This module will focus on data collection, management and preprocessing from a data literacy perspective.

- **Target group**

Staff in an SME in the process of digital transformation.

- **Themes (content area)**
  - Data rights of use and intellectual property
  - Data quality, cleaning and preprocessing
  - Data collection
- **Learning objectives**
  - **Knowledge:**
    - Describe best practices around the use of data
    - Identify the main challenges around data collection, storage and management
    - Describe data structures and formats for effective data management
    - Explain the main principles of ethical and lawful use of data.
  - **Skills:**
    - Manage data in a spreadsheet
    - Clean, validate and perform quality checks on data
    - Restructure and organise data
    - Design a schema for data
    - Use a data ethics statement to evaluate your own data projects
  - **Attitudes:**
    - Becoming proactive in promoting best practices for data management
    - Becoming committed to lawful and ethical use of data within the organisation

- **Methods/Activities**
  - Read and watch
  - Participate in discussion forums
  - Complete quizzes
  - Clean a dataset

- **Resources and materials**
  - OERs developed by the Open Data Institute for an Erasmus+ project

6.2. Action Field pattern

Project	Digital Literacy
Context	Southampton Data Science Academy (SDSA) is a joint venture between the Web Science Institue of the Univeristy of Southampton and Cambridge Education Group Digital. SDSA produces CPD Data Science courses and distributes them among SMEs and bigger corporations.
Target Group	Professionals in an SME
Aims	Learners to engage in best data management practices
Resources	SOTON DEDALUS team An set of OERs
Activities	Read and watch Participate in discussion forums Complete quizzes Clean a dataset

6.3. Learning Field - Reference System pattern

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing , transferring	Being able to transfer the project in new (or enhanced) contexts	Incorpora-tion	Having internalised digitalisation as a personal and professional key competence and the respective mindset. Being an inspiration for others.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to research on or apply suitable digital instruments and tools. To know how to analyse and evaluate digitalisation also critically	Discovering acting independen tly	• Conceptualising a research project on different aspects of DL (Module 4.1) • .Developing a study project related to DL in different educational organisations (M. 8.3)	Self-regulation, Commit-ment	Being determined and pro-active in using and improving digital literacy in the own educational environment.
3	Knowing how	• Knowing different theoretical approaches to DL and its components • Understanding the literacy aspect in DL • Understanding the context dependence of DL	Deciding/ selecting	• Ability to differentiate different forms of literacy in an essay (descriptive) • Taking part in relevant digital application activities as they are offered by the UDE, • utilise digital tools for the assignments, (videos, pitches, narrative selfies, info graphics).	Motivation/ appreciation	• Valuing digitalisation in general. • Being motivated to develop own digital literacy in the professional/educational domain
2	Knowing why (distant understanding)	Having basic understanding on relevant aspects of digitalisation related to • digital (ICT) devices, • Internet, • social and digital media and • information technology and its purposes	Using, imitating	Using the digital resources provided by the university to access learning contents Reflect on different digital formats	Perspective taking	Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that DL has something to do with digitalisation and ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them in the professional/educational context	Self-orientation	Perceiving digitalisation without relating it to to own professional field.

6.4. Reference System – Digital Literacy

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing, transferring	Being able to transfer digitalisation strategies into new professional and personal contexts. Actively planning and creating new digitally based activities.	Incorporation	Having internalised digitalisation as a personal and professional key competence and the respective mindset. Being an inspiration for others in their digitalisation activities.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to apply suitable digital instruments and tools. To know how tp analyse and evaluate digitalisation also critically	Discovering acting independently	Deliberately searching for and selecting appropriate digital techniques and instruments for the own professional and personal field. Discovering new digital tools and approaches for the own context and professional domain.	Self-regulation, Commitment	Being determined and pro-active in using and improving digital literacy in the own environment. Finding it important to be creative in this respect.
3	Knowing how	Theoretically knowing different approaches, techniques and instruments related to: • ICT literacy: • Internet literacy • Information literacy • Media literacy	Deciding/ selecting	Taking part in relevant digital application activities as they are offered by others in safe (undisturbed) contexts. Choosing singular digital tools and activities from a given (known) portfolio	Motivation/ appreciation	Valuing digitalisation in general. Being motivated to develop own digital literacy.
2	Knowing why (distant understanding)	Having basic understanding on relevant aspects of digitalisation related to digital (ICT) devices, Internet, social and digital media and information technology	Using, imitating	Occasionally taking part in non structured activities related to digital tools, instruments and digitalisation. Operate computers and digital devices or to use general purpose software and Internet services.	Perspective taking	Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that digitalisation is based on ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them	Self-orientation	Perceiving digital tools without relating it to oneself.

6.5. Learning modules/pathway in the learning field

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing transferring	Being able to transfer the project in new (or enhanced) contexts	Incorpora-	Having internalised digitalisation as a personal and professional key competence and the respective mindset. n inspiration for others.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) t instrume and eva	Discovering acting	• Conceptu different aspects of DL (Module 4.1) veloping a study project related to DL in rent educational organisations (M. 8.3)	Commit- ment	determined and pro-active in using and improving digital literacy in the own educational environment.
3	K	ct in DL pendence of D		differentiate different forms of literacy as they bed) contexts, utilise digital tools for the assignments, (videos, pitches, narrative selfies, info graphics).		Valuing digitalisation in general. Being to develop own digital literacy in al/educational domain
2	) g basic unders ts of digitalisation es, Internet, social and digital media and information technology and its purposes		Using, imitating	U u R		Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that DL has something to do with digitalisation and ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them in the professional/educational context	Self-orientation	Perceiving digitalisation without relating it to to own professional field.

Project tasks, Reports, Essays

vidoes on teaching the DL

Reflection on teaching modes

Scientific texts, vidoes on Belshaw's approach

Reflection in work-groups on Belshaw

Case Studies Reports, Observations

Explanatory model 4 components

Modul 8.2 and 4.1

Reflection on teaching modes

Intro Videos

Discover the own digital environment

Self-assessing the own DL competencs

Intro Videos

7. blinc - Digital Literacy Learning Programme

7.1. Didactic Frame Pattern

- **Summary**

blinc is a European agency working in sustainable and holistic education and development. blinc creates innovative joint development projects, applies for funding at different European programmes and manages/delivers the projects in teams of European partners. It works in AE, HE, School, VET education and youth in different societal domains. The learning programme aimed at developing data literacy competences on interns they host.

- **Target group**

Interns from a qualification of project management/European PM

- **Themes (content area)**
  - Digital literacy
  - Digital offers in Competence Oriented Learning
  - European Projects and Project Development on DL
- **Learning objectives**
  - **Knowledge:**
    - Understanding the concept of Digital Literacy and it's facettes
    - Understanding the transfer of literacy on digital work/research
    - Understanding the impact and the consequences for training and learning
    - Understanding the European (Educational) background
  - **Skills:**
    - Describing DL in the own context
    - Connecting DL and COL&V
    - Metacognition: Think about the competence development in regard to DL
    - Developing a research theme for the internship project
    - developing a project concept for potential clients in our team in a design thinking approach on Digital Literacy
  - **Attitudes:**
    - Becoming curious about Digital Literacy as internship topic
    - Becoming motivated to develop a project on it
    - Becoming committed to continue with it and to bring it about to other team members and external people

- **Methods/Activities**

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- Blended learning and coaching
    - F2F welcoming sessions (1-3), internal workgroups and one mentor
    - Weekly Synchronous zoom sessions
    - Asynchronous Moodle contents with interactive materials
    - Self-assessments (electronically, issuing competence profiles)
    - Collaborative via mahara (team presentations) and MIRO (joint boards)
- Workgroups
- Learning and research project
- Design Thinking

- **Resources and materials**
    - LEVEL5 learning suite
    - Moodle contents as described below
    - Zoom professional (incl. breakout rooms)
    - Competence profile app
    - Videos and scientific literature

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7.2. Action Field pattern

Project	Digital Literacy in internships at blinc/Q21
Context	blinc is a European agency working in sustainable and holistic education and development. Blinc creates innovative joint development projects, applies for funding at different European programmes and manages/delivers the projects in teams of European partners. It works in AE, HE, School, VET education and youth in different societal domains. It regularly hosts (European) interns with the aim to accompany them at high quality and to prepare them for a job in this domain.
Target Group	Participants of a Project Management CPD for academics Possible: Mentors and Teaching staff
Aims	Students work with different empirical research methods and apply them in the DL field
Resources	Blinc team REVEAL network 10-15 running projects Own digital platforms
Activities	Workgroups Exploring Digital Literacy Developing a research design Carrying out the research Evaluation Transfer to the next group

7.3. Learning Field - Reference System pattern

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing , transferring	Being able to transfer the project in new (or enhanced) contexts	Incorpora-tion	Having internalised digitalisation as a personal and professional key competence and the respective mindset. Being an inspiration for others.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to research on or apply suitable digital instruments and tools. To know how to analyse and evaluate digitalisation also critically	Discovering acting independen tly	• Conceptualising a research project on different aspects of DL (Module 4.1) • .Developing a study project related to DL in different educational organisations (M. 8.3)	Self-regulation, Commit-ment	Being determined and pro-active in using and improving digital literacy in the own educational environment.
3	Knowing how	• Knowing different theoretical approaches to DL and its components • Understanding the literacy aspect in DL • Understanding the context dependence of DL	Deciding/ selecting	• Ability to differentiate different forms of literacy in an essay (descriptive) • Taking part in relevant digital application activities as they are offered by the UDE, • utilise digital tools for the assignments, (videos, pitches, narrative selfies, info graphics).	Motivation/ appreciation	• Valuing digitalisation in general. • Being motivated to develop own digital literacy in the professional/educational domain
2	Knowing why (distant understanding)	Having basic understanding on relevant aspects of digitalisation related to • digital (ICT) devices, • Internet, • social and digital media and • information technology and its purposes	Using, imitating	Using the digital resources provided by the university to access learning contents Reflect on different digital formats	Perspective taking	Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that DL has something to do with digitalisation and ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them in the professional/educational context	Self-orientation	Perceiving digitalisation without relating it to to own professional field.

7.4. Reference System on Data Literacy

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
L	**Level Titles**	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing, transferring	Being able to transfer digitalisation strategies into new professional and personal contexts. Actively planning and creating new digitally based activities.	Incorporation	Having internalised digitalisation as a personal and professional key competence and the respective mindset. Being an inspiration for others in their digitalisation activities.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to apply suitable digital instruments and tools. To know how tp analyse and evaluate digitalisation also critically	Discovering acting independently	Deliberately searching for and selecting appropriate digital techniques and instruments for the own professional and personal field. Discovering new digital tools and approaches for the own context and professional domain.	Self-regulation, Commitment	Being determined and pro-active in using and improving digital literacy in the own environment. Finding it important to be creative in this respect.
3	Knowing how	Theoretically knowing different approaches, techniques and instruments related to: • ICT literacy: • Internet literacy • Information literacy • Media literacy	Deciding/ selecting	Taking part in relevant digital application activities as they are offered by others in safe (undisturbed) contexts. Choosing singular digital tools and activities from a given (known) portfolio	Motivation/ appreciation	Valuing digitalisation in general. Being motivated to develop own digital literacy.
2	Knowing why (distant understanding)	Having basic understanding on relevant aspects of digitalisation related to digital (ICT) devices, Internet, social and digital media and information technology	Using, imitating	Occasionally taking part in non structured activities related to digital tools, instruments and digitalisation. Operate computers and digital devices or to use general purpose software and Internet services.	Perspective taking	Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that digitalisation is based on ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them	Self-orientation	Perceiving digital tools without relating it to oneself.

7.5. Learning pathway

7.5.1. List of Learning and development Units at blinc

Unit No.	Title	Components	Total envisaged Time
1	Introduction to data literacy	Concept/EU-Project Intro to Digital literacy Intro Videos Task: Discover the own digital environment	2 hrs
2	Digital literacy	Scientific Theory input on explanatory model 4 components of DL Self-assessment on competences of DL #1 Bridge: Why literacy?	2 hrs
3	Focus on literacy	Doug Belshaw's approach Reflection on other literacies and difference and innovation in "digital literacy"	2-4 hrs
4	DL and teaching and education (optional)	Video Reflection and essay on appropriate teaching modes	2-4 hrs
6a	Project Preparation and start	Assignments: • Formulate an overarching development question include DL • literature search as a basis for operationalisation • Design thinking on innovative teaching approaches for DL • Challenges: on institutional and organisational levels • Team profile: create motto, make narrative selfie	2
6b	Development	• Ideating • Reflection and selection	
6b	Finalisation Finish	• Prototyping and • Pitch • Competence assessment #2	

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

7.6. Learning modules/pathway in the learning field

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing transferring	Being able to transfer the project in new (or enhanced) contexts	Incorpora-	Having internalised digitalisation as a personal and professional key competence and the respective mindset. n inspiration for others.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) t instrume and eva	Discovering acting	• Conceptu different aspects of DL (Module 4.1) veloping a study project related to DL in rent educational organisations (M. 8.3)	Commit-ment	determined and pro-active in using and improving digital literacy in the own educational environment.
3	K ect in DL endence of D			differentiate different forms of literacy as th bed) contexts, utilise digital tools for the assignments, (videos, pitches, narrative selfies, info graphics).		Valuing digitalisation in general. Being to develop own digital literacy in al/educational domain
2	) g basic unders ts of digitalisation es, Internet, social and digital media and information technology and its purposes		Using, imitating	Us u R		Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that DL has something to do with digitalisation and ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them in the professional/educational context	Self-orientation	Perceiving digitalisation without relating it to to own professional field.

Project tasks, Reports, Essays

vidoes on teaching the DL

Reflection on teaching modes

Scientific texts, vidoes on Belshaw's approach

Reflection in work-groups on Belshaw

Case Studies Reports, Observations

Explanatory model 4 components

Modul 8.2 and 4.1

Reflection on teaching modes

Intro Videos

Self-assessing the own DL competencs

Discover the own digital environment

Intro Videos

7.7. Sequence of Relevant Learning Modules

Learning Unit name: Introduction to data literacy

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
1a	Intro video on digital literacy	Different approaches to DL for different target groups	To get a first explanation on DL To become curious in the theme	Watching video and discussion	Videos: Was ist eigentlich...Digital Literacy?, Internetbeauftragte der Bundesregierung, Gesche Joost https://www.youtube.com/watch?v=ILQFh_PUwVQ English (BBC): https://www.youtube.com/watch?v=_LElWqXi7Ag	Watch the videos and outline what DL means for different target groups How do you find the digital resources at your University. How do you like the BBC explanation on that?	30min
1b	Theoretical model #1	Theoretical Text by J.A.	To understand first aspects of DL To	Reading text and making simple test (H5P)	Jimoyiannis A. (2015). Digital Literacy and Adult Learners. In M. J. Spector (ed.), The SAGE Encyclopedia of Educational Technology	H5P texts	
1c	Reflection	On “Literacy”	To connect literacy to competences	Discussion Resaech	None; collecting own sources	Why do we talk about literacy? What is the difference to digital competences? Please collect scientific publications and explanatory approaches	
2	Literacy and Digital Literacy	Different components and	To understand the complexity	Reading Discussion in the group	Text of Doug Belshaw The summary and the whole book and a Video:	Please learn about the approach of Doug Belshaw with the provided information	2 days

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
		innovation in DL	and the concept.		The essential elements of digital literacies: Doug Belshaw at TEDxWarwick	Please present Doug's model in your own way. It can be a ppt, an info graphic or a poster – it's your choice. Present it in a video not longer than 3 min.	
3	##	##	##	Team	Digital literacy: Implications for teaching and learning https://www.youtube.com/watch?v=-9w09VPNtbA	Reflection in a joint board and a video pitch (MIRO): guiding questions: • What do they proclaim? • What is changing? Why is it new? • How will teachers act? How do they have to change? • How is this changing the systems? • When would you expect this change to come? ➔ Which institutions and organisations are affected? (#1) ➔ Which kind of research question and methodological design can you develop (#1)	##
4	Start a Research project	Research methodology	To develop scientific / research approaches to DL in	Team	No media: Project tasks: #2 ➔ Step 1: Formulate an overarching research question/your specific	Which kind of research question and methodological design can you develop (general task – see left) Research areas	##

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
		Institutions and organisations Competence Oriented learning	different subjects		knowledge interest for your digital literacy. ➔ ● Step 2: Start with a literature search as a basis for operationalisation. Define your theoretical construct and find indicators/manifest variables with which your construct can be empirically explored. ➔ ● Step 3: Justify the forms of investigation you consider suitable for exploring your theoretical construct	➔ Which institutions and organisations are affected? (#1) ➔ How does DL affect learning ➔ How does DL affect teaching	

8. Dataninja – CNR - Data Literacy Learning Programme

8.1. Didactic Frame Pattern

- **Summary**

This learning programme proposes a Data Visualization learning path to be adapted according to the context and the target group that has to be addressed.

- **Target group**

Target has to be defined by each piloting partner according to its context.

- **Themes (content area)**
  - Data literacy
  - Research and design on a Data literacy output
  - Data analysis
  - Data Visualization design
- **Learning objectives**
  - **Knowledge:**
    - knows how to read and analyze data through spreadsheet software
    - knows how to modify data along a cleaning process
    - has the knowledge base of most common charts and mapping models in order to define the best option to visualize the available data
    - knows how to use the most common data visualization softwares in order to select the better one for his/her needs and for the context where the data visualization will be disseminated once created
    - knows the common rules of data visualization in terms of accessibility and communication
  - **Skills:** The learner…
    - is able to apply a variety of analysis techniques to explore data such as filtering, grouping and sub-grouping
    - is able to manage the data cleaning process thanks to data normalization and data reconciliation techniques
    - is able to merge data with other data in a methodologically correct way and with the aim of enriching information that can be extracted from data
    - is able to handle data visualization tools with the most common features to create the most effective visualization

- **Attitudes:**
    - is determined to explore ways in which data can be integrated in decision-making processes.
    - is interested in self-initiating data driven projects to solve problems and test hypotheses.
    - has curiosity to test data visualization tools and to keep himself/herself up-to-date with the ongoing debate related to data visualization
    - has a critical approach to data processing, integration and visualization

- **Methods/Activities**
    - Asynchronous Moodle sessions
    - Workgroups and collaborative assignments
    - Individual assignments
    - Practical learning, learn by doing
- **Resources and materials**
    - DEDALUS learning platform
    - LEVEL5 learning suite
    - Competence profile app
    - Slide visualization tool (player)

8.2. Action Field pattern

Project	Data Literacy in the Research workshop
Context	To be adapted by each piloting partner according to its context
Target Group	Participants of the pilots Possible: Teaching staff
Aims	Students work with different empirical research methods and apply them in the DL field
Resources	Empiric research methods Information units on DL and Literacy and DL and Education
Activities	Workgroups Exploring Data Literacy Developing a research design Carrying out the assignments Evaluation

8.3. Learning Field - Reference System pattern

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing , transferring	Being able to transfer the project in new (or enhanced) contexts	Incorporation	Having internalised digitalisation as a personal and professional key competence and the respective mindset. Being an inspiration for others.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to research on or apply suitable digital instruments and tools. To know how to analyse and evaluate digitalisation also critically	Discovering acting independently	• Conceptualising a research project on different aspects of DL (Module 4.1) • .Developing a study project related to DL in different educational organisations (M. 8.3)	Self-regulation, Commitment	Being determined and pro-active in using and improving digital literacy in the own educational environment.
3	Knowing how	Knowing different theoretical approaches to DL and its components Understanding the literacy aspect in DL Understanding the context dependence of DL	Deciding/ selecting	Ability to differentiate different forms of literacy Taking part in relevant digital application activities as they are offered by others in safe (undisturbed) contexts, utilise digital tools for the assignments, (videos, pitches, narrative selfies, info graphics).	Motivation/ appreciation	Valuing digitalisation in general. Being motivated to develop own digital literacy in the professional/educational domain
2	Knowing why (distant understanding)	Having basic understanding on relevant aspects of digitalisation related to digital (ICT) devices, Internet, social and digital media and information technology and its purposes	Using, imitating	Using the digital resources provided by the university to access learning contents Reflect on different digital formats	Perspective taking	Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that DL has something to do with digitalisation and ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them in the professional/educational context	Self-orientation	Perceiving digitalisation without relating it to to own professional field.

8.4. Reference system on Data Visualization

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**
5	Knowing where else (strategic transfer)	Knowing how to transfer data concepts into other contexts beyond those portrayed in the course. Knowing how to help other people successfully integrate a data culture in their projects.	Developing, constructing , transferring	Being able to transfer the project in new (or enhanced) contexts. Being able to transfer data strategies into new professional and personal contexts. Actively planning and creating new digitally based activities.	Incorporation	Having internalised data processing and communication as a personal and professional key competence and the respective mindset. Being an inspiration for others.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) to research on or apply suitable data instruments and tools. To know how to analyse and evaluate data and sources critically.	Discovering acting independently	• Developing an individual data project by independently being able to select the suitable data source, apply the relevant data analysis, choose the appropriate data visualization/communication strategies. • Assessing, working in a team, different data processing and communication strategies.	Self-regulation, Commitment	Being determined and proactive in using and improving data literacy in their own educational environment.
3	Knowing how	Knowing how to integrate different theoretical and practical debates in the field of data sourcing, processing and visualizing/communicating data. Knowing how to recognize the key components and functionalities of the most common data processing, visualization and communication	Deciding/ selecting	Ability to differentiate different forms of literacy Taking part in relevant data application activities as they are offered by others in safe (undisturbed) contexts, utilise data processing and visualization tools for the assignments,	Motivation/ appreciation	Valuing data in general. Being motivated to develop own data literacy in the professional/educational domain.

		tools and technologies. Understanding the literacy aspect in DL. Understanding the context dependence of DL.		(spreadsheets, data viz and mapping software, data conversion and enhancement tools)).		
2	Knowing why (distant understanding)	Having basic understanding on relevant aspects of data related to decision-making processes and communication of complexity.	Using, imitating	Using the digital resources provided by the university or available online to access learning contents.	Perspective taking	Being curious and interested in certain aspects related to data processing and communication, and related tools.
1	Knowing what	Knowing that DL has something to do with data and information .	Perceiving	Perceiving and recognising the role of data tools without taking actions or reflecting on them in the professional/educational context	Self-orientation	Perceiving data without relating it to one's professional field.

8.5. Learning pathway

8.5.1. List of Learning Units

Unit No.	Title	Components	Total envisaged Time
1	Introduction to data literacy	• Concept/EU-Project • Introduction to data literacy • Case studies • The skills involved in data literacy. • Introduction to data • Metadata	2 hrs
2	Data sourcing	• Open data and licenses • Sources and strategies to find data • Assessing and evaluating data sources • Ethical and legal issues	2 hrs
3	Processing and cleaning data	• Clean data • Spreadsheet formulas	2 hrs
4	Statistical literacy	• Basic statistics concepts • Spreadsheet formulas • Case studies	2 hrs
5	Visualization and communication of data	• Planning data visualizations • Best practices • Tools	2 hrs
6	Flipped classroom	• Individual work • Collaborative work	5 hrs

8.6. Learning modules/pathway in the learning field

	COGNITIVE/KNOWLEDGE		ACTIVITY		AFFECTIVE	
L	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**	**Level Titles**	**Individual description/ explanatory statement**
5	Knowing where else (strategic transfer)	Knowing how to transfer digitalisation concepts into other contexts. Knowing how to help other people act successfully in different digitalisation structures in this respect.	Developing, constructing transferring	Being able to transfer the project in new (or enhanced) contexts	Incorporatio	Having internalised digitalisation as a personal and professional key competence and the respective mindset. inspiration for others.
4	Knowing when (implicit understanding)	Knowing when (in which situation and to which extent) t instrum and eva	Discovering acting	• Conceptu different aspects of DL (Module 4.1) veloping a study project related to DL in rent educational organisations (M. 8.3)	Commitmen t	determined and pro-active in using and improving digital literacy in the own educational environment.
3	K	ct in DL endence of D		differentiate different forms of literacy as th bed) contexts, utilise digital tools to the assignments, (videos, pitches, narrative selfies, info graphics).		Valuing digitalisation in general. Being to develop own digital literacy in al/educational domain
2	)	basic unders ts of digitalisation s, Internet, social and digital media and information technology and its purposes	Using, imitating	U u R		Being curious and interested in certain aspects related to digital tools and digitalisation
1	Knowing what	Knowing that DL has something to do with digitalisation and ICT .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them in the professional/educational context	Self-orientation	Perceiving digitalisation without relating it to to own professional field.

Project tasks, Reports, Essays

vidoes on teaching the DL

Reflection on teaching modes

Scientific texts, vidoes on Belshaw's approach

Reflection in work-groups on Belshaw

Case Studies Reports, Observations

Explanatory model 4 components

Modul 8.2 and 4.1

Reflection on teaching modes

Intro Videos

Self-assessing the own DL competencs

Discover the own digital

Intro Videos

8.7. Sequence of Relevant Learning Modules

Learning Unit name: Introduction to data literacy

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
1a	Introduction to data literacy	Intro to Data literacy	Obtaining a general knowledge of the field of study.	Watching video and discussion	English (BBC): https://www.youtube.com/watch?v=_LElWqXi7Ag	Watch the videos and outline what DL means for different target groups How do you find the digital resources at your University. How do you like the BBC explanation on that?	0.5 hrs
1b	Case studies	Case studies on importance of data	Obtaining a general knowledge of the possible real-world	Slides, Tests	https://slidewiki.org/playl		0.5 hrs

		literacy skills in different professions.	applications of the skills taught in the course and their importance for career opportunities.		ist/67?sort=order		
1c	The skills involved in data literacy	Overview of the different skills that are part of data literacy (finding data, data cleaning, data anlysis, data visualization, etc.)	Obtaining a general knowledge of the methodology needed to work with data.	Slides			0.25 hrs
1d	What is data	Basic concepts related to data: its relation to information and the different machine-readable formats	Obtaining a practical knowledge of what type of data is needed for data projects.	Slides			0.5 hrs
1e	Metadata	What is metadata and why is it important to assess data quality.	Obtaining a practical knowledge of data documentation.	Slides			0.5 hrs

Learning Unit name: Data sourcing

Step No.	Title	Content	Learning objective	Method/	Media	Assignment	Learning Time

				Activity			
2a	Open data and licenses	Basic concepts related to data sharing and reuse: definition of open data and different levels of openness in Creative Commons licenses.	Obtaining a practical knowledge of how to share and reuse data legally.	Slides			0.25 hrs
2b	Sources and strategies to find data	Finding data in open data portals; making Freedom of Information requests; converting PDF tables; tools for crowdsourcing data.	Obtaining a practical knowledge of where to find data.	Slides			1 hrs
2c	Assessing and evaluating data sources	Critical evaluation and verification of data's reliability by investigating metadata and use of data.	Obtaining a critical knowledge in finding the appropriate dataset and recognizing misleading uses of data.	Slides			0.5 hrs
2d	Ethical and legal issues	Overview of the main ethical and legal involved in different data sourcing	Obtaining a critical knowledge in reusing data within legal and ethical boundaries.	Slides			0.25 hrs

		strategies, for example in data scraping.					

Learning Unit name: Processing and cleaning data

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
3a	Clean data	Demonstration of the concept of "clean data", what it entails and what are common data cleaning tasks and why data needs to be cleaned before use.	Obtaining a critical knowledge in assessing cleaning operations needed to produce a clean dataset.	Slides			1 hrs
3b	Spreadsheet formulas	Using spreadsheets' formulas to clean the most common mistakes in "dirty data" or to enhance data, for	Obtaining a practical knowledge of how to use Google Sheets to clean and enhance data.	Slides			1 hr4

		example by merging multiple data tables or geocoding addresses.					

Learning Unit name: Statistical literacy

Step No.	Title	Content	Learning objective	Method/ Activity	Media	Assignment	Learning Time
4a	Basic statistics concepts	Overview of basic concepts in statistics, such as the distribution, measures of central tendency, outliers, comparing groups and normalizing data.	Obtaining a critical and practical knowledge of how to interrogate data.	Slides			1 hrs

4b	Spreadsheet formulas	Using spreadsheets' formulas to perform the basic analysis and calculations explained in the previous section.	Obtaining a practical knowledge of how to use Google Sheets to interrogate data.	Slides			0.5 hrs
4c	Case studies	Meaningful examples of how to use statistics to find stories insights in data.	Obtaining a general knowledge of the possible real-world applications of data analysis.	Slides			0.5 hrs

Learning Unit name: Visualization and communication of data

Step No.	**Title**	**Content**	**Learning objective**	**Method/ Activity**	**Media**	**Assignment**	**Learning Time**
5a	Planning data visualizations	Planning data visualizations depending on data, audience and communication goals.	Obtaining a critical and practical knowledge of how to plan an effective data visualization.	Slides			0.5 hrs

5b	Best practices	Best practices for clear, well designed and accessible data visualizations, including overview of mistakes to avoid	Obtaining a critical knowledge of how to design effective data visualization.	Slides			0.5 hrs
5c	Tools	Overview, with practical guidance, on the most popular tools for crafting data visualizations and maps.	Obtaining a practical knowledge of how to make a data visualization.	Slides			1 hrs

Learning Unit name: Data Visualization Project Work

Step No.	**Title**	**Content**	**Learning objective**	**Method/ Activity**	**Media**	**Assignment**	**Learning Time**

6a	Individual work		Obtaining a critical and practical knowledge of how to work with data and solve the main hurdles.	Learn by doing	https://slidewiki.org/deck/117959/data-visualization-skills-individual-assignment-example	Craft a short presentation to communicate insights from analysed data.	3 hrs
6b	Collaborative work		Nurture a critical attitude to data work and communication.	Learn by doing		In teams, critique each other's work resulting from the individual assignment.	2 hrs
6c	Data Visualization project work	Working with real data Put your knowledge into practice	To develop data visualization project starting from real data	Collaborative learning by doing	Step 1: Choice data to be used in the project work. Step 2: Clean up your data. Define the objectives of the analysis you are going to conduct. Step 3: Visualize data in order to highlight the predefined objectives	What do you want to communicate with your data? Which institutions publish your data?	2 hrs