IO2 – DEDALUS Validation System

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Repository of Competences

1. Introduction

A competence inventory is an open catalogue of competences that are relevant for education on data and digital literacy. The concept of an inventory implies that it is neither a closed repository nor a compulsory catalogue from which all items have to be selected.

As DEDALUS is a two years project we expect that more competences will be detected and described along our taxonomy which is based on the LEVEL5 system.

Content wise the Competence Inventory has been based on the results of a large-scale survey among stakeholders on the question of which competences are most relevant in the context of data and digital literacy at (technical) Universities with more than ## respondents in ## European countries.

Data literacy was described as a concept which is not only aiming at data management and data processing focused on information technology but also embraces aspects represented in the concept of digital literacy and processing and management of digital information.

Hence also the initial question of the survey was what the experts from different economical sectors, among them experts from science and practice consider as data literacy and "data literacy competences" and how they are to be acquired in modern (versatile) learning settings.

Based on this, LEVEL5 reference systems have been developed. These reference systems form the basis for the assessment and validation of the competences of students.

In order to ensure the connectivity of the results of the validation method to other European validation systems, in particular EQR, ECVET and EUROPASS, the DEDALUS competences are clustered according to the sub-competences in the sections domain specific "field" competences (related to digital literacy, data processing and management and "personal skills and competences" of the EUROPASS system, such as:

- Personal competences,
- Social competences,
- Organisational competences.

The Field competences are normally covered by the "traditional" teaching and learning programmes of the universities.

In DEDALUS this may refer to knowledge and skills related for instance of Computer Sciences but also to cross-cutting competences for other study domains like how to retrieve and process data and even more generally, how to deal with data in a critical way.

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2. DEDALUS Competence Repository

The DEDALUS competence repository is a derived four field cluster based on different competence theories (e.g. Erpenbeck, Sauter 2014, REVEAL group 2016/2019) and the domain specific field competences. The latter have been described thoroughly in the DEDALUS stocktaking phase. It consists of a set of the following sub-competences :

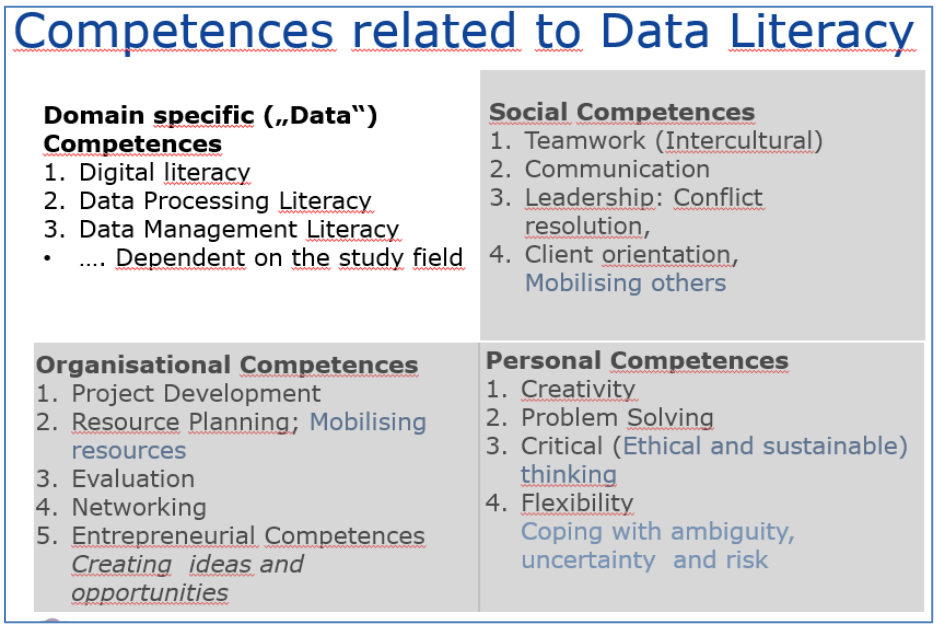

Fig. 1: The DEDALUS Competence clusters

The derived DEDALUS competence repository is a four-field cluster[1] with 16 competences which can be listed as follows:

1. Data / Digital Literacy Competences
    - Digital Literacy (with additional sub-competences)
    - Data Processing (with additional sub-competences)
    - Data Management (with additional sub-competences)
2. Social Competences
    - Intercultural Communication
    - Communication
    - (Intercultural) Teamwork
3. Personal Competences
    - Flexibility/Adaptability
    - Critical thinking
    - Creativity
    - Leadership

[1] based on different competence theories and models (e.g. Research voor Beleid (2006), Erpenbeck, Sauter 2014, REVEAL group 2016/2019).

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4. Organisational Competences
    - Project Management
    - Planning and Resource Management
    - Networking
    - Evaluating/Reflecting
    - Client Orientation
5. Competences related to mentoring and coaching
    - Planning COL for Data and Digital Literacy (DDL)
    - Delivering COL and Trainings for DDL
    - Validating DDL Competences

Sub-Competences related to Data and Digital Literacy

Digital Literacy:

Computer literacy	It is determined by the basic operational skills regarding computers and software applications
Internet literacy	This dimension relates to the ability of individuals to successfully function in Internet resources and networked environments
Media literacy	It is the ability to access, understand, critically evaluate, participate and create media content and communications in a variety of forms and contexts
Information literacy	Information literacy reflects the ability to identify, access, evaluate, manipulate and create information
Digital content creation literacy	To improve and integrate information and content into an existing body of knowledge while understanding how copyright and licences are to be applied. To know how to give understandable instructions for a computer system.
Data visualisation	To select data visualisation tools relevant to the audience expectations and abilities (i.e., academic, business, science, etc). To be able to deliver information using various graphic tools.

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Data Management

Sharing through digital technologies	To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices. (https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework)
Identifying needs and technological responses	To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility) (https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework).

Data Processing:

Reading/creating time trends and forecasts	the ability to implement data forecasting and modelling using data, to read and understand forecasts
Reading/creating data classification or rules	the ability to classify and systematize available raw data
Creating prediction models	the ability to create prediction models
Prediction models analyses	the ability to analyse prediction models

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3. DEDALUS Competence Frameworks

As outlined before, “Field Competences” will be described in the first sections. The social, personal and organisational competences in the following chapters closed by the competences for the facilitators.

The competences will be thoroughly described by:

1. Descriptions consisting of a *competence summary* and aspects what a learner should *know*, *be able to do* and respective *attitudes* related to these competences.
2. A reference system which clusters knowledge/skills/attitudes along 5 levels.

It is of major importance to relate the competences to the contexts and the action fields – the professional context in which a person is supposed to perform certain tasks. If we look at “computer literacy” the necessary knowledge and skills are dependent on the devices and the apps that a person works with.

Hence all the reference systems presented below have to be substantiated in relation to their context – the area of intervention, the target group (users), purposes and resources in order to operationalise them in learning settings or validation.

1. Data / Digital Literacy Competences
    - Digital Literacy (with additional sub-competences)
    - Data Processing (with additional sub-competences)
    - Data Management (with additional sub-competences)
2. Social Competences
    - Intercultural Communication
    - Communication
    - (Intercultural) Teamwork
3. Personal Competences
    - Flexibility/Adaptability
    - Critical thinking
    - Creativity
    - Leadership
4. Organisational Competences
    - Project Management
    - Planning and Resource Management
    - Networking
    - Evaluating/Reflecting
    - Client Orientation
5. Teaching and Training Competences
    - Planning COL for Data and Digital Literacy (DDL)
    - Delivering COL and Trainings for DDL
    - Validating DDL Competences

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4. Reference Systems on Data and Digital Literacy

4.1. 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.	Incorpora-tion	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 understandin g)	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, Commit-ment	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/ appreciatio n	Valuing digitalisation in general. Being motivated to develop own digital literacy.
2	Knowing why (distant understandin g)	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.	Perspectiv e 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.

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4.2. REFERENCE SYSTEM – Computer 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 digital tools 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 digitalisat tools into new professional and personal contexts. Actively planning and creating new digitally based activities.	Incorpora-tion	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 understandin g)	Knowing when (in which situation and to which extent) to apply suitable digital instruments and tools. To know how to analyse and evaluate digital tools also critically	Discovering acting independently	Deliberately searching for and selecting appropriate digital instruments for the own professional and personal field. Discovering new digital tools and approaches for the own context and professional domain.	Self-regulation, Commit-ment	Being determined and pro-active in using and improving digital tools and instruments 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:	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/ appreciatio n	Valuing digitalisation in general. Being motivated to develop own competences related to digital tools.
2	Knowing why (distant understandin g)	Having basic understanding on relevant aspects of digitalisation related to digital (ICT) devices	Using, imitating	Occasionally taking part in non structured activities related to digital tools Operate computers and digital devices or to use general purpose software and Internet services.	Perspectiv e taking	Being curious and interested in certain aspects related to digital tools
1	Knowing what	Knowing that digitalisation is based on computers and digital tools .	Perceiving	Perceiving and recognising digital tools without taking actions or reflecting on them	Self-orientation	Perceiving digital tools without relating it to oneself.

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4.3. REFERENCE SYSTEM – Internet 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 internet based 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 internet based strategies into new professional and personal contexts. Actively planning and creating new digitally based activities.	Incorpora-tion	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 understandin g)	Knowing when (in which situation and to which extent) to apply suitable internet based instruments and tools. To know how tp analyse and evaluate digitalisation also critically	Discovering acting independently	Deliberately searching for and selecting appropriate internet based l 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, Commit-ment	Being determined and pro-active in using and improving internet based activities in the own environment in different contexts. Finding it important to be creative in this respect.
3	Knowing how	Theoretically knowing different approaches, techniques and instruments related to: • Internet literacy	Deciding/ selecting	Taking part in relevant internet based application activities as they are offered by others in safe (undisturbed) contexts. Choosing singular internet based tools and activities from a given (known) portfolio	Motivation/ appreciatio n	Valuing the use of the internet in general. Being motivated to develop own competences in regard to internet use.
2	Knowing why (distant understandin g)	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.	Perspectiv e taking	Being curious and interested in certain aspects related to the use of the interent
1	Knowing what	Knowing that digitalisation is based on Internet. .	Perceiving	Perceiving and using internet without reflecting on them	Self-orientation	Perceiving internet without reflection

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4.4. REFERENCE SYSTEM – Information 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 concepts to identify, access, evaluate, manipulate and create information 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 strategies to identify, access, evaluate, manipulate and create information into new professional and personal contexts. Actively planning and creating new digitally based activities.	Incorpora-tion	Having internalised a critical relation to digital information as a personal and professional key competence and the respective mindset. Being an inspiration for others in their digitalisation activities.
4	Knowing when (implicit understandin g)	Knowing when (in which situation and to which extent) to apply suitable instruments and tools to identify, access, evaluate, manipulate and create information. To know how tp analyse and evaluate digitalisation also critically	Discovering acting independently	Discovering new approaches to identify, access, evaluate, manipulate and create information for the own context and professional domain.	Self-regulation, Commit-ment	Being determined and pro-active in using and improving critical information concepts in the own environment.
3	Knowing how	Theoretically knowing different approaches, techniques and instruments related to: • Information literacy	Deciding/ selecting	Taking part in activities as to identify, access, evaluate, manipulate and create information as they are offered by others in safe (undisturbed) contexts.	Motivation/ appreciatio n	Valuing information creation and processing in general. Being motivated to develop own competences on that.
2	Knowing why (distant understandin g)	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.	Perspectiv e taking	Being curious and interested in certain aspects related to the creation and utilisation of information
1	Knowing what	Knowing that digitalisation is based on digital information .	Perceiving	Perceiving and digesting information without reflecting on them	Self-orientation	Perceiving information without relating it to oneself.

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4.5. REFERENCE SYSTEM – Media 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 digital media 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 digital media strategies into new professional and personal contexts. Actively planning and creating new activities with digital media.	Incorpora-tion	Having internalised digital media as a personal and professional key competence and the respective mindset. Being an inspiration for others in their digital media activities.
4	Knowing when (implicit understandin g)	Knowing when (in which situation and to which extent) to apply suitable digital media and tools. To know how tp analyse and evaluate digital media 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, Commit-ment	Being determined and pro-active in using and improving digital media 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: • 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/ appreciatio n	Valuing digital media in general. Being motivated to develop own digital media.
2	Knowing why (distant understandin g)	Having basic understanding on relevant aspects of. digitalisation related to digital media	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.	Perspectiv e taking	Being curious and interested in certain aspects related to digital ,edia and digitalisation
1	Knowing what	Knowing that digitalisation is based different digital media.	Perceiving	Perceiving and recognising digital media without taking actions or reflecting on them	Self-orientation	Perceiving digital media without relating it to oneself.

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4.6. REFERENCE SYSTEM – Reading and Creating 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 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 programmes.	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 internalised 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 programmes. To know how to analyse 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 programmes) related to:	Deciding/ selecting	Taking part in relevant data visualization activities/courses and public debates as	Motivation/ appreciation	Valuing data in general and: • having curiosity to test information and to seek

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		• reading and analysing data and how to use them in practice • selecting the right subset of data to be visualised • key components of the main data visualization software, e.g. qGIS, Datawrapper, Tableau Public, Microsoft BI, Google Data Studio, etc. and how to use it to visualize data		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.		evidence, being open to new ideas of data visualization. • Being sceptical about data visualization not supported scientifically, with a clear methodology and the possibility to access raw data; • Being [en1][en2]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 Visualisation", including respective computer programmes. 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 programmes.	Perspective taking	Being curious and interested in certain aspects and the potential of data visualization and the respective computer programmes.
1	Knowing what	Understanding the importance of data visualization not only as an information instrument but also as a way to better interpret data.[en3]	Perceiving	Recognising 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.

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4.7. REFERENCE SYSTEM – Digital content creation

	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.	Incorporation	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, Commitment	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.

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4.8. REFERENCE SYSTEM – Data Management

	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 the data management field and incorrect way of utilization could lead to ethical issues, understand why is important to know the different regulations which applies to data management. Knowing how to align the business strategy of the company and the data management policy. Knowing the advantages of a data-driven culture.	Developing, constructing, transferring	Being able to apply analytics and statistical methods for large datasets maintaining data integration, interoperability and reversibility and being able to solve issues. Being able to manage different applicable governance models to maintain the data safe and define and implement appropriate KPI's. Being able to train people on advantages of data-driven culture.	Incorpora-tion	Promote, be influential and regularly use effective, ethical and legally compliant data management practices. Promote the advantages of data-driven culture.
4	Knowing when (implicit understandin g)	Knowing when the different data and legal regulations and requirements are applied (IPR, GDPR). Understand the ethical issues related to data management, for example algorithmic bias, risks derived from ill-formed data sets,de-anonymization of the data and others. Understand what is open data and meta data.	Discovering acting independently	Being capable to communicate the values, risks and opportunities derived from the data management. Being able to select the best practice and apply correct ethical choices while selecting data and algorithms. Being able to publish clear and content-rich open data.	Self-regulation, Commit-ment	Be proactive in applying data management tools, methods and approaches for the benefit of one's organisation and the wider data ecosystem (e.g. open data). Promote the right ethical approach to data management and data mining.
3	Knowing how	Knowing the fundamentals of data extraction, cleaning and preparation for the processes of Extract Transform Load (ETL) and Extract Load Transform (ELT). Knowing the most important methodologies for data mining such as CRISP-DM, SEMMA Knowing different methodologies for data management: • Data management principles. • Analyse information in business needs.	Deciding/ selecting	Be able to analyse the data management in the business context of the company, considering to translate/ reflect business behaviour into structured information, maintaining data integrity and interoperability. Be able to create and manage an ETL/ELT process. Be able to select best algorithms and their parameters to solve a problem. Be able to create a data mining process. Be capable of applying and implementing data curation and data quality controls.	Motivation/ appreciatio n	Demonstrate proactive interest in learning about data management tools, methods and approaches for the benefit of one's organisation.

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		• Business organisation and data lifecycle for different processes. • Data governance strategy to ensure data security of the company. Knowing the best techniques and best practices for each business need.		Be able to store and retrieve data on relational and no-sql databases, big data platforms.		
2	Knowing why (distant understanding)	Having a knowledge regarding the data data extraction, cleaning and preparation, different data schemas (star schema, ETL, big data etc.) and analytics techniques such as data mining, machine learning, statistics, even in a big data context.	Using, imitating	Understand and use the different databases types (relational, non-relational) and big data platforms which could be used in different data analysis techniques as data mining, machine learning, statistics, even in a big data context. Understand how cloud based data storage and local storage works. Understand the difference between a database and a big data platform. Understand the difference between ETL and ELT.	Perspective taking	Demonstrate curiosity for different data management tools, methods and approaches in the context of one's organisation.
1	Knowing what	Knowing what are the collaboration principles for information collection and sharing, different data types and formats and ways to store and visualize data.	Perceiving	Recognise the company information needs and understand how their can be addressed.	Self-orientation	Demonstrate awareness of different data management tools, methods and approaches.

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4.9. REFERENCE SYSTEM – Reading / creating time trends and forecasts

	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 / creating time trends and forecasts concepts into other contexts. Knowing how to help other people act successfully in different structures in this respect, including respective computer programmes.	Developing, constructing, transferring	Being able to transfer time trending and forecasting strategies into new professional and personal contexts. Actively planning and creating new respective activities.	Incorpora-tion	Having internalised data processing for the purpose of time trending and forecasting 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 and methods and data forecasting models (ways of results' processing and anticipation of new trends) including respective computer programmes. To know how to analyse and evaluate various aspects of reading / creating time trends and forecasts also critically.	Discovering acting independently	Deliberately searching for and selecting appropriate time trending and forecasting techniques and instruments for the own professional and personal field including: • be able to apply a variety of forecasting tools and methods for different data sets • be able to develop own forecast evaluation strategies • be able to process in a methodologically correct way the results of the forecasting for different purposes • be able to anticipate new trends, based on the available information Discovering new tools and approaches for time trending and forecasting.	Self-regulation, Commit-ment	Being determined and pro-active in using and improving time trending and forecasting competence in the own environment. Finding it important to be creative in this respect.

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3	Knowing how	Knowing the theory of different approaches, techniques and instruments (including relevant computer programmes) related to: • reading and interpreting time trends and forecasts and how to use them in practice • compiling data trends and producing data forecasts; • key components of the main data forecasting models, e.g. ETS, ARIMA models etc. and how to apply them for forecasting.	Deciding/ selecting	Taking part in relevant time trending and forecasting activities as they are offered by others in safe (undisturbed) contexts: Choosing singular tools and methods, evaluation strategies and data forecasting models including respective software from a given (known) portfolio.	Motivation/ appreciation	Valuing data in general including developed certain personal qualities: • having curiosity to test information and to seek evidence, being open to new ideas of data trends and forecasting; • having scepticism about trend and forecast information that is not supported scientifically; • having the humility to admit that his/her trend and forecasts 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 relevant aspects of reading / creating time trends and forecasts related to special tools and methods, evaluation strategies and ways of results' processing and anticipation of new trends including respective computer programmes.	Using, imitating	Occasionally taking part in non-structured activities related to time trending and forecasting (using / imitating specific tools and methods, evaluation strategies and data forecasting models) including respective computer programmes.	Perspective taking	Being curious and interested in certain aspects related to time trending and forecasting and the respective computer programmes.
1	Knowing what	Understanding time trends and forecasts, knowing that data processing can be used for creating time trends and forecasts.	Perceiving	Be able to read and understand data time trends and forecast. Perceiving and recognising time trends and forecasts without taking actions or reflecting on them.	Self-orientation	Perceiving time trends and forecasts without relating them to oneself.

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4.10. REFERENCE SYSTEM – Reading / creating time trends and forecasts

	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 / creating time trends and forecasts concepts into other contexts. Knowing how to help other people act successfully in different structures in this respect, including respective computer programmes.	Developing, constructing, transferring	Being able to transfer time trending and forecasting strategies into new professional and personal contexts. Actively planning and creating new respective activities.	Incorpora-tion	Having internalised data processing for the purpose of time trending and forecasting 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 and methods and data forecasting models (ways of results' processing and anticipation of new trends) including respective computer programmes. To know how to analyse and evaluate various aspects of reading / creating time trends and forecasts also critically.	Discovering acting independently	Deliberately searching for and selecting appropriate time trending and forecasting techniques and instruments for the own professional and personal field including: • be able to apply a variety of forecasting tools and methods for different data sets • be able to develop own forecast evaluation strategies • be able to process in a methodologically correct way the results of the forecasting for different purposes • be able to anticipate new trends, based on the available information Discovering new tools and approaches for for time trending and forecasting.	Self-regulation, Commitment	Being determined and pro-active in using and improving time trending and forecasting competence in the own 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 programmes) related to: • reading and interpreting time trends and forecasts and how to use them in practice • compiling data trends and producing data forecasts;	Deciding/ selecting	Taking part in relevant time trending and forecasting activities as they are offered by others in safe (undisturbed) contexts: Choosing singular tools and methods, evaluation strategies and data forecasting models including respective software from a given (known) portfolio.	Motivation/ appreciation	Valuing data in general including developed certain personal qualities: • having curiosity to test information and to seek evidence, being open to new ideas of data trends and forecasting;

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		• key components of the main data forecasting models, e.g. ETS, ARIMA models etc. and how to apply them for forecasting.				• having scepticism about trend and forecast information that is not supported scientifically; • having the humility to admit that his/her trend and forecasts 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 relevant aspects of reading / creating time trends and forecasts related to special tools and methods, evaluation strategies and ways of results' processing and anticipation of new trends including respective computer programmes.	Using, imitating	Occasionally taking part in non-structured activities related to time trending and forecasting (using / imitating specific tools and methods, evaluation strategies and data forecasting models) including respective computer programmes.	Perspective taking	Being curious and interested in certain aspects related to time trending and forecasting and the respective computer programmes.
1	Knowing what	Understanding time trends and forecasts, knowing that data processing can be used for creating time trends and forecasts.	Perceiving	Be able to read and understand data time trends and forecast. Perceiving and recognising time trends and forecasts without taking actions or reflecting on them.	Self-orientation	Perceiving time trends and forecasts without relating them to oneself.

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4.11. REFERENCE SYSTEM – Entrepreneurship

	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 entrepreneurial skills and concepts into other contexts. Knowing how to help other people act successfully in different entrepreneurial structures.	Developing, constructing, transferring	Being able to transfer business strategies into new contexts. Actively planning and creating new entrepreneurial activities.	Incorporation	Having internalised entrepreneurship as a fundamental personal mindset. Being an inspiration for others in their entrepreneurial activities.
4	Knowing when (implicit understanding)	Knowing when to apply the right instrument from the portfolio of different entrepreneurial approaches and instruments. Knowing when to use certain entrepreneurial strategies.	Discovering acting independently	Deliberately seeking entrepreneurial opportunities. Searching for and selecting appropriate entrepreneurial techniques and instruments for the own business. Creating and executing an entrepreneurial strategy for the own context and professional domain.	Commitment	Being determined and pro-active in using and improving own entrepreneurial competences. Finding it important to be creative in this respect.
3	Knowing how	Knowing different entrepreneurial approaches, techniques and instruments to develop business and value. Theoretically knowing how to act along an entrepreneurial concept.	Deciding/ selecting	Taking part in entrepreneurial activities as they are offered by others in known and undisturbed contexts. Choosing singular entrepreneurial tools from a known portfolio	Motivation/ appreciation	Valuing entrepreneurship in general. Being motivated to develop own entrepreneurial competences and visions.
2	Knowing why (distant understanding)	Knowing that through entrepreneurship one can develop an own business and become self-sustainable. Knowing that entrepreneurship includes social responsibility.	Using, imitating	Occasionally taking part in non structured entrepreneurial activities. Carrying out entrepreneurial actions when being instructed to.	Perspective taking	Being curious and interested in entrepreneurship and related concepts and opportunities.
1	Knowing what	Knowing that entrepreneurship is an essential concept that aims at developing a business.	Perceiving	Perceiving and recognising the concept of entrepreneurship without taking further steps.	Self-orientation	Perceiving the concept of entrepreneurship without relating it to oneself.

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4.12. REFERENCE SYSTEM – Problem solving

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
	Level Titles	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Having a large portfolio of problem solving strategies to solve problems constructively and sustainably in different areas of life	Developing, constructing, transferring	Developing and inventing new creative strategies to solve problems.	Incorporation	Having internalised to strive for good, sustainable solutions in a compromise oriented way, and inspiring others to become better problem solvers.
4	Knowing when (implicit understanding)	Knowing variations and modifications to solving problems in different contexts and how to actively use available resources. Knowing different ways to tackle problems.	Discovering acting independently	Actively expanding own strategies and experiences, through trial and consultation. Applying complex solutions to solve a problem.	Commitment	Being determined to find objectively good solutions for problems and to expand own competence in this regard. Openness towards innovative approaches.
3	Knowing how	Knowing how to solve a problem based on prior experiences. Recalling previous problems and comparing similar problems and strategies for solutions.	Deciding/ selecting	Applying known problem solving strategies. Choosing between different (given) possibilities to solve the problem based on prior experience.	Motivation/ appreciation	Being motivated to further develop own competence to solve problems. Valuing good solutions for problems.
2	Knowing why (distant understanding)	Knowing why the problem exists and where it's originating from	Using, imitating	Approaching a problem as being instructed to or by imitating strategies of others.	Perspective taking	Taking interest in finding solutions for problems.
1	Knowing what	Knowing there is a problem that needs to be solved to reach a goal.	Perceiving	Perceiving the problem without taking action.	Self-orientation	Only being interested in solving problems that relate to oneself.

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4.13. REFERENCE SYSTEM – Leadership

	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 which types of leadership interventions are adequate in specific situations. Knowing how to transfer leadership approaches to other areas of life.	Developing, constructing, transferring	Developing an individual leadership style and techniques as a leader and applying it adequately in different situations.	Incorporation	Having internalised to lead when needed, respecting others needs in team work and to encourage open dialogue. Inspiring others to become better leaders.
4	Knowing when (implicit understanding)	Knowing how and when certain actions/behaviours as leader will affect the group and its results. Knowing when and how to apply appropriate leadership measures to solve problems or take opportunities.	Discovering acting independently	Acting as a leader and trying out a range of different leadership styles. Applying them according to the situation and the objectives of the activity. Being able to coordinate work processes successfully.	Commitment	Feeling the need to be a good leader. Being determined to improve own leadership competences.
3	Knowing how	Knowing different leadership styles and techniques and how they are related to specific performances of a group and outcomes of a project. Knowing how to organise a process in a group to reach a goal	Deciding/ selecting	Taking the lead and applying specific leadership techniques which seem to be appropriate according to the perception of the situation based on own experiences.	Motivation/ appreciation	Valuing leadership and being motivated to develop own leadership competence.
2	Knowing why (distant understanding)	Knowing why leadership is important to reach a goal in a group/team. Knowing that different leadership styles exist and that different leadership approaches can affect the work of/in the group.	Using, imitating	Occasionally applying leadership concepts & actions (like taking responsibility, taking decision, delegating work...) as copied from a role model or as being instructed to.	Perspective taking	Being interested in leadership and its potentials. Anticipating which role leadership has in own life.
1	Knowing what	Knowing what leadership is, what competences and tasks leadership includes.	Perceiving	Recognising situations where leadership is either executed or needed.	Self-orientation	Only being interested in leadership when one is affected by it.

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4.14. REFERENCE SYSTEM – Project Management

	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 assess which PM tools are adequate in any situation. Knowing how to plan new ventures with a strategic project management approach.	Developing, constructing, transferring	Strategically adapting and applying PM tools for new contexts. Discussing and sharing information about PM with other colleagues and experts.	Incorporation	Having internalised what to anticipate in steering projects. Inspiring others to improve their PM competences.
4	Knowing when (implicit understanding)	Knowing how different PM tools can be used in different phases of the life cycle of a project. Knowing how to apply them in project situations.	Discovering acting independently	Adapting certain project management tools to the specific context. Seeking for more specific information and applying other PM tools.	Commitment	Being determined to improve own PM competences and to prioritise it to other activities for this purpose.
3	Knowing how	Knowing different PM tools and instruments.	Deciding/ selecting	Actively applying specific tools for PM in project planning and implementation	Motivation/ appreciation	Valuing project management abilities and being motivated to develop and apply them.
2	Knowing why (distant understanding)	Knowing that PM techniques are needed in order to successfully complete project work.	Using, imitating	Occasionally applying a few PM tools – offered by others – in parts the own project work.	Perspective taking	Being curious about different PM approaches and tools and their potential for the own work.
1	Knowing what	Knowing that PM exists as a methodology.	Perceiving	Recognising situations in which certain PM techniques and tools are used.	Self-orientation	Feeling the impulse to learn more on PM methodologies in a specific work situation.

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4.15. REFERENCE SYSTEM – Intercultural Communication

	KNOWLEDGE		SKILLS//CAPABILITIES		ATTITUDES/VALUES	
	Level Titles	**Level description**	**Level Titles**	**Level description**	**Level Titles**	**Level description**
5	Knowing where else (strategic transfer)	Knowing own cultural frames of reference and various patterns of cultural differences. Knowing strategies to communicate successfully with people from a variety of other cultures.	Developing, constructing, transferring	Being able to put oneself in the shoes of others and being able to apply a variety of intercultural approaches. Developing own approaches to communicate with people from other cultures and supporting others to improve.	Incorporation	Having internalised how to overcome culture based obstacles in communication. Being aware that one's own culture shapes own reactions and being able to transcend that. Inspiring others to improve their intercultural communication.
4	Knowing when (implicit understanding)	Knowing about other cultures and understanding how cultural aspects can influence communication. Knowing pitfalls of culture based misunderstandings and how to avoid them. Applying specific exemplary theory in practice (during the exchange)	Discovering acting independently	Actively collecting information about communication features of other cultures and enriching one's own communication competence by transferring diverse elements to one's own context. -> essay in the disturbed system	Commitment	Respecting and valuing expressions of cultural differences and being determined (committed) to overcome communication based obstacles between people from different cultural backgrounds.
3	Knowing how	Knowing how to anticipate certain cultural backgrounds and differences and how to adapt own communication accordingly. - list of theory	Deciding/ selecting	Being able to apply basic strategies in intercultural communication, e.g. active listening, mirroring, perceiving non-verbal signs. - List of practical learning actions, e.g. in prep scenarios	Motivation/ appreciation	Being aware that we have cultural values or assumptions that are different from others. Respecting and valuing different communication styles and being motivated to improve own competence.
2	Knowing why (distant understanding)	Knowing that one's own culture is central to what we see, how we make sense of what we see, and how we express ourselves and that others are influenced in the same way by their own culture.	Using, imitating	Communicating in a conscious way being aware of cultural backgrounds of other people. Reacting to diversity following the example of others.	Perspective taking	Being curios towards cultural diversity and different communication styles. Accepting different ways of communication and considering learning more about it.
1	Knowing what	Knowing that different cultures have different ways of communicating.	Perceiving	Recognising different styles of communication based on cultural backgrounds.	Self-orientation	Considering the benefits of culture sensible communication but feeling no need to become active in this respect.

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4.16. REFERENCE SYSTEM – Teamworking

	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 enhance team processes in different teams. Knowing how to help other people act successfully in teams and to assign specific responsibilities to people keeping in mind their relevant skills.	Developing, constructing, transferring	Leading a team in a way that members are able to contribute to the best of their abilities, supporting them to do so. Being able to strategically develop a team.	Incorporation	Having internalised the "culture" of constructive team work and to accomplish goals through mutual support. Inspiring others to improve their teamwork skills.
4	Knowing when (implicit understanding)	Having substantial knowledge on how and when to join/form a team. Understanding strength and weaknesses of team members. Knowing the importance of communication and how to coordinate workflows.	Discovering acting independently	Being able to assign and coordinate specific tasks and roles to team members on the basis of their strengths and weaknesses. Monitoring team processes. Trying out new roles for one-self.	Commitment	Feeling the importance to refrain from own preferences (e.g. in regard to procedures, own solution strategies, methods etc.) for the sake of the team and the teamwork. Being determined to be a good team worker.
3	Knowing how	Knowing the basic dynamics and demands of teamwork. Knowing how to engage in a coordinated work flow where the skills, qualities and limits of each member are taken into account in order to work efficiently.	Deciding/ selecting	Actively reaching out to join a team or help create a team. Contributing to the team process according to own strengths and needs for reaching the shared goal.	Motivation/ appreciation	Having a positive attitude towards working together in a team and to appreciate team diversity. Finding it important to have a 'team spirit'. Being motivated to develop own competence to successfully work in a team.
2	Knowing why (distant understanding)	Knowing that teamwork is a more effective way to achieve results. Knowing it demands from individuals to coordinate their work considering individual competences and abilities.	Using, imitating	Contributing to team work when being invited or instructed to. Fulfilling assigned tasks in a team by following the example of others.	Perspective taking	Being interested in the potentials of team work and to learn more about it.
1	Knowing what	Knowing that teamwork is collaborating with others to reach a shared goal.	Perceiving	Recognising situations in which teamwork is feasible to reach goals.	Self-orientation	Seeing teamwork as something positive, but without considering developing own team work competence.

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4.17. REFERENCE SYSTEM – Critical thinking

	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 critical thinking strategies in both in known and unknown situations. Knowing how to strategically use critical arguments in various contexts.	Developing, constructing, transferring	Being able to recompose arguments or information after a critical assessment process, including new aspects that provide constructive insight to an unknown problem or a situation. Thinking in coherent way to recognise critical aspects and to act accordingly.	Incorporation	Having internalised to assess issues in a critical way in order to identify and to process conclusions according to context and objectives before taking decisions.
4	Knowing when (implicit understanding)	Analysing more thoroughly, broadly and frequently, including validating source information in order to come to a holistic solution. Knowing when critical thinking is adequate.	Discovering acting independently	Researching for additional information and arguments on a given issue to include it into the analysis. Being able to explain the line of thought/results of the critical evaluation of an information or solution to others in an understandable way.	Commitment	Being determined to reach adequate and constructive conclusions through analysis and critical thinking. Being confident to engage with complex and/or unfamiliar problems and concepts.
3	Knowing how	Knowing how to look through different lenses and how to analyse diverse information in order to come to a constructive conclusion.	Deciding/ selecting	Applying different known strategies to look at an issue from different angles and questioning the given information.	Motivation/ appreciation	Being motivated to test and question own and others' judgements, opinions and ideas. Valuing critical thinking and being motivated to expand own competence to do so.
2	Knowing why (distant understanding)	Knowing why it is important to anticipate different views on an issue.	Using, imitating	Taking different views on an issue only when instructed to or following the example of others.	Perspective taking	Having the openness to look at an issue from different perspectives. Being interested in seeing issues through different lenses.
1	Knowing what	Knowing that there may be different ideas or expressions on the same issue.	Perceiving	Perceiving that there are different possible ways of looking at issues.	Self-orientation	Being aware that there are different ideas but not necessarily willing to explore them.

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4.18. REFERENCE SYSTEM – Networking

	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 integrate networking into various activities and in the collaboration with colleagues and stakeholders. Knowing how to help other people act successfully in different networking structures.	Developing, constructing, transferring	Actively planning and creating networking opportunities to improve knowledge and to establish new ways of collaboration others. Being able to transfer networking approaches to other areas of life.	Incorporation	Having internalised to network at any occasion. Enjoying networking and inspiring others to improve their networking competence.
4	Knowing when (implicit understanding)	Knowing how and when to apply different networking techniques for concrete tasks or goals. Knowing how to act in different networking structures.	Discovering acting independently	Deliberately seeking networking opportunities and researching for new networking techniques. Choosing adequate networking techniques according to goals and interlocutors and to act appropriately.	Commitment	Feeling the need to be pro-active and creative in networking. Being determined to improve networking competence.
3	Knowing how	Knowing different networking techniques and practices for sharing, learning, promoting ideas and building contacts.	Deciding/ selecting	Taking part in networking activities and applying basic networking techniques in a correct way to contribute to reaching a goal.	Motivation/ appreciation	Valuing networking in general. Being motivated to improve own networking competence.
2	Knowing why (distant understanding)	Knowing that through networking one can learn, build useful contacts and spread info to different target groups.	Using, imitating	Talking to others, trying to learn from them and building contacts following the example of others or when being instructed to.	Perspective taking	Being interested in the benefits of networking and considering learning more about it.
1	Knowing what	Knowing the concept of networking.	Perceiving	Seeing and recognising values and opportunities of networking for collaboration.	Self-orientation	Relating to networking in own life and for own benefits.

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4.19. REFERENCE SYSTEM – Creativity

	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 intuitively where and how creative thinking techniques can help solve a situation or problem. Knowing how to guide other people through the creative process.	Developing, constructing, transferring	Being able to extend creative strategies, developing own techniques to analyse things in different ways and coming up with new approaches to problems.	Incorporation	Having internalised to develop own creative approaches and solutions. Inspiring others to express and develop their creativity.
4	Knowing when (implicit understanding)	Knowing how to apply different creative thinking techniques in concrete situations. Knowing strategies to overcome attitudes and situations that can hamper creativity.	Discovering acting independently	Being able to play an active role in a creative process, such as brainstorming session, taking inspiration from others and finding new solutions and ideas by identifying unique connections between different ideas.	Commitment	Being determined to approach life in a creative way. Fostering flexibility and divergent thinking as supportive skills.
3	Knowing how	Knowing different creative thinking techniques (e.g. lateral thinking, visual explorations, metaphors, analogies, drawing, etc.), knowing in which situations creative thinking is crucial.	Deciding/ selecting	Choosing autonomously different creative techniques according to the situation and showing the capacity to look at problems from different perspectives and figuring out alternative scenarios	Motivation/ appreciation	Feeling the need of perceiving things in different ways and being determined to exercise creativity in different contexts.
2	Knowing why (distant understanding)	Knowing about the role and benefits of creativity in daily activities. Knowing why creative thinking is important in the process of solving problems and generating new ideas.	Using, imitating	Applying some creative thinking techniques when being instructed to, being able to play an active role in brainstorming sessions.	Perspective taking	Being interested in expressing own creativity in problem solving situations without knowing how to do it.
1	Knowing what	Knowing what creativity means and that creativity is not only an inborn ability expressed by a few talented people but a skill that can be learnt and wielded by everyone.	Perceiving	Recognising the usefulness of applying creative thinking in many daily activities	Self-orientation	Feeling that creativity can be useful when wanting to find innovative solutions or cope with unknown problems.

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4.20. REFERENCE SYSTEM – Evaluating/Reflecting

	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 strategically integrate evaluation outcomes into the organisational and/or individual practice in order to achieve the collaborative goals.	Developing, constructing, transferring	Developing own evaluation and adaptation strategies and an on-going participatory culture of evaluation within the organisation, promoting (self-) evaluation to achieve envisaged goals.	Incorporation	Inspiring others to value evaluation, reflection and individual and organisational learning. Inspiring others to develop their evaluation competences.
4	Knowing when (implicit understanding)	Knowing when (time schedule) to organize different phases of the evaluation (information gathering, processing, analysis, reporting) appropriate to the work plan of the organisation in coordination with organisation leaders.	Discovering acting independently	Searching for evaluation techniques and independently applying the (self-)evaluation with appropriate techniques and methods, within the given purpose of the evaluation.	Commitment	Being determined to improve reflection and evaluation competences with respect to individual and organisational learning.
3	Knowing how	Knowing how to organise (self-) evaluation as a reflective and interactive learning process. Knowing pertinent methods and techniques that can be introduced as an evaluation.	Deciding/ selecting	Making conscious choices on objectives, issues to evaluate; the methods and instruments of evaluation that seem more pertinent for the given case.	Motivation/ appreciation	Finding it important that team members/ colleagues value evaluation and reflection. Being motivated to improve own evaluations and reflection competence.
2	Knowing why (distant understanding)	Knowing why reflection and (self-)evaluation are important to facilitate individual and collective learning/ performance via evidence-based decision-making.	Using, imitating	Occasionally evaluating processes and products using existing models and techniques.	Perspective taking	Generally feeling that reflection and evaluation make sense in order to best achieve collaborative goals.
1	Knowing what	Knowing that evaluation is an important process to improve quality.	Perceiving	Recognising evaluation and reflection processes.	Self-orientation	Passive approach to evaluation and reflection, unless it refers to issues of personal relevance.

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5. Catalogue of Assessment Tools

5.1. Introduction

This catalogue gives an overview of possible methods applicable to assess the development of core competences for students and other learners.

The catalogue doesn't claim to be a complete list, but is designed to be a growing compilation of approaches to support professionals in applying the Dedalus competence framework and to validate competence developments. The catalogues presents a sample of methods that can be used in individual or group work, the examples shown should reflect a good balance of productive and responsive assessment methods. The annex provides materials that can be applied in certain assessment situations.

The assessment of competences on different competence levels acquires a good overview of suitable assessment methods. Not every method of data collection fits to each learning situation. We would like to provide a catalogue of methods which can be used for individual projects and settings.

Every method is presented with a short description, recommendations and instructions, and advantages as well as disadvantages of the method.

5.2. Methods and Data Collection

In many cases it is feasible to apply a set of methods to receive more and complementing data as basis for a rating on a competence level. In the design of the assessment setting you should consider the following aspects:

- Which target group do you work with and how many learners and assessors are involved?
- Which competences are to be assessed?
- How much time and interaction with the learners is available?
- For which purpose do you assess and evidence the competence developments? This determines the depth of the assessment, e.g. is it to show learners that they made any progress or is it to document achievements that shall benefit the learner in job-applications?

On the following pages you find the descriptions of different methods and approaches for data collection in different contexts.

Method of Data Collection	Short Description of the Method	Recommendation, Instructions	Advantages and Disadvantages
Reflective Learning Diary	A reflective diary is an instrument for learner´s self-evaluation. It enables learners to document and reflect upon their learning experiences with regard to a certain topic. As a learning activity reflective diaries facilitate learner's self-reflection. As an assessment method reflective diaries provide insight in learner's understanding, content knowledge, knowledge application but also critical self-reflection and awareness. For this method it is also possible to use a blog or other digital tools, offline or online.	Give regularly time (about 15 min. each day) for the learners to write down their learning experiences in a booklet. Explain that a reflective diary should focus on some basic elements: • A description of what happened • Personal feelings about what happened • A personal interpretation / evaluation of what happened • A conclusion from the experience • Take care that learners do not only report what happened! Let them focus on an issue related to the topic. .	**Advantages:** Gives a deep insight in the learning process Facilitates reflective learning. Digital documentation can be shared with others more quickly and more easily. **Disadvantages/Difficulties:** Takes time and discipline to keep the diary regularly Requires ability for self-reflection Sharing personal feelings with others might be a sensitive issue. Digital documentation may require certain IT skills.
Concept Map	A concept map is a diagram intended to illustrate the understanding of the relationships between concepts involved with a particular area of study. A list of words describing important aspects of a topic is assembled. The words are sorted into a hierarchy from most general to specific. They are arranged so that similar terms are near each other. Links are then drawn between the concept words, and statements written to describe or explain the links. The concept map can be created in the form of a mind map.	Use a concept map at the beginning and at the end of a learning activity to identify the progress the learners made. Identify basic concepts and ask the learners to come up with related concepts and skills.	**Advantages:** It helps individuals to establish logical connection among ideas seemingly related. **Disadvantages/Difficulties:** For individuals who are not used to thinking along a clear structure, it might be difficult to reflect themselves.
Method of data collection	**Short description of the method**	**Recommendation, instructions**	**Advantages and disadvantages**

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Group Discussion	In group discussions for the purpose of assessing competence developments a learning group is interviewed by a moderator. A specific format of such a discussion are focus groups, which are in particular useful for exploring norms, beliefs, attitudes, practices and languages.	The optimal size group consists of six to twelve individuals. Choose a topic for the discussion and prepare a list of open ended questions that are arranged in a natural and logical sequence. The discussion should be audio recorded for transcription, or even filmed. An alternative is to take careful notes during the discussion. Write a summary for each group discussion. Focus groups require trained moderators.	**Advantages:** Is very close to daily communication forms. Can be used to "explore the field", to get an insight on a particular subject. The information gained can be used to generate ideas and to prepare more structured methods (e.g. questionnaire) **Disadvantages/Difficulties:** Group discussions give information about a group not about individuals; and they do also not provide any information about the frequency or the distribution of beliefs in the target population. Much effort and time is needed.
Personal (informal) Interview	A purposeful exchange between two individuals to uncover perspectives, experiences, feelings and insights on a phenomenon. A powerful method of collecting in-depth and detailed qualitative data. Data can be analyzed through content analysis with narrations and quotations.	Prepare an interview form with questions in line with the evaluation focus. Use open ended, clear questions with follow up prompts. Do not test knowledge but explore it through experience and description questions. Do not mislead respondents with biased, assumption loaded questions. Record conversation with permission (if audio recording is not possible, take shorthand notes)	**Advantages:** Uses the basic methods of communication and eliminates limitations & artificiality of writing/ filling in a questionnaire. Helps gather in-depth and detailed data. Flexible, open to follow up. **Disadvantages/Difficulties:** Much effort and time is needed. Small samples, generalization from sample to population cannot be done.
Method of data collection	**Short description of the method**	**Recommendation, instructions**	**Advantages and disadvantages**

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Questionnaire/ Test/Exam	Questionnaires or tests can be used as a measurement tool for knowledge, skills and attitudes as well as experience gained through a training/programme. It could be used to assess initial knowledge, attitude and behaviour, improvement in these respects in the training process and outcomes reached at the end of training. Questions to test or measure learning can be in verbal or written formats: verbal questioning, e.g. a question and answer session at the start and end of a session; written format e.g. tests or exams. Questionnaires can be formal as in an examination, or informal as in a quiz.	Questionnaires or tests can be used in the 3 stages of assessment: Stage 1. Initial assessment to identify prior learning, experience or achievement. This allows the assessor to develop a baseline for learning and achievement. Stage 2. Formative assessment—to identify where the learner is, what progress is being made and how to "Fill Gaps" in knowledge, skills and understanding. Learners consider where they want to be and plan how to get there. Stage 3. Summative assessment-This is carried out to make judgements about the learner performance at the end of a training/ programme or activity. Examples of questions: • "Closed" questions which restrict the learner to answering YES or NO, TRUE or FALSE • "Open" questions which allow the learner to express an opinion or knowledge in sentences • Multiple choice questions which provide a range of answers for the learner to select the right one	**Advantages:** Provides written evidence of learning. Provides assessor with a quick way to test that learning has taken place. Can be used for both formative and summative assessment. Helps to identify the strengths and weaknesses of learners and provides feedback to both learners and trainers. Fits well into formal learning situations. **Disadvantages/Difficulties:** Questions can be misunderstood, results are determined by the interpretation of the reader. Formal style does not meet needs of learners with other learning styles. Can formalise the curriculum and suppress creativity. Does not fit easily with informal learning situations. Could cover only a limited extend of the set CPD goals and processes.

Method of data collection	Short description of the method	Recommendation, instructions	Advantages and disadvantages
Self assessment/	Self Assessment involves learners in the process of assessment and allows them to reflect upon their learning and to review and record their	It is important that learners have the opportunity to reflect on their own contribution to activities as well as the skills and knowledge they have gained. Self	**Advantages:** Gives ownership of learning.

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Checklist	achievements. Self Assessment can be both formative and summative: In formative assessments the learner reflects on where they are and where they need to go next. In summative assessment the learner reflects on the knowledge that has been gained and the skills they have acquired, at the end of an activity. Self assessment enables learners to manage their own learning and plan their progression while they gather evidence for portfolios and qualifications.	assessment can be used as a stimulus to provoke discussion and to encourage learners to develop their own techniques for reviewing their learning. The self assessment process is a cycle of planning, reviewing and evaluating. It is useful for learners to undertake some form of initial self assessment at the beginning of a learning activity, to identify existing knowledge or skills. The learner can then use this information as a base-line to monitor their progress and to recognise achievement. It is useful for the learner to develop a *logbook* as part of the planning process, which will help to identify what aim to achieve and how objectives will be achieved. Later, a comparison can be made to review progress. This is part of formative self assessment. An *evidence chart* helps the learner to keep a record of the activities done and the skills used. This is used when reflecting on what has been learned. This is part of formative self assessment An *assessment matrix* enables the learner to review their learning against pre-determined criteria by giving scores for each criterion. This gives a visual record of progress and enables to identify strengths and weaknesses. This can be used for formative and summative assessment. *Evaluation sheets* act as a reflective diary and conclude the self assessment process. The learner brings together the log, the evidence of achievements and assessment matrix to reflect on what was achieved and the progress made. This is summative self assessment.	Builds confidence. Motivates learners to progress. Develops planning and reflective skills. Provides evidence of knowledge and competence. Improves decision making and communication skills. LEVEL5 offers an interface to e-learning platforms that enable learners to autonomously carry out their self-assessment and receive a respective certificate. **Disadvantages/Difficulties** Requires a disciplined and honest self-reflection

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		Especially for target groups with little experience in self-reflection, it is recommended that a mentor is at hand to support the reflection. When applying LEVEL5 the learner should be familiar with the structure and underlying idea of the reference system.	

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Observation	The purpose of direct and indirect observation is to collect evidence of achievement by watching learners' performances while they take part in an activity, but without interfering in their work. The activity can be a real situation or a simulated situation e.g. role-plays. Observation allows you to see the knowledge being put into practice and is better used when assessing and evidencing competence based learning. Direct observation is undertaken in person, either by an assessor, peer or workplace supervisor. Indirect observation takes place when using appropriate technology such as video recording. Analysis of documents is also a kind of observation. Here documents rather than behaviour are scrutinised.	Direct Observation by an assessor: Assessor fills in a prepared observation report form during the learner is undertaking the activity – he makes a judgement against pre-determined criteria.. The assessor records what the learner does, how the learner behaves and interacts with others. Peer Assessment: This can be in the form of a discussion, a question and answer session or by recording information on a pro-forma. The peer can be another learner who has taken part in the activity alongside the learner who is being assessed. The peer assessor will either record or provide verbal feedback what the learner has done during the activity. Witness Testimony: This is a statement from a "third party" who has witnessed the learner take part in the activity in verbal or written form. The witness could be a work supervisor or colleague. Indirect Observation: This can be a video or film of the learner taking part in an activity. The assessor can recognise competence or achievement by observing the activity on the video. This can be supplemented by asking the learner questions about what is taking place on the film. 360% Feedback: this is a deliberate confrontation of observations and views on the learner's performance from different perspectives – e.g. of trainer, supervisor and colleagues.	**Advantages:** Provides the learner with the opportunity to demonstrate competence and skills Allows learner to put knowledge into practice Provides creative and innovative method of assessment Contributes to the development of an activity based curriculum Provides a range of evidence for Portfolios **Disadvantages/Difficulties:** Can be time consuming for assessor Can be difficult to observe and assess individuals within a group
(E-)Portfolio	Portfolios are personal collections of information describing and documenting a person's achievements and learning.	Ask your learners/ learners to create their own portfolio/e-portfolio, e.g. on the REBUS Platform.	**Advantages:**

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	An electronic portfolio, is a collection of electronic evidence (artifacts, including inputted text, electronic files such as Word and PDF files, images, multimedia, blog entries and Web links etc.) assembled and managed by a user, usually online. (E-) Portfolios are both demonstrations of the user's abilities and platforms for self-expression, and, if they are online, they can be maintained dynamically over time.	Encourage them to include all kinds of activities. Review during your project how competence levels are changing.	Enables the individual to be evaluated on various levels. Highlights all of an individual's skill sets. Extra curricular activities can also be highlighted. Allows the reader to understand the different dimensions of the individual. Empowers individuals to connect their formal education, work experience and extra curricular activities. **Disadvantages/Difficulties:** Learners might need individual help. E-portfolios require some technical skills as well as available soft- and hardware.

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Games	A tool to assess knowledge, skills or attitudes in a non formal way. Learners of a group get questions or task in a playful surrounding.	Not all people like games or are open to participate. Consider this when you select games. Make a good balance between knowledge questions and creative tasks. The atmosphere must be friendly enough to protect "losers". The group must not be too big. Invent tasks, which are also nice or useful to the other participants that are not directly involved in the task. Play the game yourself first before using it in the group to see the traps and to make a time-table. Every game needs a games-master. The games-master makes notes about the answers and assesses the orders.	**Advantage:** Creates a nice atmosphere. The learner can demonstrate skills or knowledge in a creative way. Improves communication skills. **Disadvantages/Difficulties:** Not every group appreciate "just games". Because of the gamble part it is a roughly assessment. It takes time, to prepare it and to play it.
Case study	A strategy to describe events and processes within a framework through various data collection methods such as observation, interview, document analysis in order to understand and evaluate the case.	Use the case study strategy to evaluate the implementation and the effects of an event or process on individuals/groups, e.g. the REBUS learning project. Case studies focusing on implementation help the evaluator to make decision whether the implementation responds to the initial intent. Case studies focusing on program outcomes assess the impact of the program and help identify reasons for success and failure. Plans should be made to obtain longitudinal data in depth and in detail.	**Advantages:** It helps to assess a complex activity or process through longitudinal, in depth and detailed description and contextual analysis. Both qualitative and quantitative data could be collected and analysed for triangulation. **Disadvantages/Difficulties:** Time consuming. Only small samples can be included in the study.
Essay	An essay is, generally, a piece of writing that gives the author's own argument — but the definition	An essay (depending on the types of essays) is usually expected to consist of an	**Advantages:**

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	is vague, overlapping with those of a paper, an article, a pamphlet, and a short story. Essays have traditionally been sub-classified as formal and informal. An Essay is an assessment question that requires an answer in a sentence, paragraph, or short composition. Essay assessments are usually classified as subjective assessments as there are normally a variety of responses.	1. Introduction/Aims/Objectives 2. Major points and ideas explained and summarized 3. Results/Related points/Issues/or others depending on the topic 4. Conclusion – future work In regard to the taxonomy essays can be used as project reports thus tackling higher competence levels or key competences of higher complexity like related to Entrepreneurship projects. An essay (depending on the types of essays) is usually expected to consist of an 1. Introduction/Aims/Objectives 2. Major points and ideas explained and summarized 3. Results/Related points/Issues/or others depending on the topic 4. Conclusion – future work Recommendations: - Let students know the assessment criteria and marking scheme, including grammar, spellings and other issues. - Try to reduce ambiguity in the essay questions, clearly define the expected response such as compare, evaluate, summarize, critique etc. - Do not use essays to measure knowledge or understanding that can be assessed using less time consuming assessment methods.	• Essays have the ability to assess all levels of learning objectives. • It encourages original and creative thinking. **Disadvantages/Difficulties:** • Due to the subjective nature of essay assessments, grading is very unreliable even for the same assessor at different periods. • Grading may be influenced by other factors such as handwriting and length of response. • As essays are very time-consuming to answer and to correct, they are not recommended if only low-level of learning outcomes are assessed which can be assessed by multiple choices or short answer questions. • Although guessing is not possible in essay assessments, but “bluffing” is. • It is also not advisable to give the topic of the essay to

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			the students at an early date. This may give rise to superficial learning where students concentrate all their efforts in completing the essay only.

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