



## MICROCREDENTIALS FOR INFORMATION DATA LITERACY

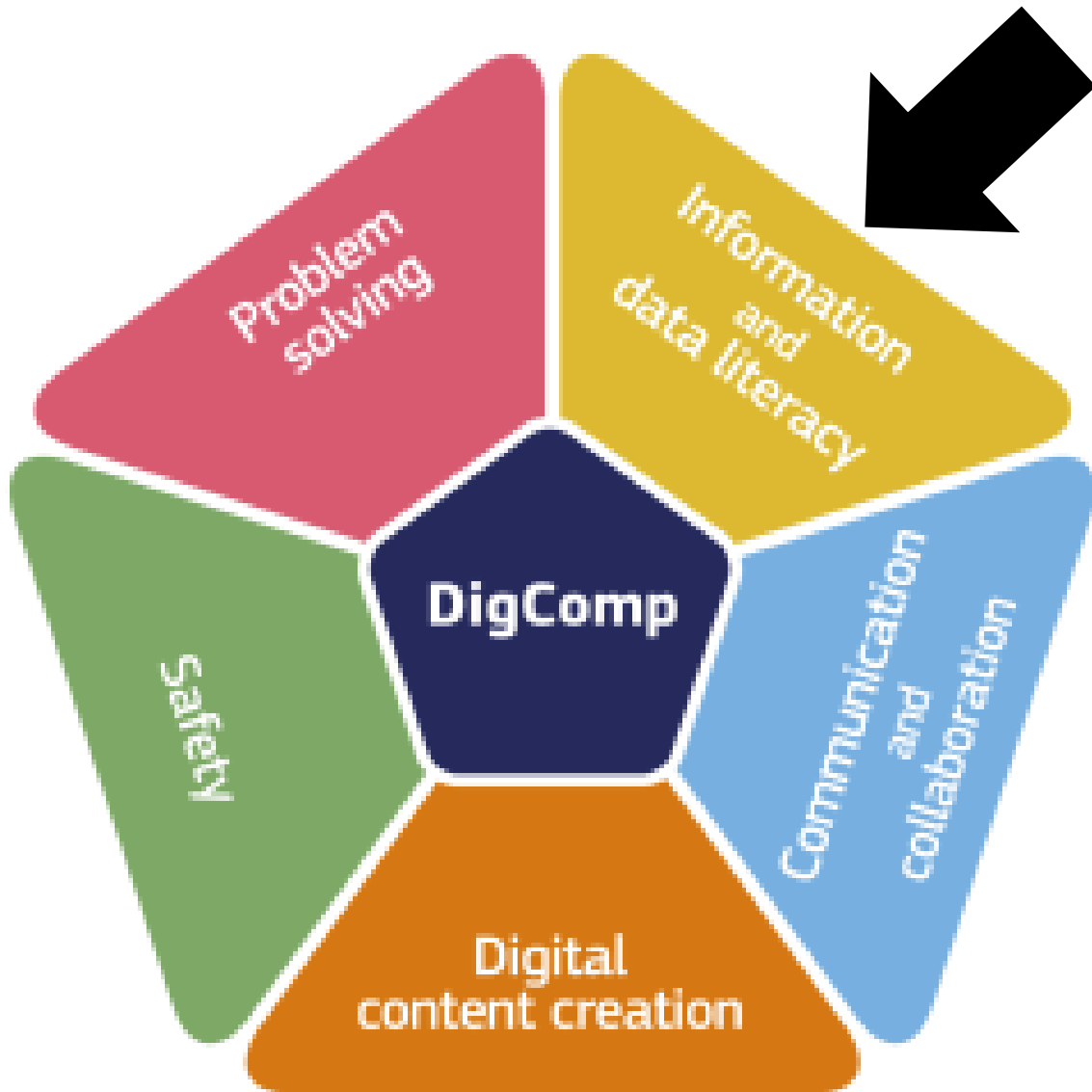
### Competence 1.3: EVALUATING DATA, INFORMATION AND DIGITAL CONTENT

**DSW**  
DIGITAL SKILLS WALLET



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# FOUNDATION LEVEL (LEVEL 1 AND LEVEL 2)



## Digitization and Data Collection Processes – WHAT, HOW AND WHY (MC 1.3.A.1)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Digitization and Data Collection Processes – WHAT, HOW AND WHY Code: MC 1.3.A.1
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	3 hrs
Level of the learning experience leading to the micro-credential	FOUNDATION
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review



## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.1, 1.3.2 and 1.3.3 )

Digital Ergonomics

- Recognize that data collection processes and digitization of data take place by systems and devices
- Recognize that the digitized data can be used for personal use, by AI technologies to train systems and recognize patterns
- Recognise that many applications on the internet and mobile phones collect and process data (personal data, behavioural data and contextual data) that the user can access or retrieve

## Description

A user should be aware that for data (e.g. numbers, text, images, sounds) to be processed by a program, they have to be first properly digitised (i.e. digitally encoded and that various devices such as sensors used in many digital technologies and applications (e.g. facial tracking cameras, virtual assistants, wearable technologies, mobile phones, smart devices) generate large amounts of data, including personal data. The user, should also be aware that data collected and processed, for example by online systems, can be used to recognize patterns (e.g. repetitions) in new data (i.e. other images, sounds, mouse click or to train an AI system).

The internet and applications collect data when users interact with them. This includes data entered through forms, buttons clicked, options selected, and any other user inputs. For example, a weather app may collect location data when a user searches for local weather information.

The learner should be aware that this data may be accessible for own use to monitor both online activities online (e.g. clicks in social media, searches on Google) and offline (e.g. daily steps, bus rides on public transport) and that applications on the internet and mobile phones collect and process data through various methods, often relying on user interactions, device sensors, and network communication.

The micro-credential “**Digitization and Data Collection Processes – WHAT, HOW AND WHY**” demonstrates that the learner is aware of the digitization process and data collection processes taking place while working online or on apps on mobile devices and explain what is collected, how is collected and why.

## Questions

### **Digitization and Data Collection Processes – WHAT, HOW AND WHY**

1. What is digitisation?
2. What kind of information is collected and how?
3. Why it is collected?

## Save Preferences and Results while working online or in an app(MC 1.3.A.2)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Save preferences and results while working online or in an app Code: MC 1.3.A.2
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	3 hrs
Level of the learning experience leading to the micro-credential	FOUNDATION
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.4)

Save preferences and results while working online or in an app

- Able to save preferences or results in a variety of ways (i.e. bookmarks, favorites) on the Internet, a web or mobile app

## Description

Saving preferences on the internet or within an app typically involves storing user-specific settings or configurations so that they persist across sessions. The method can vary depending on whether it's a web application or a native app.

The learner should also be able to employ methods to save results or favorites by using note taking apps, bookmarking, favorites, tools like Zotero, Mendeley, or EndNote, screenshots and downloading and saving on local or cloud storage.

The micro-credential “Save preferences and results while working online or in an app” demonstrates that the learner has the capacity to configure user preferences in an Internet Explorer or in an app and save search results or favorites.

## Questions

1. Can you provide a list of methods to save results while searching online?
2. What is Bookmarking?
3. What is a common function encountered on apps to bookmark items?
4. Can you provide a list of apps for organizing search results?
5. Can you download and save locally or on the cloud information encountered online?

## Data Collected While Working online (MC 1.3.A.3)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Data collected while working online Code: MC 1.3.A.3
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: 101087628
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	3 hrs
Level of the learning experience leading to the micro-credential	FOUNDATION
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.5 and 1.3.6.)

### Data collected while working online

- Describe how the internet, applications and mobile phones collect and process data through various methods (sensors, forms, tracking, GPS, accelerometers)
- Describe the various types of information that may be collected, while working online

## Description

Applications on the internet and mobile phones collect and process data through various methods, often relying on user interactions, device sensors, and network communication. For example, applications collect data through User Inputs and Interactions (a weather app may collect location data when a user searches for local weather information) or Mobile devices are equipped with various sensors that applications can utilize to gather data. (i.e. GPS for location data, accelerometers for motion data, gyroscopes for orientation).

While using the internet, various types of information may be collected, depending on your online activities and the services you use. The exact information collected can vary widely, but the common types of data that may be collected are Browsing History, Search Queries, Cookies, IP Address, Device Information, Geolocation Data, Online Purchases, Social Media Interactions, Authentication Data, Personal Information, Device Identifiers, Behavioral Data, Email Communication, data you submit through online surveys, forms, and feedback mechanisms and Ad Tracking Data

The Micro-Credential **Data collected while working online** demonstrates that learners can describe the data collected and elaborate on what each piece of information collected is and what purpose it serves

## Questions

1. What is an IP address?
2. What purpose could the information on the Device type serve?
3. Can you enlist potential data collected while working online?
4. Can you explain each information collected, the purpose(s) it can serve( both yourself and third parties)

## Local, Cloud and Network Storage – Pros and Cons (MC 1.3.A.4)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Local, Cloud and Network Storage – Pros and Cons Code: MC 1.3.A.4
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: 101087628
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	Minimum 3 – Maximum 8 hrs
Level of the learning experience leading to the micro-credential	FOUNDATION
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.7 and 1.3.8)

Local, Cloud and Network Storage – Pros and Cons

- Recognizes that there are various options for storage (local, cloud and network storage)
- Describe at high level what are the pros and cons of these storage options

## Description

Local storage, network storage, and cloud storage are different types of storage solutions that provide varying levels of accessibility, convenience, and scalability. Here's a brief overview of each:

Local storage refers to data storage devices that are directly attached to or installed in a user's computer or device (i.e. Hard Drives (HDDs), Solid State Drives (SSDs) and USB Flash Drives). Network storage involves the use of storage devices that are accessible over a network, allowing multiple devices to connect and share data (i.e. NAS and SAN). Cloud storage involves storing data on remote servers accessed over the internet (i.e. onedrive, dropbox googledrive). Users can access their data from anywhere with an internet connection.

Each storage has its pros and cons in terms of accessibility, Speed, Capacity, Ownership and Control and Backup and key considerations when choosing a storage method involve Security, Cost, Accessibility and Convenience

The learner should be aware that choosing the right storage solution depends on factors such as data accessibility requirements, collaboration needs, security considerations, and budget constraints and that many users and organizations use a combination of these storage types to meet their diverse needs.

The micro credential 'Local, Cloud and Network Storage – Pros and Cons ' demonstrates that the learner is aware of the various storage options, pros and cons of each storage and consideration when choosing.

## Questions

1. Can you provide examples of cloud storage options?
2. What are the pros and cons of local storage?
3. What are the pros and cons of cloud storage?
4. What are the pros and cons of network storage?
5. What elements you should consider when choosing a storage option?

# INTERMEDIATE LEVEL (LEVEL 3 AND LEVEL 4)





## Access and Configure information collected while working on various platforms (MC 1.3.B.1)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	<b>Access and Configure information collected while working on various platforms</b> Code: MC 1.3.B.1
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	5 hrs
Level of the learning experience leading to the micro-credential	INTERMEDIATE
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.9)

### Access and Configure information collected while working on various platforms

- Access information collected while working online.

## Description

Accessing this information depends on the type of data and the platform or service involved, such as

1. Browsing History and Cookies:
  - In most web browsers, you can access your browsing history and manage cookies through browser settings.
2. Google Account:
  - If you use Google services, you can access and manage your data through the "My Activity" page in your Google Account settings.
3. Social Media Platforms:
  - Social media platforms typically provide settings where you can view and manage your account activity, privacy preferences, and the information you share.
4. Device Settings:
  - On your device, you can check settings related to privacy and security to manage permissions, location services, and app-specific data.
5. Online Accounts:
  - For online accounts (email, shopping, etc.), check account settings for options related to data management, privacy, and security.

The acquisition of the micro-credential **Access information collected while working online** demonstrates that the learner has the knowledge and skills to access information collected by various systems and that can make changes to preferences.

## Questions

1. What information is collected while working on various platforms?
2. Can you give examples of information collected?
3. How you can change information collected by an Internet Browser?
4. How you can change information collected by a Social Media Platform?
5. How can you check your activity in a Social Media Platform?
6. If you have a google account or Microsoft Edge Account, are you able to change Information collected by these Internet Explorers?

## Using online applications and apps and accessing stored data (MC 1.3.B.2)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Using online applications and apps and accessing stored data Code: MC 1.3.B.2
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	4 hrs
Level of the learning experience leading to the micro-credential	INTERMEDIATE
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.10)

### **Using online applications and apps and accessing stored data**

- Use applications that store data and access data for own use

## Description

There are numerous applications across various domains that store data to provide functionality, maintain user preferences, or facilitate collaboration. Such examples include Health and Fitness apps (i.e. Fitness tracking application that stores user activity, health data, and fitness goals or MyFitnessPal a calorie tracking app that stores dietary information, exercise logs, and weight history, E-commerce and Shopping (i.e. Amazon stores user profiles, purchase history, and product preferences, eBay stores user profiles, transaction history, and product listings) Gaming (i.e. Steam, a digital distribution platform for video games that stores user profiles, game libraries, and achievements), Navigation and Maps (i.e. Google Maps stores location data, search history, and user preferences for navigation and Waze, a navigation app that stores real-time traffic data, user reports, and route preferences).

These examples illustrate the diversity of applications across different industries that leverage data storage to provide valuable services and features to users. Each application may employ various storage technologies, including cloud storage, databases, and local storage solutions.

The micro-credential **Using online applications and apps and accessing stored data** demonstrates the capacity of the learner to use a variety of apps and online applications and skills to access stored data (such as invoicing history, personal information, tracking data etc.)

## Questions

1. What a file type means and what does it indicate?
2. Can you enlist 5 main file types and the relevant software needed in order to open them?
3. How can you access downloaded content and how can you organize it in a structure manner in order to locate it with ease in the future?
4. What do you do if you cannot open a downloaded file?

## Use Data Collection online applications and apps (MC 1.3.B.3)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	<b>Use Data Collection online applications and apps</b> Code: MC 1.3.B.3
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	4 hrs
Level of the learning experience leading to the micro-credential	INTERMEDIATE
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.11, 1.3.12)

### **Use Data Collection online applications and apps**

- Use tools for data collection such as Google Forms, Microsoft Forms, Survey Monkey and Doodle
- Present data collected using tables in a spreadsheet application (such as Excel or Google Sheets) or charts by utilizing application features

## Description

Google Forms, Microsoft Forms, SurveyMonkey and Doodle are popular online survey and form-building tools that allow users to create, distribute, and collect responses for surveys, questionnaires, and other types of forms. Each platform has its unique features and is designed to streamline the process of gathering information from individuals or groups. In today's work environment, utilizations of such applications can be useful as they promote collaboration, sharing and group decision making.

Moreover, the learners should be able to present data collected in tables such as spreadsheets or charts.

The acquisition of the micro-credential "**Use Data Collection online applications and apps**" demonstrates that the learner is familiar with these online data collection applications and is able to use them to collect and present information

## Questions

1. Can you create an online form with google or Microsoft forms ?
2. What is Survey Monkey? What purpose can it serve?
3. What too would you use to organize a meeting?
4. How could you review data collected in Google forms?

## Basic statistical procedures for data representation with visuals(MC 1.3.B.4)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Basic statistical procedures for data representation with visuals Code: MC 1.3.B.4
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	7 hrs
Level of the learning experience leading to the micro-credential	INTERMEDIATE
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.13 and 1.3.14)

### Basic statistical procedures for data representation with visuals

- Utilize tools for automatic data representation and analysis (such as exporting in CSV file format)
- Apply basic statistical procedures to data in a structured environment (e.g. spreadsheet) to produce graphs and other visualizations

## Description

One of the main features of applications collecting data is exporting to a format that can be read by many applications such as excel or google sheets. This is the first step to get the data for further analysis.

Applying basic statistical procedures to produce graphs and other visualizations involves several steps, including data analysis, selecting appropriate statistical methods, and using visualization tools to create meaningful graphs. At a high level, after data collection, the data should be cleaned and organized, followed by computation of basic descriptive statistics such as mean, median, mode, range, and standard deviation and graphical representation by selecting the appropriate visual and formatting.

The acquisition of the micro-credential 'Basic statistical procedures for data representation with visuals' demonstrates that the learner has the skills to export data from various applications, clean data, apply computations, select the appropriate visual and create and format graphs or any other visual that is best suited to the situation.

## Questions

1. What are the main steps to represent raw data in a visual?
2. What is CSV file format? When it is used?
3. Can you perform basic statistical calculations (i.e. average and standard deviation)?
4. Can you create a chart in a spreadsheet provided specific guidelines?
5. Can you format a graph (adding labels, axis titles etc)?
6. Can you use a variety of charts? Do you know which type is best suited in each situation?
7. Can you export your bank statement of the current month and create a visual with the categories of your spendings?



## Interacting with dynamic data visualization (MC 1.3.B.5)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	<b>Interacting with dynamic data visualization</b> Code: MC 1.3.B.5
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	INTERMEDIATE
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.15)

### **Interacting with dynamic data visualization**

- Interact with dynamic data visualization and can manipulate dynamic graphs of interest

## Description

Interacting with dynamic data visualizations involves engaging with the visual representation of data in a way that allows for exploration, analysis, and understanding of complex datasets. Dynamic visualizations often enable users to interactively explore different aspects of the data.

It is important first to understand the Interface by exploring Tools and Controls and be able to navigate through different sections (i.e. periods) and zoom. The dynamic visualizations often offer options to filter and make selections of data points or even change perspectives or layouts and time sliders to explore data at different time intervals. Examples of such dynamic visualizations are found in various websites such as Eurostat.

The acquisition of the micro-credential “**Interacting with dynamic data visualization**” demonstrates the capacity of the learner to work with dynamic visualizations.

## Questions

1. Provided a website that offers dynamic visualizations can you use the various features to narrow down to a specific time period?
2. Provided a website that offers dynamic visualizations can you use filters to filter according to specific criteria?
3. Provided a website that offers dynamic visualizations can you apply different layouts or view data from different perspectives?

## Selecting and using the appropriate storage (MC 1.3.B.6)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Selecting and using the appropriate storage Code: MC 1.3.B.6
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: 101087628
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	INTERMEDIATE
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.16 and 1.3.17)

### Selecting and using the appropriate storage

- Can differentiate between different types of storage locations (local devices, local network, cloud) that are the most appropriate to use
- Be able to use various storage options (local, network or cloud)

## Description

Choosing the most appropriate storage entails a number of factors to be considered, such as

- **Use Case:** Determine the primary purpose of storage (personal, collaborative, backup, etc.).
- **Accessibility Needs:** Evaluate where and how you need to access your data. Local devices are suitable for local access, while cloud storage provides universal access.
- **Collaboration Requirements:** If collaboration is crucial, cloud storage or a local network may be more suitable than local devices.
- **Data Security:** Consider the sensitivity of the data. Local devices provide more direct control, while cloud storage may offer advanced security features.
- **Scalability:** Assess whether the storage solution can scale to meet growing needs. Cloud storage is highly scalable, while local devices and networks may have limitations.
- **Cost:** Evaluate the costs associated with each storage option, including hardware costs, subscription fees for cloud storage, and potential scalability costs.
- **Backup and Redundancy:** Consider the backup mechanisms provided by each storage option. Cloud storage often includes automatic backup features.
- **Integration with Applications:** Ensure that the chosen storage option integrates well with the applications and software you use.
- **Compliance Requirements:** If handling sensitive or regulated data, ensure compliance with relevant regulations and industry standards.
- **Performance Requirements:** Balance the need for high performance with considerations such as accessibility and collaboration.

Moreover, effectively using and navigating the different storages is a fundamental skill that is often neglected. Emphasis should be given on

- Organizing Files into Folders
- Navigating between various storage options (cloud, local and network)
- Understanding the use of the recycle bin in each situation

The acquisition of the micro-credential “**Interacting with dynamic data visualization**” demonstrates the capacity of the learner to differentiate between different types of storage locations and use a variety of storages (local, cloud and network)

## Questions

1. Can you choose the appropriate storage location after evaluating needs and other various factors?
2. Can you navigate among different storage locations?
3. Can you create folders and navigate the folder hierarchy?
4. Do you know how the recycle bin works in when deleting files from local/network or cloud?

## Cloud storage: Synchronization and synchronizing on a local storage (MC 1.3.B.7)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Cloud storage: Synchronization and synchronizing on a local storage Code: MC 1.3.B.7
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	INTERMEDIATE
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.18 and 1.3.19 )

### **Cloud storage: Synchronization and synchronizing on a local storage**

- Describe at high level how cloud storage works and what is synchronization
- Use tools to synchronize cloud storage on local devices

## Description

Cloud storage is a technology that allows users to store and access their data (such as files, documents, photos, and videos) over the internet on remote servers rather than on local devices or servers. Cloud storage services are provided by cloud storage providers, and users can access their stored data from anywhere with an internet connection. Learners should be aware at high level how this service works , be aware of related terms such as Data Centers, Service models etc.

They should also understand how synchronization works. Synchronization in the context of cloud storage refers to the process of ensuring that the data across multiple devices or locations is kept up-to-date and consistent. It allows users to maintain the latest version of their files and folders across various devices, such as computers, smartphones, and tablets. Synchronization is a key feature of cloud storage services that enhances accessibility and collaboration. Learners should be aware of the processes performed and key aspects of synchronization (File Updates, Automated Process, Bidirectional Communication, Conflict Resolution and Real-Time or Scheduled Sync).

Additionally, learners should be aware of the possibility to synchronize cloud data on local devices and understand and be able to instal and use tools such as Microsoft One drive or googledrive synch on the PC.

The acquisition of the micro-credential “**Cloud storage: Synchronization and synchronizing on a local storage** ” demonstrates the capacity of the learner to work with cloud storage, understand the processes involved and resolve file conflicts and synchronize cloud data on local devices.

## Questions

1. What is Cloud Storage?
2. How cloud storage works?
3. What is synchronization?
4. When file conflicts occur when using cloud storage?
5. How to resolve file conflicts?
6. Can you synchronize cloud data on a local storage?

**ADVANCED LEVEL  
(LEVEL 5 AND LEVEL 6)**



## Visualizing Structured Data from a local or online database with Business Intelligence Tools (MC 1.3.C.1)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Visualizing Structured Data from a local or online database with Business Intelligence Tools Code: MC 1.3.C.1
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	ADVANCED
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review



## Learning Outcomes

Learning Outcomes (ref. LOs 1.4.20)

### **Visualizing Structured Data from a local or online database with Business Intelligence Tools**

- Use Business Intelligence tools (such as Power BI or Tableau) to analyse structured and clean data from a database source (online or local)
- Use Business Intelligence Tools (such as Power BI or Tableau) to analyse structured and clean data from an online sources (such as RSS feeds or Google analytics)

## Description

Tableau and Power BI are similar tools as they both belong to the category of business intelligence (BI) and data visualization platforms. They share common objectives of helping users analyze, visualize, and gain insights from their data. It is particularly valuable for professionals working with large datasets and engaging in business intelligence and analytics activities.

Power BI and Tableau allow users to perform Data Import and Transformation, Data Modelling, Measures, Hierarchies and Time Intelligence functions. At this level, the learner should be able to connect to a local or online database, create models and create visualizations.

The acquisition of the micro-credential ‘**Visualizing Structured Data from a local or online database with Business Intelligence Tools**’ demonstrates that the learner is able to create simple visualizations from data models by drawing data sets databases.

## Questions

1. How can you enable the PowerPivot Add – In?
2. What is a data model?
3. How to import data from database? What are the steps?
4. What are the basic Relationships that can be used in Power BI?
5. Can you create a set of visualizations to gain insights from a set of tables in a database?

## Visualizing Structured Data from a local or online Sources such as RSS or Google Analytics with Business Intelligence Tools (MC 1.3.C.2)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Visualizing Structured Data from a local or online Sources such as RSS or Google Analytics with Business Intelligence Tools Code: MC 1.3.C.2
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	ADVANCED
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.21)

### **Visualizing Structured Data from a local or online Sources such as RSS or Google Analytics with Business Intelligence Tools**

- Use Business Intelligence Tools (such as Power BI or Tableau) to analyse structured and clean data from an online sources (such as RSS feeds or Google analytics)

## Description

Tableau and Power BI are similar tools as they both belong to the category of business intelligence (BI) and data visualization platforms. They share common objectives of helping users analyze, visualize, and gain insights from their data. It is particularly valuable for professionals working with large datasets and engaging in business intelligence and analytics activities.

Power BI and Tableau allow users to perform Data Import and Transformation, Data Modelling, Measures, Hierarchies and Time Intelligence functions. At this level, the learner should be able to connect to an online data source such as RSS or Google Analytics and create visualizations.

The acquisition of the micro-credential **‘Use Business Intelligence Tools (such as Power BI or Tableau) to analyse structured and clean data from an online sources (such as RSS feeds or Google analytics)’** demonstrates that the learner is able to create visualizations from online sources such as RSS feeds and Google Analytics.

## Questions

1. How can you connect to an online source using PowerBI?
2. Provide 5 examples of online sources that Power Bi supports connection
3. How to import data from Online Sources? Can you provide the steps?
4. Can you create a set of visualizations to gain insights from an online data sources i.e. RSS feeds or Google Analytics?

## Data transformation and visualization in a spreadsheet software (MC 1.3.C.3)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	<b>Data transformation and visualization in a spreadsheet software</b> Code: MC 1.3.C.3
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	5 hrs
Level of the learning experience leading to the micro-credential	ADVANCED
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.2.22)

### **Data transformation and visualization in a spreadsheet software**

- Transforming and Cleaning Data in a flat file to prepare the data for analysis

## Description

Visualizing data in a spreadsheet software like Microsoft Excel or Google Sheets is a powerful way to draw conclusions, identify patterns, and communicate insights. Prior to visualization, important steps should be performed such as importing or entering data, understanding the structure of the data (numeric, categorical), performing data cleaning (if needed) and selecting the appropriate visualization type.

By following these steps, the learner can effectively use spreadsheet software to visualize data, gain insights, and communicate findings to others. Visualization is a powerful tool for making data-driven decisions and conveying information in a clear and compelling manner.

The acquisition of the micro-credential “**Data transformation and visualization in a spreadsheet software**” demonstrates that the learner is able to use a spreadsheet software to perform the steps described above to visualize data for making data-driven decisions and conveying information in a clear and compelling manner

## Questions

1. What is data cleaning?
2. Describe possible methods to perform data cleaning in a spreadsheet software
3. Use a variety of functions (TEXT, LOGICAL, etc) to transform data (i.e. categorization of data) prior to data analysis
4. What steps should you take to visualize data?
5. Write down the steps to create a chart from the data set provided.

## Processing Data – Cleaning and Normalizing data with BI tools (MC 1.3.C.4)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Processing Data – Cleaning, Normalizing data with BI tools Code: MC 1.3.C.4
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	ADVANCED
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LOs 1.3.23 and 1.3.24)

Processing Data – Cleaning and Normalizing data with BI tools

- Describe what is data processing including cleaning, normalization, and transformation.
- Cleaning and Normalizing Data to prepare the data for analysis

## Description

Cleaning and normalizing data are crucial steps in the data preprocessing phase of a data analysis. These processes help ensure that the data is accurate, consistent, and ready for analysis or model training.

The objective of Data Cleaning is to identify and rectify errors, inconsistencies, and inaccuracies in the dataset such as handling missing values, removing duplicates, handling outliers, correcting inaccurate data, standardizing data formats and dealing with inconsistent data:

Normalizing is the process of organizing and structuring data within a relational database to eliminate redundancy and reduce the likelihood of data anomalies.

Cleaned and normalized data contributes to overall data quality, which is essential for reliable analyses and model building.

The acquisition of the micro-credential ‘Processing Data – Cleaning and Normalizing data with BI tools ’ demonstrates that the learner is able to take the preprocess steps which are essential to prepare data prior to the creation of visuals.

## Questions

1. Why cleaning of data is an important step before analyzing data?
2. What Normalization means?
3. Why normalization is important?
4. On a data model I can take the necessary steps to clean data
5. On a data model I can take the necessary steps to normalize data

# EXPERT LEVEL

## (LEVEL 7 AND LEVEL 8)





## Data processing using DAX functions (MC 1.3.D.1)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	<b>Data processing using DAX functions</b> Code: MC 1.3.D.1
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	6 hrs
Level of the learning experience leading to the micro-credential	EXPERT
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. )

### Data processing using DAX functions

- Perform Data Processing by using tools such as the programming language such as DAX

## Description

DAX, which stands for Data Analysis Expressions, is a formula language and scripting language used in various Microsoft products for business intelligence, analytics, and data modelling. DAX is primarily associated with Microsoft Power BI, Excel Power Pivot, and SQL Server Analysis Services (SSAS). It is designed to work with data models and provide a powerful set of functions and operators for creating custom calculations and aggregations.

DAX is a formula language similar to Excel formulas, but it is designed to work with data models and databases. It allows users to create custom formulas for calculations and aggregations within these data models. It operates on a columnar database structure, which means that calculations are performed on entire columns of data rather than individual rows. This can lead to more efficient processing and faster query performance. It is widely used in Microsoft Power BI, a business analytics service, and Excel Power Pivot, an Excel add-in for data analysis. Users can create interactive reports and dashboards using DAX expressions. DAX introduces the concept of calculation context, which determines how a calculation is applied in different situations. Understanding calculation context is crucial for creating accurate and meaningful formulas.

In the context of this micro-credential, DAX expressions can be used to transform data, create calculated fields and measures, in order to group or calculate new fields and extent reporting capabilities with visualizations.

The acquisition of the micro-credential **Data processing using DAX functions** demonstrates that the learner has the skills to create measures and calculated columns to transform, manipulate and extent calculations necessary for visualising data.

## Questions

1. What is a calculated field?
2. Can you demonstrate examples where a calculated field is needed in a data model?
3. What is a measure?
4. Can you demonstrate examples where a measure is needed in a data model?
5. Can you use DAX functions (i.e. logical functions, aggregate functions, text functions etc) to create calculated columns or measures?

## Introduction to Data Mining (MC 1.3.D.2)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Introduction to Data Mining Code: MC 1.3.D.2
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	EXPERT
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

### Introduction to Data Mining

Learning Outcomes (ref. LO 1.3.26 and 1.3.27)

1. Describe what data mining is
2. Enlist software that perform data mining

## Description

Data mining is the process of discovering patterns, trends, correlations, or meaningful insights from large datasets. It involves the use of various techniques, algorithms, and statistical methods to analyse and extract knowledge from data. The goal of data mining is to uncover hidden patterns and information that can be valuable for decision-making, prediction, and optimization in various fields.

Data mining begins with the exploration of large datasets to identify patterns or trends. This involves examining the structure, relationships, and characteristics of the data. Before applying data mining techniques, it's essential to clean and preprocess the data to handle missing values, outliers, and inconsistencies. This ensures the accuracy and reliability of the results. Data mining algorithms use pattern recognition techniques to identify regularities or anomalies in the data. This can include identifying associations, correlations, sequences, clusters, or outliers. Based on the patterns identified, data mining models are constructed. These models can be statistical models, machine learning models, or other analytical models, depending on the goals of the analysis. One of the primary applications of data mining is predictive analysis. Models built through data mining can be used to predict future trends, outcomes, or behaviors based on historical data.

Data mining techniques include classification, where data is categorized into predefined classes, and regression, where relationships between variables are modeled to make predictions. Clustering involves grouping similar data points together based on certain criteria. This can reveal natural groupings or structures within the data. Association rule mining identifies relationships and associations between variables. This is often used in market basket analysis to discover patterns of co-occurring items in transactions.

Data mining is not limited to numerical data; it can also be applied to text data. Text mining involves extracting valuable information, patterns, or knowledge from large sets of unstructured text.

Data mining can also be used to identify unusual patterns or outliers in the data. This is important for detecting fraud, errors, or unusual behavior.

Data mining is used for optimizing processes and decision-making. For example, in supply chain management, it can help optimize inventory levels or distribution routes.

Scalability is a crucial consideration in data mining, especially as datasets continue to grow. Efficient algorithms and techniques are essential for handling large volumes of data.

Data mining is applied in various industries, including finance, healthcare, marketing, telecommunications, and more. It plays a crucial role in extracting actionable insights from vast amounts of data, ultimately aiding organizations in making informed decisions and improving their overall performance.

There are several software tools and platforms used for data mining, each offering a range of functionalities, algorithms, and capabilities. The choice of software often depends on the specific needs of the data mining

task, the type of data, and the preferences of the user or organization. Some widely used data mining tools are:

**RapidMiner:** RapidMiner is an open-source data science platform that provides a user-friendly interface for various data mining tasks. It supports a wide range of data preprocessing, modeling, and evaluation techniques. It is widely used in academia and industry.

**Weka:** Weka (Waikato Environment for Knowledge Analysis) is an open-source machine learning and data mining software. It includes a collection of machine learning algorithms for classification, regression, clustering, and feature selection.

**KNIME:** KNIME (Konstanz Information Miner) is an open-source data analytics, reporting, and integration platform. It allows users to visually create data flows, execute analysis processes, and deploy models.

**Orange:** Orange is an open-source data visualization and analysis tool for novice and expert users. It provides a visual programming environment for data mining and machine learning tasks.

The micro-credential **Introduction to Data Mining** demonstrates that the learner is aware of what data mining is and can enlist software that can be used to perform data mining.

### Questions

1. Can you explain what data mining is?
2. In what kind of industries data mining is used?
3. Can you enlist software to perform Data Mining?

## Data mining with RStudio (MC 1.3.D.3)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Data Mining with RStudio Code: MC 1.3.D.3
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	EXPERT
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review

## Learning Outcomes

Learning Outcomes (ref. LO 1.3.28 )

### Data Mining with RStudio

- Use RStudio for Data mining

## Description

RStudio is a powerful integrated development environment (IDE) for the R programming language, and it is widely used for data analysis, statistical modeling, and data mining tasks.

The learner should be able to use RStudio to load and import your dataset into R, write scripts and Use R's built-in functions and packages (e.g., `summary()`, `str()`, `head()`, `tail()`) to explore and understand the structure of data. The learner should also be able to perform data cleaning and preprocessing using R. R offers a wide range of functions and packages for data cleaning and preprocessing. It can handle missing values, remove outliers, and transform variables using functions like `na.omit()`, `subset()`, `mutate()`, and more.

RStudio integrates with popular data visualization packages such as `ggplot2` for creating insightful visualizations. The learner should be able to use R scripts to generate plots and charts to better understand the patterns and trends in your data. Perform statistical analysis using R's extensive statistical functions. RStudio provides a convenient environment to run statistical tests, conduct hypothesis testing, and generate summary statistics.

The learner should be able to Utilize R's rich set of packages for machine learning and data mining. Popular packages include `caret`, `randomForest`, `e1071`, `glmnet`, and many others. Build predictive models, conduct clustering, or perform classification using these packages.

The acquisition of the micro-credential **Data Mining with RStudio** demonstrates that the learner can use R Studio to perform data mining, starting from preprocessing steps up to the creation of visualizations and datamining tasks.

## Questions

1. Can you write scripts in RStudio script editor?
2. Can you perform preprocessing steps for cleaning and transforming data?
3. Can you utilize R's packages for data mining?

## Using SPSS for Statistical Analysis (MC 1.3.D.4)

### Basic Information

Identification of the learner	Any Citizen
Title and code of the micro-credential	Using SPSS for Statistical Analysis Code: MC 1.3.D.4
Country(ies)/Region(s) of the issuer	ITALY, CYPRUS, GREECE, ROMANIA <a href="http://dsw.projectsgallery.eu">http://dsw.projectsgallery.eu</a>
Awarding body(ies)	DSW Consortium Project Number: <b>101087628</b>
Date of issuing	Nov 2023
Notional workload needed to achieve the learning outcomes	8 hrs
Level of the learning experience leading to the micro-credential	EXPERT
Type of assessment	Automatically marked Questions Number of Questions: 16 – 20 Passing Score: 75%
Form of participation in the learning activity	Online Asynchronous
Type of quality assurance used to underpin the micro-credential	Peer Review



## Learning Outcomes

Learning Outcomes (ref. LO 1.3.29)

Using SPSS for Statistical Analysis

- Use Statistical Tools such as SPSS for data analysis

## Description

SPSS, which stands for Statistical Package for the Social Sciences, is a software suite used for statistical analysis and data management. Originally developed by IBM in 1968, SPSS has become one of the most widely used statistical software packages in various fields, including social sciences, psychology, marketing, health research, and more. Over the years, SPSS has evolved and is now part of the IBM SPSS Statistics family.

The micro-credential Using SPSS for Statistical Analysis demonstrates that the learner can use SPSS for data cleaning, transformation, and preparation, manipulation and restructuring of datasets, handle missing values, and recode variables. The acquisition of this micro-credential also demonstrates that the user can use a variety of descriptive statistics, including measures of central tendency (mean, median), measures of dispersion (range, standard deviation), and frequency distributions. Additionally, it demonstrates that users can create a wide range of graphical representations of data, including bar charts, histograms, scatterplots, and more. Finally users demonstrate their capacity to use a variety of parametric and non-parametric hypothesis tests like t-tests, ANOVA, chi-square tests, correlation tests and regression analysis.

## Questions

1. Can you perform cleaning, transformation, and preparation in SPSS?
1. Can you perform manipulation and restructuring of datasets in SPSS?
2. Can you perform descriptive statistics in SPSS?
3. Can you create graphical representations?
4. Can you use a variety of parametric and non-parametric hypothesis tests, like t-tests, ANOVA, chi-square tests, correlation tests and regression analysis.





## APPENDIX I: LEARNING OUTCOMES FOR COMPETENCE 1.3 MANAGING DATA, INFORMATION AND DIGITAL CONTENT

COMPETENCE AREA 1: INFORMATION AND DATA LITERACY		
COMPETENCE 1.3: MANAGING DATA, INFORMATION AND DIGITAL CONTENT		
1	At basic level and with guidance, I can:	<ul style="list-style-type: none"> <li>• identify how to organise, store and retrieve data, information and content in a simple way in digital environments.</li> <li>• recognise where to organise them in a simple way in a structured environment</li> </ul>
2	At basic level and with autonomy and appropriate guidance where needed, I can:	<ul style="list-style-type: none"> <li>• identify how to organise, store and retrieve data, information and content in a simple way in digital environments.</li> <li>• recognise where to organise them in a simple way in a structured environment.</li> </ul>
3	On my own and solving straightforward problems, I can:	<ul style="list-style-type: none"> <li>• select data, information and content in order to organise, store and retrieve them in a routine way in digital environments.</li> <li>• organise them in a routine way in a structured environment.</li> </ul>
4	Independently, according to my own needs, and solving well-defined and non-routine problems, I can:	<ul style="list-style-type: none"> <li>• organise information, data and content to be easily stored and retrieved.</li> <li>• organise information, data and content in a structured environment.</li> </ul>
5	As well as guiding others, I can:	<ul style="list-style-type: none"> <li>• manipulate information, data and content for their easier organisation, storage and retrieval.</li> <li>• carry out their organisation and processing in a structured environment.</li> </ul>
6	At advanced level, according to my own needs and those of others, and in complex contexts, I can:	<ul style="list-style-type: none"> <li>• adapt the management of information, data and content for the most appropriate easy retrieval and storage.</li> <li>• adapt them to be organised and processed in the most appropriate structured environment</li> </ul>
7	At highly specialised level, I can:	<ul style="list-style-type: none"> <li>• create solutions to complex problems with limited definition that are related to managing data, information, and content for their organisation, storage and retrieval in a structured</li> </ul>



		<p>digital environment.</p> <ul style="list-style-type: none"> <li>• integrate my knowledge to contribute to professional practices and knowledge and to guide others in managing data, information and digital content in a structured digital environment</li> </ul>
8	At the most advanced and specialised level, I can:	<ul style="list-style-type: none"> <li>• create solutions to solve complex problems with many interacting factors that are related to managing data, information, and content for their organisation, storage and retrieval in a structured digital environment.</li> <li>• propose new ideas and processes to the field.</li> </ul>

## COMPETENCE 1.3: FOUNDATION LEVEL

<b>COMPETENCE AREA 1: INFORMATION AND DATA LITERACY</b>			
<b>COMPETENCE 1.3 - MANAGING DATA, INFORMATION AND DIGITAL CONTENT</b>			
<b>LEVEL: FOUNDATION</b>			
<b>LEVEL 1</b>			
At basic level and with guidance, I can:			
<ul style="list-style-type: none"> <li>• identify how to organise, store and retrieve data, information and content in a simple way in digital environments.</li> <li>• recognise where to organise them in a sim</li> </ul>			
<b>LEVEL 2</b>			
At basic level and with autonomy and appropriate guidance where needed, I can:			
<ul style="list-style-type: none"> <li>• identify how to organise, store and retrieve data, information and content in a simple way in digital environments.</li> <li>• recognise where to organise them in a simple way in a structured environment</li> </ul>			
Learning Outcome	Level	K – S - A	Explanation
<b>INTERNET AND SOCIAL MEDIA</b>			
1. Recognize that data collection processes and digitization of data take place by systems and devices	L1-L2	K	Aware that for data (e.g. numbers, text, images, sounds) to be processed by a program, they have to be first properly digitised (i.e. digitally encoded). Aware that various devices such as sensors used in many digital technologies and applications (e.g. facial tracking cameras, virtual assistants, wearable technologies, mobile phones, smart devices) generate large amounts of data, including personal data which are digitized.



2. Recognize that the digitized data can be used for personal use, by AI technologies to train systems and recognize patterns	L1-L2	K	Knows that data collected and processed, for example by online systems, can be used to recognise patterns (e.g. repetitions) in new data (i.e. other images, sounds, mouse click or to to train an AI system).
3. Recognise that many applications on the internet and mobile phones collect and process data (personal data, behavioural data and contextual data) that the user can access or retrieve,	L1-L2	K	<p>The internet and applications collect data when users interact with them. This includes data entered through forms, buttons clicked, options selected, and any other user inputs. For example, a weather app may collect location data when a user searches for local weather information.</p> <p>The learner should be aware that this data may be accessible for own use to monitor both online activities online (e.g. clicks in social media, searches on Google) and offline (e.g. daily steps, bus rides on public transport).</p>
4. Able to save preferences and results in a variety of ways (i.e. bookmarks, favorites) on the Internet, a web or mobile app	L1-L2	S	Saving preferences on the internet or within an app typically involves storing user-specific settings or configurations so that they persist across sessions. The method can vary depending on whether it's a web application or a native app. Additionally the learner should have the skills to save/manage results in a variety of ways.
5. Describe how the internet, applications and mobile phones collect and process data through various methods (sensors, forms, tracking, GPS, accelerometers)	L1-L2	K	Applications on the internet and mobile phones collect and process data through various methods, often relying on user interactions, device sensors, and network communication. For example, applications collect data through User Inputs and Interactions (a weather app may collect location data when a user searches for local weather information) or Mobile devices are equipped with various sensors that applications can utilize to gather data. (i.e. GPS for location data, accelerometers for motion data, gyroscopes for orientation).
6. Describe the various types of information that may be collected, while working online	L1-L2	K	<p>While using the internet, various types of information may be collected, depending on your online activities and the services you use. The exact information collected can vary widely, but there are common types of data that may be collected such as Browsing History, IP address, Device Identifier etc.</p> <p>The learner should be able to describe the data collected and elaborate on what each piece of information collected is and what purpose it serves</p>



7. Recognises that there are various options for storage (local, cloud and network storage)	L1-L2	K	Local storage, network storage, and cloud storage are different types of storage solutions that provide varying levels of accessibility, convenience, and scalability. The learner should be aware of these storage options and that choosing the right storage solution depends on factors such as data accessibility requirements, collaboration needs, security considerations, and budget constraints and that many users and organizations use a combination of these storage types to meet their diverse needs.
8. Describe at high level what are the pros and cons of these storage options	L1-L2	K	The learner should be able to describe the pros and cons of each storage option in terms of accessibility, Speed, Capacity, Ownership and Control and Backup and key considerations when choosing a storage method involve Security, Cost, Accessibility and Convenience



## COMPETENCE 1.3: INTERMEDIATE LEVEL

COMPETENCE AREA 1: INFORMATION AND DATA LITERACY			
COMPETENCE 1.3 - MANAGING DATA, INFORMATION AND DIGITAL CONTENT			
LEVEL: INTERMEDIATE			
<p><b>LEVEL 3</b></p> <p>On my own and solving straightforward problems, I can:</p> <ul style="list-style-type: none"> <li>• select data, information and content in order to organise, store and retrieve them in a routine way in digital environments.</li> <li>• organise them in a routine way in a structured environment.</li> </ul> <p><b>LEVEL 4</b></p> <p>Independently, according to my own needs, and solving well-defined and non-routine problems, I can:</p> <ul style="list-style-type: none"> <li>• organise information, data and content to be easily stored and retrieved.</li> <li>• organise information, data and content in a structured environment.</li> </ul>			
9. Access information collected while working online	L3-L4	S	Accessing this information depends on the type of data and the platform or service involved, such as Browsing History and Cookies, Google Account, Social Media Platforms etc This LO provides the skills to access information collected by various systems and make changes to preferences.
10. Use applications that store data and access data for own use	L3-L4	S	The learner should be able to utilize information gathered by apps or the Internet for personal use.



11. Use tools for data collection such as Google Forms, Microsoft Forms, SurveyMonkey and Doodle	L3-L4	S	Google Forms, Microsoft Forms, SurveyMonkey and Doodle are popular online survey and form-building tools that allow users to create, distribute, and collect responses for surveys, questionnaires, and other types of forms. Each platform has its unique features and is designed to streamline the process of gathering information from individuals or groups. The learner should be able to effectively use these applications in various situations
12. Present data collected using tables in a spreadsheet application (such as Excel or Google Sheets) or charts by utilizing application features	L3-L4	S	This LO covers the skills required to present data collected in tables such as spreadsheets or charts.
13. Utilize tools for automatic data representation and analysis (such as exporting in CSV file format)	L3-L4	S	One of the main features of applications collecting data is exporting to a format that can be read by many applications such as excel or google sheets. This LO covers a wide variety of online apps which offer exporting features and explains the main file formats which are widely used.
14. Apply basic statistical procedures to data in a structured environment (e.g. spreadsheet) to produce graphs and other visualisations	L3-L4	S	Applying basic statistical procedures to produce graphs involves several steps, including data analysis, selecting appropriate statistical methods, and using visualization tools to create meaningful graphs
15. Interacts with dynamic data visualisation and can manipulate dynamic graphs of interest	L3-L4	S	There is a wide variety of dynamic data visualizations available and accessible online (e.g. as provided by Eurostat, government websites) .The learner should be able to interact a with these visualizations to filter or analyze data of specific concern.
16. Can differentiate between different types of storage locations (local devices, local network, cloud) that are the most appropriate to use	L3-L4	S	This LO focuses on teaching the learners to differentiate between different types of storage locations (local devices, local network, cloud) that are the most appropriate to use (e.g. data on the cloud is available anytime and from anywhere, but has implications for access time).



17. Be able to use various storage options (local, network or cloud)	L3-L4	S	This LO focuses on teaching the learners on how to use and navigate the various storage options with emphasis on <ol style="list-style-type: none"> <li>1. Organizing Files into Folders</li> <li>2. Navigating between various storage options (cloud, local and network)</li> <li>3. Understanding the use of the recycle bin in each situation</li> </ol>
18. Describe at high level how cloud storage works and what is synchronization	L3-L4	K	This LO aims to teach how synchronization works. Synchronization in the context of cloud storage refers to the process of ensuring that the data across multiple devices or locations is kept up-to-date and consistent. It allows users to maintain the latest version of their files and folders across various devices, such as computers, smartphones, and tablets. It also focused on the process of synchronization
19. Use tools to synchronize cloud storage on local devices	L3-L4	S	This LO teaches learner how to install and use tools to synchronize cloud storage on local devices

## COMPETENCE 1.3: ADVANCED LEVEL

<b>COMPETENCE AREA 1: INFORMATION AND DATA LITERACY</b>			
<b>COMPETENCE 1.3 - MANAGING DATA, INFORMATION AND DIGITAL CONTENT</b>			
<b>LEVEL: ADVANCED</b>			
<b>LEVEL 5</b>			
As well as guiding others, I can:			
<ul style="list-style-type: none"> <li>manipulate information, data and content for their easier organisation, storage and retrieval.</li> <li>carry out their organisation and processing in a structured environment.</li> </ul>			
<b>LEVEL 6</b>			
At advanced level, according to my own needs and those of others, and in complex contexts, I can:			
<ul style="list-style-type: none"> <li>adapt the management of information, data and content for the most appropriate easy retrieval and storage.</li> <li>adapt them to be organised and processed in the most appropriate structured environment</li> </ul>			
20. Use Business Intelligence tools (such as Power BI or Tableau) to analyse structured and clean data from a database source (online or local)	L5-L6	S	This LO aims to deliver the skills in using Business Intelligence Tools to create visualizations from a database (online or Offline) provided that the data is cleaned and no further processing is required
21. Use Business Intelligence Tools (such as Power BI or Tableau) to analyse structured and clean	L5-L6	S	This LO aims to deliver the skills in using Business Intelligence Tools to create visualizations from a online sources (i.e. RSS feeds or Google Analytics) provided that the data is cleaned and no further processing is required

data from an online sources (such as RSS feeds or Google analytics)			
<b>22. Transforming Data in a flat file to prepare the data for analysis</b>	L5-L6	S	Visualizing data in a spreadsheet software like Microsoft Excel or Google Sheets is a powerful way to draw conclusions, identify patterns, and communicate insights. Prior to visualization, important steps should be performed such as importing or entering data, understanding the structure of the data (numeric, categorical), performing data cleaning (if needed) and selecting the appropriate visualization type.
<b>23. Describe what is data processing including cleaning, normalization, and transformation.</b>	L5-L6	K	Cleaning and normalizing data are crucial steps in the data preprocessing phase of a data analysis. These processes help ensure that the data is accurate, consistent, and ready for analysis or model training. This LO aims to deliver the necessary knowledge on what cleaning of data means (i.e. removing outliers, dealing with missing values) and what normalize data is and why it is an important step prior to analysis of data.
24. Cleaning and Normalizing Data to prepare the data for analysis	L5-L6	S	Cleaning and normalizing data are crucial steps in the data preprocessing phase of a data analysis. These processes help ensure that the data is accurate, consistent, and ready for analysis or model training. This LO aims to deliver the necessary skills to clean and normalize data using BI Tools

## COMPETENCE 1.3: EXPERT LEVEL

COMPETENCE AREA 1: INFORMATION AND DATA LITERACY			
COMPETENCE 1.3 - MANAGING DATA, INFORMATION AND DIGITAL CONTENT			
LEVEL: EXPERT			
<p><b>LEVEL 7</b></p> <p>At highly specialised level, I can:</p> <ul style="list-style-type: none"> <li>• create solutions to complex problems with limited definition that are related to managing data, information, and content for their organisation, storage and retrieval in a structured digital environment.</li> <li>• integrate my knowledge to contribute to professional practices and knowledge and to guide others in managing data, information and digital content in a structured digital environment.</li> </ul>			
<p><b>LEVEL 8</b></p> <p>At the most advanced and specialised level, I can:</p> <ul style="list-style-type: none"> <li>• create solutions to solve complex problems with many interacting factors that are related to managing data, information, and content for their organisation, storage and retrieval in a structured digital environment.</li> <li>• propose new ideas and processes to the field.</li> </ul>			
25. Perform Data Processing by using tools such as the programming language such as DAX	L7-L8	S	DAX, which stands for Data Analysis Expressions, is a formula language and scripting language used in various Microsoft products for business intelligence, analytics, and data modelling. DAX is primarily associated with Microsoft Power BI, Excel Power Pivot, and SQL Server Analysis Services (SSAS). It is designed to work with data models and provide a powerful set of functions and operators for creating custom calculations and aggregations.



			This LO aims to deliver the skills to create measures and calculated columns to transform, manipulate and extent calculations necessary for visualising data
26. Describe what data mining is	L7-L8	K	<p>Data mining is the process of discovering patterns, trends, correlations, or meaningful insights from large datasets. It involves the use of various techniques, algorithms, and statistical methods to analyse and extract knowledge from data. The goal of data mining is to uncover hidden patterns and information that can be valuable for decision-making, prediction, and optimization in various fields.</p> <p>This LO aims to deliver basic knowledge on data mining</p>
27. Enlist software that perform data mining	L7-L8	K	<p>There are several software tools and platforms used for data mining, each offering a range of functionalities, algorithms, and capabilities.</p> <p>This LO aims to introduce software tools used for data mining and their basic functionality.</p>
28. Use RStudio for Data mining	L7-L8	S	<p>RStudio is a powerful integrated development environment (IDE) for the R programming language, and it is widely used for data analysis, statistical modelling, and data mining tasks.</p> <p>The learner should be able to use RStudio to load and import your dataset into R, write scripts and Use R's built-in functions and packages for data mining and create visualizations</p>
29. Use Statistical Tools such as SPSS for data analysis	L7-L8	S	<p>This LO aims to deliver the skills to perform cleaning, transformation, and preparation, manipulation and restructuring of datasets, perform descriptive statistics, create graphical representations and use a variety of parametric and non-parametric hypothesis tests, like t-tests, ANOVA, chi-square tests, correlation tests and regression analysis.</p>

# Project Coordinator:



# Partners:



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