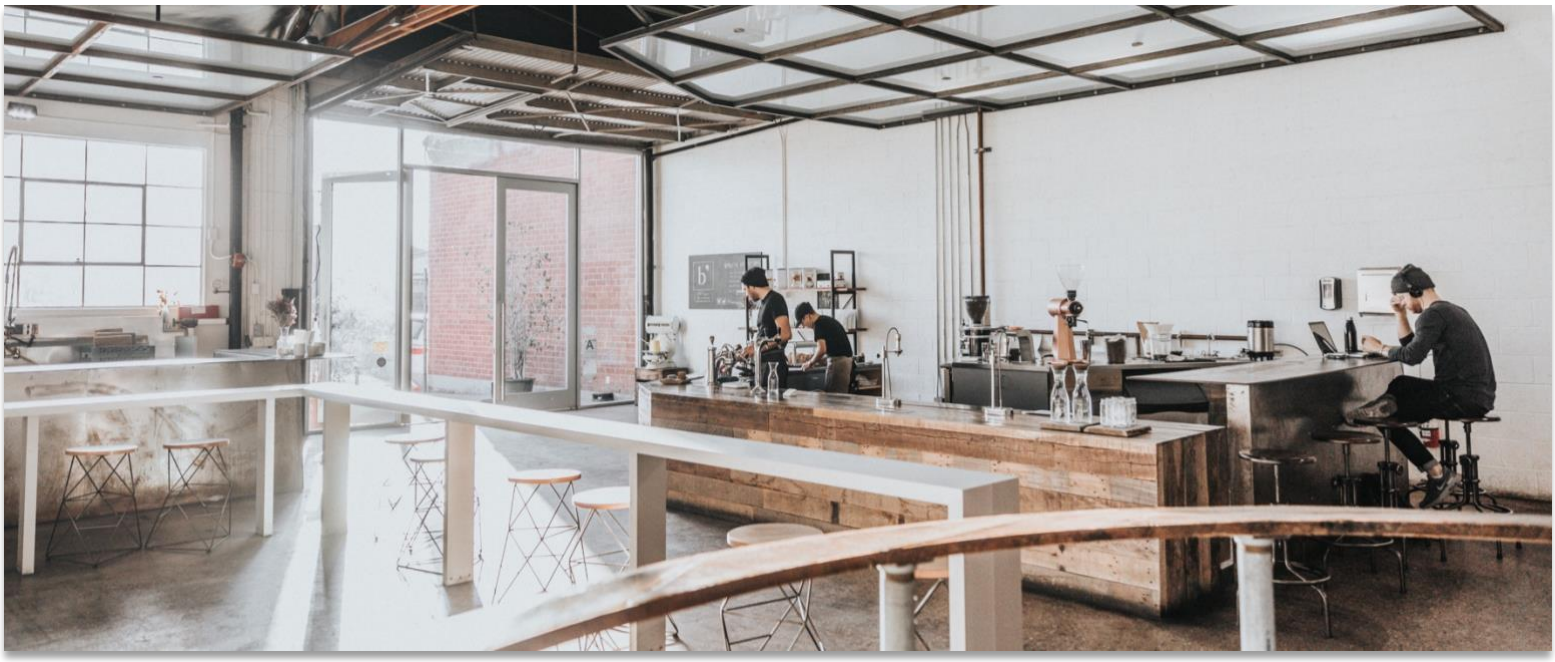
European Commission

Blueprint 4

Introduction to Data Analytics



Extract of Digital Skills: New Professions, New Educational Methods, New Jobs

A study prepared for the European Commission
DG Communications Networks, Content & Technology
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Digital Single Market

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By the European Commission, Directorate-General of Communications Networks, Content & Technology.

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INTRODUCTION

Europeans face an everchanging world with increased digitisation requiring a greater need for digital skills. SMEs represent an important source of employment and are economic motors for the EU, yet they are often at a disadvantage to upskilling their employees and/or recruiting the skills most in demand today.

It is in this context that the European Commission commissioned a Pilot Project to develop and test a structured programme to enable SME employees and unemployed persons to acquire the digital skills that are required in the modern work place. To represent diversity within the European Union, two very different European regions, the Region of Murcia in Spain and Lithuania were selected as test beds for the pilot programmes on Digital Skills.

The work undertaken has been fundamentally empirical in nature, drawing inputs from a wide range of stakeholders, including SMEs and organisations working with the unemployed. The resulting insights fed into this set of Digital Skills Blueprints. The Blueprints have been developed as aids to support not just planning, but also the implementation of digital skills centred initiatives that are oriented towards those who do not currently have ready access to the means to acquire the digital skills necessary to compete in an increasing digital economy.

This Blueprint, Blueprint 4 – Introduction to Data Analytics, provides guidance on the content, structure and resources, providing decision makers in SMEs or unemployed people with ICT backgrounds with skills relating to Data Analytics concepts and the tools that would enable them to better understand the data generated within their business and take decisions based on that data.

WHAT IS DATA ANALYTICS?

Data Analytics (DA) is the process of examining data sets in order to enable organisations to make more-informed business decisions. It includes a set of methodologies, tools and applications to gather, debug and transform information from a variety of internal and external sources (ERP and CRM, web, statistics, public repositories, etc.) and formats (structured and unstructured), both for its direct exploitation (reporting, analysis - OLAP, alerts, etc.) and for its analysis and conversion into knowledge to support decision making.

The aim is to provide participants with enough knowledge and skills about Data Analytics concepts and the tools that support them to enable them to understand business opportunities and make decisions, as well as report on them.

1.1 TARGET AUDIENCE

The course is aimed at professionals who have a basic knowledge of business management and statistical concepts, as well as some skills to treat and analyse data. It is particularly well-suited to employees who handle large volumes of data and need it to inform, make decisions and act accordingly.

SME MANAGERS	EMPLOYEES
	
SELF-EMPLOYED	**UNEMPLOYED**
	

1.2 COMMITMENT REQUIRED

TOTAL PARTICIPANT WORKLOAD	FACE-TO-FACE CLASSES, LABS & WORKSHOPS
121 HOURS	21
WEBINARS	**PERSONAL ASSIGNMENT**
10	90

1.3 REQUIRED SKILLS ON ENTRY

The following skills are recommended for participants to have on entry

- Knowledge or experience of business management concepts
- Basic knowledge of statistical concepts
- Capacity to treat and analyse data, e.g. manipulation with Excel

No programming skills are necessary. Participants must have basic computer literacy.

SYLLABUS

1.4 PROJECT BASED LEARNING

Learning activities revolve around short projects for each module culminating in a final project, which is the backbone of the training programme. The project will consist of the definition of new business strategies using real or provided high-volume datasets. Throughout the rest of the course, participants will continue to develop their models and visualisations working in teams.

The project assignment provides an opportunity to bring all course content together and applying the skills acquired.

1.5 LEARNING OUTCOMES

- Ability describe the role of business intelligence in the management of companies
    - Use of BI tools and platforms in order to:
    - Collect data from different sources and discriminate between different data sources
    - Interpret and give meaning to data
    - Identify patterns and trends in large and diverse datasets
    - Visualise data in a meaningful way and use them for reporting
    - Identify market trends and use them to make decisions
- Ability to go beyond obvious assumptions regarding data and gain more meaningful and accurate insights
- Ability to put into practice all the acquired skills to design a data analytics solution for a business problem

1.6 CORE SKILLS DEVELOPED

- Identification and understanding of the use of different Data Analytics techniques.
- Know and be able to select and use the tools offered by common IT frameworks for Data Analytics.
- Basic skills for designing a business intelligence solution for a business problem.
- Be able to communicate business decisions based on Data Analytics.

1.7 SUMMARY OF CONTENT

The following table provides a broad overview of the course and the methodology applied to each of the elements.

CONTENT MODULE	METHODOLOGY AND FACE-TO-FACE ACTIVITIES
1. Introduction to the course • Course learning objectives, overall organisation, resources, training platform and assessment techniques • Teachers, tutors and mentors, Trainees and trainees' expectations	1 hour - Face-to-face classroom presentation
2. Introduction to data analytics, key tools and techniques • Introduction to Data Analytics • BI in a nutshell • Use cases • Installation of the software • Introduction to tool capabilities and characteristics	4 hours - Face-to-face class on facilities 2 hours – Personal tutoring 2 hour – Webinar 6,5 hours - Personal work: reading materials, tutorials, videos, etc. 11,5 hours - Short project 4 hours - Short evaluation task and materials review
3. Data gathering, cleaning and modelling • Data collection • Data modelling • Cleaning data	4 hours - Face-to-face class on facilities 2 hours – Personal tutoring 2 hour – Webinar 6,5 hours - Personal work: reading materials, tutorials, videos, etc. 11,5 hours - Short project 4 hours - Short evaluation task and materials review
4. Visualising data • OLAP (Online Analytical Processes) cubes • Visualisation techniques and tools • Report design and strategy	4 hours - Face-to-face class on facilities 2 hours – Personal tutoring 2 hour – Webinar 6,5 hours - Personal work: reading materials, tutorials, videos, etc. 11,5 hours - Short project 4 hours - Short evaluation task and materials review
5. Dashboards, KPIs and decision making • Creating dashboards • Selecting relevant and measurable KPIs • Decision-making processes and tools	4 hours - Face-to-face class on facilities 1,5 hours – Personal tutoring 2 hour – Webinar 6,5 hours - Personal work: reading materials, tutorials, videos, etc. 6 hours – Project preparation 3 hours - Short evaluation task and materials review. 4 hours – Project presentation 4 hours – Face-to-face project presentation

For the purpose of simplifying the content and avoiding unnecessary repetitions, following terms and abbreviations are used in the Implementation section:

ABBREVIATION	TERM
TR/H	Trainee hours
INS/H	Instructor hours
V	Venue
TP	Training platform
WS	Work station(s)

IMPLEMENTATION

The following tables provide the adjusted framework for the implementation digital skills training in this topic. The content can be adapted to that available to the particular provider, the structure will enable policy makers and other stakeholders to plan and resource digital training initiatives. The total number of trainer hours required is 238.

Week 1. Introduction to Data Analytics

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Introduction to course Objectives, organisation, resources, training platform, assessment, teachers, tutors and mentors	TP: documents, presentations and links Domains, hosting, licenses	Classroom face-to face	1	1
Introduction to data analytics, familiarization with tools	TP: documents, presentations and links	Classroom and Lab. face-to face	4	4
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	4	N/A
Evaluation task and materials review	TP: task	Independent work	2	N/A
Content, preparation and marking, etc.			N/A	11
			11	16

Week 2. Introduction to business intelligence

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Webinar on PowerBI basics	TP	Online Face-to-face	1	1
Online tutoring (individual)	TP	Online Face-to-face	0,5	12,5
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	2,5	N/A
Short project development	TP: forum, videos, materials	Independent and team work	5	N/A
Evaluation and materials review	TP: task	Independent work	1	N/A
Content, preparation and marking, etc.			N/A	11
			10	24,5

Week 3. Early analysis

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Online tutoring (groups of 5 students)	TP	Online Face-to-face	1	5
Project development	TP	Independent and team work	8	N/A
Trainees personal work: readings, review of materials, use of training platform, etc. Semi-collaborative	TP: documents, presentations and links	Independent work	1	N/A
Content, preparation and marking, etc.			N/A	10
			10	15

Week 4. Data collection

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Introduction to data collection, gathering and cleaning methods	TP: documents, presentations and links	Classroom and Lab. face-to face	4	4
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	4	N/A
Evaluation task and materials review	TP: task	Independent work	2	N/A
Content, preparation and marking, etc.			N/A	11
			10	15

Week 5. Data Cleaning

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Webinar on cleaning and normalizing	TP	Online Face-to-face	1	1
Online tutoring (individual)	TP	Online Face-to-face	0,5	12,5
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	2,5	N/A
Short project development	TP: forum, videos, materials	Independent and team work	5	N/A
Evaluation and materials review	TP: task	Independent work	1	N/A
Content, preparation and marking, etc.			N/A	11
			10	24,5

Week 6. Presenting clean and comparable datasets

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Online tutoring (groups of 5 students)	TP	Online Face-to-face	1	5
Project development	TP	Independent and team work	8	N/A
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	1	N/A
Content, preparation and marking, etc.			N/A	11
			10	16

Week 7. OLAP Cubes

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Introduction to OLAF cubes and data visualisation methods	TP: documents, presentations and links	Classroom and Lab. Face-to face	4	4
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	4	N/A
Evaluation task and materials review	TP: documents, presentations and links	Independent work	2	N/A
Content, preparation and marking, etc.			N/A	11
			10	15

Week 8. Data visualisation

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Webinar on visualisation techniques	TP	Online Face-to-face	1	1
Online tutoring (individual)	TP	Online Face-to-face	0,5	12,5
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	2,5	N/A
Short project development	TP: forum, videos, materials	Independent and team work	5	N/A
Evaluation and materials review	TP: task	Independent work	1	N/A
Content, preparation and marking, etc.			N/A	11
			10	24,5

Week 9. Report preparation

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Online tutoring (groups of 5 students)	TP	Online Face-to-face	1	5
Project development	TP	Independent and team work	8	N/A
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	1	N/A
Content, preparation and marking, etc.			N/A	11
			10	16

Week 10. Dashboards and metrics

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Development of dashboards, selecting KPIs and metrics, tools to support data-based decision-making	TP: documents, presentations and links	Classroom and Lab. Face-to face	4	4
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	4	N/A
Evaluation task and materials review	TP: documents, presentations and links	Independent work	2	N/A
Content, preparation and marking, etc.			N/A	11
			10	15

Week 11. Dashboards

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Webinar on complex dashboards	TP	Online Face-to-face	1	1
Online tutoring (individual)	TP	Online Face-to-face	0,5	12,5
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	2,5	N/A
Short project development	TP: forum, videos, materials	Independent and team work	5	N/A
Evaluation and materials review	TP: task	Independent work	1	N/A
Content, preparation and marking, etc.			N/A	11
			10	24,5

Week 12. Supporting decisions – final presentation

ACTIVITIES	RESOURCES	NATURE	TR/H	INS/H
Online tutoring (groups of 5 students)	TP	Online Face-to-face	1	5
Online tutoring (individual)	TP	Online Face-to-face	0,5	12,5
Trainees personal work: readings, review of materials, use of training platform, etc.	TP: documents, presentations and links	Independent work	1	N/A
Preparation of presentation	TP: documents, presentations and links	Independent work	4	N/A
Final Project presentation		Face-to-face session at facilities	4	4
Content, preparation and marking, etc.			N/A	11
			10	32,5

ASSESSMENT OF PROGRESS

The guidelines for assessing progress are as follows:

	TOPICS	INDIVIDUAL WORK	ASSESSMENT
Weeks 1-3	Introduction to data analytics	Group project + Individual tasks	Individuals access to the online resources Tests and exercises Online face-to-face webinars and Online tutoring (aid and assessment) Attendance
Weeks 4-6	Data collection and cleaning		
Weeks 7-9	Data visualisation, OLAP cubes		
Weeks 10-11	Dashboards and metrics		
Week 15	Presentations and final assessment	Individual project	Intensive workshop for final achievements and assessments. It complements face-to-face work.

TEACHING RESOURCES REQUIRED

For this course, trainers preferably should be middle or senior level developers, who are selected based on the following criteria:

- Core Trainers
  - 1 trainer. Expertise in the subject
  - 1 tutor per team (he/she can be the trainer or other person). Expertise in the subject
- External expertise
  - 1 mentor per team

OTHER RESOURCES

- Classroom for face-to-face classes, provided with projector and screen, tables for small group works. Assuming 2 half-day sessions.
- Computer lab with at least 20 computers. Assuming 4 half-day sessions.
- Working material (canvases, markers, pens, highlighters, post-it, etc.) for workshops.
- Training platform maintenance and updating (across all programmes):
  - 1 technician, 2 hours a week, for 10 weeks: 20 hours. Estimated 30 EUR/hour.
  - Set-up costs are not included. It will be set up in the project and will be ready for next courses.
- Adaptation of content, customization of projects, configuration and maintenance of tools and platforms according to students and trainer needs.
  - 1 technician (programmer), 60 hours. Estimated 30 EUR/hour.
- Microsoft PowerBI desktop, Tableau.
- Communication tools: Moodle platform forums, Big Blue Button integration.