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GENERATION DATA

USING DATA FOR PROFIT

Facilitator Guide

Erasmus+ This project has been funded with support from the European Commission

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1 About the Generation Data Curriculum

1.1 What is Generation Data?

Generation Data is an Erasmus project which focuses on the development of smart data skills and an understanding of its close relationship to innovation and competitiveness. It consists of a set of open educational resources created for teachers and lecturers, published online and free to download and use.

1.2 Objective of the Course

The Generation Data Curriculum and corresponding Course Materials are intended to enable facilitators (lecturers, trainers and teachers) to deliver classroom and small group training to business/management students and start-up entrepreneurs on the topic of smart data. Although a proportion of teachers and lecturers state they have some understanding of smart data, a large majority recognise that they lack pedagogic strategies to teach the topic confidently. The goal of Generation Data is therefore to overcome an informational challenge by presenting up-to-date content that is relevant to the use of smart data for business, but also to improve the quality of teaching of the topic so that students and entrepreneurs acquire the knowledge and skills they need to successfully implement data driven business models.

1.3 Who was it created by?

The course has been developed by experts who are passionate about Smart data and its transformational use in business today. It is designed to create a new and effective training model to empower students and entrepreneurs to be data competent and active, that is optimizing the use of smart data across business, even if they have no prior experience of data science or technology, improving digital skills, entrepreneurial skills and improved business potential.

Hereunder we introduce the partners who have provided input in the development of this course.

UNIWERSYTET SZCZECINSKI	Szczecin University (SU) has, in under 30 years, established itself as the leading HEI in West Pomerania, Poland. In total it has over 30,000 students in full-time, evening and part-time studies in 27 subjects in 13 faculties. One of the most important objectives of the University is educating students in such a way as to prepare them for entering the labour market and the university maintains close ties to the private sector and local enterprises as well as cultivating international cooperation, an essential element of raising the quality standards of research and teaching. As such, Szczecin University is an acknowledged partner in research and education both in and outside Europe
LETTERKENNY INSTITUTE OF TECHNOLOGY	LYIT is a lively and inspirational education hub that attracts a creative mix of 300 staff and 3,500 students from the peripheral North West region and further afield. With modern integrated campuses in Letterkenny and Killybegs, the college has an ambitious and progressive ethos, and has expanded the course curriculum to offer over 100 Educational programmes across its 4 Schools of Business, Tourism, Engineering and Science, many up to Masters Level. All programmes are designed to combine academic theory with practical skills in order to prepare students for the world of work and lifelong learning. All of the programmes have been developed in conjunction with industry which makes LYIT graduates very attractive to employers. The Institute was recently voted amongst the top 2 Institutes of Technologies in Ireland in a national survey.
EUROPEAN	The European University Continuing Education Network (eucen) is an international non-governmental not-for-profit association founded in 1991 and

UNIVERSITIES CONTINUING EDUCATION NETWORK	registered under Belgian law. It currently has 174 members in 36 countries, all of them universities actively committed to and involved in the development of University Lifelong Learning (ULLL). It includes 17 national networks for University Continuing Education (UCE) and ULLL in Europe and 8 associations concerned with the education of adults. eucen is one of the founding associations of the EUCIS-LLL platform (now known as the LLL Platform).
VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETAS	Vilnius Gediminas Technical University (VGTU) is a leading higher education institution situated in Vilnius, Lithuania. Established in 1956 VGTU has 11,000 students and carries out studies in 10 faculties. Research is carried out at 14 research institutes, 2 research and 4 training centres, 33 research laboratories. VGTU is positioning itself among the best institutions of technological education and research in Baltic region.
European E-learning Institute	European E-learning Institute (EUEI) specialises in the creation of powerful online platforms, immersive educational environments and provision of resources and tools to create truly valuable learning experiences. EUEI was founded on the concept of 'continuing education'; a post-secondary education programme that provides further enrichment to learners in a wide range of sectors, covering topics that are professional and/or personal. As an organisation, EUEI places tremendous worth on the informal and flexible nature of continuing education and crafting flexible, online learning courses for those wishing to improve themselves and stay ahead in their careers and in business. Building inclusive and resilient communities is also a key goal of the organisation.
Feltech Software Innovations Ltd	Feltech Software Innovations Ltd is a data specialist with over 25 years IT programming and business experience and business experience and a high-profile client list including AST, UCD, Aventis, Warner Lambert, Pfizer, Irish Times, and Aryzta. Based in Co. Galway but operating across the EU, Feltech offers a complete range of IT, technical, data migration and analytic services across the full project life cycle, from project scoping and design through to implementation and support.

1.4 Overall Learning Objectives

Smart data is powerful because of its transversal use across the public, private and non-profit sectors; the curriculum and course materials reflect this potential. However, given the focus is on the teaching of smart data to business and management students and start up entrepreneurs, the lens has been narrowed to focus on smart data in business, especially small and medium businesses, and the strategic role of data in creating sustainable, profitable business models.

The overall objective of the GENERATION DATA project is to empower students and entrepreneurs to be data competent and active, that is optimizing the use of smart data across a business, even if they have no prior experience of data science or technology.

Specifically, participants will acquire the following knowledge and skills:

- Comprehend the emerging role of big data and how it can be turned into smart data.
- Craft and coordinate integrated data capture and analysis activities.
- Carry out data interpretation to gain actionable insights into business performance and market opportunities.
- Determine appropriate technological tools for data solutions based on cost-benefit analysis.
- Understand the key regulatory and ethical aspects of data privacy and handling.

1.5 Who can deliver the Course?

The course is designed to be delivered by HEI educators, VET teachers and trainers. Trainers can easily adapt our set of training materials and resources to design and deliver training sessions using high-quality content which has been developed, tested and reviewed in Poland, Ireland, Lithuania and Belgium. Of note

- The Generation Data Curriculum and corresponding Course Materials are intended to enable lecturers and teachers to deliver classroom and small group training to business/management students and start-up entrepreneurs on the topic of smart data.
- We provide all the necessary resources and materials to successfully deliver the course in several settings and formats, see Section 3 for course delivery options.

2. General Instructions for Trainers

2.1 Methodological Approach

The Curriculum and corresponding Course Materials introduce students and entrepreneurs to data skills in a way that is both rigorous and congruent with academic research and focused on the real-world use of data in the business sector. The Curriculum is based on the understanding that data competency at company level arises through the alignment of data organisation processes and technological infrastructure in a way that enables the strategic use of data to inform decision making. In addition, it shows how competency can be consolidated through sound compliance with legal requirements and ethical frameworks and provides practical insights into learning a new skill set in a future proofing way.

2.2 General Instructions

Please read this guide thoroughly before conducting the training.
For classroom, flipped or blended delivery please:

- Download, review and revise course resources for the training as necessary
- Allow adequate training time for sessions
- Localise training content with case studies and information on local supports for entrepreneurial students
- Ensure that each participant utilises the Generation Data Glossary from the outlet and completes exercises embedded in each Module– these provide valuable learning
- Spend time for review during the training course

2.3 Instructional Approach

The Curriculum and Course Materials have been designed to accommodate a range of teaching styles and cultures. As a common thread, each module is presented with the following design:

a) The topic is introduced with a story (a summarized case study in narrative format) to illustrate its importance to real-world business operations and profitability.

b) Information and current best practice on the topic is presented, moving from general definitions to more detailed applications, enabling the scope of the topic to be understood.

c) Knowledge is reinforced, and skills are developed as students participate in practical exercises or study questions.

3 Course Delivery Options

3.1 Traditional Classroom Training

Classroom training remains one of the most popular training techniques for building skills capacity. Typically, it is instructor-centered face-to-face training that takes place in a fixed time and place. The Generation Data tools, suggested use and additional resources required can be outlined as …

Classroom Tool	Suggested Use in the Classroom	Additional Resources Required
Powerpoint© presentation	Training materials are developed in PowerPoint. We suggest that these will be displayed on a large screen for classroom delivery.	Laptop/Computer Projector Large Screen
Videos	Videos are used to explain certain sections of the training content and to present case studies for discussion.	Audio/sound system
Whiteboard	Invite learners to write on the board or ask for feedback that you write on the board	Pens and so on

Suggested delivery mechanisms:

- **Small group discussions**. Break the participants down into small groups and give them case studies or work situations to discuss or solve. This is allows for knowledge transfer between learners.
- **Q & A sessions**. Informal question-and-answer sessions are most effective with small groups and for updating skills rather than teaching new skills. These should be used frequently across course delivery.
- **Multimedia**. Multimedia training materials tends to be more provocative and challenging and, therefore, more stimulating to the adult mind. Trainers should ensure that these are used to their full potential.
- **Interactive tools.** The engagement of students can be easily achieved by using interactive tools. An example of a free tool is Kahoot! which is a game-based learning and trivia platform used in classrooms, offices and social settings. You can compile a quiz, which can be answered by the students on their phones/tablets/computers. It's possible to get immediate feedback and results.

3.2 Online Learning

This delivery method uses Internet technologies embedded in the Generation Data learning platform to deliver a broad array of solutions to enable learning. The Generation Data course is provided as an online learning programme for direct access by all stakeholders including business/management students and entrepreneurs on the topic of smart data: the platform will be a multilingual, interactive site combining informative resources with interactive data analysis exercises and skills development activities. The online learning facility incorporates best practice in online learning so that while the learning objective remains the same (or similar) the user interface and experience can be radically different as befits the medium.

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3.3 Other teaching methodologies

- ***Flipped Classroom***

  In a Flipped Classroom learners study module content prior to class with a focus on exercises and assignments in class. The classroom transfer of knowledge makes way for online instruction outside the classroom. This creates more room for practicing in class, for extra explanation when needed and offers the possibility to dive deeper into the materials during school hours.

- ***Blended Learning***

  Blended Learning combines online digital media with traditional classroom methods. It requires the physical presence of both teacher and student, with some element of student control over time, place, path, or pace. Learners still attend a classroom setting with a teacher present, face-to-face classroom practices are combined with computer-mediated activities regarding content and delivery. Blended learning is most used in professional development and training settings.

- ***Collaborative/Peer to Peer Learning***

  Collaborative learning is an educational approach to teaching and learning that involves groups of learners working together. Examples for boosting collaborative and peer-to-peer learning are:

  - **Peer review**

    Peers in the classroom are brought together to jointly evaluate the work by one or more people of similar competence to the producers of the work. Peers not only assess the performance of each other, but also share their experience and know-how.

  - **Google Docs**

    This online collaboration tool facilitates the creation of meaningful documents. All group members can work at the same time (real-time) in the same document, from any location from various devices. Changes are automatically saved in documents as being typed upon. It's possible to monitor the revision history of a document where you also can see who made a specific change. The value of Google Docs as a learning resource in that group members can also share documents, chat and comment on same,

4. Course Content Overview

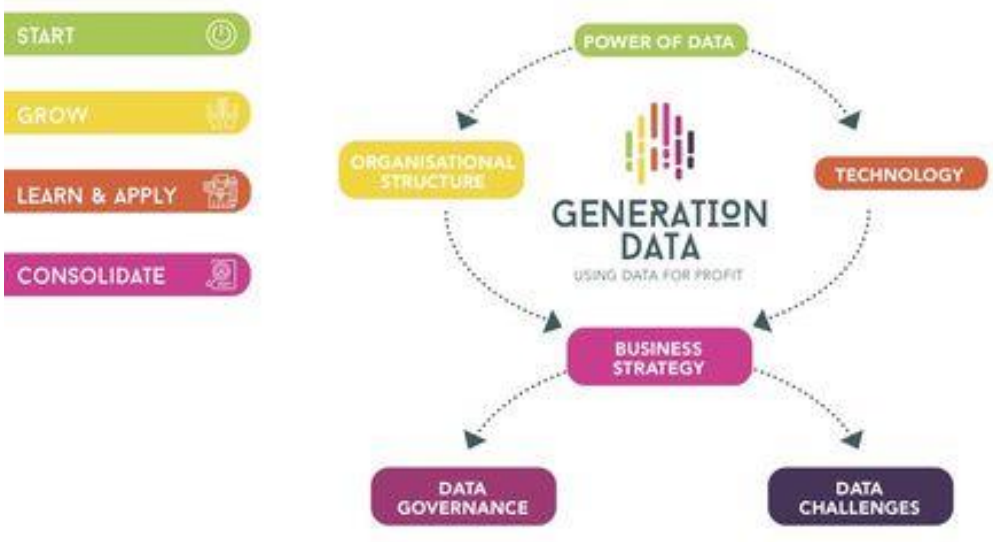
4.1 Modules

The Curriculum comprises six modules structured as a journey through the phases of data competency.

- MODULE 1: THE POWER OF DATA
- MODULE 2: WORKING WITH DATA
- MODULE 3: DATA FOR STRATEGY
- MODULE 4: DATA TECH RESOURCES
- MODULE5: DATA COMPLIANCE: SECURITY AND PRIVACY
- MODULE 6: BIG DATA – OVERCOMING CHALLENGES, EMBRACING OPPORTUNITIES

4.2 Visual summary of content organization

We recommend that ideal and most comprehensive approach is to follow the course sequence as laid out. However, course designers have been careful to allow for interdependence of topics meaning the order can be adjusted or modules can be accessed independently.



4.3 Course Content Detailed Overview

Module 1	**The Power of Data: Why Data Skills Matter**
Overview	This module offers a practical introduction to the role of big data and smart data in driving business growth and profitability. As well as constructing a sound knowledge base, it positions the tangible benefits of data use as a means to increase students' motivation to engaging with data and committing to further in depth learning.
Learning Objectives	Upon completion of this module participants will: • Comprehend the emerging role of big data for business • Understand and be able to apply the key terms • Know how big data can be turned into smart data • Be able to articulate a case for data as a route to a competitive advantage or as a way to optimize processes, provide new services or increase the quality of existing services or products.
Topics covered	• A brief history of data • What is Big Data? • The 5Vs • Understanding data • From Big Data to Smart Data • Benefits of data for business
Case studies	• Model T Ford • Amazon's business model
Suggested learning activities	• How much data do you generate? • True or false? • What does it mean to be data driven?
Further reading	Richard Sunley, "5 Steps for Turning Big Data into Smart Data"

	www.convinceandconvert.com/digital-marketing/smart-data/ Big data Timeline https://www.winshuttle.com/big-data-timeline/

Module 2	Working with Data: Collection Organisation and Management
Overview	Module 2 presents a practical view of the processes involved in the practice of data science, from creation and collection, to preparation, visualization and the evaluation of analytic models. As a result, learners will feel confident in setting up and coordinating integrated data flows within their businesses and navigate the entire data science pipeline from data acquisition to publication.
Learning Objectives	Upon completion of this module, participants will be able to: • Understand the stages of the data pipeline. • Classify data by source and understand its processing opportunities. • Select appropriate storage and analytical options. • Evaluate the costs and benefits of building predictive models or using algorithms to discover structure in data. • Present data in an attractive and accurate manner for diverse purposes.
Topics covered	• The Data Value Chain • Data Collection • Sources of data • Types of data • Data Storage • Onsite v. cloud storage • Data Analysis • Basic techniques • Advanced techniques • Data Interpretation and Use • Data visualization • Implementing insights
Case study	Tesco Clubcard
Further reading	Data Visualization Catalogue https://datavizcatalogue.com/index.html

Module 3	Data for Strategy
Overview	This module focuses on how to use data as an effective driver of competitiveness and profitability within a business.
Learning Objectives	Upon completion of this module, participants will be able to: • Understand the role of data to transform performance, strategy and new opportunities. • Assess and improve the ability of data to lead to actionable insights. • Maximise data value by asking appropriate data questions • Define capabilities and recruit a data lead

Topics covered	• Data driven growth • 5 ways to unlock value • How to make your data strategy strategic • Make a business case for data • Data audit • Asking the right questions • Data based decision making methods • Choosing a data lead • The data science skillset • IT business trade-offs
Suggested stories / Case studies	Amazon's Data Strategy for customer suggestions
Suggested learning activities	Have checklist of building your company's data strategy - can you do this, this, this?
Suggested assessment ideas	Einstein approach to solving a business problem
Further reading	Data routes to value https://www.bcg.com/publications/2013/information-technology-strategy-digital-economy-opportunity-unlocked-big-data-five-routes-value.aspx From Strategy to Implementation: https://www.ey.com/en_gl/advisory/how-to-move-your-data-strategy-from-insight-to-implementation

Module 4	**Data Technology**
Overview	This Module will provide an overview of the supporting platforms and technologies used in data for business, with an emphasis on accessible cloud services. It also sets out the importance of cost-benefit in relation to financial investment in data capacity.
Learning Objectives	Upon completion of this module, participants will be able to: • Comprehend key components of data science technology • Understand the benefits and costs of software-as-a-service in the cloud • Select appropriate data tech solutions based on cost/benefit and long-term value analyses

Topics covered	• 1. Understanding data architecture
	• 2. Data processing technologies
	  ○ Entry level tools
	  ○ Big data tools
	• 3. Working in the cloud
	  ○ Benefits and challenges
	  ○ Principal cloud providers
	  ○ Service comparisons
	• 4. Choosing the right tech solutions

Suggested stories / Case studies	AMAZON Data Lakes compared to Data Warehouses – two different approaches
Suggested learning activities	A tentative data architecture diagram outlining the main functional building

	blocks
Suggested assessment ideas	CRM Assessment Process
Further reading	A short history of Databases: https://www.3pillarglobal.com/insights/short-history-databases-rdbms-nosql-beyond Best Practice in Software Solutions https://bi-survey.com/bi-software-selection-process

Module 5	**Data Governance: Security and Privacy**
Overview	This module introduces the key regulatory and ethical aspects of data and reflects on their application in the context of the data strategies developed so far.
Learning Objectives	Upon completion of this module, participants will be able to: • Identify and categorise threats to data security • Understand the legislative requirements with regard to data privacy and data handling. • Comprehend the effect of, and the source of, bias or discrimination in data systems • Understand the need for, and optionally be able to carry out, ethical, social or privacy assessment of data projects

Topics covered	• Data Security
	  ○ Types of threats
	• Data Privacy
	  ○ Data Protection Legislation: GDPR
	• Data Ethics
	  ○ Data rights
	• Data Governance
	  ○ Risk assessment

Suggested stories / Case studies	Facebook Social Security Case Study British Airways case study
Suggested learning activities	Structured discussion on regulatory and ethical aspects
Suggested assessment ideas	DPIA Template preparation
Further reading	Big Data Prejudice: https://www.newscientist.com/article/2166207-discriminating-algorithms-5-times-ai-showed-prejudice/ GDPR Breaches- digital guardian: https://digitalguardian.com/blog/almost-60000-post-gdpr-data-breaches-reported-europe Business Security Steps: https://www.dataversity.net/seven-preventative-cyber-security-tips-smes-should-take-today/

Module 6	**The Future of Data**
Overview	This module takes a look at the major trends and cutting-edge technologies for data analysis and their application to business.

Learning Objectives	Upon completion of this module, participants will be able to: • Identify major trends such as AI, Deep learning, blockchain and IoT • Understand the basic lingo and tenets of each • Understand the history of development & evolution of AI • Understand the applications for business

Topics covered	• Data Security
	  ○ Types of threats
	• Data Privacy
	  ○ Data Protection Legislation: GDPR
	• Data Ethics
	  ○ Data rights
	• Data Governance
	  ○ Risk assessment

Suggested stories / Case studies	VTS Software
Suggested learning activities	Discussion on how VR could be used in an educational institution or business: discussion questions What data would your company store in blockchain ? Discuss
Suggested assessment ideas	
Further reading	What Will Our Society Look Like When Artificial Intelligence Is Everywhere ? Innovation _ Smithsonian Magazine https://www.smithsonianmag.com/innovation/artificial-intelligence-future-scenarios-180968403/ The Current and Future Landscape of AI and VR https://www.infoq.com/news/2019/11/landscape-ai-vr/

5 Useful Links

Official Generation Data Website	https://www.generationdata.eu/
Generation Data Toolkit	https://www.generationdata.eu/resources/resources-en/
Training courses and materials including facilitators guide	https://www.generationdata.eu/learning-resources/
Facebook	https://www.facebook.com/generationdata/

6 Sample 5 Day Generation Data Training Timetable

Day	Training Content
Day 1	09.00 – 13.00 Module 1 14.00 – 15.30 Module 2
Day 2	09.00 – 13.00 Module 2 14.00 – 15.30 Module 3
Day 3	09.00 – 13.00 Module 3 14.00 – 15.30 Module 4
Day 4	09.00 – 13.00 Module 4 14.00 – 15.30 Module 5
Day 5	09.00 – 13.00 Module 6 14.00 – 15.30 Module 6

It is recommended to keep the days maximum the length indicated in the table above. Since the learning materials are quite intense and new to the teachers and learners, it's recommended to spread the information across multiple days. For the best processing, you can choose to spread the days across weeks, so for example one day per week.

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