

SEnDIng Online Training Concept – Competency-Based, Adaptive Learning in Data Science for ICT Professionals

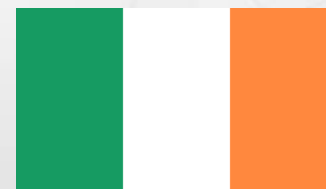
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Project overview

- **Program:** Erasmus+ KA2: Cooperation for innovation and the exchange of good practices - Sector Skills Alliances
- **Call ID:** EACEA-04-2017
- **Lot:** Lot 2, SSA for Design and Delivery of VET
- **Project Number:** 591848-EPP-1-2017-1-EL-EPPKA2-SSA
- **Grant Agreement Number:** 2017-3184/001-001
- **Project Coordinator:** University of Patras
- **Duration:** 36 months
- **Number of Partners:** 12
- **EU grant:** 982.537 €
- **Start Date:** 1st December 2017
- **End Date:** 30th November 2020

Consortium



Needs and challenges

- Addressing the skills' gap of Data Science (DS) and Internet of Things (IoT) professionals.
- Contributing to the increased demand of industry's sectors other than ICT (e.g. banking, energy, logistics) for high-qualified DS and IoT professionals.
- Providing the DS and IoT professionals with skills and competences, that are transferable and recognized among European countries.
- Making the vocational trainings more relevant to the actual needs of the labor market.

Key objectives

- Define vocational trainings' learning outcomes for the occupational profiles of DS and IoT professionals.
- Design a common reference scheme of competences, skills, knowledge and proficiency levels for DS and IoT professionals in accordance with European frameworks (e.g. eCF framework and ESCO).
- Design two modular learning outcome oriented VET curricula, one targeting DS and another IoT taking into consideration EQAVET.

Key objectives

- Design a mechanism for the certification of the provided skills and competences.
- Making recommendations for the validation, certification & accreditation of the provided VET program and its alignment with NQFs, EQF and ECVET.
- Each VET program will be delivered in three phases
 - e-learning (100 hours),
 - face-to-face (20 hours) and
 - work based learning (4 months)
 - 150+ trained professionals

Target Groups

- IT professionals and associations
- VET providers
- Certification bodies
- Higher Education Institutes
- Companies & SMEs
- Policy-makers

Main results (1)

- Learning outcomes of DS and IoT VET programs
- A reference scheme of knowledge, skills and competences for Data Scientists and IoT professionals.
- Two modular learning outcomes-oriented vocational curriculum
 - Modularity: each curriculum is divided into educational modules and each module into training units at three levels of proficiency (introduction, core, advanced)
 - Personalized learning: a different learning path for each learner according to its occupational profile.
- An online training course that will be used for the online training phase of VET programs
- Open Educational Resources.

Main results (2)

- A training methodology incorporating online training, face-to-face training and work based learning
- A framework for the certification of skills, knowledge and competences.
- A survey for the validation, certification & accreditation of provided VET programs and their alignment with NQFs, EQF and ECVET.
- A set of exploitation toolkits for Higher Education Institutes, VET providers and enterprises.
- Workshops organized at Greece, Cyprus and Bulgaria.
- One conference organized at Greece.



Produced results

- Learning outcomes in terms of Knowledge, Skills and Competences (WP2)
 - Desktop research on existing Data Science and Internet of Things curricula and courses -> definitions of skills and knowledge
 - The draft version of the DS and IoT Learning outcomes was discussed among partners and key experts in the respective fields.
 - Design and distribution of an online survey among CIOs of IT companies to explore on their plans and needs (skills and knowledge) in the IoT and the Data Science domains (more than 140 companies and organizations).
 - Data received validated the defined skills and knowledge.
 - Received 36 responses for Data Science learning outcomes and 43 responses for Internet of Things learning outcomes
 - from companies all over the world

The training concept



Training Characteristics

- Learning outcome-based curricula = Flexible
 - > modular
 - > adaptable
- Use micro-modules that will be able to be combined for trainees of different Vocational Level, or different existing knowledge

Data Science learning outcomes

Knowledge

- Describe the key concepts of Data Science
- Describe ICT methods and tools applicable for the storage and retrieval of data
- Describe methods and tools applicable for the statistical analysis of data
- Explain basic concepts and requirements related to information security and privacy (e.g. how to deal with people profiling in the context of GDPR)

Skills

- Analyse domain specific trends and present them as structured information
- Create code to statistically analyse data
- Apply data statistics and data visualization
- Deploy simple machine learning techniques
- Deploy data storage and retrieval techniques;
- Implement data models validation techniques
- Ensure that IPR, security and privacy issues are respected

Competences

- Exercise self-management within the guidelines of work or study contexts that are usually predictable, but are still a subject to change
- Supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities

IoT learning outcomes

Knowledge

- Describe the value that IoT delivers in different business domains
- Explain the business processes related to IoT in specific domains
- Understand IoT architectures and the related network and communication protocols
- Recognize different types of sensors, actuators, displays and related embedded electronics
- Design the application level (e.g. use protocols that support different IoT applications) of IoT in the context of big data, cloud technologies and data science
- Formulate requirements about IoT information security

Skills

- Analyse, argue and describe the business value of a particular IoT system
- Design an IoT system that includes sensors, controllers, actuators and displays, connected to a cloud platform through internet connection
- Develop and deploy workflows and dashboards for an IoT system that includes sensors, controllers, actuators and displays, connected to a cloud platform through internet connection
- Develop working code for an IoT system that includes sensors, controllers, actuators and displays, connected to a cloud platform through internet connection
- Apply IoT information security concepts

Competences

- Exercise self-management within the guidelines of work or study contexts that are usually predictable, but still are a subject to change
- Supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities

Key competences in terms of soft skills

- Communication skills;
- Adaptable to change;
- Team work;
- Ability to present in front of colleagues and clients;
- Goal-oriented;
- Thinking outside the box;
- Agile mindset;

Curricula contents

DATA SCIENCE modules

Introduction to Data
Science

Python for Data Science

Statistics for Data Science

Storing and retrieving data

Applied machine learning

Data Visualization

INTERNET OF THINGS modules

IoT System Architecture and Design

IoT Communication technologies

IoT Applications (includes Smart City,
Smart Homes, Wearables, Location based
etc.)

IoT Security

Business Value (Opportunities) with
IoT

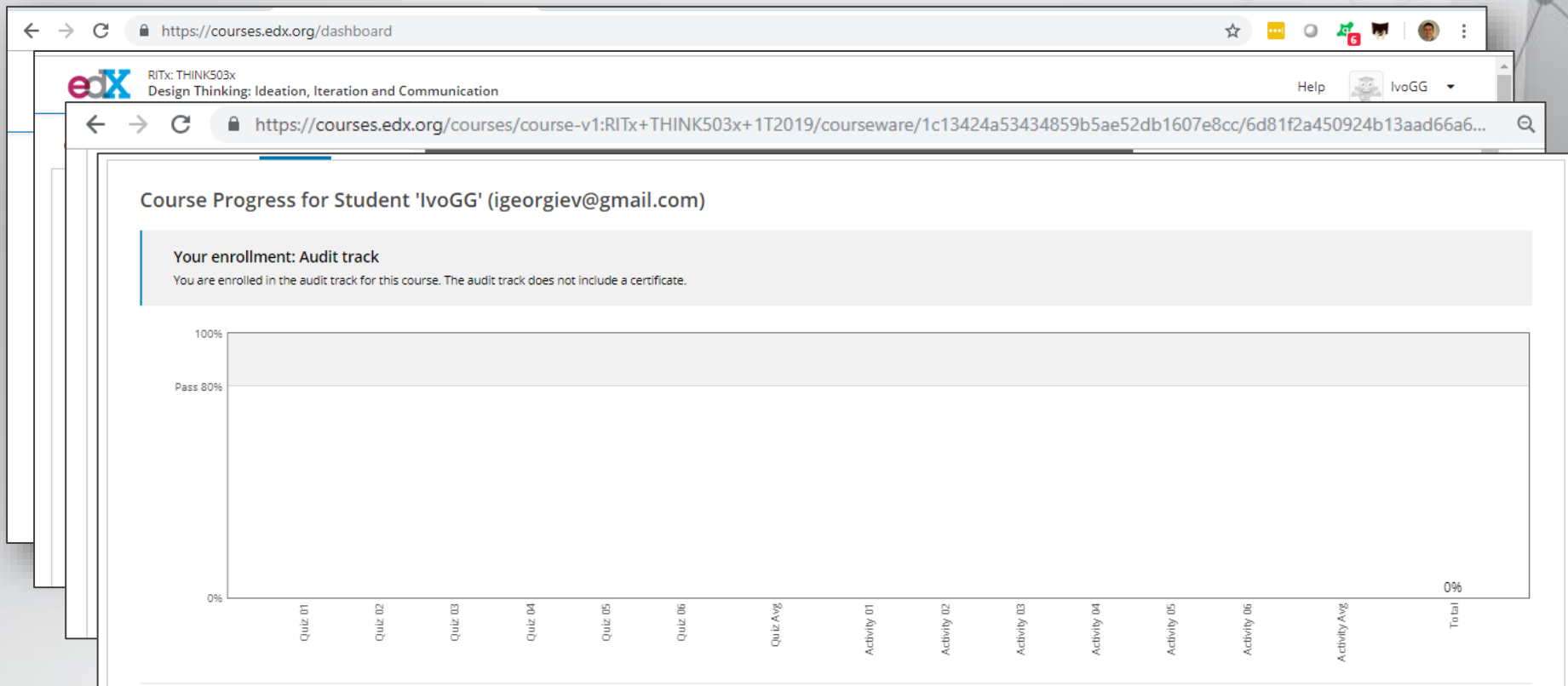
Online training delivery

- Open edX platform
- Micro-modular
- Built-in assessment
- Adaptable
- Mass-customizable
- Progress follow-up
- Learning data



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Samples



Thank you!

Project website:

<http://sending-project.eu>

For specific questions
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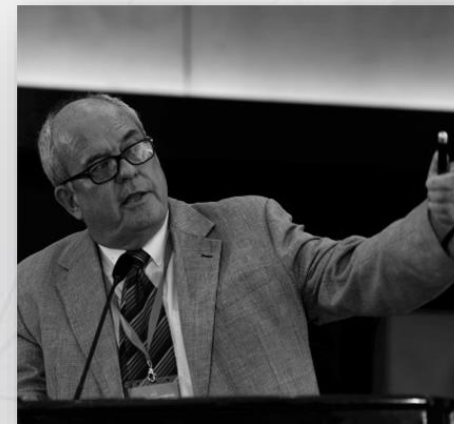
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