SEnDIng

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SEnDIng project: Design of VET programmes for Data Science and Internet of Things professionals

[EVENT: Patras, 4/12/2018   EO4GEO Workshop]

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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

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Needs and challenges

- Address the **skills' gap** of ICT professionals in the domains of Data Science (DS) and Internet of Things (IoT)

- Contribute to the **increased demand** of industry's sectors other than ICT (e.g. banking, energy, logistics) for highly-qualified DS and IoT professionals

- Provide the DS and IoT professionals with skills and competences, that are **transferable** and **recognized** among European countries

- Make the vocational trainings more relevant to the actual **needs of the labor market**

Target Groups

- ICT professionals and associations
- VET providers
- Certification bodies
- Higher Education Institutes
- Companies & SMEs
- Policy-makers
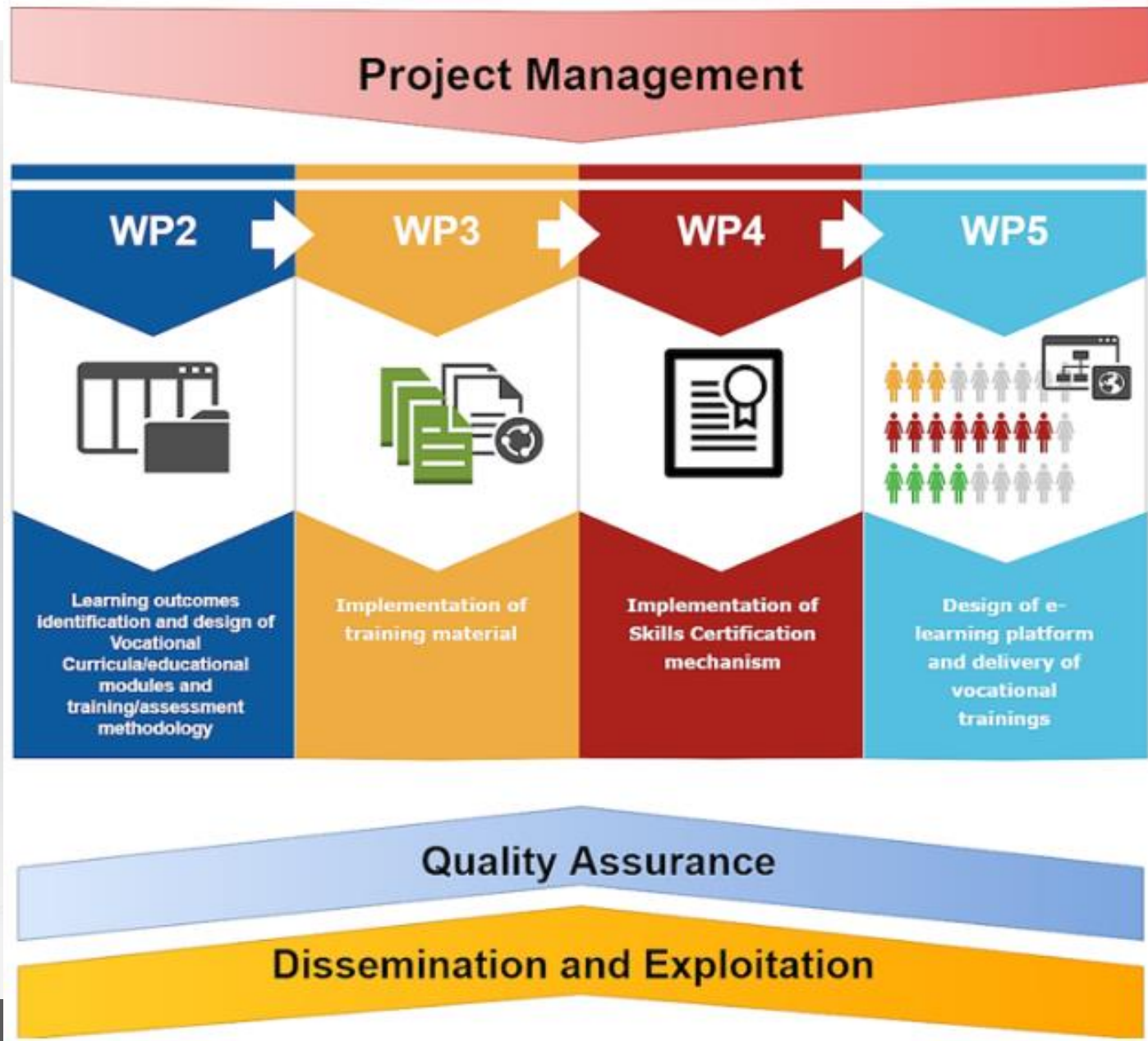
Main results (1)

- **Learning outcomes** of Data Science and IoT VET programs
- A **reference scheme** of knowledge, skills and competences for Data Scientists and IoT professionals.
- Two modular learning outcomes-oriented **vocational curricula**
  - *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 the occupational profile
- Each VET program will be delivered in three phases
  - e-learning (100 hours),
  - face-to-face (20 hours) and
  - work based learning (4 months)
  - *we must train at least 75 IT professional in DS and 75 in IoT (from GR, BL and CY).*

Main results (2)

- A **MOOC** that will be used for the online training phase of VET programs
- **Open Educational Resources**
- A **training methodology** incorporating online training, face-to-face training and work based learning
- A certification framework for the **certification**
- 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
- **3 Workshops** (Greece, Cyprus and Bulgaria) and a **conference** organized in 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

DS learning outcomes

Knowledge	Skills	Competences
▪ 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)	▪ 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	▪ 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

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IoT learning outcomes

Knowledge	Skills	Competences
▪ 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	▪ 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	▪ 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

Training Characteristics

- Learning outcome based curricula = Flexible
- Flexible = modular and adaptable

- Use micro-modules that will be able to be combined for trainees of different Vocational Level, or different existing knowledge

Curricula design template

(based on the work of the Technical Committee CEN/TC 428)

Thank you!

For further information please contact

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