

# Training of ICT professionals in soft skills: the case of SEnDIng

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## Purpose of this paper

Presentation of the methodology followed for the design, development and delivery of a VET curriculum on soft skills for ICT Professionals, within the framework of SEnDIng

# SEnDIng training in a nutshell

- 2 Curriculums
  - Data Science
  - Internet of Things
- Modular form of the curriculum
- 103 h online courses in Data Science or IoT
- **20 h online training in Soft skills**
- 320 hours of work based learning during 4 months

# Two main categories of skills for ICT Professionals

## I. Technical Skills

- necessary for hiring ICT professionals

## II. Soft Skills

- evaluated later in the frame of HR assessment
- are linked to a strong performance level of professionalism

(Stal & Paliwoda-Pękosz, 2018)

## Research has shown that....

- Specialists in the ICT sector possess well developed technical skills but they have skill gaps in soft skills (Szilárda, Benedek & Cioca, 2018)
- Senior executives in Adecco felt that 44% of their subordinates needed better soft skills (Georgetown University, 2020)
- Among 1,250 HR and line of business executives in the US, 98% of them declared hiring people for IT positions according to their soft skills while 66% of them had rejected IT professionals due to lack of soft skills (Zetlin, 2019)
- In over 25 million online job listings, one in four of the most sought-after skills among IT listings were soft skills (Burning Glass Technologies, 2015)

# But what kind of skills are “soft skills” eventually?

- Lack of consensus for a solid definition (EQAVET, 2015)
- Concern the interpersonal human and behavioural skills needed for the application of technical skills and knowledge in the workplace (Weber et al, 2009)
- Categorized by academics in 5 categories (De Villiers, 2010) :  
communication skills, problem-solving and thinking skills, leadership and team working skills, ethical and moral values, and self-management.
- EQAVET recognizes 3 categories (EQAVET, 2015):  
Communication skills, Interpersonal skills, Problem solving

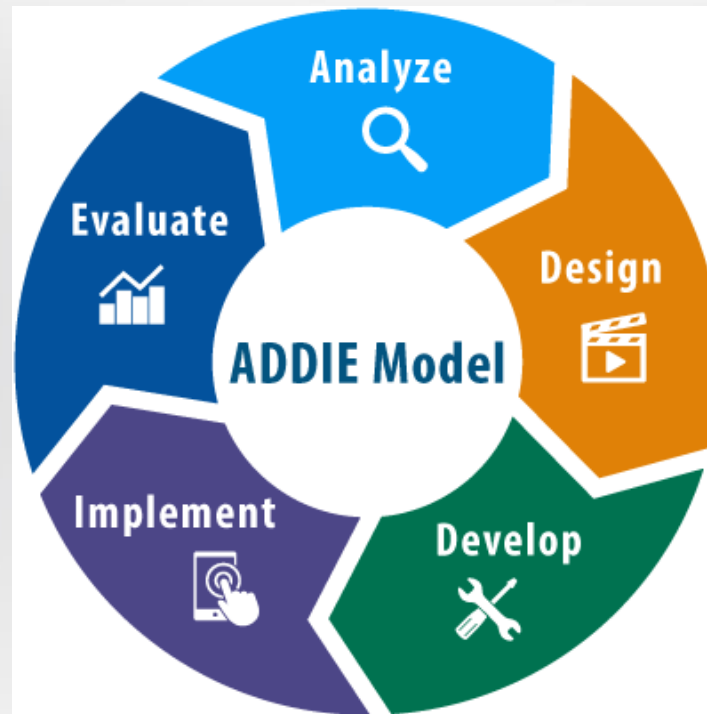
**Within the framework of SEnDIng project a 20h training program on soft skills for IT professionals was designed, developed and delivered following the principles of ADDIE model**

# The ADDIE model

- Is an Instructional Systems Design (ISD) that “is being applied for performance-based learning” (Branch, 2009)
- provides VET curriculum designers with clearly defined, useful stages for developing effective educational products (Peterson, 2003)



## The ADDIE model: phases



<https://www.edapp.com/blog/the-addie-model/>

## a. Analyze (1/3)

The 1st phase of ADDIE provides:

- the basis for the definition of learning outcomes,
- the organization and formulation of training objectives,
- the selection of training content, training methods and evaluation in accordance to trainees' needs.

“Need” describes the **gap between current and desired** (or required) results or **the gap in results between what is and what should be**

(Kaufman, 1994; Swedish Civil Contingencies Agency (MSB), 2012; Iqbal & Khan, 2011)

## a. Analyze (2/3)

Training Needs Analysis (TNA):

- Is a process that identifies the learning gaps in compliance with standards or external requirements and that can be resolved wholly or partly by training (Goldstein, 1993)
- Its main purpose is the definition of the performance gap and it consists of surveillance, investigation, and data analysis.

SEnDIng TNA enabled:

- a) The identification of the specific soft skills that IT professionals should have
- b) The identification of the general content of the training, training methods and material

## a. Analyze (3/3)

For a comprehensive TNA, the SEnDIng partnership conducted:

- desktop review of existing studies in IoT and DS formulating the scope of the training in the respective domains
- desktop review of good practices applied for the definition of learning outcomes in VET, including the domain of soft skills and how to apply them to the process of formulating the Learning outcomes of DS and IoT vocational training

The research revealed that (PricewaterhouseCoopers EU Services EEIG, 2017):

- the demand for the acquisition of specific soft skills for IT is growing rapidly
- IoT jobs in Europe will rely on specific human skills such as **creativity, problem-solving skills, design thinking, systems thinking and communications skills.**

## b. Design (1/6)

The main objective of this step is to identify what it should be accomplished and how the learning outcomes (LO) will be defined.

Learning Outcomes are

- statements of what an individual should know, understand and/or be able to do at the end of a learning process” (EP, 2008)
- commonly used to: define the levels of qualifications frameworks, set qualification standards, describe programs and courses, orient curricula and define assessment specifications.
- influencing teaching methods, learning environments and assessment practices (CEDEFOP, 2017)

## b. Design (2/6)

In SEnDIng, the desirable LOs of soft skills for IoT and DS professionals were developed based on the TNA that:

- a) Complied with the pedagogies applied in VET and adult education and
- b) Involved all the relevant stakeholders in the process (companies that represent the industry's demand for IoT and DS, qualified employees, learners, educators and VET providers, policymakers and other stakeholders)

## b. Design (3/6)

For defining LOs in practical terms:

- desktop research on the state of art in DS and IoT was carried out, to extract the most relevant to the project objectives and indicative topics and definitions
- the definitions were discussed with specialists in both domains and disseminated among DS and IoT companies and organizations in Bulgaria, Greece, Cyprus and other countries
- a validation procedure was established with the industry through comprehensive review implementing direct meetings with domain leaders and a survey among more than 40 organizations

## b. Design (4/6)

The Validation procedure consisted of the following levels:

- **Level 1: Verification of the Approach** among partners.
- **Level 2: Verification of the first draft of the LOs** by project partners.
- **Level 3: Validation of the LOs and the survey's format** in collaboration with leading experts in DS and IoT domains aiming to a) assess the potential value (usefulness) for the companies that would employ IoT and DS professionals and b) improve the format and content of the survey's questionnaires.
- **Level 4: Validation of LOs through an online survey** where quantitative and qualitative data from more than 40 respondents were received and analyzed



## b. Design (5/6)

The proposed LOs related on soft skills were common for both IoT and DS sectors:

- communication,
- adaptability to change,
- teamwork,
- ability to present in front of colleagues and clients,
- goal orientation,
- thinking outside of the box,
- and agile mindset.

## b. Design (6/6)

The received data validated the defined skills and knowledge.

- 36 responses for **DS** learning outcomes were received, where the proposed soft skills were evaluated as extremely important and very important, by 74%-93% of the respondents
- 43 responses for **IoT** learning outcomes were also received, where the proposed soft skills, with one exception, were also evaluated as extremely important and very important by 81%-90% of the respondents. The only exception was the ability to present in front of colleagues and clients, which was evaluated as extremely important or very important by 67% of the respondents

## c. Develop (1/2)

The methodology applied was combined with the constructive alignment approach for maximizing the conditions for quality learning throughout the process (Bloomberg, 2009)

The main pillars of the theoretical background for the SEnDIng training methodology were:

- a) the constructivist approach,
- b) the principles of adult education,
- c) the principles of soft skills training,
- d) the principles of e-learning and
- e) the principles of work-based learning

## c. Develop (2/2)

5 Training Units:

Effective communication and presentation (TS-EM1), Change management (TS-EM2), Team working (TS-EM3), Goal setting (TS-EM4) and Creative thinking (TS-EM5)

The structure of each training unit includes the following elements:

- Objectives,
- Learning Outcomes,
- Content,
- Learning Methodologies
- Assessment of methodologies
- Duration

## d. Implement (1/2)

Due to Coronavirus pandemic, the delivery of the soft skills training had to be redesigned in terms of:

- **Method of delivery** - the training program was revised to be conducted online (synchronous) using zoom
- **Modification of self-assessment and further activities**
- **Time of the interventions** - the deadline of the training completion had to be extended
- **The number of participants** - in the online delivery, there was a decrease in the number of attendants so as the groups of learners to be more manageable
- **Number of courses**

## d. Implement (2/2)

The components that remained the same and /or had minor adjustments were:

- **Training material** - it was adjusted to the online environment with minimum changes
- **Training methods and techniques** - selected so as to promote experiential, collaborative, active, transformational and self-directed learning; to cater for different learning styles when used in combination; to be differentiated according to the type of learning activity.

The most frequently used techniques were: brainstorming, case studies, questions, reflections, group discussions, lectures, action plan, group activities, memory activation, working in teams and self-assessment

## e. Evaluate (1/5)

### Evaluation

- is the systematic process of delineating, obtaining, reporting, and applying descriptive and judgmental information about some object's merit, worth, significance and/or equity (Stufflebeam & Shinkfield, 2007)
- in case of training, it means measure its effectiveness focusing on learning, teaching, outcomes and providing information for improving the learning and teaching process (Academia edu, nd).

## e. Evaluate (2/5)

Within SEnDIng a holistic evaluation procedure is being followed based on:

### Formative Assessment

- refers to an evaluation that aims at improving the internal function of the training program and its expected results (Noe, 1999)
- is conducted during the development and the implementation of a program, or intervention and its main purpose is its continuous improvement (Eseryel, 2002; Madaus et al., 2000; Stufflebeam & Shinkfield, 2007; Guerra-Lopez, 2008)



## e. Evaluate (3/5)

### Summative Assessment

- is about an assessment undertaken to get a summary judgment on certain critical aspects of a program's performance; for instance to determine if specific goals and objectives are met (Rossi, Lipsey & Freeman, 2004)

### Self-Assessment

- is relatively autonomous and deliberate engagement in reviewing and critiquing one's work in an appraisal of progress made over some time (Tillema, 2010)
- is essential since learners can achieve their learning goals if they understand it and can assess what they can do to reach it.

## e. Evaluate (4/5)

### Within SEnDIng

**Formative and Self-Assessment** - take place throughout the phase of soft skills training. Tools used: case studies, presentations, peer-evaluation, checklists and portfolio.

**Summative Assessment** - will be carried out in two ways:

- a) the results of the ongoing (formative) assessment are collected in the personal file of each learner, so that the individual learner profile is constructed
- b) after the completion of each of the training phases learners will be asked to demonstrate how they will be able to combine and integrate multiple aspects of training in complex situations and also to pass a final test leading to certification

The combination of cumulative assessment and final tasks compiles the final assessment of each learner.

## e. Evaluate (5/5)

The measurement of other aspects of training are employed such as:

- the rate of successful completion,
- the attendance rate,
- the rate of trainees that abandon training

Additional tools for the monitoring of the soft skills training process are observations, checklists, analysis of attendance and complementary data, questionnaires.

**Over 100 IT professionals participated in the training with the dropout rate being especially high due to the COVID-19 pandemic**

## Conclusion

Advantages of adopting ADDIE for the development of IT professionals' soft skills:

- a) the well-designed and clear structure that enhances the training program development,
- b) the ability to be applied in multiple forms of learning types (online, face-to-face, work-based learning, blended),
- c) the possibility for continuous assessment of the training programs components (objectives, results) that facilitates further improvements,
- d) the comprehensive design that fosters learners motivation and engagement.

**THANK YOU  
FOR YOUR ATTENTION!**