SEnDIng

D6.4

IMPACT EVALUATION METHODOLOGY

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Delivery Slip

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PROJECT SUMMARY

SEnDIng project aims to address the skills' gap of Data Scientists and Internet of Things engineers that has been identified at the ICT and other sectors (e.g. banking and energy) at which Data Science and Internet of Things have broad applications. To achieve this goal, SEnDIng will develop and deliver to the two aforementioned ICT-related occupational profiles two learning outcome-oriented modular VET programmes using innovative teaching and training delivery methodologies.

Each VET program will be provided to employed ICT professionals into three phases that include: (a) 100 hours of on-line asynchronous training, (b) 20 hours of face-to-face training and (c) 4 months of work-based learning. A certification mechanism will be designed and used for the certification of the skills provided to the trainees of the two vocational programs, while recommendations will be outlined for validation, certification & accreditation of provided VET programs.

Furthermore, SEnDIng will define a reference model for the vocational skills, e-competences and qualifications of the targeted occupational profiles that will be compliant with the European eCompetence Framework (eCF) and the ESCO IT occupations, ensuring transparency, comparability and transferability between European countries.

Various dissemination activities will be performed – including the organization of one workshop at Greece, Bulgaria and Cyprus and one additional conference at Greece at the last month of the project – in order to effectively disseminate project's activities and outcomes to the target groups and all stakeholders. Finally, a set of exploitation tools will be developed, giving guides to stakeholders and especially companies and VET providers, on how they can exploit project's results.

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1 Introduction

1.1 Objectives

The scope of the deliverable is to develop and describe the overall methodology for the evaluation of the SEnDIng project impact. It specifies steps and instruments necessary for performing this evaluation. Specific indicators will be used, qualitative and quantitative data will be analyzed derived indicatively from questionnaires, interviews, and other primary or secondary data if available.

The World Bank defines impact evaluation as follows: An impact evaluation assesses changes in the well-being of individuals, households, communities or firms that can be attributed to a particular project, program or policy. The central impact evaluation question is what would have happened to those receiving the intervention if they had not in fact received the program (World Bank, 2008).

The Impact Evaluation plan is a living document that will be updated in accordance with the findings and intermediate results achieved at the different stages of the project implementation. Corrective actions will be proposed, considered and performed if needed in order to improve the impact evaluation methodology.

We would like to mention, that this is the final version of the deliverable produced during the second half of the project after incorporating the feedback of partners in order to make more concrete the impact evaluation methodology. The first version of the deliverable has been produced on Month 7.

1.2 Dependencies with other WPs and deliverables

The work of the SEnDIng project is divided into the following 7 work packages:
- WP1: Project management and coordination
- WP2: Learning outcomes identification and design of vocational curricula/educational modules and training/assessment methodology
- WP3: Implementation of training material
- WP4: Implementation of skills certification mechanism
- WP5: Design of e-learning platform and delivery of vocational trainings
- WP6: Quality assurance and evaluation of the project
- WP7: Dissemination and Exploitation

Work Packages 1, 6 and 7 constitute horizontal activities concerning Project management and coordination (WP1), Quality assurance and evaluation (WP6) and Dissemination and Exploitation (WP7). This document aims to provide methods, tools and techniques for the measurement of the impact of the tasks completed in WP2, WP3, WP4, WP5 and WP7, as

well as for the assessment of the effectiveness of the whole approach of the SEnDIng project to all beneficiaries, partners and stakeholders.

All partners have the overall responsibility for the evaluation of the project delivery. Each partner in cooperation with BASSCOM will plan and align impact assessment activities relevant to the specific tasks and the corresponding deliverables of work packages WP2, WP3, WP4, WP5 and WP7.

2 Target groups and expected impact

2.1 Target groups

The target groups of the project are the following:

- **Trainees** who will mainly be ICT professionals and more specific Data Scientists and Internet of Things engineers who work at the ICT sector, and other economic sectors presenting demand for high qualified Data Scientists and Internet of Things specialists (e.g., banking, insurance, energy)
- **Companies** coming from the ICT sector and other sectors, that employ ICT professionals who will participate in the VET programs
- **VET providers**, both public and private VET institutions and companies that supply VET and related services
- **Higher education institutes** (HEIs)
- **Partners of SEnDIng project**
- **Trainers** from HEIs and VET providers, as well trainers from companies providing the work-based learning environment
- **Other stakeholders** (Policy makers, European authorities, others).

2.2 Expected impact on the target groups

The project is expected to have the following impact on:

1. ICT professionals and enterprises:
- Training in skills and competences that are more tailored to the needs of ICT learners and industry based on a learning outcomes oriented vocational curricula;
- Up-skilling of ICT professionals and especially Data Scientists and IoT engineers in order to meet new challenges in the work field;
- Free access to learning opportunities and training methodologies for ICT businesses that lack training facilities and departments;
- Reduced training expenses for ICT businesses due to the free access to the VET programs;

- More interactive learning opportunities via the use of new teaching and learning technologies for learners;
- Development of a more aware and flexible mind-set amongst ICT professionals.

2. The organizations participating in the consortium as a whole and stakeholders:

- International cooperation with like-minded organizations involved in the European VET ecosystem;
- Creation of collaboration networks between different parties (VET providers, HEIs, enterprises) through a structured set of tools and procedures;
- Development of a learning network within a transnational context;
- Strengthening the interconnection between higher education institutes, business world and vocational education and training, creating the conditions for an all-around, up-to-date vocational education and training of ICT specialists in targeted occupational profiles;
- Development and exploitation of new forms of learning via the use of new teaching and learning technologies.

3. The ICT sector (and other sectors where Data Science and IoT have broad applications) at local, regional, national, European and/or International level:

- Better matching between labor workforce supply and demand in the ICT sector and other sectors where Data Science and Internet of Things have broad applications;
- Intra-EU labor geographic mobility through a commonality of Data Scientists and IoT engineers skills' and competences' development;
- More attractive opportunities for vocational education and training in ICT sector at a pan-European level;
- More cohesive society through increased opportunities for mobility and professional development;
- Enhanced productivity, innovation, competitiveness and growth potential in the European ICT sector;
- Ability of ICT professionals throughout Europe to respond to the needs of different ICT markets and other sectors like banking, insurance and energy.

3 Indicators

3.1 Indicators included in the proposal

In this section, are outlined all the quantitative and qualitative indicators defined during proposal's preparation. These indicators will be used for evaluating the project impact and the extent to which the project achieved its objectives.

The major measurable indicators that will be used are the following:

- Number of curricula produced
- Number of educational modules produced
- Number of open educational resources produced
- Hours of online asynchronous training provided
- Hours of face-to-face training provided
- Hours of work-based learning provided
- Number of trainees participated in the vocational trainings
- Number of companies participated in the vocational trainings
- Number of participants in the workshops
- Number of participants in the final conference
- Number of exploitation toolkits designed
- Number of dissemination material (newsletters, poster, flyers, banners) produced.

Except from the aforementioned indicators, we have defined additional indicators during project implementation for measuring project impact. All the quantitative and qualitative indicators per WP used to measure the project impact are provided in Annex 1.

The target values defined during the application to evaluate whether and to what extent, the project reaches its objectives and results are the following:

- At least 150 employees participated in the VET programs;
- At least 20 companies participated in the VET programs;
- At least 10 educational modules created;
- At least 5 companies participated in the VET programs coming from economy's sectors other than ICT sector;
- 20 hours of face-to-face training per employee;
- 100 hours of e-learning training per employee;
- 4 months of work-based learning.

In addition, the quantitative and qualitative indicators depicted at the following two tables have been defined during proposal writing and will be used for measuring the short- and long-term project results.

Short term results	Target groups/potential beneficiaries	Quantitative indicators	Qualitative indicators
Elimination of skills' gap through the delivery of VET programmes	ICT professionals ICT companies Other sector companies (e.g. banking, energy)	Number of skills	Kind of skills
VET programs that meet the real needs of market	ICT professionals ICT companies Other sector companies (e.g. banking, energy) VET providers Higher Education Institutes	Number of curricula Number of educational modules Number of training hours	Quality of training material
Collaboration network between main stakeholders	Higher Education Institutes Companies VET providers Associations Certification organizations	Number of participants at the network	Activities of the collaboration network

Long term outcomes	Target groups/potential beneficiaries	Quantitative indicators	Qualitative indicators
Access to open training infrastructure	ICT professionals ICT companies Other sector companies (e.g. banking, energy)	Number of training hours	Availability of e-learning platform Reliability of e-learning platform

Enhanced productivity of trained ICT professionals	ICT professionals ICT companies Other sector companies (e.g. banking, energy	Productivity as measured within the company	Quality of services as measured outside the company
Increased mobility of ICT professionals	ICT professionals	Number of mobilities	Sub sectors
Recognition of skills provided	ICT professionals	Number of countries that has included the skills at their National Qualification Frameworks	Type of skills recognized

4 Evaluation tools

In order to ensure the proper measurement of the SEnDIng project impact, the following evaluations tools will be used:

- Surveys and Questionnaires
- Interviews and Focus Groups
- WP impact evaluation reports

4.1 Surveys and questionnaires

Questionnaire is a systematic, data collection technique consisting of a series of questions required to be answered by the respondents to identify their attitude, experience, and behavior towards the subject of research.

One of the most critical parts of a survey is the creation of questions that must be framed in such a way that it results in obtaining the desired information from the respondents. There are no scientific principles that assure an ideal questionnaire and in fact, the questionnaire design is the skill which is learned through experience.

Below are described in detail the survey method process, author role and stakeholders.

Survey method process

1. Decide what you want to know and how you will analyze the data before you develop questions.
2. Look for questions or ideas from other sources to inspire the writing of your method.

3. Write questions to be as specific as possible. Use simple, straightforward language. Avoid the use of terminology specific to a few people and related to the project specifics.

4. Write short questions to ensure reader understanding, including:
   - Limit the number of questions, so people are focused;
   - Ask the questions in the most appropriate moment when the target groups have fresh outlook on the research topic;
   - Limit the number of choices available to a question to five or less (if applicable);
   - Offer a "don't know" or "no opinion" option, so people do not invent answers;
   - Vary the format of the questions to keep people interested.

5. When you have written the survey questions, it is important to test them to make sure that the language is current, the questions are not biased, and the questions are relevant to the purpose of the survey. Deliver the set of questions to the stakeholder for their response. Provide a date by which the answers are to be returned.

Author role

The author of the survey is responsible for crafting questions to solicit the needs and requirements from stakeholders. Once the answers have been received, the author is responsible for recording them into a document for confirmation by the survey method respondents. To develop a useful method, the writer should be familiar with the purpose of the evaluation and ideally have some experience with developing surveys.

Stakeholder role

The stakeholder is responsible for answering the questions and verifying the resulting information presented by the author for confirmation.

Questionnaire Design Process

The following steps are involved in the questionnaire design process:

1. Specify the information needed
2. Define the target respondent
3. Specify the type of interviewing method
4. Determine the content of individual questions
5. Overcome respondent's inability and unwillingness to answer
6. Decide on the question structure
7. Determine the question wording
8. Determine the order of questions
9. Identify the form and layout
10. Reproduction of questionnaire
11. Pretesting.

4.2 Interviews and Focus Groups

The interview is the verbal conversation between two or more people (in groups) with the objective of collecting relevant information for the purpose of research and project needs. We plan to use this evaluation tool in the project, focused on project partners, target groups and stakeholders.

Group Interviews and Focus Groups

The recommended pattern for introducing the focus group discussion includes:

1. Welcome
2. Overview of the topic
3. Ground rules
4. First question

The following steps are recommended about how to conduct the focus groups:

1. Define the purpose
2. Establish a timeline
3. Identify and invite participants
4. Generate the questions
5. Select a facilitator
6. Choose location
7. Conduct the focus group
8. Interpret and report results
9. Translate the results into action

Individual Interviews

Individual, face-to-face interviews are by far the most popular and efficient form of data collection and process assessment. A face-to-face interview method provides advantages over other data collection methods. They include:

- Accurate screening
- Capture verbal and non-verbal questions
- Keep focus
- Capture emotions and behaviors

There are a number of different types of interview formats, e.g., structured, semi-structured or unstructured. The more unstructured the interview, the more it is expected that the main issues will emerge from the interviewer, rather than being imposed by the structure of the interview. These different interview formats are not mutually exclusive. It is possible to combine them effectively in an interview to be flexible and focused when it is appropriate.

4.3 WP Impact Evaluation reports

The WP leaders will be asked to evaluate the impact of their WP using the template that is provided at Annex 2.

5 Impact Evaluation Plan

As mentioned previously, the Impact Evaluation plan is a living document that will be updated in accordance with the findings and intermediate results achieved at the different stages of the project implementation. Corrective actions will be proposed, considered and performed if needed in order to maximize the expected project impact. All partners have the overall responsibility for the evaluation of the project implementation. Each partner should apply the impact evaluation methodology based on national data and should submit impact evaluation reports on a regular basis.

5.1 Main axes

In order to measure the impact of SEnDIng, the project target groups are categorized into the following categories:
- Impact on trainees
- Impact on trainers
- Impact on companies
- Impact on VETs
- Impact on partners
- Impact on other stakeholders

5.2 Division of main tasks and responsibilities among project partners

The division of the main tasks and responsibilities within the partnership regarding the evaluation of project impact is the following:
- BASSCOM develops the impact evaluation methodology (this deliverable) on project level.
- The Project coordinator and the work package leaders of WP2, WP3, WP4, WP5 and WP7 support BASSCOM in the development, implementation and further update (if needed) of the impact evaluation methodology, within the scope of the respective work packages they are responsible for (including metrics, evaluation tools, planning, reporting, corrective actions etc.).
- The partnership reviews and approves the present deliverable.
- Each WP leader applies the impact evaluation methodology (in cooperation with the partners involved in each WP) in the WP he/she leads.

- The WP leaders summarize and analyze the collected data on a WP level and provide impact evaluation reports to BASSCOM.
- BASSCOM supports the partners, aggregates the results and consults partners for maximizing the impact of the project.
- Project coordinator incorporates the findings of the impact evaluation in the interim and final progress reports.
- Each partner can propose corrective actions, if needed, at any stage of the project implementation.
- BASSCOM in cooperation with relevant partners, when necessary, updates the impact evaluation plan in order to align it with the project deliverables and intermediate results.

5.3 Impact evaluation plan

The impact evaluation plan provides for each WP:

- An overview of the potential project impact
- Potential evaluation tools to use
- Responsible organizations and periods for reporting
- Quantitative and qualitative indicators to be measured

For more information please, see Annex 1.

6 REFERENCES

- http://ec.europa.eu/regional_policy/archive/policy/future/pdf/4_morton_final-formatted.pdf;
- http://ec.europa.eu/regional_policy/en/policy/evaluations/guidance/impact_faq_theor#1;
- https://businessjargons.com/questionnaire-design-process.html;
- https://www.snapsurveys.com/blog/advantages-disadvantages-facetoface-data-collection/

7 ABBREVIATION

BASSCOM	Sdruzenie Bulgarska Asociacia na Softuernite Kompanii BASCOM (Bulgarian Association of Software Companies), Bulgaria
CD	Code Runners, Bulgaria
D2.1	Deliverable (2.1)
DLV	Deliverable
EACEA	Education, Culture and Audiovisual Executive Agency, Belgium
e-CF	European e-Competence Framework
ESCO	European Skills, Competences, Qualifications and Occupations Classification
ESI CEE	"Software Institute - Center Eastern Europe", Bulgaria
GCS	Greek Computer Society, Greece
HEIs	Higher Education Institutes
ICT	Information and Communications Technologies
IT	Information Technologies
MIXANOGRAFIKI	MIXANOGRAFIKH EPE, Greece
NEME	Nemetschek OOD, Bulgaria
OTC	OLYMPIC Training & Consulting Ltd, Greece
UCY	University of Cyprus, Cyprus
ULS	Universal Learning Systems Ltd, Ireland
UNICERT	UNICERT Universal Certification Solutions, Greece
UPATRAS	University of Patras, Greece
VET	Vocational Education and Training
WBL	Work-based learning

WP(s)	Work Package(s)
YDW	Yodiwo AE, Greece

8 ANNEXES

8.1 Annex 1: Impact Evaluation Plan

WP No.	Title of WP	Potential impact on	Evaluation tools to use	Responsible for reporting/ Reporting period	Quantitative Indicators	Qualitative Indicators
2	Learning outcomes identification and design of vocational curricula/ educational modules and training/ assessment methodology	1. Development of a more aware and flexible mind-set amongst ICT professionals. 2. Development of a learning network within a transnational context. 3. Strengthening the interconnection between higher education institutes, business world and vocational education and training, creating the conditions for an all-around, up-to-date vocational education and training of ICT specialists	1. Surveys among target companies, partners, and other stakeholders 2. Individual interviews with key representatives of the industry curricula for the industry 3. Focus groups 4. Project internal evaluation	European Software Institute - Center Eastern Europe on M18 and M36	1.1a. Number of surveys conducted 1.2a. Number of stakeholders involved in the surveys 1.3a. Number of interviews conducted 1.4a. Number of stakeholders involved in the interviews 1.5a. Number of learning outcomes defined	1.1b. Profile of participants (industry, size, profile) 1.5b. Extensiveness of research for the development of the learning outcomes

WP No.	Title of WP	Potential impact on	Evaluation tools to use	Responsible for reporting/ Reporting period	Quantitative Indicators	Qualitative Indicators
		in targeted occupational profiles. 4. Better matching between labor workforce supply and demand in the ICT sector and other sectors where Data Science and Internet of Things have broad applications. 5. Development and exploitation of new forms of learning via the use of new teaching and learning technologies.			1.6a. Number of curricula produced	-
					1.7a. Number of educational modules produced	-
3	Implementation of training material	1. Up-skilling of ICT professionals and especially Data Scientists and IoT engineers in order to meet new challenges in the work field. 2. Reduced training expenses for ICT businesses due to the free access to the VET	1. Questionnaires at workshops and final conference 2. Project internal evaluation 3. Surveys among trainees	University of Cyprus on M18 and M36	2.1a. Number of open educational resources produced	2.1b. Type of open educational resources produced
					2.2a. Number of trainees involved in the evaluation of training material	-

WP No.	Title of WP	Potential impact on	Evaluation tools to use	Responsible for reporting/ Reporting period	Quantitative Indicators	Qualitative Indicators
		programs.				
4	Implementation of skills certification mechanism	1. Up-skilling of ICT professionals and especially Data Scientists and IoT engineers in order to meet new challenges in the work field.	1. Project internal evaluation 2. Surveys among trainees	Unicert on M18 and M36	3.1a. Number of certification schemes developed	-
					3.2a. Number of certified professionals	3.2b. Profile of certified professionals
5	Design of e-learning platform and delivery of vocational trainings	1. Training in skills and competences that are more tailored to the needs of ICT learners and industry based on a learning outcomes oriented vocational curricula. 2. Up-skilling of ICT professionals and especially Data Scientists and IoT engineers in order to meet new challenges in the work field. 3. Free access to learning opportunities and training methodologies for ICT businesses that lack	1. Questionnaires at workshops and final conference 2. Project internal evaluation 3. Surveys among trainees	Universal Learning Systems on M24 and M38	4.1a. Hours of online asynchronous training provided	-
					4.2a. Hours of face-to-face training provided	-
					4.3a. Hours of work-based learning provided	-
					4.4a. Number of participants in the vocational trainings for Data Science and IoT	4.4b. Profile of participants in the vocational trainings for Data Science and IoT
					4.5a. Number of companies participated in the vocational	4.5b Profile of companies

WP No.	Title of WP	Potential impact on	Evaluation tools to use	Responsible for reporting/ Reporting period	Quantitative Indicators	Qualitative Indicators
		training facilities and departments. 4. More interactive learning opportunities via the use of new teaching and learning technologies for learners. 5. More attractive opportunities for vocational education and training in ICT sector at a pan-European level. 6. Ability of ICT professionals throughout Europe to respond to the needs of different ICT markets and other sectors like banking, insurance and energy.			trainings	participated in the vocational trainings
					4.6a. Number of MOOC users	4.6b. Profile of MOOC users
					4.7a. Number of trainees completing the first phase of the training	
					4.8a. Number of trainees completing the first phase of the training	
					4.9a. Number of trainees completing the first phase of the training	
					4.10a. Number of trainees evaluated the first phase of training	4.10b. Profile of trainees evaluated the first phase of training
					4.11a. Number of trainees	4.11b. Profile of

WP No.	Title of WP	Potential impact on	Evaluation tools to use	Responsible for reporting/ Reporting period	Quantitative Indicators	Qualitative Indicators
					evaluated the second phase of training	trainees evaluated the first phase of training
					4.12a. Number of trainees evaluated the third phase of training	4.12b. Profile of trainees evaluated the first phase of training
7	Dissemination and Exploitation	1. International cooperation with like-minded organizations involved in the European VET ecosystem; 2. Creation of collaboration networks between different parties (VET providers, HEIs, enterprises) through a structured set of tools and procedures;	1. Questionnaires at workshops and final conference 2. Focus groups at workshops and final conference 3. Project internal evaluation	Greek Computer Society on M18 and M36	5.1a. Number of participants in the workshops	5.1b. Profile of participants in the workshops
					5.2a. Number of participants in the final conference	5.2b. Profile of participants in the final conference
					5.3a. Number of exploitation toolkits designed	-
					5.4a. Number of dissemination material produced	5.4b. Type of dissemination material

WP No.	Title of WP	Potential impact on	Evaluation tools to use	Responsible for reporting/ Reporting period	Quantitative Indicators	Qualitative Indicators
					5.5a. Number of publications at international conferences	-
					5.6a. Number of stakeholders reached Number of stakeholders reached through project website	-
					5.7a. Number of followers at social networks	-
					5.8a Number of project follow-up activities already implemented	-

8.2 Annex 2: WP impact evaluation report

Reporting Partner:	
Reporting Period:	
Contact Persons:	
Date:	
Deadline for returning the form:	

Impact evaluation Based on the Impact Evaluation methodology of Annex 1 please describe which the estimated impact is on the target groups (including participating institutions and stakeholders). Please add lines as necessary.

WP No	No of deliverable/ result(s)	Evaluation tools used	Target groups/ potential beneficiaries	Impact	Quantitative Indicators measured	Qualitative indicators measured	Impact for the sector concerned/ Comments/ Recommendations/ Corrective actions proposed or/and implemented