Educational Package Specification:

Sustainable digital transformation (SDT)

Within the Erasmus+ Knowledge Alliance ProDiT – Projects for the Digital Transformation

621745-EPP-1-2020-1-DE-EPPKA2-KA

Authors: Carolina Cruz (UPV/EHU), Nerea Toledo (UPV/EHU), Maider Iturrondabeitia (UPV/EHU)

Version 1.0, 09.09.2022

Version 2.0, 19.12.2023

Version 3.0, 26.04.2024

Co-funded by the Erasmus+ Programme of the European Union

ProDiT
Projects for the Digital Transformation

1. Summary

The **Educational Package "Sustainable digital transformation (SDT)"** delivers the competences for managing the digital transformation sustainably, leading digital transformation projects to the desired impact.

Overall Learning Outcome: Participants will learn:

- to manage the digital transformation sustainably with projects
- to assess and manage the sustainability of digital transformation projects (DTP), e.g. by applying the Digital Sustainability Canvas (DSC)
- to lead digital transformation projects (DTP) to the intended impact, e.g. by applying result-oriented monitoring

Target Group Analysis:

- Students in Master's programmes need the competences in addition to their Bachelor degree. Prerequisite major degree in management, IT or engineering. Monitoring and Control of the learning process required.
- Professionals need the competences as they progress into project management positions. Prerequisite major degree in management, IT or engineering. Flexible dedication to the learning process on a daily and weekly basis.
- Consultants need the competences in order to analyse and support the digital transformation, including sustainability audits.

Competences & Learning Outcomes: The main competences are:

- Knowledge about the methods, tools and processes for a sustainable digital transformation, including sustainability assessment and controlling of DTP
- Practical skills in order to plan and execute the digital transformation and digital transformation projects in a sustainable way and with the intended impact
- Scientific reflection about the issues and concepts behind a sustainable digital transformation
- Ability to lead the sustainable digital transformation successfully

Selection of Content: Main topics addressed by the package:

- Sustainable Digital Transformation
- Life-cycle Analysis and Sustainable Management
- Managing Digital Change
- Management Systems & Audit
- Development Project for a Sustainable Digital Innovation
- Scientific Methods and Tools for the Sustainability Analysis of the Digital Transformation

Concept and composition of the package: The package is composed out of 2 mandatory modules, 1 elective (1 out of 2), a project (with project thesis) and a scientific seminar.

Teaching Materials/Literature/Media/Technical Requirements/Lab Equipment: Digital infrastructure for agile project management.

Tailoring & Educational Tracks (Practical, Entrepreneurial, Scientific): Tailoring options are focussing on the usage in Master's programmes (Scientific Track) or company trainings (Practical Track).

Competence Assessment: Competence assessment is done with online tests (including self-assessment), oral exams, project assignment reviews, presentation, writing of scientific papers/reports.

Curricula Integration: Educational programmes can integrate the package as:

- single modules as electives
- complete package as a 30 ECTS minor in Master's programmes
- project assignments

in educational programmes like Master's in Management or Business Administration, Master's in Sustainability, Master's in Project Management, Master's in Informatics, Business Informatics, Information Technology

Quality Evaluation:

For quality assurance, students will complete pre- and post-course evaluations to measure knowledge gains, skills development, and provide feedback.

Change History & Ownership:

Release V1.0: Initial version of the specification of the edupack "Sustainable digital transformation (SDT)", 09.09.2022. Authors: Joserra Otegi (UPV/EHU), Carolina Cruz (UPV/EHU), Abouzar Daneshpajouh (UPV/EHU), Jorge Maldonado (FH Do).

Release V2.0: Initial version of the specification of the edupack "Sustainable digital transformation (SDT)", 19.12.2023. Carolina Cruz (UPV/EHU), Nerea Toledo (UPV/EHU), Maider Iturrondabeitia (UPV/EHU)

Release V3.0: Initial version of the specification of the edupack "Sustainable digital transformation (SDT)", 26.04.2024.

Table of Content

2. Introduction to the educational package

The educational package (edupack) on “Sustainable digital transformation (SDT)” delivers the relevant project management competences:

- to manage the digital transformation of an organisation to a higher maturity level with projects,
- to manage the work within agile and projectized organisations, e.g. by doing projects, and
- to develop organisational and individual knowledge and cope with the fast change.

The competence is delivered by providing:

- the mandatory module “Sustainable Digital Transformation” (6 ECTS),
- the mandatory module “Life-cycle Analysis and Sustainable Management” (6 ECTS)
- the elective module (choose 1 out of 3) “Managing Digital Change” (6 ECTS)
- the elective module (choose 1 out of 3) “Management Systems & Audit” (6 ECTS)
- the elective module (choose 1 out of 3) “Scientific Methods and Tools for the Sustainability Analysis of the Digital Transformation” (6 ECTS)
- the team/individual project assignment “Development Project for a Sustainable Digital Innovation” (12 ECTS)

The edupack addresses topics like:

- What is a sustainability? What is sustainable project management? What impact can the digital transformation develop on people, planet, profit (PPP)?
- How can the sustainability of digital transformation projects (DTP) be assessed? What are sustainability aspects and how can canvas models be used for it?
- How can DTP be controlled and managed with a focus on sustainability and impact?
- What are relevant sources of information about the topics? What are recent developments in the field? Is there key literature?

3. Educational package Description

3.1 Overall Learning Outcomes

The main competences are (according to EQF [1][2]):

- Knowledge about the methods, tools and processes for sustainable management of the digital transformation and DTP
- Practical skills in order to plan and execute a sustainable digital transformation project, including the assessment and controlling of sustainability aspects
- Scientific reflection about the issues and concepts behind the digital transformation and respective sustainability considerations
- Ability to lead the digital transformation sustainably and successfully

Learning Outcomes/Competences need to consider several competence domains [3]:

- **Technical Competence:** This involves digital literacy in the relevant tools, project management tools and methods in the digital transformation domain.
- **Professional Competence:** This involves effective communication skills in the context of sustainable digital transformation; entrepreneurial and leadership abilities; capability to work in diverse teams; flexibility and a robust work ethic in professional environments; curiosity and a lifelong learning mind-set in the changing landscape of digital transformation; and critical and creative thinking applied to real-world challenges.
- **Global Competence:** This involves an understanding of global markets and business practices in the field of digital transformation; communication in languages other than one's native language; adaptability to work in multicultural global environments; understanding global standards of ethics, safety and security in the context of digital transformation; and having cultural, social and political awareness.

The **Overarching Learning Outcomes (OLO)** [5] are a technical competence which involves knowledge of digital tools, project management methods and the application of scientific approaches in the field of digital transformation. Secondly, a professional competence which refers to effective communication, entrepreneurial and leadership skills, teamwork skills, flexibility. It also encompasses a strong work ethic, curiosity, a lifelong learning mindset and critical thinking adapted to real-world challenges in sustainable digital transformation. And finally, a global competence that includes an understanding of global markets and digital business practices, a multilingual communication, the adaptability to multicultural environments, as well as compliance with global ethical and security standards in the digital transformation, and this for having cultural, social and political awareness on a global scale.

3.2 Target Group Analysis

Relevant target groups are:

- Students in Master's programmes need the competences in addition to their Bachelor degree. Prerequisite major degree in management, IT or engineering. Monitoring and Control of the learning process required.
- Professionals need the competences as they progress into project management positions. Prerequisite major degree in management, IT or engineering. Flexible dedication to the learning process on a daily and weekly basis.
- Consultants need the competences in order to analyse and support the digital transformation, including sustainability audits.

3.3 Competences & Learning Outcomes

This chapter contains a more detailed description of the competencies provided by the educational package. The content is structured to enhance the understanding and to clarify the expected outcomes of the educational package by providing a roadmap for students and instructors of the associated competencies contained inside this educational package [3].

Knowledge:

- The student become familiar with basic concepts of Digital Transformation.
- The student understands the concept of DTP.
- The student defines the concept of Sustainability and become aware of the environmental economic and social implications of products and projects.
- The student lists the advantages of integrating environmental criteria into the product development process.
- The student knows and understands impact on Sustainability of DTP.
- The student understands the origin and need of Life Cycle thinking.
- The students learn to visualize the impact of DTP with Digital Transformation Canvas tool.

Skills:

- Define or select proper a tool to assess the sustainability of DTP.
- Tailor or developing the Sustainability Assessment model.
- Apply the Sustainability models to projects.
- The student applies the eco-design methodology and manages the available tools.
- The student positions eco-design within the business organization in the framework of the product development process.
- The student reports the current environmental problems associated with DTP, products and services.
- The student defines the life cycle concept and identify the phases of the life cycle of a product.

- The student describes the fundamentals and regulations of the Life Cycle Analysis.
- The student applies evaluation methodologies and software tools for product life cycle analysis.
- The student evaluates and control the sustainability aspects within DTP.

Autonomy

- Students explore and apply tools such as DSC and LCA in DTP.
- The student is able to assess sustainability impacts on people, planet and profit (PPP).
- They conduct sustainability assessments of digital transformation projects using canvas models without direct supervision.

Responsibilities

- Students explore diverse sources of information to keep up to date with the latest developments and integrate this knowledge into their projects and evaluations.
- Plan, implement and monitor sustainable digital transformation projects, ensuring that sustainability aspects are taken into account.
- Ensure that their projects reflect scientific and practical accuracy in their work.
- They are responsible for leading digital transformation efforts in a way that aligns with both organisational goals and broader sustainability outcomes, demonstrating an understanding of global business practices.

Technical competence:

- Use of tools for sustainability assessment in digital transformation projects.
- Knowledge of project management tools and methods.
- Application of scientific methods and tools in the field of digital transformation.

Professional competence:

- Effective communication skills in the context of sustainable digital transformation.
- Leadership and entrepreneurial skills.
- Ability to work in diverse teams.
- Flexibility and strong work ethic in professional environments.
- Curiosity and a continuous learning mind-set in the changing scenario of digital transformation.
- Critical and creative thinking applied to real-world challenges.

Global competence:

- Understanding of global markets and business practices in the field of digital transformation.
- Communication in languages other than mother tongue.
- Adaptability to work in multicultural global environments.

- Knowledge of ethical, safety and security standards in the context of digital transformation.
- Cultural, social and political awareness applied to the dynamics of global digital transformation.

3.4 Content

Main topics addressed by the package:

- Sustainable Digital Transformation
- Life-cycle Analysis and Sustainable Management
- Managing Digital Change
- Management Systems & Audit
- Development Project for a Sustainable Digital Innovation
- Scientific Methods and Tools for the Sustainability Analysis of the Digital Transformation

3.5 Concept and composition of the package

A) Overall concept, curation of content, didactic concept

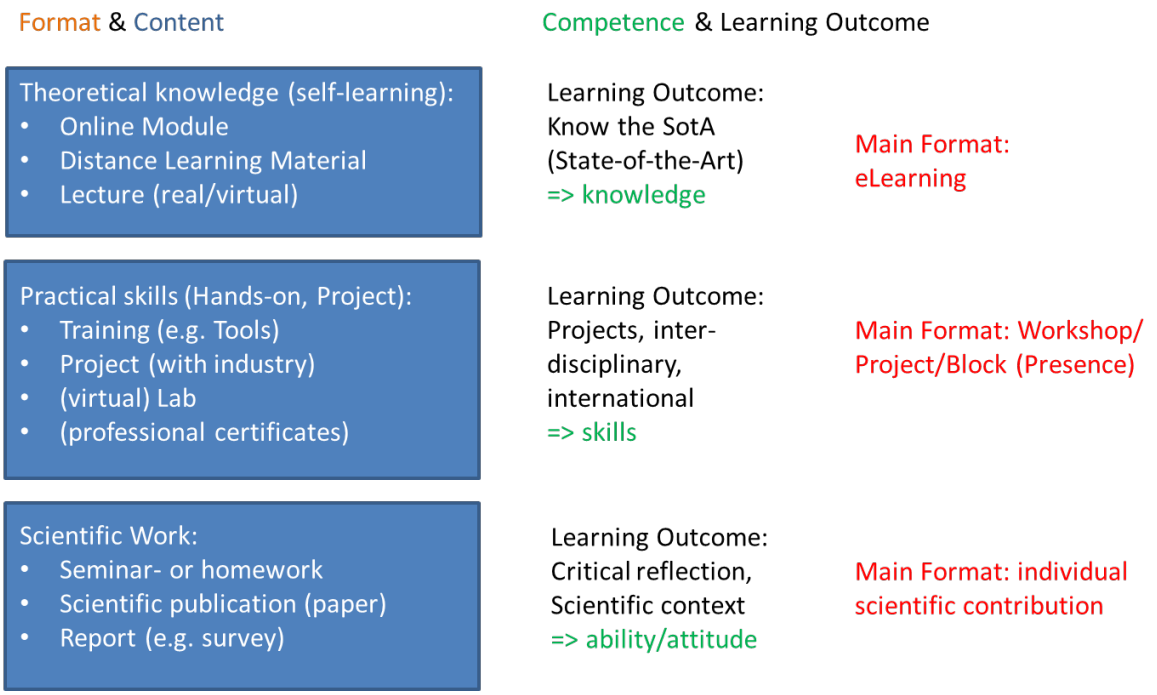

Figure 1 Didactic Formats per Competence Area [see specification "Educational & Didactic Concept]

The educational package follows the following concept:

- Knowledge about the methods, tools and processes for sustainability assessment and controlling for the digital transformation will be provided within 2 mandatory eLearning modules and 1 (out of 3) elective eLearning modules. The educational resources will contain online courses, classical lecture slides, video courses, tutorials, reading materials

etc. Knowledge is delivered and also assessed with tests and exams. Prior knowledge is assessed with self-assessments.

- Practical skills are already addressed in the mandatory and elective modules by conducting team exercises and small project assignments. Industrial case studies are used.
- Practical skills (including overarching learning outcomes (OLOs), professional and global competences) are intensively trained by conducting a development project for a sustainable digital innovation, usually as a student team, solving a realistic problem for an industrial case study, generating realistic work situations. The management project might be conducted cross-border in an international setting.
- The ability to lead the digital transformation towards a sustainable impact and to fill certain roles in digital transformation projects is trained by preparing students for such roles, put them into the roles in projects, and by letting them reflect on the role afterwards.
- The scientific competences for analysing, reflecting and researching on the sustainable digital transformation are delivered with small scientific assignments (e.g. homework) in the mandatory and elective modules, an optional scientific seminar (including courses on research methods & tools, actual research tasks, and writing a scientific paper for a Master student conference), and a possible scientific thesis on the management project. This can be later continued into a scientific publication and/or a Master thesis.

B) Educational Elements

The package is composed out of:

- eLearning Modules (including online courses)
  - Sustainable Digital Transformation (6 ECTS), mandatory
  - Life-cycle Analysis and Sustainable Management (6 ECTS), mandatory
  - Managing Digital Change (6 ECTS), elective
  - Management Systems & Audit (6 ECTS), elective
- Projects (including methodology, templates, courses on project-based work)
  - Development Project for a Sustainable Digital Innovation (12 ECTS)
  - Or as an alternative: Company Internship (12 ECTS)
- Case studies (digital description, data, materials)
- Scientific elements:
  - Scientific Seminar, 6 ECTS, elective

C) Teaching & Learning Activity Plan

Example (of a project management educational package):

Mandatory (Core) Modules	**ECTS**	**Description**
Sustainable Digital Transformation	**6**	Including the Digital Sustainability Canvas (DSC)
Life-cycle Analysis and Sustainable Management	**6**	The student understands the origin and need of Life Cycle thinking.
Elective (Additional) Modules		
Managing Digital Change	*6*	
Management Systems & Audit	*6*	
Scientific & Practical Elements		
Scientific Seminar (Elective)	**6**	scientific methods and tools for the analysis of the sustainability of the digital transformation, including e.g. course on Research Methods & Tools, assignment of writing a paper for a student conference
Development Project for a Sustainable Digital Innovation	**12**	Students conduct a team project (2-4 students per team) on a consulting case study and present the results
Company Internship (alternative to management project)	*12*	*Students conduct an internship and deliver an internship report*

3.6 Teaching & Learning Resources

Learning Management System (LMS): moodle

IT tools for project management (e.g. Atlassian Confluence, Jira, MS project, Openproject)

IT tools for collaborative work (Microsoft 365, Teams)

Required digital learning resources:

- Case studies, Siemens case studies analysed with DSC.
- Online courses, webinars CIDIPI 2023 (https://youtu.be/S4GoqeueBaU)
- Tutorials and reading materials, Literature review (ANNEX 1), Sustainability class material.

3.7 Tailoring & Educational Tracks

The educational package will implement 2 Educational Tracks:

- Practical: focus on professionals and consultants => company training programme
- Scientific: focus on master's students

3.8 Assessment Methods

Planned assessment methods:

FORM	ECTS	REMARK
Sustainable Digital Transformation	6	Team project + presentation (50%) and oral exam (50%)
Life-cycle Analysis and Sustainable Management	6	Team project + presentation (50%) and homework (50%)
Managing Digital Change	*6*	*Team challenge (50%) and online test (50%)*
Management Systems & Audit	*6*	*Practical demonstration (audit results) (50%) and written exam (50%)*
Scientific Seminar	*6*	*Test (Research Methods & Tools) (30%), Scientific Paper presented at conference (70%)*
Development Project for a Sustainable Digital Innovation	12	Project pitch as team presentation (30%), product/service demonstration (30%), written reflection report (40%)
Company Internship	*12*	*feedback of employer (30%), internship report (30%), presentation of work results (40%)*

3.9 Curricula Integration

Educational programmes can integrate the package as:

- single modules as electives
- complete package as a 30 ECTS minor in Master's programmes
- project assignments

in educational programmes like Master's in Management or Business Administration, Master's in Sustainability, Master's in Project Management, Master's in Informatics, Business Informatics, Information Technology

3.10 Quality Assurance - Evaluation

To ensure high-quality course delivery, students will be asked to fill in pre-course and post-course evaluation questionnaires. These assessments will measure knowledge gains and the acquiring of skills and competencies. Students will also have the opportunity to reflect on their learning journey and provide feedback to help the continuous improvement of the course.

4. References

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[2] EU: Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), https://enqa.eu/index.php/home/esg/, Brussels, Belgium, 2015

[3] Rajala, S.A.: Beyond 2020: Preparing Engineers for the Future. Proceedings of the IEEE, Vol. 100, pp. 1376-1383, DOI 10.1109/JPROC.2012.2190169, 2012

[4] European Institute of Innovation and Technology (EIT), “Quality for learning” EIT Quality Assurance and Learning Enhancement Model, https://eit.europa.eu/sites/default/files/eit_label_handbook.pdf, 2016

ANNEX 1

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