DIGITAL TRANSFORMATION MANAGER

[DELIVERABLE TITLE]:

D.3.1. – The new Joint Curriculum of the Digital Transformation Manager
and
D3.2 - Report on effective training methodology
D3.3 - New curriculum and training methodology validation

[PROJECT WORK PACKAGE]:

WP3 – Digital Transformation Manager New Joint Curriculum

CONTEXT

Grant agreement	601011-EPP-1-2018-1-ES-EPPKA2-SSA
Programme	Erasmus+
Key action	Cooperation for innovation and the exchange of good practices
Action	Sector Skills Alliances / KA2 Lot 2: SSA for Design and Delivery of VET
Project acronym	DITRAMA
Project title	**Digital Transformation Manager**: leading companies in furniture value chain to implement their digital transformation strategy
Project starting date	01/01/2019
Project end date	31/12/2021
Project duration	36 months
Project work package	**WP3- Digital Transformation Manager New Joint Curriculum**
Deliverable title	**D3.1. The new Joint Curriculum of the Digital Transformation Manager** **D3.2 Report on effective training methodology** **D3.3 - New curriculum and training methodology validation**
Nature of deliverable	**REPORT**
Dissemination level	Public
Due date of deliverable	Month 9 – Month 28
Actual date of deliverable	02/10/2019
Produced	WOODWIZE – Jeroen DOOM
Reviewed	CENFIM – J. Rodrigo and AMIC – M. Rumignani (Date: 06/06/2020)
Validated	Through online survey by 91 Experts

DOCUMENT CHANGE RECORD

Issue date	Version	Author	Sections affected / Change
02/10/2019	V0	Jeroen DOOM	draft version v0
29/10/2019	V1	Jeroen DOOM	1st draft version, distributed to all partners of WP3
02/06/2020	V2	Jeroen DOOM	2nd version, after discussion with partners WP5
29/06/2020	V3	Jeroen DOOM	Validated version with small changes
24/07/2020	V4	Jeroen DOOM	Validation results

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1 Introduction

The activities and deliveries of this WP3 are based on the outcomes and outputs of the WP2, which will deliver a report on tasks and subtasks, knowledge, skills, and competencies needs for the new occupational profile of the Digital Transformation Manager (D2.4).

IN WP2 we defined that the Digital Transformation Manager (DTM) is the professional, able to properly guide companies within the furniture sector towards their digital transformation. The DTM is the professional, that will plan, design, guide and check the implementation of the changes, needed by furniture companies, to transform themselves and adapt to the digital transformation.

Digital transformation is the profound and accelerating transformation of business activities, processes, competencies and models to fully leverage on the changes and opportunities of digital technologies and their impact across society in a strategic and prioritized way, with present and future shifts in mind. Digital transformation in the integrated and connected sense requires, among others, the transformation of:

- *Business activities/functions;*
- *Business processes;*
- *Business models;*
- *Business ecosystems;*
- *Business asset management;*
- *Organizational culture;*
- *Ecosystem and partnership models;*
- *Customer, worker and partner approaches.*

*By 2025, with a massively **connected and globalized economy**, the wood furniture manufacturing industry will offer **personalized smart products and services** based on **digital manufacturing, logistics and sales systems** supplied by **resource-efficient and sustainable industries** with an immense need for sufficient **digitization talents and skills** securing a competitive transformation of the industry.*

Based upon these outcomes of WP2, in WP3 we have defined the new joint curriculum related to the new occupational profile of the Digital Transformation Manager.

This joint curriculum must be consistent with the EU instruments for mobility and transparency ECVET, EQF and EQAVET and will include information and descriptions related to learning objectives and learning outcomes (LO's), a list of the learning units (training path) and the description of their content in relation to knowledge, skills and competencies (KSC's).

To have a real impact on the sector, the curriculum must be attractive for young people, in terms of content and career perspective.

ECVET points will be assigned for each unit (with the support of the ECVET toolkit).

In a next chapter, we make some recommendations about the most appropriate training and teaching methodology and instruments for each unit. We will also define the preferred requisites for the course participants to allow them to benefit the best from the course.

Then, we can define the EQF level Qualification of the course, that at this stage is expected to be of level 5. This will be decided when the curriculum will be finalized (M.28) and based upon the developed learning pills (WP5).

We make recommendations for the certification, delivered to the students that successfully finalized the course.

Finally, several ESCO Furniture sector occupations will be affected in terms of knowledge and skills requirements by the digital transformation processes. The new joint curriculum for the Digital Transformation Manager will cover parts of these new skills needs. A report, analyzing the links among these occupations and the new tasks required, will support professionals with those ESCO occupations to increase their skills and knowledge and better face the challenges represented by the Industry 4.0 transformation.

This part will be described in D3.4 'Report for supporting furniture sector professionals with ESCO occupations affected by the digital transformation of the sector'.

2 New Joint Curriculum for the Digital Transformation Manager (DTM)

2.1 Main principles of curriculum design

2.1.1 Why: Define the aims

What is de core of the newly defined job profile?

Is the context well described?

Are there different contexts possible?

2.1.2 What: develop and write Learning Outcomes, formulating goals and objectives

Goals and objectives are the heart of your content. Goals are broad statements describing what the learner should be able to do, once instruction is complete.

Objectives are more specific and outline how each goal will be met.

When writing goals and objectives you are doing backwards planning: thinking about the desired end results and then working backwards, creating steps to achieve these results.

2.1.3 Develop teaching activities and materials

There are many types of instruction to use. The key is to pick a teaching method that best suits our goals and objectives, adapted to the specified content.

Some examples:

- lecturing
- demonstration
- brainstorming / group discussions
- (group) work assignments
- cooperative learning and argumentation
- context base learning
- independent study
- …

2.1.4 How: design assessment and an assessment plan (SMART)

If you have designed measurable goals and objectives, the assessment plan should be fairly simple.

Assessing students may include demonstration of learned techniques as well as online tests or written or oral exams. Assessments don't need to be long or complex. When defining the assessment, we should define the criteria for the evaluation: what (KSCs)?, when?, how?, with which tools (tests, evaluation of practical work…)? …

2.1.5 Where: check alignment

Map the learning outcomes to the defined curriculum and to the defined new job profile. Are all compulsory KSC's integrated in the course(s)? Are there any gaps? Any optional elements?

2.1.6 Organize the course(s)

This is the practical implementation of the curriculum.

2.1.7 Revise, interpret and report findings

The evaluation of the curriculum is necessary to determine the extent to which the implementation of this curriculum has produced positive and suitable outcomes for all stakeholders (students, teachers and lecturers, educational institutes, firms, companies and organizations…). To evaluate curricular effectiveness, we must check if the defined content matches the learning outcomes.

The experiences, opinions and feedback from the students on the curriculum and the learning materials are essential to adjust and improve for next time. This information will enable to adapt the curriculum and/or the learning materials for further improvement and to stay relevant in these fast changing times.

2.2   Description

In WP2, we have defined **7 categories of skill sets**, relevant to digital transformation.

1. Technical skills (digitalization);

2. Innovation skills;

3. Communication skills;

4. Management, leadership and entrepreneurial skills;

5. Emotional intelligence skills;

6. Skills related to quality, risk and safety;

7. Ethics

The proposed curriculum is designed and set up considering that VET providers, as one of the two main target groups of this delivery, can use it as a (solid) basis for building up the desired new qualification.

Furthermore, the proposed curriculum is useful for employers, employees and all people willing to enter the labour market with the new qualification of DTM. The curriculum describes the role of a DTM with relevant information and gives a better view and understanding of the knowledge, skills and competences a DTM should gain to respond accurately to the labour market needs.

A revision of the new joint curriculum will take place after the implementation of the pilot course, taking into consideration the participants' feedbacks and comments, where the partners consider that the suggested changes improve the quality of this delivery.

2.3   Definition of the new Joint Curriculum content

In this WP, we agreed on the definition of the Learning Units and their content, based upon the outcomes of the results of the WP2 'Fine tune of the skills and knowledge needs of the sector'.

The layout of all the units will shape the specific training path for the DTM professional profile.

Taking into consideration the European Qualification Framework we consider that this new joint curriculum will refer to level 5, considering that it will require at least:

- Comprehensive, specialized, factual and theoretical knowledge
- A comprehensive range of cognitive and practical skills
- Competences to exercise management and supervision in contexts of work or study activities where there is unpredictable change.

3 Definition of the Learning Units and their contents = What?

Learning Units are the 'What?'

Learning outcomes are described in relation to the specific knowledge, skills and competencies, in order to secure that the new joint curriculum properly matches the market and companies' needs. The training pills that will be developed within WP5 will further specify these specific learning outcomes.

Learning units and their contents.

Each Learning Unit of the curriculum is delivered in a comprehensive manner and in relation to other parts. This makes that the curriculum represents a coherent and appropriate Learning Path, which represents the ideal sequence of learning activities, that allows participants becoming proficient in the shortest possible time in the topic and properly complete the foreseen tasks by the related occupation.

But this proposed order and sequence is not compulsory. Each participants will be able to make in a flexible way his/her own learning path, based upon his/her own experience and interest area.

To make it a more comprehensive tool, the 11 defined technical skills are divided into four learning units, a first one on emerging technologies, a second one on engineering and digital manufacturing, a third one on digital technologies as virtualization and simulation and a last technical learning unit on data and cybersecurity.

The non-technical skills are organized in 6 learning units, one for each defined non-technical skills' set: innovation, leadership, communication, people, quality, risk and safety issues in a digital environment and a final unit on the social and environmental impact of digitization.

3.1   Learning Unit 1: Digital technology - exploration of contemporary emerging and potential disruptive technologies

- Internet of Things (IoT)
- Industrial Internet of Things (IIoT), framework for product development
- Cloud computing, enabler of Industry 4.0

(7)

3.2   Learning Unit 2: Digital technology – engineering and manufacturing

- Horizontal and vertical system integration
    - o Industry 4.0, concept and terminology (ERP, ORP…)
    - o Parametric design softwares for furniture industry 4.0
    - o From product design to production
- Additive manufacturing
- Autonomous robots

(19)

3.3   Learning Unit 3: Digital technology – simulation and AR/VR

- Simulation, digital twins, machining and virtual prototyping
- Virtual/Augmented reality: in design and in relation to AI

(10)

3.4   Learning Unit 4: Digital technology – data & security

- Data management and data-driven analytics
- Information Security Management & Cybersecurity (including blockchain)

(11)

3.5   Learning Unit 5: Innovation and digital transformation

- Disruption and (digital business) models and frameworks
- Innovation, creativity and ideas generation
- Business and IT strategy & alignment

(10)

3.6 Learning Unit 6: Leadership in digital transformation[1]

- Organizational structures and leadership
  - Digital maturity models in the furniture industry
- Change management - strategy and culture
  - Digital accelerators for digital adoption
- Process management, governance and management of digital assets
  - Self-assessment, evaluation maturity tools and case studies

(13)

3.7 Learning Unit 7: Communication in digital transformation

- Engagement, transparency and accelerators adoption
- Partnerships
- Digital marketing

(10)

3.8 Learning Unit 8: The people within the digital transformation[2]

- Working in team: HR-practices in a digital environment
- Culture and mindset in a digital company

(6)

3.9 Learning Unit 9: Quality, risk and safety in digital transformation

- Quality: automation and standardization
- Implementing a digital strategy with regards to Risk and Safety
  - From an analog safety management system to a digital system
  - Risk management in the digital area

(8)

3.10 Learning Unit 10: Social and environmental impact of digitization[3]

- The Good, the Bad and the Ugly in a digital transformation process
- Digital tools in times of emergency
- Connecting sustainability with digitalization

(6)

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[1] Skilss set related to Leadership, but also to Entrepreneurial skills and management
[2] Skills set related to Emotional intelligence
[3] Skills set related to Ethics

4 Effective Teaching methodology and instruments = How?

The training methodology must be very intuitive and user friendly. The basic idea is that innovative and effective training methods will be used such as online video materials, webinars, serious games, on-line educational games, etc…

Each learning pill will be developed using the most suited training method for that specific item and the learning outcomes that are aimed at in that specific learning pill. The preferential methodology can be (in function of the specific content/theme and aims of the training pill):

- Video material with interviews, statements, explanations from experts…
- Animated video or animated graphics, infographics
- Slides and learning objects
- Case studies
- Text, written explanation
- Recommended reading of articles, books, blogs…
- Exercises and/or self-evaluation

For the participants from VET and HE work based learning should be integrated and followed up by the means of online workshops and discussion sessions among participating students and PPs professionals and trainers.

The Pilot training course will include **a final work**, to be delivered by the participants, which should cover a wide range of the units' content (choice out of 10) and to be linked to the practical work the participants are required to do within their company or other organization. Partners will provide students with clear information and guidelines about the format, content, aims and length of the practical work delivery. The final work will be produced in English by learners that will be supported during the process by a Technical Team, composed by different staff members among partners, based on their specific and complementary expertise. This same team will evaluate the works produced.

5   Participants = Who?

Definition of the target audience

The target audience is defined in two categories, with each two "levels". For each of these, we have defined a specific training path.

The training course is intended to be exploited by current and future employees within the furniture sector (managers and workers) and by current and future students, both VET- and higher education (HE) students in the domains of woodworking and furniture, ICT/digitization and/or innovation/product development.

These different groups might have a different level of interest for the different parts of the course, depending on their specific needs (for example as employees) and on their specific approach (for example as students).

The differentiation is relevant for our target groups, as it will support them to focus their attention and efforts on those parts of the course, that are the most relevant for their specific starting situation and their future work.

5.1   Professional workers

The complete program is designed for professionals from furniture companies, involved in business and IT-strategy setting, with the objective to create value out of a digital transformation of their businesses.

We think of CEO's, CIO's, IT-managers & directors, production managers, innovation managers, portfolio-, program- and project-managers, digital marketeers…

For this category, we've defined a complete training path, that includes all of the course pills. Here we are targeting companies' managers. Successful completion leads to a full DITRAMA DTM certification (situated at EQF level 5).

Within the category of working professionals, we also aim to the professionals on the work floor, who can benefit from the training courses.

For these professionals (on the work floor), we've defined a reduced training path, which consists of a specific selection of pills. Completion of this (reduced) training path leads to a partial DITRAMA DTM certification (situated at EQF level 4).

5.2 Future workers

In the case of students, we made a differentiation between HE- and VET-students.

For HE-learners, we recommend the complete course training path, that leads to the full DITRAMA DTM certification (EQF 5).

For VET-learners, we defined a reduced training path, leading to a partial DITRAMA DTM certification (EQF 4).

In the Annexed table with the complete list of pills, we have identified which pills are relevant for each of the different target groups (differentiated training paths):

1) managers of furniture companies,
2) workers of furniture companies,
3) HE-students in woodworking and furniture and/or digitization or innovation,
4) VET-students in woodworking and furniture and/or digitization.

Practically, two training paths are defined: one for the target groups 1 and 3 (EQF level 5), and one for target groups 2 and 4 (EQF level 4).

6 Course declaration and Badges

Based on active participation in the course and after successful completion of the module assignments, each participant will receive an official declaration of 'Digital Transformation Manager: Digital technology – Engineering and Manufacturing'[4] of Erasmus+ DTM consortium'. It will be mutually recognized by the partners signatories of the DITRAMA Memorandum of Understanding, in spite of not being a certification officially recognized at national level.

For students that will successfully pass all the assessments for all the pills and modules (the path foreseen for HE learners and companies' managers in Annex 1) will get a title corresponding to EQF 5. While those students that will successfully pass all the assessments foreseen by the path for VET students and companies' workers (as specified in Annex 1) will get a title corresponding to EQF 4.

This declaration will be automatically provided by the DITRAMA learning platform to those learners that successfully passed all the integrated tests of the course learning pills.

The same learning platform will provide specific badges to those learners that successfully passed the tests of specific modules. These badges will also be mutually recognized by the partners signatories of the DITRAMA Memorandum of Understanding.

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[4] Or any other title of Learning Unit

7 Validation of the new curriculum and training methodology

*The new joint Curriculum will be validated through **the organization of national workshops***

They will analyze, revise and validate the proposed new joint curriculum and the proposed training methodology.

7.1 National workshops

National focus groups with job holders and firms

For this validation, we suggested to have national workshops and focus groups in all the countries involved. Therefore, WP3 leader WOODWIZE would provide a script to be used during this activity, in order to have consistent focus groups in all the countries. The focus groups could have been done in small groups (ca. 12 persons from different firms). The selection was suggested to be done at national level.

7.2 Adaptation due to Corona-pandemic crisis - COVID-19

The validation has be done through an online questionnaire, where the relevant actors and stakeholders (focus-group and/or experts' group) was be asked to answer online the questionnaire.

The members of **the sector-specific expertise group or focus group** were defined at national level, but should involve full and associated partners and sectorial representatives of formal and non-formal VET-providers, companies' associations, trade unions, VET regulatory bodies or labour officers, etc… They were invited with a personalized e-mail to join the online questionnaire (link).

No successful results without participants. The choice of the relevant stakeholders and actors is very important. For the project partners, we advised to personally contact these experts to achieve the desired participation. Be aware that they need some (minimal) time to carefully read the proposed questions. They will have to formulate their conclusions and suggest maybe some recommendations to improve the curriculum.

The number of participants was defined at minimum 12 per organizing country, with around 70% of the participants from enterprises and firms. It can be interesting to bring together people with different functions (HR, production, general managers ...). The heterogeneous composition of the group of participants must allow valuable insights from different perspectives (sub-sectors, company size, etc.). When selecting companies, you should consider a number of criteria

that can increase the representativeness of the sample. Examples of selection criteria are:

- the nature of the activities (subsector)
- the region
- the size of the company (number of employees)
- the degree of innovation
- …

In addition to these participants, other experts from sector federations, trade unions, sectoral (training) funds, educational institutions, research institutes and so on should be invited to participate. Some possible actors, who could participate in the focus groups or experts' groups are:

- VET institutions with sector-relevant specialization (dual learning, school based learning, adult education, private training institutes)
- Sectoral training funds, where available
- Research institutions
- Labour market partners such as trade unions, employers organisations, umbrella organizations…
- Public employment services
- Regulatory bodies i.c. qualifications
- …

Our suggestion is to have a minimum of 12 participants per country (8 from sector companies) and 4 other experts

Throughout the validation period, these members of the focus group could consult and adapt their answers to our questionnaire until the defined deadline or until final submission of their answers and suggestions.

Finally, we integrated some extra questions on the proposed training offer and the further action plan of the DTM-project.

This way, we expected to gather useful contributions on the developed content of the new joint curriculum for the Digital Transformation Manager.

7.2.1 Questionnaire

The questionnaire was structured in such a way that a relatively large number of people received all relevant information in a relatively short time, without going through all project reports.

First and foremost, we wanted to summarize the most important and relevant developments and trends for the furniture sector, related to the digitization in the furniture sector. Therefore, we used the results of WP2 and the report of the Digit-Fur project. A link to these reports was provided. After this short introduction, the

participants had a global idea of the current and future competence needs for the Digital Transformation Manager in the furniture sector.

Then the real questionnaire was set up: https://woodwize.typeform.com/to/ybrsiq

7.2.2 Timing

The online questionnaire was available from June 25th 2020 till July 8th 2020.

7.2.3 Participants

234 participants opened and started the questionnaire.

91 participants submitted their answers to the questionnaire. The average duration for filling in the questionnaire was 20 minutes.

Per country (89 answered this question)

- Italy : 12
- Spain : 12
- Denmark : 1
- Romania : 30
- Belgium : 13
- Poland : 1
- Czech Republic : 0
- Portugal : 11
- Other : 9 (FRA, USA, UK, SWE, The Netherlands)

Per professional expertise (88 answered this question)

- Furniture manufacturer (employer) : 21
- VET or HE professional : 20
- Industry 4.0 technology expert : 12
- Employee in furniture sector or member of relevant trade union : 11
- Full or Associated Project Partner : 9 10%
- Member of a (national) VET Regulatory body : 3
- Other : 12

7.2.4 Reporting and results

As the validation was done by an online questionnaire, the results obtained were automatically summarized. A summary of this results is included in the annexes of this report.

The main objectives were to have a **validation** of the new joint **curriculum for the Digital Transformation Manager**.

The proposed joint curriculum has been validated by 91 experts, through an online survey.

Final conclusion:

The new joint Curriculum is validated.

8 Preparation of the report on ESCO Occupations affected by the sector digital transformation

Based on D2.2 workshop working document, the outcomes and results of the D2.3 Workshop and the related report D2.4, P3 WOODWIZE will prepare a Report on ESCO Occupations affected by the sector digital transformation.

P3 will be supported in this task by the other VET providers and Higher Education Institutes.

This document will focus about those ESCO occupations of the furniture sector that will require an update of the knowledge and skills needs, in relation to the new tasks required by the companies digital transformation.

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PROJECT CONSORTIUM

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