User manual

e-learning instrument, glossary of terms and e-learning platform – version 4
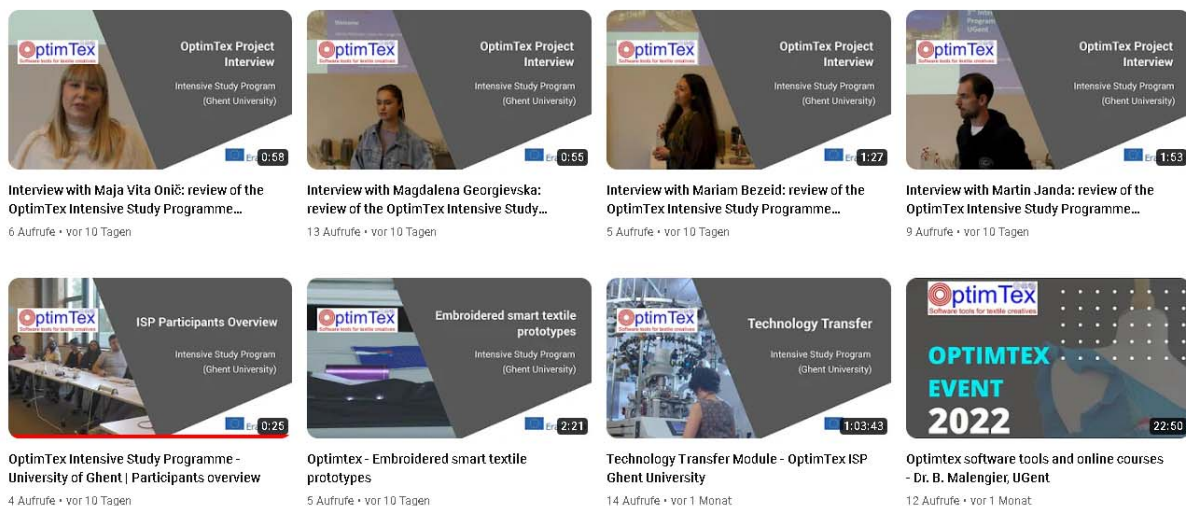
http://optimtex.eu/

http://www.advan2tex.eu/portal/

Interview with Maja Vita Onič: review of the OptimTex Intensive Study Programme…
6 Aufrufe • vor 10 Tagen

Interview with Magdalena Georgievska: review of the OptimTex Intensive Study…
13 Aufrufe • vor 10 Tagen

Interview with Mariam Bezeid: review of the OptimTex Intensive Study Programme…
5 Aufrufe • vor 10 Tagen

Interview with Martin Janda: review of the OptimTex Intensive Study Programme…
9 Aufrufe • vor 10 Tagen

OptimTex Intensive Study Programme - University of Ghent | Participants overview
4 Aufrufe • vor 10 Tagen

Optimtex - Embroidered smart textile prototypes
5 Aufrufe • vor 10 Tagen

Technology Transfer Module - OptimTex ISP Ghent University
14 Aufrufe • vor 1 Monat

Optimtex software tools and online courses - Dr. B. Malengier, UGent
12 Aufrufe • vor 1 Monat

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A. Introduction

This user manual describes the access and work modality with the e-learning instruments and the Open Educational Resources of the Erasmus+ OptimTex project: "Software tools for textile creatives" (No. 2020-1-RO01-KA203-079823). The envisaged target groups of the project are Higher Education students and young professionals in textiles. The project aim is to prepare and present software for the design and modelling of textiles. Knowledge in this field is presumed to offer a competitive advantage for textile creatives within the world-of-work, which is characterized nowadays by digitization and Industry 4.0.
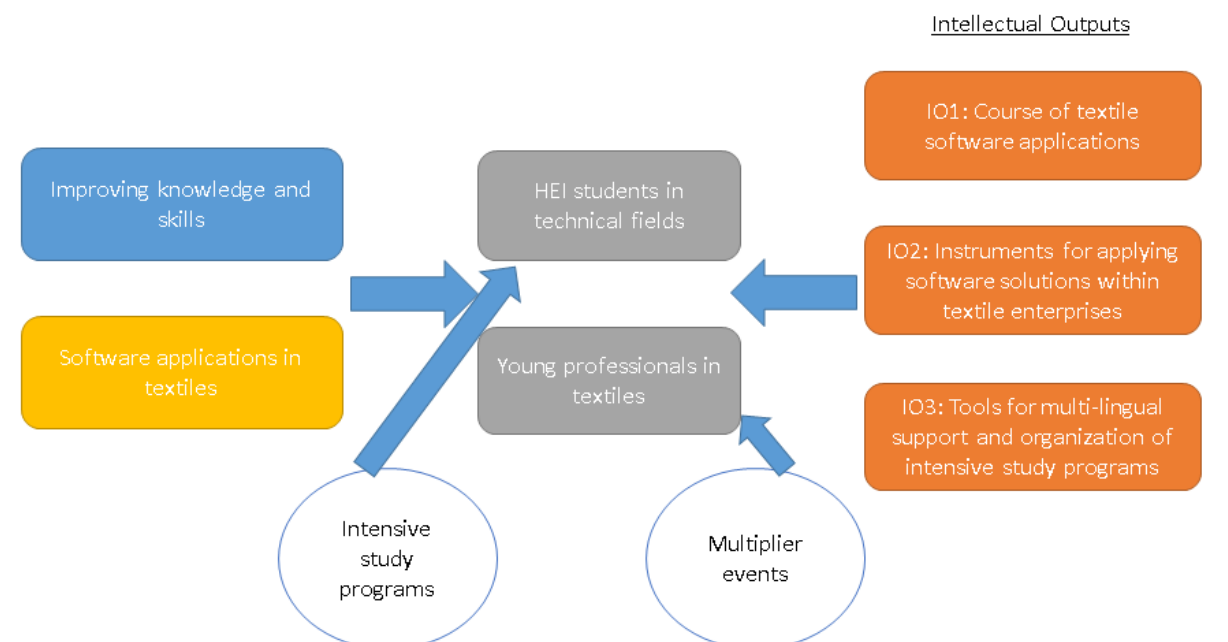

Fig. 1 – Educational approach of OptimTex

OptimTex tackles some innovative aspects within its three Intellectual Outputs:

- it promotes digital skills in correlation with Industry 4.0 and the strategic research agenda for textiles;

- it presents the design, modelling and manufacturing process of modern textile products: composites, e-textiles, smart textiles;

- it provides educational modules from practice to theory within a Problem-Based-Learning concept.

The six educational modules of the project tackle one main technological field in textiles:
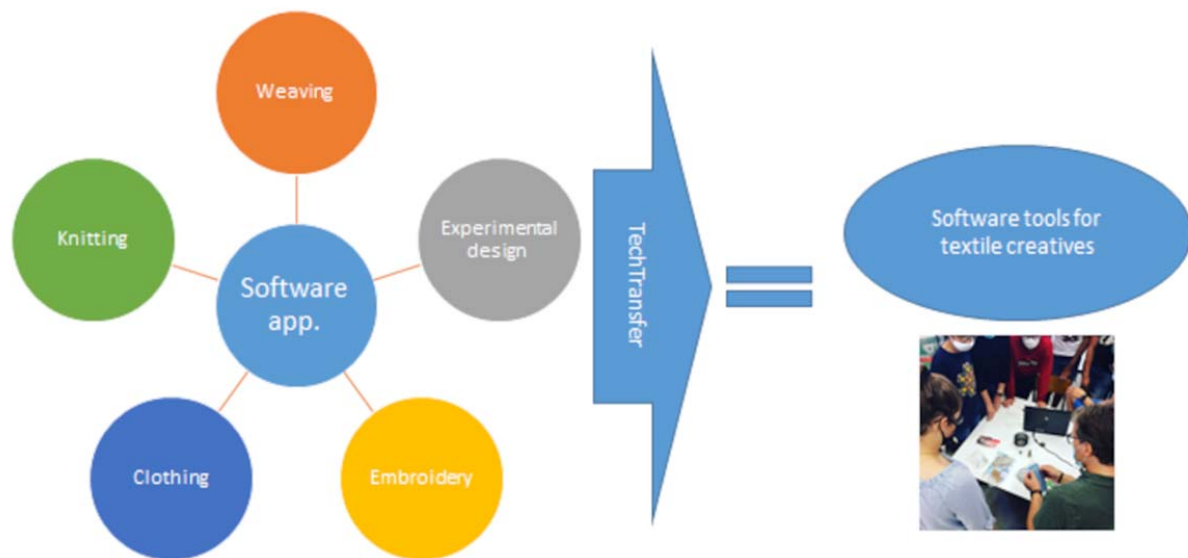

Fig. 2 – The six modules of OptimTex

Each of the six modules was prepared by one of the project's partners (Table 1):

Table 1 – Educational module and responsible partner

Educational module	Project partner
Design and modelling of woven structures	Ghent University
Design and modelling of knitted structures	Technical University Iasi
Design and modelling of garments by 3D scanning software and CAD/PDS software	University of Maribor
Design and modelling of embroidered structures	University West Bohemia
Design of experiments	INCDTP – Bucharest
Guide regarding technology transfer of textile software solutions into the industry	TecMinho / UMinho

All modules were conceived in a Problem-Based-Learning approach, starting with 4-5 examples of the textile practice, explained by the corresponding theory, the related software applications and some multiple choice self-assessment quizzes.
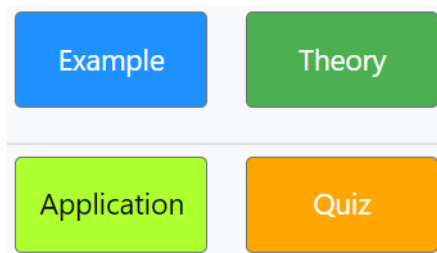
Fig. 3 – The four pillars structure of the educational modules

The following examples from textile practice in the design and modelling of textiles were covered (Table 2):

Table 2 – The examples tackled by each educational module

Design and Modeling of woven structures	Design and Modeling of knitted structures	Design and modelling of garments by 3D scanning software and CAD/PDS software
Case 1: Standard woven structures and Texgen Case 2: Complex yarns in woven structures Case 3: 3D Woven Structures Case 4: Simulation of Woven Structures with Abaqus Case 5: Complex weaving patterns and coloring	Case 1: Knitted fabrics with normal loops Case 2: Knitted fabrics with modified loops Case 3: Spacer weft knitted fabrics Case 4: 3D shaped knitted fabrics	Case 1: 3D human body scanning using the 3D photogrammetry Case 2: 3D human body modelling and reconstruction Case 3: Construction of a kinematic 3D body model Case 4: 3D virtual prototyping of personalized smart garments

Design and Modeling of embroidered structures	Design of experiments	Guide regarding technology transfer of textile software solutions into the industry
Case 1: Technical computerized embroidery Case 2: Design and digitizing of technical embroidery Case 3: Textile Based Heating Element Case 4: Illuminated fabrics Case 5: Textile based water leak sensor on fabric	Case 1: Factorial plans for plasma treatment of hydrophobic fabrics Case 2: Central composite design for optimizing plasma coated electric conductive fabrics Case 3: Factorial design of RF plasma experiments to obtain hydrophilic textile Case 4: Central composite design and bivariate analysis of process variables Case 5: Draping Simulation using Tensor Flow Case 6: FEM Analysis using Python	Case 1: WeaveEXVBA - Academic software development for weaving Case 2: Spin-off UMinho TO-BE-GREEN - Screening and Business plan Case 3: IOTech a driver to Industry 4.0 - Business development Case 4: Protechdry® - Reusable underwear for urinary incontinence SWOT analysis

The e-learning resources developed within OptimTex, follow the same four pillars structure of the educational modules.

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B. The e-learning instrument

The e-learning instrument is available with free access on the Project website www.optimtex.eu TAB Instrument and includes all six modules with 28 cases in a related visual format. The e-learning instrument was programmed in HTML5 / Javascript and has interactive buttons to browse the educational content in English, based on the four-pillar structure.

- Design and modelling of woven structures
- Design and modelling of knitted structures
- Design and modelling of garments by 3D scanning software and CAD/PDS software
- Design and modeling of embroidered structures
- Software for research experimental design
- Guide regarding technology transfer of textile software solutions into the industry

Each module is conceived in a Problem-Based-Learning approach and is structured with several practical examples, the corresponding theory, software for design and quiz for self-assessment. The e-learning instrument is meant to share quick access on the structured educational content of the Erasmus+ project.

| Module | Design and modelling of woven structures |
| Lesson | 1 |

Next | Previous

| Category | 1 |

Example | Theory

Application | Quiz

Example

Woven structures are all around you. A tablecloth, bedsheets, your jeans, they are all created from woven fabric. In this case we will learn you how you can create a digital representation of one, and how this representation contains the information needed to produce the woven structure on a weaving machine.

We will use the TexGen software. TexGen is open source software licensed under the General Public License developed at the University of Nottingham for modelling the geometry of textile structures. TexGen has been used by the Nottingham team (http://texgen.sourceforge.net/index.php/Main_Page) as the basis of models for a variety of properties, including textile mechanics, permeability and composite mechanical behaviour [1][2]. Install it for windows with the instruction on the webpage.
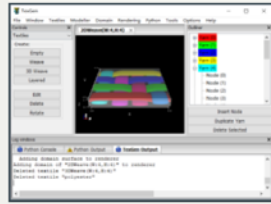
Fig. Graphical user interface of TexGen.

Fig. 4 – Print screen of the e-learning instrument

The multiple-choice self-assessment quizzes were programmed in HotPotatoes free software.

C. The glossary of terms

The multi-lingual glossary of terms was designed to support the translation of key terms and definitions of the English lectures in the national language during the three Intensive Study Programs (ISP) with HEI students. The three ISPs were hosted by the partners: Technical University Iasi, University of Maribor and Ghent University, with a special focus and practical part on the module of the host university. Four students from each of the above universities plus four students of

University West Bohemia participated with mobility funds at the three ISPs, having as main objective learning from the expertise of the host university. However, all lectures were taught in English language by lecturers from the six partners and thus, a translation of key technical terms in national language was needed. The glossary of terms is available with free access on the project website TAB Glossary and includes 20 key terms and definitions per module (120 terms and definitions) in all 6 languages of the partnership (EN, CZ, NL, PT, RO, SI).

Fig. 5 – Print screen of the Glossary of terms

The Glossary was programmed in PHP / MySQL. Some definitions include pictures stored in the data base (Fig. 6).
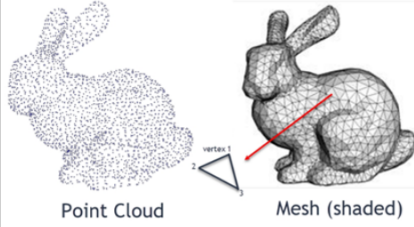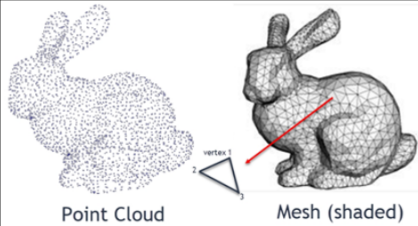

Fig. 6 – Definition with picture

OptimTex multilingual glossary of terms

This Glossary is meant to offer the students support for learning key textile terms of the 6 educational modules in all the languages of the project.

LANGUAGE	TERM	Triangulatie
	DEFINITION	Procesul de construire a retelei triunghiulare 3D din norul de puncte.
EN CZ NL PT RO SI	PICTURE (optional)	Point Cloud Mesh (shaded)
Back		

Fig. 7 – Definition in the national language (Romanian)

The key term and definition is displayed in the particular language by clicking on the corresponding language in the left panel.

D. The e-learning platform

1. Overview

The OptimTex e-learning platform (www.advan2tex.eu/portal/) was first configured within the Erasmus+ project Advan2Tex 2014-1-RO01-KA202-2909. It currently includes the Open Educational Resources (OER) of four Erasmus+ strategic partnership VET + HEI projects (Table 3).

Table 3 – The four Erasmus+ VET projects with OERs

Acronym / Logo	Advan2Tex E-learning course for innovative textile fields	TEX MATRIX of knowledge for innovation and competitiveness in textile enterprises	Skills4Smartex	OptimTex Software tools for textile creatives
Title	E-learning course for innovative textile fields	Matrix of knowledge and competitiveness in textile enterprises	Smart textiles for STEM training	Software tools for textile creatives
Idea	VET of young professionals by advanced modules in textiles.	Support of innovation within textile enterprises by new R&D solutions	Supporting learning of basic disciplines by smart textile prototypes for practical VET.	Support HEI students and young professionals in textiles by software for design and modelling
Duration	2014-2016	2016-2018	2018-2020	2020-2022

The e-learning platform is a Moodle e-learning platform.

Moodle (www.moodle.org) is an open-source e-learning platform under a GNU license. The description of the OptimTex project e-learning platform is based on the Moodle working modality. Please find general aspects regarding this working modality on the Moodle website: https://docs.moodle.org/30/en/Main_page. For this reason, this user manual only indicates schematically the procedure of working with the www.advan2tex.eu/portal/ e-learning platform.

2. Structure

The e-learning platform is multilingual: it has a menu for switching between the languages of the project (Figure 8):

Fig. 8 – Print screen of the multilingual menu

The OptimTex e-learning course is conceived in six national languages – Czech, Dutch, Portuguese, Romanian, Slovenian and English. The e-learning course is structured in Topics format: each case is one topic. For each of the six modules of textile technology, the course includes:

I. The Book resources with the content of the example, theory and application

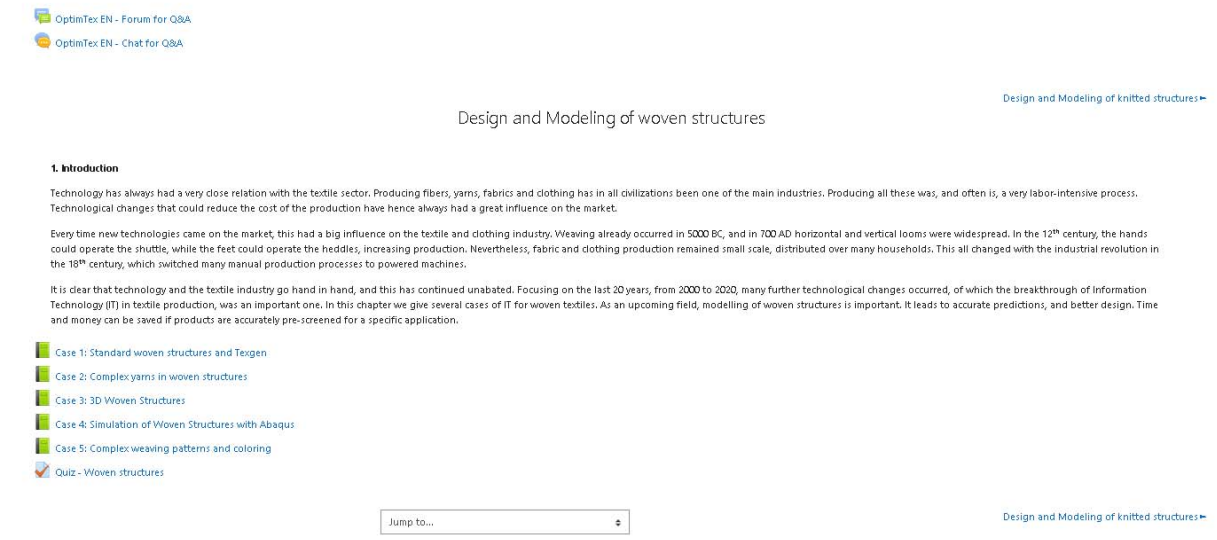II. A Quiz activity for self-assessment and final multiple-choice tests (Fig. 9)

Fig. 9 – Print screen of the weaving module with Books and Quiz

Communication between tutors and trainees is performed via synchronous (Chat) and asynchronous (Forum) methods (Fig. 9).

3. Access to the course

The procedure to login on the OptimTex e-learning platform:

- Access the URL address www.advan2tex/portal/
- Log in with the username and password provided by the national coordinator
- You will have the possibility to select the national course you are enrolled in, on the left block of the platform page

You can navigate through the e-learning course as follows:

- Books with the content of the module:
  o You can navigate back and forward with the arrows
  o You can jump at a certain chapter/ subchapter of the modules by clicking on the table of contents on the right side of the platform's page

- Quizzes with multiple choice questions:
  - o You can enter a quiz several times for self-training, after you have red and learned the module's content
- Forum and chat:
  - o You can enter the forum to put questions to your lecturer, or
  - o You can enter the chat room to chat with other colleagues on the course's topics

E. Contact

For assigning to an e-learning course or regarding any question on the working modality of the e-learning platform, please contact the OptimTex national coordinator. The OptimTex project's partners have the following contact details:

INCDTP	CO: INCDTP – The National R&D Institute for Textiles and leather – Bucharest, Romania Alexandra Gabriela Ene: office@incdtp.ro ; Ion Razvan Radulescu: razvan.radulescu@incdtp.ro
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