

# Transfer of INNOVATRAN project



## INNOVATRAN TRANSFER methodology



INNOVATRAN TRANSFER

*Transfer of INNOVATRAN project*

*Leonardo da Vinci Programme*

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Lifelong  
Learning  
Programme

## **Project Information**

Project name: Transfer of INNOVATRAN project

Acronym: INNOVATRAN TRANSFER

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Coordinator: Industrial Research Institute for Automation and Measurements  
PIAP, Poland

Partners:

ATB – Institut Für Angewandte Systemtechnik Bremen, Germany

ASTRA - Association for Innovation and Development, Slovakia

CARSA - Consultores de Automatizacion y Robotica, S.A., Spain

## Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Content adaptation methodology .....</b>                             | <b>4</b>  |
| <b>2</b> | <b>Guidelines for course content preparation.....</b>                   | <b>7</b>  |
| 2.1      | General and specific objectives .....                                   | 7         |
| 2.2      | The overall process .....   | 7         |
| 2.3      | Identification of the Target Audience.....                              | 8         |
| 2.4      | Identification of the Key Learning Objectives .....                     | 8         |
| 2.5      | Designing the Courseware.....   | 8         |
| 2.6      | <b>INNOVATRAN TRANSFER ICT system utilisation guidelines.....</b>       | <b>8</b>  |
| 2.6.1    | Guidelines for implementing/updating training courses on eLearning tool | 9         |
| 2.6.1.1  | Access to and handling of the eLearning tool.....                       | 9         |
| 2.6.1.2  | Editing Content in the eLearning tool.....                              | 14        |
| 2.6.1.3  | Course structure .....  | 15        |
| 2.7      | <b>Creation of multimedia content .....</b>                             | <b>16</b> |
| 2.8      | <b>Definition of learning objects.....</b>                              | <b>17</b> |
| 2.9      | <b>Testing and Feedback .....</b>                                       | <b>18</b> |
| 2.10     | <b>Introduction to the lesson .....</b>                                 | <b>19</b> |
| 2.11     | <b>Questions .....</b>  | <b>19</b> |
| 2.12     | <b>Glossary .....</b>   | <b>20</b> |
| 2.13     | <b>Conclusion .....</b>   | <b>20</b> |
| <b>3</b> | <b>Guidelines for organisation of training .....</b>                    | <b>21</b> |
| 3.1      | Objective of the training .....   | 21        |
| 3.2      | Defining the training sessions/ scenarios and approach.....             | 21        |
| 3.3      | Examples .....  | 23        |
| 3.4      | Examination .....   | 23        |
| <b>4</b> | <b>Guidelines for execution of training.....</b>                        | <b>24</b> |
| 4.1      | <b>Training Methodology – Introductory Classroom Training.....</b>      | <b>24</b> |
| 4.1.1    | Lecture concerning eLearning .....                                      | 24        |
| 4.1.2    | Training concerning interface and using of the eLearning Software ..... | 26        |
| 4.2      | <b>Guidelines for collaborative learning.....</b>                       | <b>26</b> |
| 4.3      | <b>Guidelines on how to support learners .....</b>                      | <b>27</b> |
| <b>5</b> | <b>Conclusion .....</b>   | <b>29</b> |

# 1 Content adaptation methodology

Two main parts comprises to the INNOVATRIN TRANSFER solution. Both are equally important and the concept of both will be detailed described in following chapters. These are INNOVATRIN TRANSFER system and methodology. Both parts will be evaluated on a basis of existing innovative solutions. Content of AIM and INNOVATRIN project results will be adapted and transferred to INNOVATRIN TRANSFER solution. The transfer methodology will be evaluated to successfully complete this complex task, resulting in developing new innovative solution.

The INNOVATRIN TRANSFER system development process is presented below:

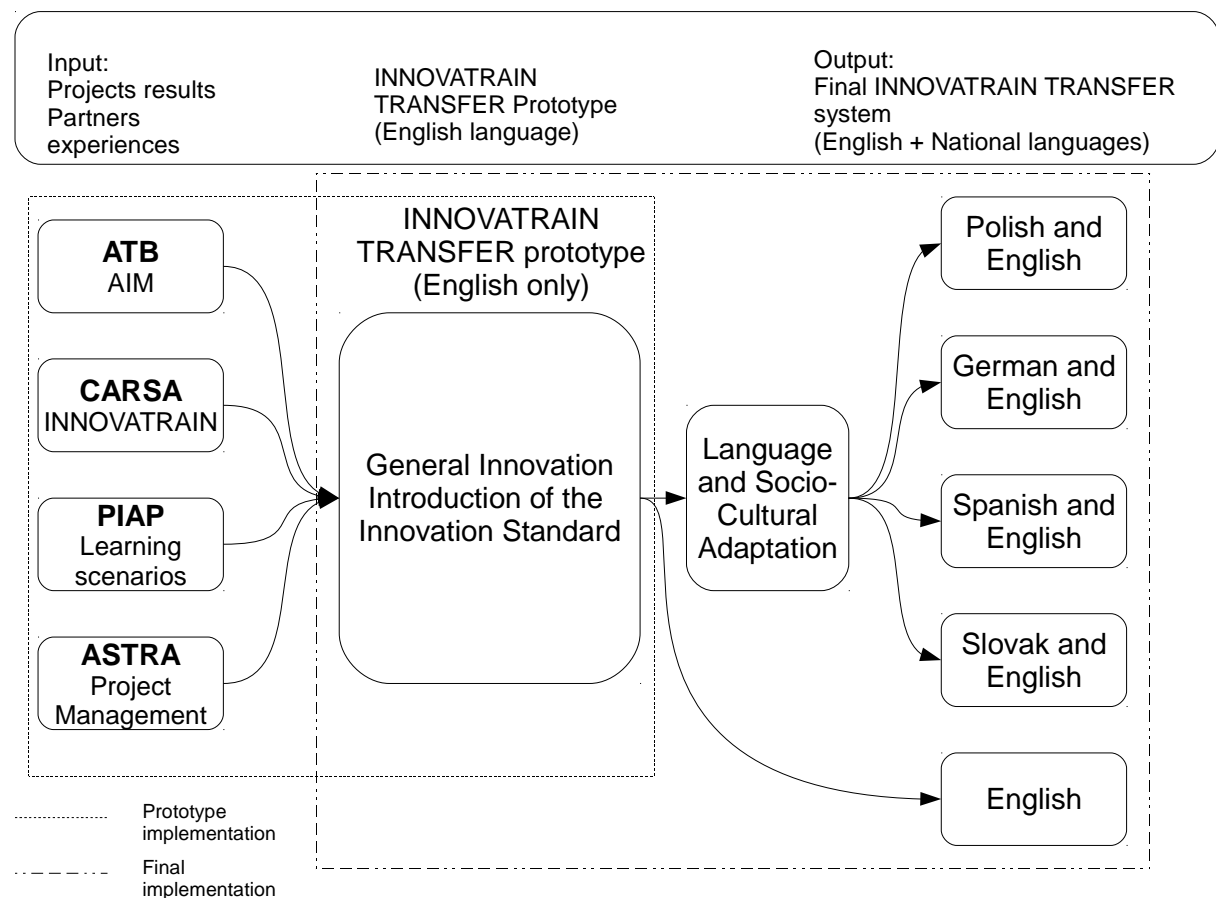


Figure 1 INNOVATRIN TRANSFER content adaptation and implementation

All partners brought to the project knowledge and experiences on a basis of which the INNOVATRIN TRANSFER course content was designed and built. The INNOVATRIN TRANSFER course content was be originally developed in English and together with methodology comprise on full system. After completion and internal assessment the course content and methodology were translated to all partner languages with regard to socio-cultural aspects and the national versions will be further localized by project partners during the project follow-up phase. The developed system was tested and assessed with the representatives of all target groups in all project partners countries by project partners. To assure coherent, comparable testing results the testing procedure for all partner countries was developed and used by all partners. Analysis results of performed tests will be used in during the commercialization phase when partners will be preparing the final product to be used

during the regular training. System and content adaptation methodology is presented on Figure below:

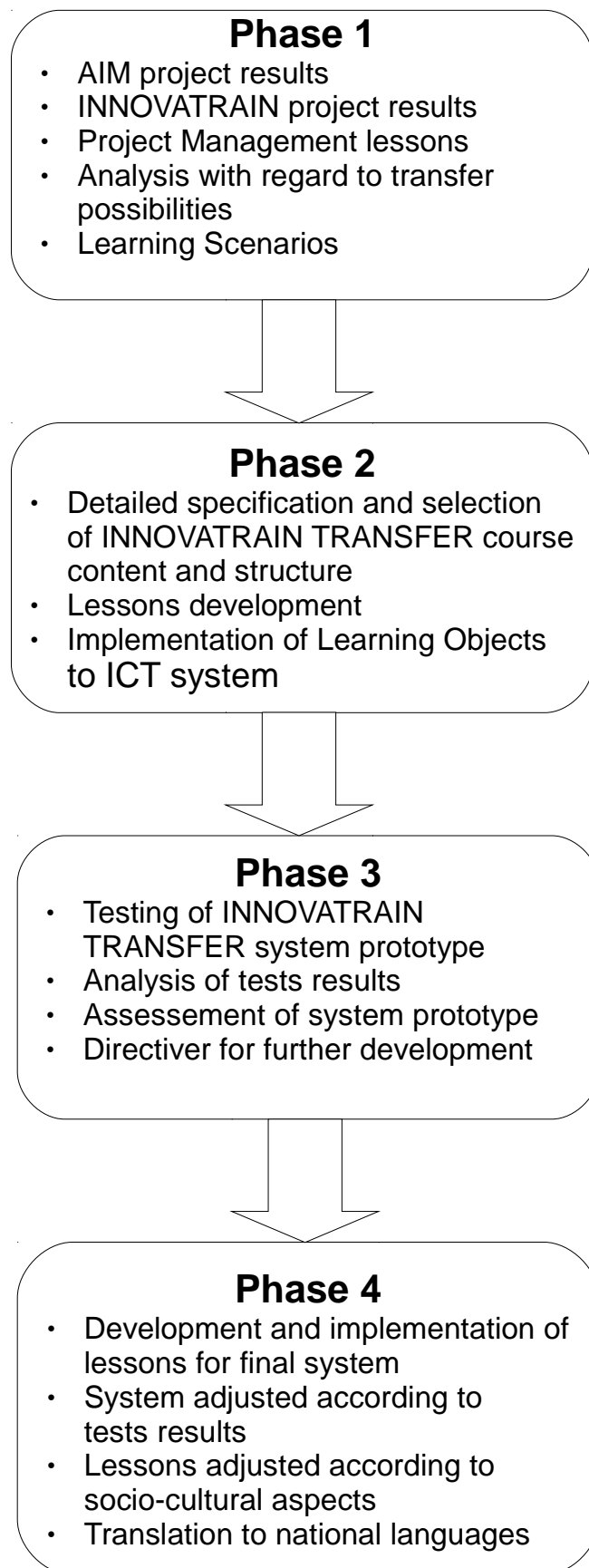


Figure 2 INNOVATRIN TRANSFER adaptation methodology

The methodology developed for the project adaptation comprises four phases:

- Phase 1. Inputs for further works are the results of the previous projects and Partners experiences. Analysis of both AIM and INNOVATRIN TRANSFER projects was done with regard to main INNOVATRIN TRANSFER topics. Gathered materials regarding Innovation and Introduction of the Innovation Standard were analysed.
- Phase 2. Selection of INNOVATRIN TRANSFER course content with regard to the identified target groups' requirements was done to answer optimally to those requirements.
- Phase 3. Testing of INNOVATRIN TRANSFER prototype (course structure and ICT solution) with regards to the target groups requirements helped to achieve right direction for further course development.
- Phase 4. After satisfactory results of elaborated preliminary tests, using information related to each participant's country specifics, adaptation and transfer of the selected materials were done. National versions of Final INNOVATRIN TRANSFER System, including English, were developed.

After the phase 2 the prototype of the INNOVATRIN TRANSFER course was set up and during the phase 4 final version of the INNOVATRIN TRANSFER solution was created.

## 2 Guidelines for course content preparation

### 2.1 General and specific objectives

Innovation is the process of translating an idea or invention into a good or service that creates value or for which customers will pay. To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need. Innovation is synonymous with risk-taking and organizations that create revolutionary products or technologies take on the greatest risk because they create new markets.

Innovation Management Systems are multifaceted and versatile techniques aiming at facilitating the innovation processes within open organizations. Innovation projects are related to the work done in order to achieve a number of objectives, within the restriction of a specific time limit and a given cost. Innovation projects are a critical factor for the success of any organization. The fundamental objective of this course is increasing the number of companies making successful use of those two concepts/methods/techniques, Innovation Management Systems and Project Management. In order to achieve such an objective, the course is providing professional people in the area of project management with a global and systematized approach to both concepts. The course will qualify professionals for implementing an Innovation Management System within their own organizations, covering all process from the concept phase to the analysis of the impact. Specifically, this course is aiming at providing the necessary know-how and competences for implementing a robust and complete Innovation Management System.

### 2.2 The overall process

The overall process of course preparation is comprised of several stages. The first step is to identify the target audience. The key target audiences are already identified and this will be detailed in the next section. The second important step is to identify the key learning objectives. These two elements are the basis for the courseware composition from the available/predefined content. In the courseware design phase the developer must orientate to an appropriate selection of the content from the previous projects/courses and its adaptation to suit the needs of the learners. The selected courseware is to be implemented on the web based learning tool in an optimal form to be presented to the user. Feedback is taken from the user and is used to refine and update the course content and usability. Diagram of the overall course development process is shown below on Fig 3.

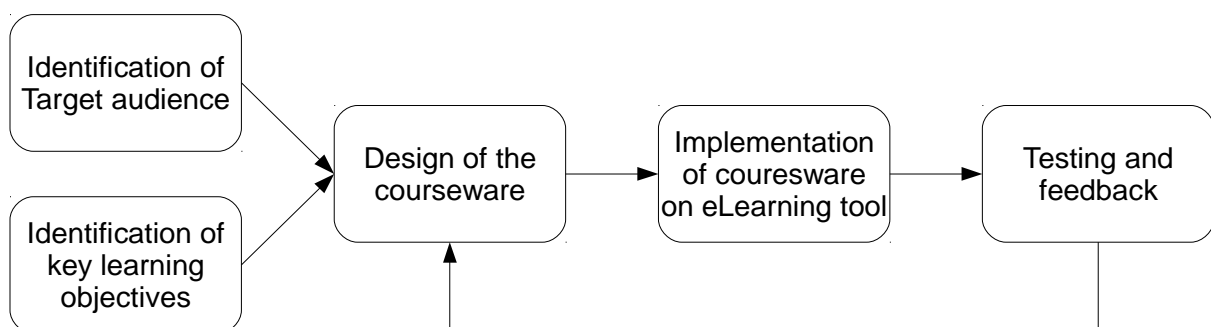


Figure 3 Courseware development process

## **2.3 Identification of the Target Audience**

When developing the lesson from the outset the developer of the course material must identify the target user audience. This will influence the amount (number of lessons) and content/detail of the material to be presented.

In the INNOVATRAN TRANSFER selected target user groups are:

- Manufacturing SME Managers
- Technical staff
- Administrative Staff
- Trainers and consultants (addressed indirectly)

The target key sectors are of course the manufacturing companies, however training/consulting institutions providing courses in the related topics also have to be addressed.

## **2.4 Identification of the Key Learning Objectives**

The key learning objectives need to be identified when designing and developing a course keeping in mind the target user groups and identifying the relevance which the course has to them. In the INNOVATRAN TRANSFER case main learning objectives are to extend knowledge of the SME managers, technical and administrative staff in a specific area of innovation introduction to the company as well as to provide training organisations a comprehensive set of lessons and facilitate organisations of courses from this area.

## **2.5 Designing the Courseware**

The INNOVATRAN TRANSFER courses were planned as pure eLearning solution but this can be applied only for advanced users. Therefore we have to keep in mind during course preparation that it should be also ready to be used as a blended learning solution, with introductory classroom training for students or as supporting materials to traditional courses.

Typical lesson shall include:

- Explanation of the method - textual/graphical
- Test - set of multiple-choice questions, tasks etc.

Additionally a practical example (business case study - optional) shall be prepared allowing the learners to solve their own practical assignments applying learned content/methods.

## **2.6 INNOVATRAN TRANSFER ICT system utilisation guidelines**

The following guidelines summarise the usage of Moodle software package, describing how to establish the working INNOVATRAN TRANSFER system out-of-box and how to make/update web based lessons and courses for training of different target groups.

Moodle is a software package for producing internet-based courses and web sites. It's an on-going development project designed to support a social constructionist framework of education and is provided free as Open Source software (under the GNU Public License). Moodle can run on any computer that can run PHP, and can support many types of database (particularly MySQL).



The development environment installed uses Linux as operating system with an Apache HTTP Server as Web server with PHP support and a MySQL database.

The detailed documentation regarding moodle installation and administration can be downloaded from the Moodle webpage [www.moodle.org](http://www.moodle.org).

## 2.6.1 Guidelines for implementing/updating training courses on eLearning tool

### 2.6.1.1 Access to and handling of the eLearning tool

The eLearning tool is accessed by opening the projects webpage in a web browser. The address of the INNOVATRIN TRANSFER English working version is <http://www.atb-bremen.de/projects/q4sme/moodle/>. The courses in other languages are available at corresponding pages reachable from the English page but also interlinked mutually as it can be seen from ... and ... The English front page is repeated here for the sake of comfort by reading this document.

Figure 4 Log in page

Figure 5 Initial INNOVATRIN TRANSFER course page

All users – students, teachers and administrators - are using the same webpage to access the system.


Depending on the users login different defined administration rights are activated:

- course creator:
  - can create new courses
  - take part in teachers forum
- teacher
  - teachers can perform different actions in a course, including changing the activities and grading students.
- non-editing teacher
  - non-editing teachers can teach in courses and grade students, but may not alter activities.
- student
  - students generally have fewer privileges within a course.
- guest
  - guests have minimal privileges and usually cannot enter text anywhere.

After logging-in, all the courses in which the user is enrolled to are listed and can be opened to show the contents of the course.


If the logged in user has the editing privileges the mode of editing content can be turned on and off by clicking the first function in the block 'Administration'.

Activating the editing mode lets display icons to any editable object in order to initiate the different editing actions.



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# INNOVATRAIN TRANSFER



## Innovatrain Transfer

You are logged in as **Patrick Osterhorn** (Logout)

Home ► Courses ► Courses ► [Add/edit courses](#)

Blocks editing off

**Navigation**

Home

- My home
- Site pages
- My profile
- ▼ **Courses**

**Admin bookmarks**

bookmark this page

**Settings**



- My profile settings
- ▼ Site administration
  - ⚙ Notifications
  - ⚙ Registration
  - ⚙ Advanced features
  - Users
  - ▼ Courses
    - ⚙ **Add/edit courses**
    - ⚙ Course default settings
    - ⚙ Course request
    - Backups
    - Grades
    - Location

### Course categories

| Course categories                                   | Courses | Edit        | Move category to:               |
|---|---------|-------------|---------------------------------|
| Innovatrain Transfer                                | 16      | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Top                             |
| Miscellaneous                                       | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Top                             |
| Case study  | 1       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Top                             |
| Innovatrain Transfer in Deutsch                     | 0       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Top                             |
| Innovatrain Transfer Demonstrator                   | 1       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in Deutsch |
| Innovatrain Transfer für Manager                    | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in Deutsch |
| Innovatrain Transfer für administrative Mitarbeiter | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in Deutsch |
| Innovatrain Transfer für Berater/Trainer            | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in Deutsch |
| Innovatrain Transfer für Techniker                  | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in Deutsch |
| Innovatrain Transfer in English                     | 0       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Top                             |
| Innovatrain Transfer Demonstrator                   | 1       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in English |
| Innovatrain Transfer for Managers                   | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in English |
| Innovatrain Transfer for Administrative Staff       | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in English |
| Innovatrain Transfer for Consultants/Trainers       | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in English |
| Innovatrain Transfer for Technicians                | 2       | ⚙ ✕ ⚙ ⬆ ⬇ ⬆ | Innovatrain Transfer in English |

Figure 6 Editing mode activated

The icon  opens a page to edit properties and contents of the particular resource or activity.

# INNOVATRIN TRANSFER

You are logged in as **Patrik Osterholm** (Logout)

English (en)

## Module 1: Innovation Process - General

Home ▶ Module 1 Innovation Process

Turn editing off

### Navigation

- Home
- My home
- Site pages
- My profile
- Current course
  - Module 1 Innovation Process**
    - Participants
    - Reports
    - General
    - Lesson 1
    - Lesson 2
    - Lesson 3
    - Lesson 4
    - Lesson 5
    - Lesson 6
    - Lesson 7
    - Lesson 8
    - Lesson 9
    - Practical Exercise
    - Lesson 10
    - Lesson 11
    - Lesson 12
    - Lesson 13
    - Glossary

News forum

MS PowerPoint files for Flash

Add a resource...

Add an activity...

Lesson 1

Innovation - General

Add a resource...

Add an activity...

Lesson 2

Phases of Innovation

Add a resource...

Add an activity...

Lesson 3

Methods/Techniques used in the Fuzzy Front End of the innovation process management

### Search forums

Go

Advanced search

### Latest news

Add a new topic...

(No news has been posted yet)

### Upcoming events

There are no upcoming events

Go to calendar...

New event...

### Recent activity

Activity since Wednesday, 15 October 2014, 7:58 AM

Full report of recent activity...

Nothing new since your last login

Figure 7 Screen resource activity

In order to add new resources or activities the resource or activity has to be selected from the ‘Add a resource...’ or ‘Add an activity...’ menus.

Entering a lesson and pressing 'Edit' tab in collapsed view shows the list of all pages of the lesson.

The screenshot shows the INNOVATRIN TRANSFER interface. At the top, there are logos for the Lifelong Learning Programme and INNOVATRIN TRANSFER. The user is logged in as 'Course Teacher (Logout)'. The main heading is 'Module 1: Innovation Process - General'. Below this, there is a breadcrumb trail: 'Home > Module 1 Innovation Process > Lesson 1 > Innovation - General > Edit'. The left sidebar contains a 'Navigation' menu with options like 'Home', 'My home', 'Site pages', 'My profile', 'Current course', 'Module 1 Innovation Process', 'Participants', 'Reports', 'General', 'Lesson 1', 'Innovation - General', 'Lesson 2', 'Lesson 3', 'Lesson 4', 'Lesson 5', 'Lesson 6', 'Lesson 7', 'Lesson 8', 'Lesson 9', 'Practical Exercise', 'Lesson 10', 'Lesson 11', 'Lesson 12', 'Lesson 13', 'Glossary', 'My courses', and 'Courses'. The 'Settings' section includes 'Lesson administration' and 'Edit settings'. The main content area is titled 'Innovation - General' and has tabs for 'Preview', 'Edit', 'Reports', and 'Grade essays'. The 'Edit' tab is active, showing a table with columns: 'Page title', 'Page type', 'Jumps', and 'Actions'. The table lists several pages: 'Introduction', 'General considerations', 'Importance of Innovation', 'Categories of Innovation', 'Systematic approach to innovation', 'Evaluation of the lesson', 'Question 1', 'Question 2', and 'Question 3'. Each row shows the page type (Content or Multichoice), the jumps (Previous page, Next page, This page), and actions (Add a new page...).

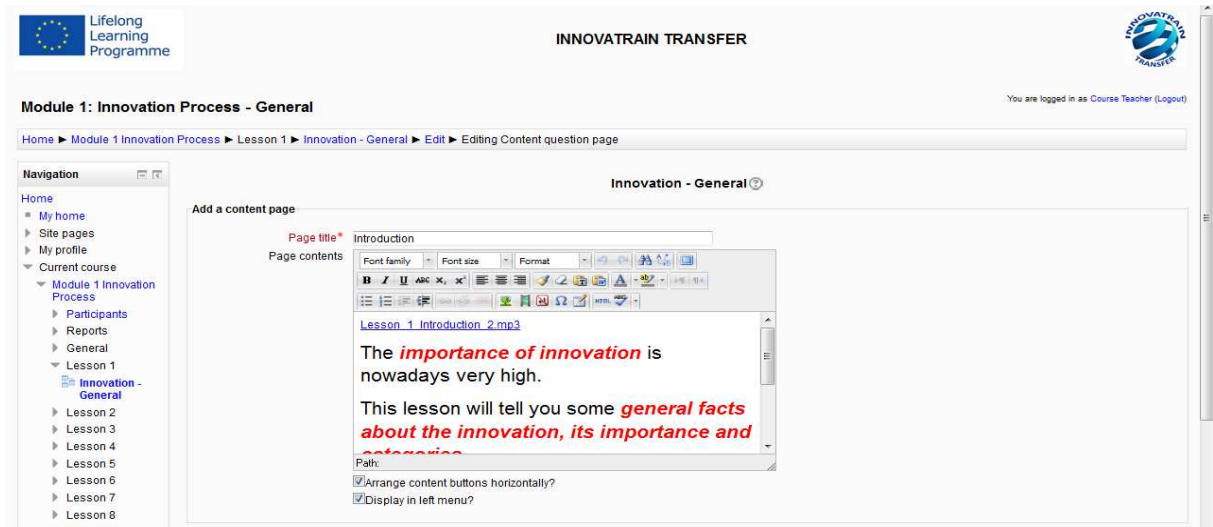
Figure 8 Lesson editing – Collapsed View

Clicking on 'Expanded view' shows the content of the pages and enables adding of further 'Branch Tables' (which are used as pages of content with branches to each other) and 'Question Pages'.

The screenshot shows the INNOVATRIN TRANSFER interface in the 'Expanded View'. The layout is similar to the collapsed view, but the 'Edit' tab is active, and the content of the pages is visible. The 'Introduction' page is shown, containing text about the importance of innovation. Below the text, there is a 'Content' section with a table listing 'Content 1' and 'Jump 1'. The 'General considerations' page is also visible, containing text about innovation as an evergreen topic. The 'What is innovation?' section is partially visible at the bottom. The left sidebar and top navigation are the same as in the collapsed view.

Figure 9 Lesson editing – Expanded View

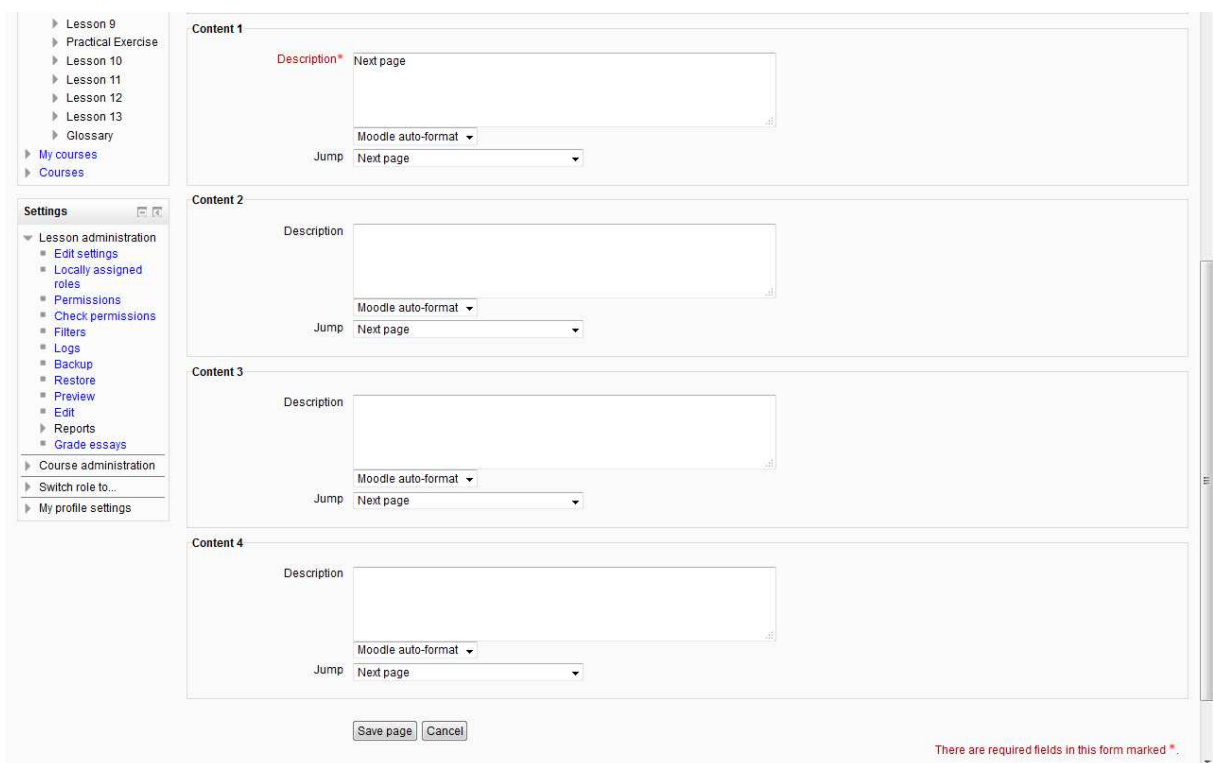
Clicking once again on  or 'Add a Branch Table' opens a page with an editor to work on or create the content.



The screenshot shows the 'Add a content page' editor in the INNOVATRIN TRANSFER system. The left sidebar contains a navigation menu with options like 'Home', 'My home', 'Site pages', 'My profile', and 'Current course'. The main area is titled 'Innovation - General' and shows the 'Add a content page' form. The form includes a 'Page title' field with the value 'Introduction', a 'Page contents' text area with rich text formatting tools, and checkboxes for 'Arrange content buttons horizontally?' and 'Display in left menu?'.

Figure 10 Editing content

The page shows also the 'Branch Table' in order to define buttons which provide links to certain pages. 'Description' sets the caption of the button and 'Jump' the link itself.



The screenshot shows the 'Branch Table' form with four content entries. Each entry has a 'Description' field and a 'Jump' dropdown menu. The 'Jump' dropdowns are set to 'Next page'. The form includes a 'Save page' button and a 'Cancel' button. A red error message at the bottom states: 'There are required fields in this form marked \*'.

Figure 11 Setting link

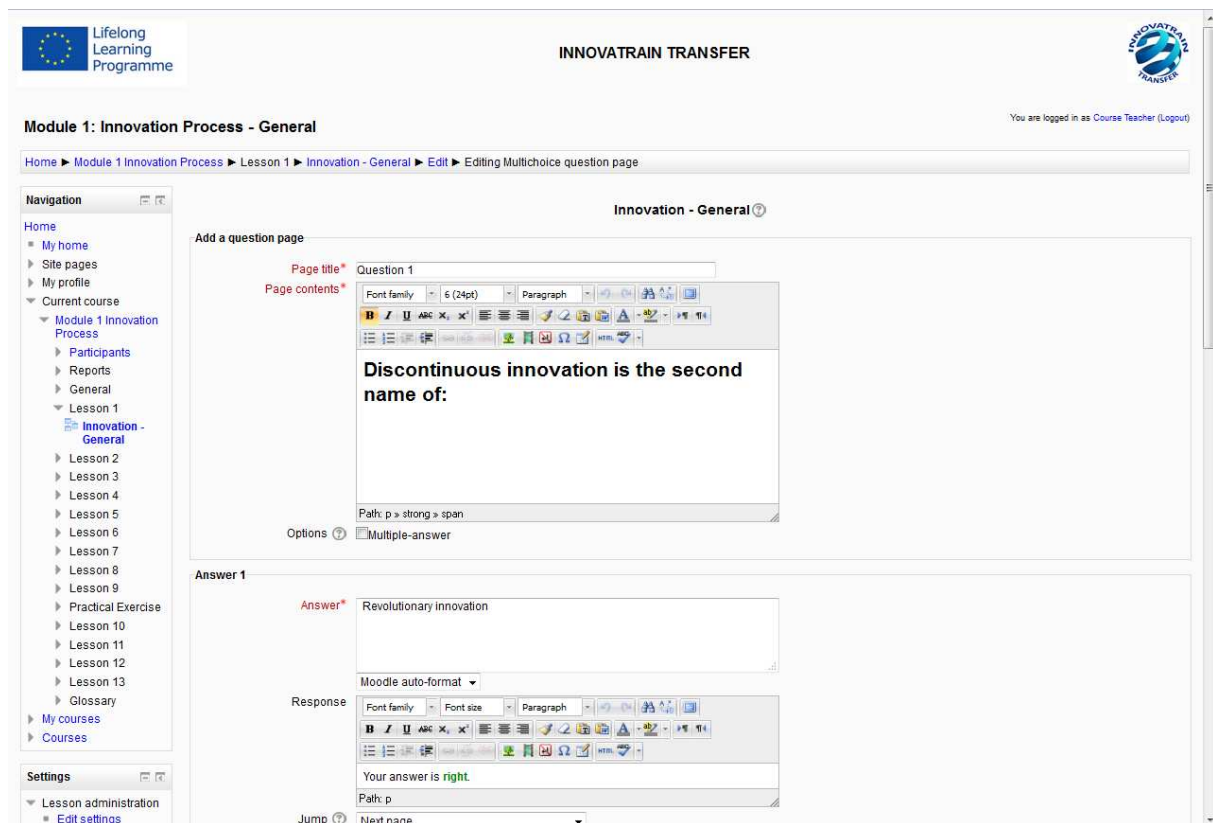


Figure 12 Question page inserting...

‘Adding a Question Page’ or opening an existing question page opens a page with editors to define the question and the answers with corresponding responses.

A response can be defined in order to display this as feedback to the user in case of answering the question correctly. If more than one answer to the question is correct only the response corresponding to the last answer that is marked as being correct is shown. In case of wrong answers or no responses defined default responses are given, saying that the answers were correct or not.

The default question type is ‘Multiple Choice’ with multiple offered answers on one question and the possibility to define different answers as correct answers. Answers are marked as correct answers by setting the ‘Score’ to ‘1’, incorrect answers retain ‘0’.

Other build-in question types are ‘True/False’, ‘Short answer’, ‘Numerical’, ‘Matching’ and ‘Essay’ with accordingly different approaches to define the answers.

### 2.6.1.2 Editing Content in the eLearning tool


The content can be typed in directly or pasted from an existing source by using the built-in editor. Standard editor functionality can be extended by clicking on the right corner at the bottom of the editor . After this few helpful options will be added along with text opened in separate window.





Figure 13 Toolbars with editing buttons

The formatting of the text is to be done by using the predefined styles in Trebuchet ▼, in order to keep the format of the content homogenous and centrally customizable. To format a part of a text the text has to be selected and the desired style has to be chosen.

As the text is in HTML a certain procedure of using the styles has to be followed to keep the text clean and avoid unwanted effects of nested tags.

Lists are to be created by using the buttons for unordered lists or ordered lists .

Pictures to be shown in the text have to be first uploaded to the web server and then inserted in the text by pressing and defining the 'Image URL' in the opened window.

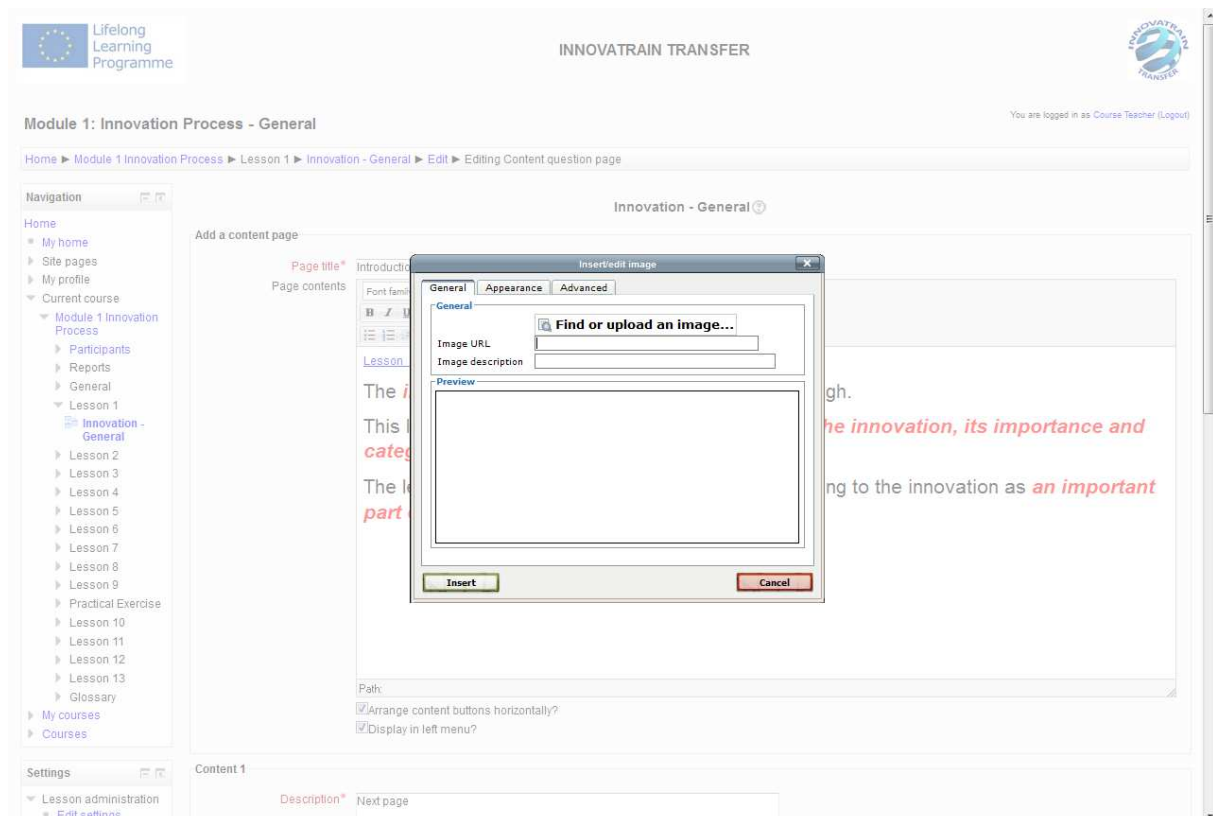


Figure 14 Screen for inserting images

The required 'Image URL' is created while uploading the image to the web server.

The images are to be uploaded using the 'Files' page of the course 'Administration' block.

The 'Image URL' is shown in the status bar of the browser and could be copied using its context menu.

### 2.6.1.3 Course structure

All lessons generated for one training program composed of the training courses for different target groups are to be developed and comprised within the framework of one 'Moodle

course'. This 'Moodle course' will be basis for subsequent building of the INNOVATRIN TRANSFER training courses as combination of related lessons.

Each lesson starts with a description page introducing the general lesson content.

Each lesson consists of several 'Branch Tables' containing the main content of each lesson and branches to each other and to the question pages.

## **2.7 Creation of multimedia content**

The multimedia content is composed of e.g. audio files, animations, films etc. For creation of each of them specific free software tools are available.

The audio files are to be created using text-to-speech converters which are provided as stand-alone tools or as parts of e.g. pdf readers.

Among the stand-alone text-to-speech converters one can use e.g. Ivona (<http://www.ivona.com/>), Google Übersetzer (<https://translate.google.de/>), Loquendo TTS (<http://www.nuance.de/>), Naturalreader (<http://www.naturalreaders.com/>), Foxit Reader (<http://www.foxitsoftware.com/>). By selecting the text-to-speech converter it is important to take care that not all of them are equally good for different languages.

Animations can be produced using Microsoft PowerPoint 2010, creaza (<http://www.creazaeducation.com/>), prezzi (<http://prezi.com/>) with free and paid version, free software mixeek (<http://www.mixeek.com/>) and several others.

Recording of the presentations can be done using e.g. powersoft, Free Online Screen Recorder, V1.2. (<http://www.powersoft.com/>), Debut (<http://www.nchsoftware.com/>), Adobe Captivate (<http://thankyou.adobe.com/>), which offers several other functionalities for creating e-learning courses, etc.

For conversion of the animated presentations in flash the DVDVideoSoft Freestudio V.6.3.0.430 can be used.



## 2.8 Definition of learning objects

Learning objects (LOs) enable and facilitate the use of educational content online. Internationally accepted specifications and standards make them interoperable and reusable by different applications and in diverse learning environments. LOs are defined as educational resources that can be employed in technology-supported learning. A LO can be based on an electronic text, a simulation, a Web site, a .gif graphic image, a QuickTime movie, a Java applet or any other resource that can be used in learning.

A typical Learning Object is usually composed by:

- Title – the Learning Object title has to be meaningful, and able to catch the students' attention.
- Subtitle - it's very useful, even if not mandatory. The subtitle introduces the topic of the Learning Object by using various strategies: you can be ironic, engaging, or catch the attention with an exclamation or a question.
- Training purpose - it is important to communicate the training purpose of each lesson in a clear way. Remember: each Learning Object has to be focused on a single, specific training purpose.
- Content - while managing the content of a Learning Object, you have to take care about the "logic" that is used to transmit the message. This logic can be deductive or inductive:
  - Deductive method: it is used to transmit strong and clear concepts. Usually includes also descriptive examples and practical cases.
  - Inductive method: starting from the description of different and specific situations, it's possible to go back to a specific concept.
- Self test - It helps the students to verify their learning level. A self test is not intended to give score, but feedback: by this way, the students are able to learn from their mistakes. It is also important share more information with the users, so they are able to find additional contents before repeating the lesson.
- Final Test - It's important to define goals, questions typology – true/false, multiple choice, etc. – and how the score is assigned.

Based on this definition a template for creating the Learning Objects for the purposes of the INNOVATRIN TRANSFER course has been elaborated and can be used as a general template for a further LOs creation:

| No. | Description   | Comment   |
|-----|---|-----------|
| 1.  | Title of the Lesson   | Mandatory |
| 2.  | Subtitle  | Optional  |
| 3.  | Introduction – it consists of two parts. The first is short audio file explaining the purpose of the lesson, followed by a short introductory text. | Mandatory |
| 4.  | Lesson Content – learning materials are composed of text, pictures and multimedia content and are supplemented by presentation of                   | Mandatory |

|    |   |           |
|----|---|-----------|
|    | links to external resources supplementing lesson material.<br><br>For each lesson an 'average student' should spend between 20-30 minutes (to study explanation and to do all exercises), so the material shall not exceed the length of 8 pages. If you have more materials you can elaborate sub lessons. |           |
| 5. | Self test – a set of multiple choice questions to test the students knowledge. It helps the students to verify their learning level. A self test is not intended to give score, but feedback: by this way, the students are able to learn from their mistakes.  | Mandatory |
| 6. | Final Test – after each module a final test will be elaborated to test the students knowledge. After the completion of the final test the final score will be presented to the student.   | Optional  |

When designing and developing a course the developer should keep in mind that the total number of lessons should be maximum 25-35. An 'average student' should spend between 20-30 minutes to learn all material. The total, if we assume that a student will spend 1-2 hours per day, he/she may needs about 10 +1 working days.

## 2.9 Testing and Feedback

Tests play an important role in e-learning and provide an array of benefits for both the learner and the instructor. They improve the experience of both the instructor and a student. For the Instructor part:

- Testing can be made unique in a LMS by randomizing question and answer order. This is especially useful when a learner has to re-do a test which he/she previously had poor performance on so that the test is not completed by memory, but rather by actually thinking through the correct solution once again. This feature is also useful to produce more variety by using a large pool of questions from which testing can be done, rather than recycling the same questions over and over.
- Grading and giving feedback is where the instructor has the ability to comment on the strengths and weaknesses of a learner and enable learning to actually take place. For instance, in a multiple-choice test if the learner chooses answer B over the correct answer C, the appropriate feedback will be given back to the learner, indicating fault in the thought process, or hints as to why another answer would be more appropriate. It allows the learner to get instant feedback on a correct/ incorrect answer, and it saves time for the instructor who can take advantage of automated feedback.
- Tests have to be gathered and graded, and through a reporting system, a LMS gives the instructor an overview of test scores, progress and growth with graphical representation to make the analysis easier to grasp especially when the class-size is very large. That way, an instructor has the ability to analyze which students scored highest/ lowest, and which questions were hardest/ easiest for the majority of students.

For the student part:

- Testing online will usually provide the user with results instantly. This is good for students because it allows them to know what they did wrong immediately, what they need to focus on, and how to improve should they have to retake the test.
- Tests keep learners engaged and have always been a motivator to study harder when students know that their progress will be judged upon an exam, a performance review etc. It sets a deadline for when material needs to be learned by and diligent students know they must adhere to that.

The use of different forms of testing, such as multiple choice tests, fill-in-the-blanks, true or false, or essay questions can also be used to assess the progress of students with different learning styles. Catering to the needs of different learning styles is an important aspect of e-learning which gives it the edge over traditional learning models. It is a good idea to use different types of material, and varying types of tests and quizzes to engage everyone in an online class.

An important note on online testing is the ability a learner has to research the web for answers and creating tests should be done with that in mind. If something is too hard and/or a little off topic in terms of the material taught, it is likely to be researched online. If the tests are too easy, they will be dismissed and passed over without much being learned. Thus tests should be structured in a way that encourages learners to think back to the material taught within the course rather than looking for answers elsewhere.

## **2.10 Introduction to the lesson**

In the introduction section the developer should introduce the reader to the course material, outline the topic area, and identify the objective of the content from the learners' perspective. Also the objectives of the lessons material should be introduced i.e. the user should have a clear understanding of the particular purpose of the material presented e.g. to gain an overview of a topic, to get ready for moving into down path etc. These objectives should be written with the learner in mind.

## **2.11 Questions**

After each lesson developer should present a number of questions and tasks that test the learners' ability to apply and understand the material in the lesson. Guidelines for development of questions are presented below:

- If the material is heavily textual and consists of a set of guidelines with documentation schemes the exam should employ a number of multiple choice questions that tests the users familiarity with the text presented and the concepts that the learner should be familiar with.
- If the material in the lesson consists of a tool for example flow charts then the lesson should present partially completed problems whereby the learner employs the tool to complete the solution. This should test the learners' ability to use the tool.
- Questions should be developed considering the specific learner for example whether the learners objective is application or whether it is theoretical understand or both will ultimately determine the type of questions being asked.

For the INNOVATRAN TRANSFER material the following approach was taken: after each lesson a set of multiple choice questions is presented to the student to test his/her knowledge acquired during the lesson. It shall help the students to verify their learning level and is not intended to give score, but feedback: by this way, the students are able to learn from their mistakes.

## **2.12 Glossary**

For the purpose of the course a dedicated glossary was developed with explanations of terms most commonly used. Like the rest of the course, the glossary is available in five languages, which enables students to specifically refer to the English terminology related to realized material. The glossary was created with utilization of Moodle glossary activity module allows participants to create and maintain a list of definitions, like a dictionary. The entries can be searched or browsed in different formats. A glossary is currently restricted to entries made by the teacher but in the future can be turned into a collaborative activity where all course participants will be able to add and edit entries. Entries can be put in categories. The auto-linking feature highlights any word in the course which is located in the glossary.

## **2.13 Conclusion**

Once these lesson parts are created they can then be used interchangeably to suite the individual learner. For example the manager and technical staff may have the same lesson regarding the specific aspects of innovation introduction while the administrative staff may not be interested in these topics. By creating these lesson objects the developers of the courseware for the methodology can create interchangeable and reusable lesson parts hence reducing the overall development effort required.

### **3 Guidelines for organisation of training**

The following part of this document contains a guidelines for the organization of the training course for different target audiences.

Each type of audience - target groups Manufacturing SMEs managers, Technical staff, Administrative staff, Teachers and Consultants could establish the training scenarios based on a harmonized, common guideline.

The application of this guideline helps the organization of the trainings in all the countries involved in the INNOVATRAN TRANSFER project, and furthermore allows a good feedback mechanism to enhance the trainings based on the experiences gained from each partner.

#### **3.1 Objective of the training**

The targeted and the participating audience define the objective of the training. The targeted audience allows for a preliminary planning and objective setting, while the participants arriving on that day to the training session will or could reshape the objectives at least for that single occasion. As the participant structure and composition of each training session could change significantly, and exactly the same composition of attendees could never happen again, each training's objective will change slightly or significantly partly "on-line".

To begin with the planned audience, the following trainings are envisaged, as main categories:

- Managers of manufacturing SMEs' - In order to increase the SMEs competitiveness, their management needs continuous efficient training programmes aiming to improve their skills and qualifications connected with innovation (product innovations, process innovations, marketing innovations and organisational innovations). The time for training is especially critical for this group; therefore they need training solution, which can be used in combination with their everyday work. (suggested eLearning or blended approach)
- Technical staff needs continuous trainings in order to continuously update their knowledge which is rapidly changing, and apply/modernize and service innovation support systems. They need training on complex issues related to product innovations and process innovations. (suggested blended approach)
- Administrative staff - people who need training on how to introduce innovation. They have to be trained to quickly switch from one marketing innovations or organisational innovations system to another. Administrative staff need trainings enabling them to raise and/or change their qualifications and improve chances at the work market. (suggested classical training or blended training)
- Trainers and Consultants. The project addresses also the needs of training and consultancy organisations offering them an innovative, easily adaptable and widely applicable learner-centred training system to train manufacturing SMEs in different innovation aspects. In addition, this group needs to be trained on how to support SMEs in introduction of innovation support systems. (all type of usage are possible : classical training or blended training or eLearning training)

#### **3.2 Defining the training sessions/ scenarios and approach**

This is the first step. Several issues must be defined at the very beginning of the process:

- Define type of training: blended (with introduce lessons and traditional final exam), eLearning, classical training (usage INNOVATRIN TRANSFER system as support training material)
- Define the objectives of the trainings: Make sure, that the targeted goal is clearly, explicitly stated.
- Define the target audience categories/groups: For example a training course could be set up for an individual SME company or several (sets of) SMEs could delegate students for the common session, or a few trainers are to be trained.
- Define for each target group the amount of knowledge/ lessons to pass on, as separate courses; such as beginners' level, advanced level, experts' level, middle management level, or top-management level.
- Define for each course the amount of participants and allocated time duration (sessions). These are sometimes controversial requirements to fulfil. Staff level persons are hard to grab out from the daily job. Thus, it is "hard" for a top manager to send the workers away for days. But to share a day for both work and for training: the physical tiredness of the workers do not allow for a fast and rapid progress in the teaching sessions.
- Select for each session the appropriate venue, teachers, and teaching materials (hard and soft materials).
- Clearly define/select the locally and the remotely applicable teaching sessions or lessons.
- Calculate financial feedback on profitability
- Be prepared for the assessment of the session, based on the students' feed-back.
- Perform the (self- and feed-back-) assessment after each session.
- Develop the teaching modules as the feed-back analysis or assessment requires/defines.
- Definition of Units of Learning Outcomes. The specifications for a unit should include:
  - the generic title of the unit,
  - the generic title of the qualification (or qualifications) to which the unit relates, where applicable,
  - the reference of the qualification according to the EQF level and, where appropriate, the national qualifications framework (NQF) level, with the ECVET credit points associated with the qualification,
  - the learning outcomes contained in the unit,
  - the procedures and criteria for assessment of these learning outcomes,
  - the ECVET points associated with the unit,
  - the validity in time of the unit, where relevant.
- identify of training needs, including Ongoing consultation with relevant stakeholders takes place to identify specific local/ individual needs.
- definition of specific indicators (success criteria).
- definition of methods for validation and certification of competences,
- early involvement of staff in planning, including with regard to quality development,
- definition of transparent quality assurance system,
- definition/selection of Self-assessment/self-evaluation procedures,
- definition of methods for individual Learners' feedback gathering on individual learning experience and on the learning and teaching environment.

Each action or process listed above needs person(s) to make it happen, and need further resources, such as available venue, available teachers/tutors, available equipment.

### **3.3 Examples**

The learners must receive and gain new knowledge - being understood by participating at the course - , but many questions could still be unclear. The planner of the training sessions will take care to include good examples, and allocate a good time for reasoning and getting the case studies understood.

### **3.4 Examination**

The training session should be concluded by an examination. This will force the learner to care for reading/ and exercising mostly ALL of the materials available for him/her. The examination will not take long, but will give a picture on the level of knowledge gained. Also, a good examination process helps to deepen the knowledge of the student, and to make the student ambitious/eager to learn more details.

## 4 Guidelines for execution of training

Guidelines for the execution of the training will include:

- Material for introductory classroom training – this will include several sets of viewgraphs for different target groups, and instructions how to carry out introductory training
- Guidelines for learners how to use INNOVATRIN TRANSFER eLearning training courses
- Guidelines for collaborative learning
- Guidelines on how to support learners (mentor role)

### 4.1 Training Methodology – Introductory Classroom Training

Introductory classroom training was not planned originally to support the INNOVATRIN COURSES. But during the specification phase some of the respondents expressed interest in that kind of activity. So, the introductory classroom training can be organized on a special demand for a specific target group or company.

The initial classroom training can be needed to introduce the INNOVATRIN TRANSFER approach and training system (eLearning) to target users (trainees) who are from companies, often not familiar with the topic and modern teaching means.

The classical classroom teaching is supported by lecture materials available in paper form or as software and will be supplemented by practical demonstrations and trials to be conducted to enable the trainees to follow the subject. The aim of this introductory part is to acquaint trainees with e-Learning in general and the interface of eLearning Software.

The lecture containing all necessary information for a target audience should last not more than 2 times 45 minutes and should consist of following two parts:

#### 4.1.1 Lecture concerning eLearning

During this part of classroom training students will learn about theoretical and practical aspects of eLearning.

E-learning is (in some ways) to classroom learning as cell phones are to a pay phone at the bus station.

E-learning allows students to learn anywhere and usually at any time, as long as they have a properly configured computer. Cell phones allow you to communicate any time and usually anywhere, as long as you have a properly configured phone.

E-learning can be CD-ROM-based, Network-based, Intranet-based or Internet-based. It can include text, video, audio, animation and virtual environments. It can be a very rich learning experience that can even surpass the level of training you might experience in a crowded classroom. It is self-paced, hands-on learning.

The quality of the electronic-based training, as in every form of training, is in its content and its delivery. E-learning can suffer from many of the same pitfalls as classroom training, such as boring slides, monotonous speech, and little opportunity for interaction.

E-learning falls into four categories, from the very basic to the very advanced. The categories are:

- Knowledge databases - While not necessarily seen as actual training, these databases are the most basic form of e-learning. You've probably seen knowledge databases on software sites offering indexed explanations and guidance for software questions, along with step-



by-step instructions for performing specific tasks. These are usually moderately interactive, meaning that you can either type in a key word or phrase to search the database, or make a selection from an alphabetical list.

- Online support - Online support is also a form of e-learning and functions in a similar manner to knowledge databases. Online support comes in the form of forums, chat rooms, online bulletin boards, e-mail, or live instant-messaging support. Slightly more interactive than knowledge databases, online support offers the opportunity for more specific questions and answers, as well as more immediate answers.
- Asynchronous training - This is e-learning in the more traditional sense of the word. It involves self-paced learning, either CD-ROM-based, Network-based, Intranet-based or Internet-based. It may include access to instructors through online bulletin boards, online discussion groups and e-mail. Or, it may be totally self-contained with links to reference materials in place of a live instructor.
- Synchronous training - Synchronous training is done in real-time with a live instructor facilitating the training. Everyone logs in at a set time and can communicate directly with the instructor and with each other. You can raise your cyber hand and even view the cyber whiteboard. It lasts for a set amount of time -- from a single session to several weeks, months or even years. This type of training usually takes place via Internet Web sites, audio- or video-conferencing, Internet telephony, or even two-way live broadcasts to students in a classroom.

E-learning has definite benefits over traditional classroom training. While the most obvious are the flexibility and the cost savings from not having to travel or spend excess time away from work, there are also others that might not be so obvious. For example:

- It's less expensive to produce - Using dedicated software to produce your own asynchronous training programs; e-training is virtually free once you reach the break-even point. Synchronous programs will have continued costs associated with the instructor managing the class, but will still be lower than traditional courses.
- It's self-paced - Most e-learning programs can be taken when needed. The "books" that you set up using Trainers oft create a module-based design allowing the learner to go through smaller chunks of training that can be used and absorbed for a while before moving on.
- It moves faster - e-learning courses progress up to 50 percent faster than traditional courses. This is partly because the individualized approach allows learners to skip material they already know and understand and move onto the issues they need training on.
- It provides a consistent message - E-learning eliminates the problems associated with different instructors teaching slightly different material on the same subject. For company-based training, this is often critical.
- It can work from any location and any time - E-learners can go through training sessions from anywhere, usually at anytime. This Just-In-Time (JIT) benefit can make learning possible for people who never would have been able to work it into their schedules prior to the development of e-learning. (If you manage a corporate learning program, however, be careful about requesting that workers learn on their own time from home.)
- It can be updated easily and quickly - Online e-learning sessions are especially easy to keep up-to-date because the updated materials are simply uploaded to a server. CD-ROM-

based programs may be slightly more expensive to update and distribute, but still come out cheaper than reprinting manuals and retraining instructors.

- It can lead to increased retention and a stronger grasp on the subject - This is because of the many elements that are combined in e-learning to reinforce the message, such as video, audio, quizzes, interaction, etc. There is also the ability to revisit or replay sections of the training that might not have been clear the first time around. Try that in a crowded auditorium!
- It can be easily managed for large groups of students - it allows corporate training directors, HR managers and others to keep track of the course offerings schedule or assign training for employees and track their progress and results. Managers can review a student's scores and identify any areas that need additional training.

#### **4.1.2 Training concerning interface and using of the eLearning Software**

During this part of classroom training students will learn how to use eLearning software. All system aspects (needed to know by the student) will be presented to them, to make them familiar with a computer and eLearning system. Following the introductory part there will be a set of practical examples/exercises supervised by a teacher. This part of the classroom training will be conducted in the purpose of preparing trainees (from the SMEs) which can be very often insufficiently familiar with both the subject to be trained and modern learning solutions.

### **4.2 Guidelines for collaborative learning**

Collaborative eLearning means mutual engagement of two or more learners in a coordinated effort to construct knowledge, negotiate meanings and/or solve problems using Internet and electronic communications.

There are two methods for collaborative eLearning – synchronous and asynchronous.

Synchronous collaborative eLearning occurs when we have real-time eLearning at scheduled time with learners and teachers participants present, much like a real classroom, but using modern technology for remote access. Common forms of synchronous learning include:

- video conferencing
- audio conferencing
- computer conferencing
- chats

Asynchronous collaborative eLearning occurs when the learner is engaged at a time other than concurrent with the faculty or other learners – collaboration does not occur in the real time. This can include the use of:

- e-mail
- Discussion forums
- List servers

Collaborative learning uses two categories of tools, both involving internet technologies:

- the first category consists of collaborative tools for delivering just-in-time performance assistance or training to a small group

- the second is a class of instructional tools that emulate the more formal training classroom or auditorium through the Web browser as an interface.

Some of the most common benefits associated with collaboration tools are as follows:

- typically 2 to 10 people can interact
- while one person can act as a moderator, all participants typically have equal access
- there are real-time chat functions
- small-group interaction is possible
- possibility to use whiteboards
- possibility of file transfer, application and document sharing

Collaboration provides a way for experienced individuals to learn and share their knowledge. Some tools as discussion boards can capture knowledge and also function as document repositories for storing files and searching for information and files.

An asynchronous course could have a link to a discussion board that forms a sort of “living document” for tracking responses to questions and examples from worth of individuals who go through the course. In addition to answering questions and keeping the content fresh, this builds a significant knowledge repository and generates an integrated community even if students are separate by time and space. So it is important to have a system that allows a whole team to post and contribute knowledge, documents and chat-style collaboration.

### 4.3 Guidelines on how to support learners

With infusion of e-learning in vocational and corporate training, learners are more attuned to self-paced learning. E-Learning provides them the opportunity to learn as per their needs and convenience but at the same time, the worth of human interactions in learning cannot be discounted. Learners often need support during an e-course to fully grasp the concepts and their practical applications. The roles of mentors are teaching assistants, social connectedness initiators, and technical supporters that emulate the roles of faculty within eLearning environments. As teaching assistants, mentors provide students with an extra help toward clarifying and comprehending course contents. As social connectedness initiators, mentors help students develop an eLearning connectedness. As technical supporters, mentors help students solve technological problems.

To fulfil the roles of mentor following guideline is proposed. It outlines major responsibilities of mentor roles and their contributions toward removing eLearning barriers, meeting student needs and enhancing teaching and learning effectiveness. It may be adopted by mentors as a fundamental job-aid in eLearning environment, so that they would have a clearer idea about how to do and how to do in practicing mentoring. Guideline covers three aspects of mentor role, describes their responsibilities and contributions:

Table: Mentoring guidelines structure

| No. | Mentor Roles          | Responsibilities   | Contributions  |
|-----|-----------------------|--|--|
|     | Assisting Instruction | <ul style="list-style-type: none"> <li>- Respond to students questions concerning curse contents</li> <li>- Monitor discussions</li> <li>- Provide students information for better learning effectiveness</li> <li>- Clarify grading criteria</li> </ul> | <ul style="list-style-type: none"> <li>- Provide quick responses</li> <li>- Improve the quality of instructions</li> </ul> |

| No. | Mentor Roles                    | Responsibilities   | Contributions  |
|-----|---------------------------------|--|--|
|     |                                 | <ul style="list-style-type: none"> <li>- Keep tracks of students attendance</li> <li>- Post routine class announcements</li> </ul>   |  |
|     | Initiating social connectedness | <ul style="list-style-type: none"> <li>- Provide students needed information</li> <li>- Guide students to their learning goals</li> <li>- Provide extra help</li> <li>- Respond to students concerns</li> </ul>  | <ul style="list-style-type: none"> <li>- Increase students support structure</li> <li>- Increase students' level of comfort</li> <li>- Increase of quality of instruction and learning</li> </ul>  |
|     | Providing technical support     | <ul style="list-style-type: none"> <li>- Coach students on fundamental online skills</li> <li>- Facilitate students in solving online access problems</li> <li>- Provide necessary information concerning course website navigation</li> <li>- Help students in locating specific resources within eLearning environment</li> <li>- Upload or download course materials</li> <li>- Post messages onto discussion boards</li> <li>- Refer students to other resources when technological problems are not able to be solved by the faculty and mentors</li> </ul> | <ul style="list-style-type: none"> <li>- Reduce technical difficulty concerns</li> <li>- Increase students support structure</li> <li>- Increase students level of comfort</li> <li>- Increase eLearning effectiveness and efficiency</li> </ul> |

Introducing a Mentor in e-learning has many benefits and can be achieved through multiple ways and means. The process of interactions is beneficial for learners as they get to interact with experts and gain from their support. For Mentors, the interactions strengthen their own knowledge. Additionally, the interactions also help Mentors understand the perspective of the learners and help them assess the learning content better.

## 5 Conclusion

The general objective of the INNOVATRAN TRANSFER Training Methodology is primarily to explain how to apply INNOVATRAN TRANSFER system i.e. to provide the detailed guidelines on development and application of training courses in SMEs. To facilitate these objectives the good understanding between all users of the INNOVATRAN TRANSFER system (users here means both trainers and trainees, system managers, etc.) is crucial. It is expected that this methodology will be already in this phase an appropriate basis for preparation of end-users to utilize the INNOVATRAN TRANSFER system. With the further system development the INNOVATRAN TRANSFER methodology will finally evolve to the comprehensive, clear and easy to understand guidelines and user manuals, providing essential knowledge about best methods of utilisation and management of INNOVATRAN TRANSFER system.

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