



DT1.3: Training delivery mechanisms

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ABSTRACT	This document contains the instructional and architectural design of PROMISE training courses. In addition the document specifies the delivery schedule and a common course evaluation strategy.

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Abbreviations

BOL	Beginning Of Life
CMS	Course Management System
DSS	Decision Support System
EOL	End Of Life
LMS	Learning Management System
MOL	Middle Of Life
PDKM	Product Data and Knowledge Management
PEID	Product Embedded Information Device
VoIP	Voice over IP

1 Introduction

1.1 PROMISE Training goal

WPT1 aims to design and provide training for:

- improving knowledge on PROMISE technology and its exploitation
- supporting the development of demonstrators by delivering the necessary technical knowledge on the new technologies developed in the project.

1.2 Purpose of this document

The reference instructional design model used to design and develop the training architecture has been presented in Deliverable DT1.2.

This document is the output of the micro phase in the adopted model (as shown on Figure 1) and establishes the delivery mechanisms for individual courses. In this phase the instructional strategy is designed on the basis of the defined specifications. Furthermore specifications on learners, goals, contents and infrastructure are further detailed following a spiral approach.

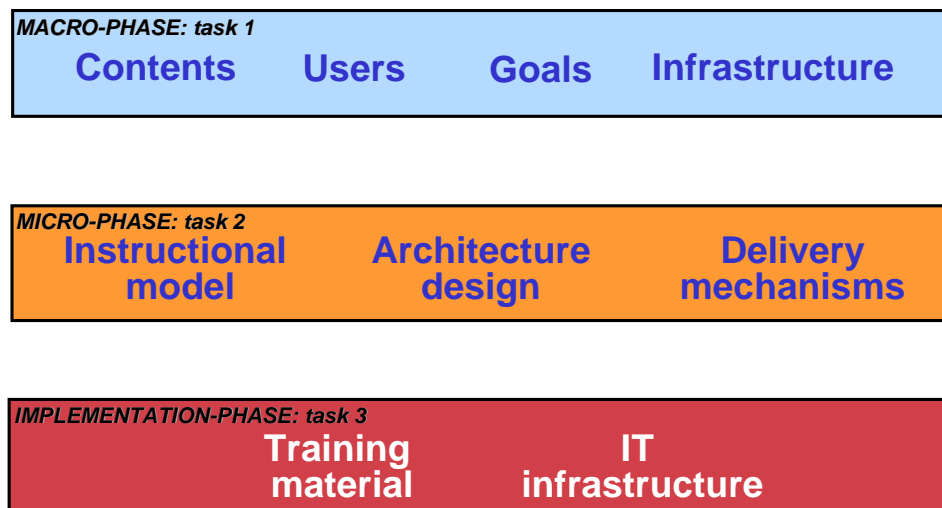


Figure 1. PROMISE Training Model: from the learner analysis to the delivery of contents.

In summary this document contains:

- the guidelines used for the design of courses on the basis of the training specifications defined in task TT.1
- the storyboard of PROMISE training courses in accordance with the Task 2 Micro-phase. Courses will be designed in terms of training/learning strategies, necessary resources infrastructure tools.

The instructional strategy is composed of the following elements:

- Instructional Model, which gives a description of the instruction and learning model to be adopted and implemented by specifying the integration between presence and distance, the

learner autonomy, the learning assessment and the training strategies such as collaborative learning, self-learning, student centred, teacher centred, group centred etc.

- Architecture Design, which gives a description of both the training content structure decomposed in modules and sub-modules, and the IT infrastructure
- Delivery mechanisms, which gives a description of the tools used to deliver training contents including syllabus, multimedia, forums, tutoring, etc.

According to the spiral model described in deliverable DT1.2 specifications can be reviewed and changed when unfeasible or unnecessary at this stage. The design phase of courses will be implemented in task TT1.3.

1.3 Structure of the document

This document is structured as follows.

Section 2 describes the **guidelines** adapted to design training courses in PROMISE.

Section 3 presents the **common learning evaluation strategy** of the courses.

Section 4 describes the **storyboard** for each training course.

Section 5 contains a **summary** of the specifications defined in the previous sections.

Section 6 draws the **conclusions** of this document.

2 Guidelines for the design of course

2.1 Overview

The micro phase analysis consists of designing the training architecture for each course with respect to the following structure:

- Instructional Model:
 - Defines the integration degree between presence and distance of the training delivery.
 - Defines the learner autonomy during his/her learning path.
 - Defines the training strategies.
 - Defines the assessment method.
- Architecture design
 - Defines the training contents module by module.
 - Defines the relationships among modules.
- Delivery mechanisms:
 - Defines the IT or human based delivery format of the courses.

The output of this design phase will provide all the information for the implementation phase. The following section describes the content of the micro analysis.

2.2 Instructional model

2.2.1 Presence vs distance

The instructional model gives a description of the presence/distance, learner autonomy assessment methods and training strategy. Although some courses will be blended, in terms of presence and distance, given the characteristics of learners, most of them do not have time to travel for training courses, hence the most common way to deliver course contents in PROMISE will be *at distance*.

It is suggested to deliver contents face to face if:

- learners have to familiarize with a technology and they do not have high skills on that technology
- learners have the necessity to acquire behavioral practices that cannot be transmitted by video
- learners have the necessity to collaborate and to meet other learners (ex. decision making simulations, role playing, etc.)
- learners have the necessity to interact synchronously with teachers and tutors.

If these conditions do not hold, it can be assumed that contents can be delivered asynchronously at distance preserving a certain efficacy.

The specifications in Deliverable DT1.2 that can help course designers to make this decision are:

- Learners' skills
- Formalization of concepts
- Interactivity required by concepts
- Additional resources

2.2.2 Learner autonomy

The autonomy of learners may affect, among several aspects, their motivation and how they learn. Depending on the individuals involved:

- high degree of autonomy stimulates learners with high skills and motivation but it also generates confusion in learners with low skills
- low degree of autonomy guides the learners with low skills but it also decreases the learners' involvement in learners with high skills.

The specifications in Deliverable DT1.2 that can help course designers to make this decision are:

- Learners' skills
- Training goals of the course

2.2.3 Training strategy

Designers can select the instructional strategy to adopt in PROMISE courses among a diverse set of alternatives including:

- Lectures are the most popular way to deliver contents. Learning material, in form of documents and power point presentations, is made available for learners. An overview of the lecture is also suggested to guide the learner.

- Tutorials are used to train students in a sort of programmed way in which the learning pathway is divided in small learning units separated by frequent questions. The learning pathway can be either linear or not, and the passage from a unit to the next one is generally constrained to the positive answers of the learner to questions.
- Case studies involve a printed description of a problem situation that contains enough detail to enable the learners to recommend a solution. The learners encounter a real-life situation under the guidance of an instructor or computer in order to achieve an instructional objective. Control of the discussion comes through the amount of the detail provided.
- Collaboration involves learners working together in small groups to develop their own answer through interaction and reaching consensus, not necessarily a known answer. Monitoring the groups or correcting "wrong" impressions is not the role of the trainer since there is no authority on what the answer should be.
- Self study occurs when the learner is largely responsible for his/her own instruction during the course delivery. Self study content is intended to be used as a medium that relies on the learner to follow through on learning tasks related to a course.

All specifications in Deliverable DT1.2 affect the selection of the training strategy.

2.2.4 Assessment

Learners should be evaluated after the training to ensure that their needs have been met. Evaluation should take place on the following four levels, as developed by Kirkpatrick (1994):

1. Evaluation of learner satisfaction: Did the learner enjoy the training?

Just as the word implies, evaluation at this level measures how participants in a training program react to it. It attempts to answer questions regarding the participants' perceptions including if the learners enjoyed the course, and whether the material relevant to their work. This type of evaluation is often called a "smile-sheet." According to Kirkpatrick, every program should at least be evaluated at this level to improve the training program. In addition, the participants' reactions have important consequences for the evaluation of learning. Although a positive reaction does not guarantee learning, a negative reaction almost certainly reduces its possibility.

2. Evaluation of learning achievement: Have learning objectives been met on the completion of training?

Assessing at this level moves the evaluation beyond learner satisfaction and attempts to assess the extent to which learners have advanced in skills, knowledge, or attitude. Measurement at this level is more difficult and laborious than level one. Methods range from formal to informal testing to team assessment and self-assessment. If possible, participants take the test or assessment before the training (pre-test) and after training (post-test) to determine the amount of learning that has occurred.

3. Continuous Evaluation:

Are the learners able to use the training in their jobs?

This level measures the transfer that has occurred in learners' behaviour due to the training program. Evaluating at this level attempts to answer the question: Are the newly acquired skills, knowledge, or attitude being used in the everyday environment of the learner? For many trainers this level represents the truest assessment of a program's effectiveness. However, measuring at this level is difficult as it is often impossible to predict when the change in behaviour will occur,

and thus requires important decisions in terms of when to evaluate, how often to evaluate, and how to evaluate.

Is the mission of the organization advanced?

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4. Evaluation of training delivery mechanism: Was the training delivery mechanism successful in delivering the training content?

Evaluation at this level assesses the learners' satisfaction with the delivery mechanism in delivering the contents of the course.

A common learning evaluation strategy is developed to address the above questions. This is given in Section 3.

2.3 Architecture design

In this activity course designers define:

- training contents module by module; including target learners, learning objectives, and mapping to course goals given in DT1.2.
- the relationships among modules, in terms of precedence and sequences

2.4 Delivery mechanisms

The selection of the Moodle system to deliver training contents has been made for all courses; the most common IT components used in classical distance learning courses will be adopted. The platform Moodle, a course management system (CMS), is chosen to give TC1 course; and provides the following functionalities:

- To manage the planning of the course including its syllabus, agendas, and calendar.
- To publish course content including multimedia, text, video, and power point based modules, exercises in the form of quizzes, or tests.
- To enable different methods of communication including forums, blogs, chats, and email.

Regardless of the presence or distance of the modules, module delivery needs to offer published content to support learners at distance. Collaboration and tutorials need communication media as they form human based delivery. Table 1 shows delivery mechanisms available for different training strategies.

Table 1: Training Strategy vs delivery mechanisms

Training strategy	Available delivery mechanism	Form of delivery
Lecture	Multi-media animation, video, power point, text, face to face lecturing, demonstrator simulation	Human or IT based
Tutorial	Email, forum, chat, in class communication	Human based

Case study	Multi-media animation, video, power point, text, face to face story telling, demonstrator simulation	Human or IT based
Collaboration	Email, forum, chat, in class communication	Human based
Self study	Multi-media animation, video, power point, text, self study exercises, demonstrator simulation	IT based

3 Common Learning Evaluation Strategy

The assessment mechanism is to evaluate not only learner satisfaction with the delivery mechanism and course content but also the level of learning achieved by learner him/herself at the end of each course. All courses will adhere to a combination of the following fourfold assessment strategy:

1. Evaluation of learner satisfaction:

Evaluation at this level measures how participants in a training course react to it. Check-sheets will be used to collect the feedback from learners. The assessment will evaluate if participants enjoyed the course, if the material is relevant to the participant's work and if the participants will be able to use the training in their jobs. The target for this assessment is 70% of the participants to respond with a positive satisfaction feedback.

Appendix A is an example check-sheet for learner satisfaction for the evaluation of each module.

Appendix B is an example check-sheet for general learner satisfaction evaluation.

2. Evaluation of training delivery mechanism:

Evaluation at this level measures how participants assess the training delivery mechanism for a particular course. Check-sheets will be used to collect the feedback from learners regarding the participants' perceptions on the stability and user-friendliness of the delivery mechanism, and the ease of understanding of the content. The target for this assessment is 70% of the participants to respond with a positive satisfaction feedback.

Appendix C is an example check-sheet for the Moodle training system evaluation.

3. Evaluation of learning achievement:

Evaluation at this level measures to what level the participants have achieved learning. After the learners finish the training process for a particular course or module, they are asked to have an exam. The length, delivery mechanism and types of the examinations differ between courses. The target for this assessment is 70% of the participants to obtain the 50% pass grade in each course.

4. Continuous evaluation:

Evaluation at this level measures how participants use the training knowledge, skills or attitude in practice and if the mission of the training has been advanced. A check-sheet will be sent to the learners six months after their training is given, tracking the training results in a long-term. The target for this assessment is 70% of the participants to respond with a positive satisfaction feedback.

4 Storyboards of courses

This section presents the storyboard of each course structured according to micro analysis structure presented in Section 2.

4.1 TC1: Technical course on PROMISE technologies at system level

The objective of TC1 is to give an overall presentation of the PROMISE project, architecture and technology. An important objective is also to inform and motivate end users and external partners about the impact of this technology. This course is to be delivered by SINTEF.

4.1.1 Instructional model

4.1.1.1 Presence vs. Distance

The course will be available on distance in electronic form. However the course material will also be available on overheads for personal presentations. This may be the case in promoting PROMISE to end users and external partners.

Table 2: Presence and pre-requisites for TC1 modules

Module No.	Module name	Presence/distance	Pre-requisites
TC1.1	Introduction to TC1 training	Distance	None
TC1.2	What is PROMISE?	Distance	None
TC1.3	Application areas	Distance	None
TC1.4	PROMISE system Architecture	Distance	None
TC1.5	PROMISE components (HW/SW)	Distance	None
TC1.6	How to integrate existing systems (HW/SW) into PROMISE architecture	Distance	None
TC1.7	How to implement PROMISE applications	Distance	None
TC1.8	Examples of business impact using PROMISE technology (demo cases)	Distance	None

4.1.1.2 Learner autonomy

The course will in most cases be downloaded from long distance and no learner is needed. When the course is used to promote PROMISE for end users, face to face communication with external partners will normally be used. The degree of learner autonomy is in this case high.

4.1.1.3 Training strategy

Self study: There will be e-learning accounts allocated for trainees to develop their general knowledge of PROMISE project, architecture and technology in their own time. The web space hosts material in form of text materials, PowerPoint presentations, project reports, and demo videos.

Table 3 shows modules and their associated training strategy.

Table 3: Training strategy for TC1

Module No.	Module name	Self study
TC1.1	Introduction to TC1 training	✓
TC1.2	What is PROMISE?	✓
TC1.3	Application areas	✓
TC1.4	PROMISE system Architecture	✓
TC1.5	PROMISE components (HW/SW)	✓
TC1.6	How to integrate existing systems (HW/SW) into PROMISE architecture	✓
TC1.7	How to implement PROMISE applications	✓
TC1.8	Examples of business impact using PROMISE technology (demo cases)	✓

4.1.1.4 Evaluation

TC1 is expected to be a course used many times during the PROMISE life time. Learning objectives will therefore be continuously evaluated.

Table 4: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	-
Evaluation of learning achievement	-
Continuous evaluation	All modules

4.1.2 Architecture design

The general objective of this course (TC1) is to give an overall presentation of the PROMISE project. The course will describe the PROMISE architecture, components and how the PROMISE technology can be implemented into existing products and infrastructure. Business impact on implemented industrial cases will also be shown.

The course modules can be divided into 4 groups with different type of focus and motivation

Table 5: Focus for TC1

Focus on	Content	Module number
Motivation	Why PROMISE?	TC1.1, TC1.2, TC1.3

Architecture	What can PROMISE offer - PROMISE technology	TC1.4, TC1.5
Implementation	How to use / implement PROMISE results	TC1.6, TC1.7
Impact	Results and impact from demo cases	TC1.8

Table 6 shows a mapping of the course modules to the training goals set out in DT 1.2, and the content description of the courses.

Table 6: Module content description and target groups

Goal	Module	Content description	Learner group
	Introduction to TC1 training	Training Objectives Training Strategies Training Schedule	All
To give an overall description of the PROMISE technology and potential	What is PROMISE?	Objectives Closing the info loop BOL-MOL-EOL Problems to be addressed What can PROMISE do for the customer	External End user Researcher Business
To describe the business possibilities and potential of PROMISE technology in different industrial areas	Application areas	BOL-MOL-EOL Business potential Industrial areas (industry, services, etc) PROMISE demo cases (short introduction)	External End user Researcher Business
To deliver a description and understanding of the PROMISE architecture	PROMISE system Architecture	Overall architecture Components System layers and interfaces Standards Data capture and information flow	External End user Researcher Business
To deliver a description and understanding of the PROMISE components	PROMISE components (HW/SW)	PEID PDKM DSS middleware others	External End user Researcher Business
To describe how existing systems at end users can be integrated into PROMISE architecture	How to integrate existing systems (HW/SW) into PROMISE architecture	Use existing PDKM databases Develop company specific solutions Integration Data capture – sensors	End user Researcher Business
To deliver methods and descriptions how to implement PROMISE technology	How to implement PROMISE applications	Implementation Guidelines	End user Researcher

To deliver examples of implementation cases and describe business impact	Examples of business impact using PROMISE technology (demo cases)	Caterpillar Bombardier CRF Intracom Fidia Indesit	End user Researcher Business
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The learning objectives in this case are:

- Introduction to TC1 training: Learners will be introduced to PROMISE technology and training
- What is PROMISE?: Learners will have an overall picture of the PROMISE technology and potential
- Application areas: Learners will understand the business possibilities and potential of PROMISE technology in different industrial areas
- PROMISE system Architecture: Learners will have an understanding of the PROMISE architecture
- PROMISE components (HW/SW): Learners will have an understanding of the PROMISE components
- How to integrate existing systems (HW/SW) into PROMISE architecture: Learners will be able to describe how existing systems at end users can be integrated into PROMISE architecture
- How to implement PROMISE applications: Learners will have an understanding of methods and descriptions on how to implement PROMISE technology
- Examples of business impact using PROMISE technology (demo cases): Understanding of learners will be sharpened through examples of implementation cases and business impact descriptions

4.1.3 Training delivery mechanisms

In TC1 training, the content will be delivered in the following formats:

- IT based (OH presentations)

4.1.4 Course schedule

Table 7 shows each module and the date of its finalization.

Table 7: Course delivery schedule for TC1

Module	Due date
Introduction to TC1 training	09/2007
What is PROMISE?	09/2007
Application areas	09/2007
PROMISE system Architecture	10/2007
PROMISE components (HW/SW)	10/2007
How to integrate existing systems (HW/SW) into PROMISE architecture	11/2007
How to implement PROMISE applications	11/2007
Examples of business impact using PROMISE technology (demo cases)	12/2007

Table 8 shows envisaged e-learning time for each module that the learners are expected to spend.

Table 8: Module timeframes for TC1

Module No.	Content	Self study (minutes)
TC1.1	Introduction to TC1 training	10
TC1.2	What is PROMISE?	20
TC1.3	Application areas	20
TC1.4	PROMISE system Architecture	20
TC1.5	PROMISE components (HW/SW)	20
TC1.6	How to integrate existing systems (HW/SW) into PROMISE architecture	15
TC1.7	How to implement PROMISE applications	15
TC1.8	Examples of business impact using PROMISE technology (demo cases)	30
Total		2 hours 20 minutes

4.2 TC2: Technical course on PROMISE DSS technology

The Decision Support System (DSS) technology course aims to provide a detailed knowledge of use and extension of the PROMISE DSS. There are four modules introducing different types of learners to their specific area. These modules are related to the following tasks:

- Installation of the DSS module,
- Usage of the DSS module,
- Overview of product analysis methods, and
- Extension of the algorithmic part of the DSS

The material is based on the work carried out in PROMISE WP R8. A total of 25 participants are expected, including programmers from research institutes who are involved in the development phase of the DSS modules for BOL, MOL and EOL phases (research group); and technical staff from the PROMISE demonstrator owners who will be involved in the testing phase of the DSS modules for BOL, MOL and EOL phase (end user group). This course is to be delivered by COGNIDATA and Cambridge.

4.2.1 Instructional model

Much education and preparation is necessary in order to run this course. The learners need to

- know the programming environment (and preferably have it installed on her/his PC),
- have the DSS installed on the class PC,
- have a good background in statistics and, of course,
- understand the processes where the DSS is applied.

Provided that these prerequisites are satisfied, this course can be given with the goal to put every learner into the position to implement their own DSS scenario.

4.2.1.1 Presence vs. Distance

This set of topics leads to a mixture of distance and presence based modules. In the table below a list of the modules with their pre-requisites and the presence required is shown.

Table 9: Presence and pre-requisites for TC2 modules

Module No.	Module name	Presence/distance	Pre-requisites
TC2.1	Introduction to Decision Support in Product Lifecycle Management	Distance	Basic background in Mechanical Engineering
TC2.2	Usage of a DSS	Distance	TC2.1 The class PCs need to have the environment installed including some example case studies
TC2.3	Advances in Decision Support in Product Lifecycle Management	Distance	TC2.1 +TC2.2 Good background in Mechanical Engineering and Statistics
TC2.4	Programming decision support scenarios in a DSS	Presence	TC2.1 + TC2.2 + TC2.3 Good background in Mechanical Engineering, Statistics and Modern Programming

The face to face lectures can be given in the form of a workshop where all learners get the programming system explained and can see from code examples how to write their own programs.

In addition the learner may install the open source programming environment and the DSS and leave her/him to write own programs. The course material would then be similar to the standard courses for programming languages like Java.

4.2.1.2 Learner autonomy

Two delivery systems are currently foreseen for the modules: firstly, lectures which have to be physically attended and, secondly, well-prepared material for self study. The second alternative does allow a high degree of learner autonomy.

The self study course has a theoretical part in which the foundations are clarified and a practical part in which the system and the DSS methods are applied. Participants need to be well-prepared, in order to follow the content of modules TC2.3 and TC2.4. Moreover, after TC2.4 an intensive self-study is necessary to become an efficient DSS programmer.

4.2.1.3 Training strategy

The following training strategies will be applied:

- **Lecture:** The content is delivered using class based presentations.
- **Self study:** This part of the training will be delivered in form of well-prepared material. The learners have to go through the material. In due course TC2.3 PROMISE is preparing a

handbook on DSS technology. However, further reading of background literature is highly recommended. In course TC2.4 it is certainly valuable to program small pieces of code on its own in order to become familiar with the system.

The next table shows modules and their associated training strategies.

Table 10: Training strategy for TC2

Module No.	Module name	Lecture	Self study
TC2.1	Introduction to Decision Support in Product Lifecycle Management	-	✓
TC2.2	Usage of a DSS	-	✓
TC2.3	Advances in Decision Support in Product Lifecycle Management	-	✓
TC2.4	Programming decision support scenarios in a DSS	✓	-

4.2.1.4 Evaluation

A survey will be used at the end of the training day to gather the participants' feedback regarding their enjoyment of the course and its relevance to their work.

Table 11: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	-
Evaluation of learning achievement	-
Continuous evaluation	-

4.2.2 Architecture design

In the following table a mapping of the course modules to the training goals set out in DT 1.2 is shown, and the content description of the courses. Most of the modules are targeted to both types of learner groups, whereas only the programming course is dedicated to the software engineers.

Table 12: Module content description and target groups

Goal	Module name	Content Description	Learner group
Technical benefits of DSS	Introduction to Decision Support in Product Lifecycle Management	Explain learners the advantages and concepts of different strategies for Decision support in Product Lifecycle Management	End user
How to use DSS	Usage of a DSS	Hands on usage shows the learner how to work with a	These learners will apply the DSS for different problems in different sectors.

		DSS.	
Which logic is behind the DSS	Advances in Decision Support in Product Lifecycle Management	Presentation of different decision support methods for standard scenarios like preventive maintenance.	
How to Implement the DSS prototype	Introduction to Decision Support in Product Lifecycle Management	Explain learners the advantages and concepts of different strategies for Decision support in Product Lifecycle Management	Research: High availability of sharing and collaborating of learners is expected because one of their main goals is to develop the software code for the various DSS modules.
Which tools to use for the DSS development	Usage of a DSS	Hands on usage shows the learner how to work with a DSS.	
How to implement the final DSS	Advances in Decision Support in Product Lifecycle Management	Presentation of different decision support methods for standard scenarios like preventive maintenance.	
Technical benefits of DSS	Programming decision support scenarios in a DSS.	Allow learners to implement own decision support strategies and extend the DSS.	

The learning objectives of each module are given below.

- Introduction to Decision Support in Product Lifecycle Management: At the end of this module the participants should have a basic understanding of decision support functionalities in Product Lifecycle Management.
- Usage of a DSS: At the end of this module the participants will be able to use a DSS and to work on their own analysis problems with a readily configured system.
- Advances in Decision Support in Product Lifecycle Management: At the end of this module the participants have got a wide overview of the opportunities of decision support.
- Programming decision support scenarios in a DSS: The participants will have learned to implement new DSS functions.

4.2.3 Training delivery mechanisms

The lectures are delivered in person using presentations. The hands on modules are practical sessions that make use of some well-equipped lab and are delivered under the supervision of the lecturers.

For the parts which can be learned by self-study it might be advantageous to have a running test system with simple examples.

4.2.4 Course schedule

The next table presents the delivery schedule of the different module components.

Table 13: Course delivery schedule for TC2

Module	Due date
Introduction to Decision Support in Product Lifecycle Management	11/2007
Usage of a DSS	11/2007 after finishing

	the DSS
Advances in Decision Support in Product Lifecycle Management	11/2007 after finishing the handbook for DSS
Programming decision support scenarios in a DSS.	14/09/2006

Table 14 shows the envisaged timeframe for each module.

Table 14: Module timeframes for TC2

Module No.	Content	Self-study (minutes)	Lecture (minutes)
TC2.1	Introduction to Decision Support in Product Lifecycle Management	60	-
TC2.2	Usage of a DSS	120	-
TC2.3	Advances in Decision Support in Product Lifecycle Management	120	-
TC2.4	Programming decision support scenarios in a DSS.	-	360
Total		5 hours	6 hours

4.3 TC3: Technical course on PROMISE PDKM technology

The PROMISE PDKM technology course aims to provide a detailed knowledge of the PDKM component developed in PROMISE.

A total of 10-20 participants are expected, including technical staff from the PROMISE demonstrator owners who will be involved in the testing phase (end user group). This course is to be delivered by InMediasP.

4.3.1 Instructional model

4.3.1.1 Presence vs. Distance

The course will be blended:

- Distance: the pre-requisites that are necessary to be acquired before attending face to face lessons will be delivered using the PROMISE training platform.
- Presence: training on how to customize and populate the PDKM is an activity that requires high interactions between trainer and learners, thus it will be a face to face lesson.

Table 15: Presence and pre-requisites for TC3 modules

Module number	Module name	Presence/distance	Pre-requisites
TC3.1	PDKM description	Distance	None
TC3.2	Products	Presence	TC3.1
TC3.3	Additional attributes	Presence	TC3.2
TC3.4	Product structures	Presence	TC3.3
TC3.5	Field data	Presence	TC3.4
TC3.6	Events	Presence	TC3.5

4.3.1.2 Learner autonomy

The degree of autonomy of learners required for this course is low, this does not allow selecting some specific pathways during the training. The main reason is that this course will provide

practical set of concepts and guidelines in a tutorial style to customize the PDKM in the development of demonstrators.

4.3.1.3 Training strategy

The training strategies used in this course are:

- **Lecture:** The structure of the PDKM system and its functions are explained. General information about PDKM will be provided for self-study. Face-to-face lectures will be carried out for PDKM front-end and PDKM back-end functions. Latter is designed for PDKM key-users.
- **Case study:** The trainings will include solution proposals for real-life problems.

Table 16: Training strategy for TC3

Module No.	Module name	Lecture (distance)	Lecture (face to face)	Case study
TC3.1	PDKM description	✓	-	-
TC3.2	Products	-	✓	✓
TC3.3	Additional attributes	-	✓	✓
TC3.4	Product structures	-	✓	✓
TC3.5	Field data	-	✓	✓
TC3.6	Events	-	✓	✓

4.3.1.4 Evaluation

Learners will be evaluated with the following questionnaires:

- **Intermediate test:** is to be given before attending the face to face lessons to evaluate the acquisition of pre-requisites
- **Final test:** is to be given at the end of the course to evaluate learning achievement.
- **Satisfaction questionnaires:** The quality of the course will be assessed by means of satisfaction questionnaires filled by learners at the end of the course (after the final test).

The efficacy of the course will be assessed by collecting some statistics in the post-training activities, i.e. during the PDKM customization. These statistics will concern information on number of bugs, help requests, etc. Furthermore user activity in the PDKM system will be tracked, e.g. number of created objects, database access, implemented classes/characteristics, field data input, changed attributes etc.

Table 17: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	-
Evaluation of learning achievement	All modules
Continuous evaluation	All modules

4.3.2 Architecture design

Table 18 shows a mapping of the course modules to the training goals set out in DT 1.2, and the content description of the courses.

Table 18: Module content description and target groups

Goal	Module name	Content description	Learner group
Give an overview of the PDKM back-end	PDKM introduction	Basics, accessing the back-end, navigation, transaction, search	Key-user of the application scenario
Understanding product modelling in PDKM	Products	Product types, product instances, creating equipments and materials	Key-user of the application scenario
Modelling application specific attributes	Additional attributes	Classification, creating classes and characteristics, allocation of attributes	Key-user of the application scenario
Creating product structures in PDKM	Product structures	Product hierarchies, sub-equipments, install/uninstall equipments	Key-user of the application scenario
Understanding field data management	Field data	Field data types, creating measuring points and measurement documents	Key-user of the application scenario
Understanding event management	Events	Event types, creating notifications, customised notifications	Key-user of the application scenario

4.3.3 Training delivery mechanisms

TC3.1 will be delivered using documentation explained via lectures whereas the rest of the modules will be delivered using power point presentation, and case study based application exercises during lectures, and tutorials.

4.3.4 Course schedule

Table 19 shows each module and the date of its finalization.

Table 19: Course delivery schedule for TC3

Module	Due date
TC3.1, TC3.2, TC3.3	03/04/2007
TC3.4, TC3.5, TC3.6	19/04/2007

Table 20 shows envisaged e-learning time for each module that the learners are expected to spend.

Table 20: Module timeframes for TC3

Module No.	Content	Lecture (face to face) (minutes)	Case study (minutes)
TC3.1	PDKM description	30	15
TC3.2	Products	45	60
TC3.3	Additional attributes	30	30
TC3.4	Product structures	30	30
TC3.5	Field data	45	60
TC3.6	Events	30	30
Total (minutes)		210	235

4.4 TC4: Technical course on PROMISE PEID technology

The PEID technology course aims to provide a detailed knowledge of the PEID component developed in PROMISE. TC4 course content is to be delivered by Cambridge, BIBA, Infineon and Stockway, under the design and leadership of Cambridge. There are seven modules introducing the learners to a range of considerations when employing the PEID technology. These include considerations relating to the physics of RFID such as environmental influences on its effective usage, hardware and software integration and RFID based product data management, as well as legislation and policy issues to consider when deploying RFID solutions. A total of 25 participants are expected, including technical staff from application owners (end user group) and programmers and researchers from universities (research group). The domain expertise of participants ranges in IT, mechanical and production engineering.

4.4.1 Instructional model

4.4.1.1 Presence vs. Distance

Given such a broad range of topics the instructional model is a blend of distance and presence based modules. All modules except the practical RFID DIY module are supported by e-learning self study platform which is followed at distance. All modules except legislation and policy issues have a presence component where lectures are followed by hands on practical experience. Cambridge Auto-ID labs provide the ideal environment for the hands on training. It is envisaged that one day of attendance will be required to deliver the lectures and hands on training. Table 21 shows a list of the modules with their pre-requisites and the presence required.

Table 21: Presence and pre-requisites for TC4 modules

Module number	Module name	Presence/distance	Pre-requisites
TC4.1	Motivation & Background	Presence & Distance	None
TC4.2	Components	Presence & Distance	TC4.1
TC4.3	Physics of RFID	Presence & Distance	TC4.2
TC4.4	Legislation and policy	Distance	TC4.3, TC4.6, TC4.7

	issues		
TC4.5	RFID DIY	Presence	TC4.3
TC4.6	RFID integration a. RFID Hardware integration b. RFID software integration	Presence & Distance	TC4.3
TC4.7	RFID based product data management	Presence & Distance	TC4.6

4.4.1.2 Learner autonomy

Three delivery systems are in place for the modules: lectures, self-learning and tutorial training. The highest degree of learner autonomy with these delivery mechanisms is the distance based self-learning followed by the hands on tutorial sessions. During hands on training after demonstration of technologies participants will be divided into groups and given small assignments to complete under the supervision of Cambridge Auto-ID lab trainers. At the end of lectures on training day the attendees will be encouraged to actively participate in the lecture by group discussion. This will encourage group discussion and learner autonomy. While the seminar and hands on training encourage group discussion, and the e-learning platform is developed to support the modules to ensure that participants have a permanent reference for the delivered concepts in their own time. Participants will be encouraged to read the online material before attending the training day.

4.4.1.3 Training strategy

A blend of the following training strategies will be followed:

- **Lecture:** The seminar is delivered using various class based presentations followed by discussion sessions.
- **Tutorial:** This part of the training will be delivered as a hands on lab based module. The module is aimed to demonstrate the individual components and their configurations to successfully set up an RFID system.
- **Self-study:** There will be a e-learning accounts allocated for trainees to develop their RFID knowledge in their own time. The web space hosts material used in the classrooms as well as extra material for self-learning.

Given the homogeneous background in terms of technical expertise and interests, the modules rapidly build up on technical content after the short introduction. The hands on experience is intended to capture the interest of the participants by encouraging them to experiment. During the RFID DIY module participants will be tagging and reading a component they use in their work so that maximum relevance to their work is ensured and they can receive expert advice during the day.

Table 22 shows modules and their associated training strategies.

Table 22: Training strategy for TC4

Module No.	Module name	Lecture	Hands on Tutorial	Self-study
TC4.1	Motivation & Background	✓	-	✓
TC4.2	Components	✓	✓	✓
TC4.3	Physics of RFID	✓	✓	✓

TC4.4	Legislation and policy issues	-	-	✓
TC4.5	RFID DIY	-	✓	-
TC4.6	RFID integration a. RFID Hardware integration b. RFID software integration	✓	✓	✓
TC4.7	RFID based product data management	✓	-	✓

4.4.1.4 Evaluation

A threefold assessment strategy will be followed.

- A survey will be used at the end of the training day to gather the participants' feedback regarding their enjoyment of the course and its relevance to their work. A further survey is sent after six months to the participants to gather continuous evaluation.
- Assessment exercises will be placed on the e-learning platform for learners to complete after each module. This shall provide evaluation of learning achievement at learner level. A multiple-choice assessment will be included for each module for trainees to assess their development. Multiple-choice questions are for each module and care will be taken to provide as much case based questions as possible for learners to relate taught the material to industry.
- Furthermore the RFID DIY exercise module provides an ideal frame to assess learners' understanding of the delivered concepts under the supervision of RFID experts at the Cambridge Auto-ID lab.

Table 23: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	All modules
Evaluation of learning achievement	All modules
Continuous evaluation	All modules

4.4.2 Architecture design

Table 24 shows a mapping of the course modules to the training goals set out in DT 1.2, and the content description of the courses. Although most of the modules are targeted to both types of learner groups, TC4.6 will be given only to the researcher group as their interest is to gain a more in depth knowledge on the RFID systems, whereas the end user group is concerned mostly with RFID systems at the product data management level.

Table 24: Module content description and target groups

Goal	Module name	Content Description	Learner group
Goals 3 and 4	Motivation & Background	Describe why the RFID technology is needed, what are the objectives of the technology. Show example case studies from involved partners.	End user & research
	Components	Present overview of the technology involved including unique ID.	End user & research

Goal 1	Physics of RFID	Present different types of RFID technologies including passive/active, HF/UHF, near/far field UHF etc. Describe environmental effects on RFID readability.	End user & research
Goal 2	Legislation and policy issues	Introduce legislation regarding power levels and UHF Bands. Explain policies to address privacy concerns of consumers. Present Health & Safety regards, general standards on RFID, and sources of legislation.	End user & research
Goals 1-6	RFID DIY	Allow users to test RFID solutions on their products thereby enabling a practical experience of the concepts learned in modules TC4.1, TC4.2, TC4.3.	End user & research
Goals 3 and 4	RFID integration a. RFID Hardware integration b. RFID software integration	Illustrate the integration of PEIDs to existing hardware such as the ECU of the vehicle. Illustrate the development and integration of software that can communicate with the PEIDs	Research
Goal 6	RFID based product data management	Discuss advantages of holding data on tag vs. network (including distributed and centralised). Describe sensor ID, and integration of data coming from different PEIDs and translation of data to meaningful information.	End user & research

The learning objectives of each module are given below.

- Motivation & Background: At the end of this module the participants should have an understanding of why the RFID technology is needed, and what are the objectives of the technology.
- Components: At the end of this module the participants will have a general understanding the components of the technology involved including unique ID including different ID systems, tags, and readers.
- Physics of RFID: At the end of this module the participants are expected to understand basic issues involved with tag placement, and interferences of materials the tag is attached to.
- Legislation and policy issues: The participants will know the general legislation regarding RFID systems, and where to find policies.
- RFID DIY: At the end of this module the participants will have an experience of tag placement and reading in their own products.

- RFID integration: At the end of this module the participants should have a basic understanding of the integration of PEIDs to existing hardware and software, including filtering of data on the network.
- RFID based product data management: Participants will have an understanding of translation of tag data to meaningful information and the issues involved with data on tag vs. data on network.

The general precedence strategy starts with familiarization with RFID needs, and follows on to technology, legislation and standards of RFID, integration of RFID to existing systems, and finally familiarization with different strategies for RFID data management.

The self study modules are given in the following order of delivery: TC4.1, TC4.2, TC4.3, TC4.4, TC4.6, TC4.7. During the training day lectures and hands on training will be given consecutively for each module. Modules will be given in the following order: TC4.1, TC4.2, TC4.3, TC4.5, TC4.6, TC4.7. A discussion session is to be held at the end of the day.

4.4.3 Training delivery mechanisms

While the e-learning self study platform delivers an IT based training, and makes use of video, text and power point delivery formats. The lectures are delivered in person using power point presentations. The hands on tutorial modules are practical sessions that make use of the Cambridge Auto-ID labs and are delivered under the supervision of the lecturers.

4.4.4 Course schedule

Table 25 presents the delivery schedule of the different module components, while Table 26 shows the envisaged timeframes for each module.

Table 25: Course delivery schedule for TC4

Module	Due date
E-learning self study platforms for TC4.1, TC4.2, TC4.3, TC4.4, TC4.6, TC4.7	29/06/2007
Lecture delivery for TC4.1, TC4.2, TC4.3, TC4.6, TC4.7	23/07/2007
Hands on tutorial delivery for TC4.2, TC4.3, TC4.5, TC4.6	23 /07/2007

Table 26: Module timeframes for TC4

Module No.	Module name	Self study (minutes)	Lecture (minutes)	Tutorial (minutes)
TC4.1	Motivation & Background	15	15	-
TC4.2	Components	30	15	30
TC4.3	Physics of RFID	60	15	60
TC4.4	Legislation and policy issues	60	-	-
TC4.5	RFID DIY	-	-	60
TC4.6	RFID integration a. RFID Hardware integration b. RFID software integration	60	25	90

TC4.7	RFID based product data management	30	15	-
Total		3 hours 15 minutes	1 hour 25 minutes	3 hours

4.5 TC5: Technical course on PROMISE Middleware technology

The PROMISE PDKM technology course aims to provide a detailed knowledge of the Middleware component developed in PROMISE. Middleware is a generic term for a piece of software that allows two or more otherwise incompatible software components to communicate with each other. With the increasing use of *distributed applications* that communicate over Internet, Middleware is more and more often used for describing the message-passing mechanism needed in such applications, where message persistence, authentication, encryption etc. are considered to be a part of Middleware functionality. Data filtering and semantic enrichment of information may also sometimes be included in the Middleware. The PROMISE Middleware technology course aims to provide a basic understanding of the Middleware concept, its role in PROMISE and how it can be put into use by end-users.

A total of 15 participants are expected, including technical staff from the PROMISE end users who will be responsible for applying the PEID concept to suit their application (end user group). This course is to be delivered by HUT.

4.5.1 Instructional model

4.5.1.1 Presence vs. Distance

The course will be distance-based. This is mainly motivated by the generic nature of Middleware, which makes it difficult to define a presence-based course to a target audience with very different background in a meaningful way. Even though PROMISE demonstrators can be used for illustrating the role and use of Middleware, targeted and presence-based instruction can be expected to be the most efficient when provided in connection with the PROMISE demonstrators and the corresponding end-users. Such presence-based instruction is best given by the technical partners that implement the actual demonstrator.

Table 27: Presence and pre-requisites for TC5 modules

Module No.	Module name	Presence/distance	Pre-requisites
TC5.1	Middleware	Distance	None
TC5.2	PROMISE Middleware	Distance	TC5.1
TC5.3	Installation and setup	Distance	TC5.2

4.5.1.2 Learner autonomy

The web-based course material is to be designed in a way that allows for good learner autonomy. This signifies that there should be illustrative examples and demonstrations included in the course material. It would also be preferable that learners could download, install and test some test software by themselves, but this could turn out to be unrealistic due to security restrictions on learners' computers.

4.5.1.3 Training strategy

The training strategy will mainly be tutorial-based. Representative case studies selected from PROMISE demonstrators or similar application scenarios will also be used in order to help the learners to understand the connection with their own needs. If possible, limited on-line

simulations could also be used even though it is not yet certain to what extent such simulations would increase the learner's understanding. As web-based self study environment is mainly client-server based, it is challenging to demonstrate how a distributed program works in such a way that it would provide an increased understanding.

Table 28: Training strategy for TC5

Module No.	Module name	Tutorial	Case study
TC5.1	Middleware	✓	✓
TC5.2	PROMISE Middleware	✓	✓
TC5.3	Installation and setup	-	✓

4.5.1.4 Evaluation

Feedback forms, and a questionnaire will be used to evaluate to what extent the contents have been understood by the learners.

Table 29: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	-
Evaluation of learning achievement	All modules
Continuous evaluation	-

4.5.2 Architecture design

Three modules are planned for the course. Table 30 shows a mapping of the course modules to the training goals set out in DT 1.2, and the content description of the courses.

Table 30: Module content description and target groups

Goal	Module	Content description	Learner group
To gain an understanding of middleware	Middleware	Definition of Middleware, typical use of Middleware, Middleware protocols	End user
To gain an understanding of PROMISE middleware interfaces	PROMISE Middleware	PROMISE architecture, Middleware interfaces in the PROMISE architecture, choice of Middleware protocols, extensibility for future need, limitations.	End user
To know how to install and set up PROMISE middleware	Installation and setup	Different implementations of PROMISE Middleware, firewall issues, examples mainly using PROMISE Middleware	End user

		implementation with HUT's DIALOG software platform.	
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The learning objectives of each module are given below.

- Middleware in general: understand the “middleware” concept, background, technology, application domains.
- PROMISE Middleware: understand the role of “PROMISE Middleware”, position in “PROMISE architecture”, implemented functionality, and underlying technology.
- Installation, setup: understand how a PROMISE Middleware is set up, how it is integrated with existing IT systems, how it communicates with PEIDs, how it can be distributed over different computers.

4.5.3 Training delivery mechanisms

The course is IT based. The training environment would consist of syllabus, course content and possibly a discussion forum (as provided by Moodle).

4.5.4 Course schedule

Table 31 presents the delivery schedule of the different module components.

Table 31: Course delivery schedule for TC5

Module	Due date
E-learning platforms for TC5.1, TC5.2, TC5.3	12/2007

Table 32 shows envisaged e-learning time for each module that the learners are expected to spend.

Table 32: Module timeframes for TC5

Module No.	Module name	Tutorial (minutes)	Case study (minutes)
TC5.1	Middleware	60	30
TC5.2	PROMISE Middleware	60	120
TC5.3	Installation and setup	-	240
Total		2 hours	6 hours 30 minutes

4.6 BC1: Business course over all the whole life cycle

BC1 aims to provide main PROMISE concepts, technologies, and benefits overall the lifecycle and presents a business view over the PROMIS benefits. Most people interested in the whole product lifecycle are expected to be persons at a certain management level of a company or researchers or engineers working in the lifecycle engineering area. The content on the whole product lifecycle will be useful for trainees of various industry domains and academic researchers. Learners are expected to be of diverse backgrounds, especially, IT, Logistics, Finance, Mechanical Engineering, Marketing and Sales, Research. The PROMISE whole life cycle business course aims to provide to provide the basic concept of product lifecycle management,

characteristics of PROMISE PLM, conceptual system architecture, and research issues and tools of each product lifecycle phase.

A total of 33 participants are expected, including individuals interested in the whole spectrum of product lifecycle including BOL, MOL, and EOL (end user group). This course is to be delivered by EPFL.

4.6.1 Instructional model

4.6.1.1 Presence vs. Distance

The training contents will include introductions to lifecycle concept, issues, and applications in PROMISE project, training methods do not require face to face education. Hence, we expect that the most suitable way to deliver course will be at distance. Table 33 shows a list of the modules with their pre-requisites and the type of presence/distance required.

Table 33: Presence and pre-requisites for BC1 modules

Module number	Module name	Presence/distance	Pre-requisites
BC1.1	Introduction of PLM	Distance	None
BC1.2	Closed-loop PLM	Distance	None
BC1.3	Introduction of system architecture for closed-loop PLM	Distance	None
BC1.4	Introduction of whole product lifecycle	Distance	None
BC1.5	Introduction of BOL	Distance	None
BC1.6	Introduction of MOL	Distance	None
BC1.7	Introduction of EOL	Distance	None

4.6.1.2 Learner autonomy

Regarding the training of whole lifecycle concept, we expect that the degree of learner autonomy is medium. The training does not require much interactive communications and it does not request high skill levels. The learner with medium level of autonomy is expected to understand the overall concept of product lifecycle management, overall issues happening throughout the whole lifecycle, and solution frameworks for them.

4.6.1.3 Training strategy

Training in whole product lifecycle will be done with the following two methods:

- **Self study:** Learning materials, in form of text materials, PowerPoint presentations, project reports, journal/conference publications, and EU directive documents will be available for learners.
- **Case study:** Learners can get real product lifecycle concept and solutions from PROMISE 10 applications. For this, presentation materials and some movies for the demonstration of each application case study will be available.

Table 34 shows modules and their associated training strategies.

Table 34: Training strategy for BC1

Module No.	Module name	Self study	Case study
BC1.1	Introduction of PLM	✓	-
BC1.2	Closed-loop PLM	✓	-
BC1.3	Introduction of system architecture for closed-loop PLM	✓	-
BC1.4	Introduction of whole product lifecycle	✓	-
BC1.5	Introduction of BOL	✓	✓
BC1.6	Introduction of MOL	✓	✓
BC1.7	Introduction of EOL	✓	✓

4.6.1.4 Evaluation

This course will be assessed by trainees from the two viewpoints: Content and Training system.

1. Content assessment: The training contents should be evaluated by trainees to identify whether suitable materials and subjects are delivered to them or not. Since the subject of whole product lifecycle is somewhat abstract and broad, it will be necessary to get feedback from trainees for checking the maturity of the course.
2. Training System assessment: Not only training contents but also training system should be assessed by trainees. In the BC1 training, we will mainly give lectures based on on-line presentations at the Moodle system. The effectiveness of on-line presentations and the interface of Moodle system should be evaluated by the trainees.

A mapping of the evaluation to the common evaluation strategy is given in the table below.

Table 35: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	All modules
Evaluation of learning achievement	All modules
Continuous evaluation	-

4.6.2 Architecture design

The goal of this course is to provide the general concept of product lifecycle, PROMISE specific product lifecycle concept, and overall views of product lifecycle management from business,

software, and hardware viewpoints. Table 36 shows a mapping of the course modules to the training goals set out in DT 1.2, and the content description of the courses.

Table 36: Module content description and target groups

Goal	Content	Content description	Learner group
Getting general PLM concept	Introduction of PLM	Introduction of lifecycle concept and definition Product lifecycle management Difference among PLM and CPC	End user
Getting PROMISE PLM concept	Closed-loop PLM	Introduction of emerging technologies Introduction of closed-loop PLM Introduction of PROMISE	End user
Understanding Conceptual architecture of PROMISE PLM	Introduction of system architecture for closed-loop PLM	Generic PLM model Business architecture Hardware architecture Software architecture	End user
Understanding challenging issues and solutions in the whole product lifecycle	Introduction of whole product lifecycle	Whole product lifecycle issues Solution approach	End user
Understanding BOL and learning practical things from PROMISE cases	Introduction of BOL	Characteristics of BOL lifecycle phase Description of Business issue How to solve them in PROMISE framework Solution approach Introduction of PROMISE case study or demonstration	End user
Understanding MOL and learning practical things from PROMISE cases	Introduction of MOL	Characteristics of MOL lifecycle phase Description of Business issue How to solve them in PROMISE framework Solution approach Introduction of PROMISE case study or demonstration	End user
Understanding EOL and learning practical things from PROMISE cases	Introduction of EOL	Characteristics of EOL lifecycle phase Description of Business issue How to solve them in PROMISE framework Solution approach Introduction of PROMISE case study or demonstration	End user

The learning objectives of each module are given below:

- Introduction of PLM: The objective is to introduce the general concept of PLM, basic functions, review of commercial software, and difference among other enterprise applications such as SCM, CRM, CPC, and PDM.
- Closed-loop PLM: The objective is to provide the concept and background of closed-loop PLM, difference between PLM and the closed-loop PLM, and characteristics of closed-loop PLM. Furthermore, emerging technologies that enable closed-loop PLM are introduced.
- Introduction of system architecture for closed-loop PLM: It deals with the conceptual architecture of closed-loop PLM system, which consists of business, hardware, and software viewpoints. Through this session, learners will get necessary components and their relations for closed-loop PLM.
- Introduction of whole product lifecycle: It will introduce the challenging research issues of whole product lifecycle and their solution tools.
- Introduction of BOL: The objective is to provide characteristics, challenging issues, solution approaches, and PROMISE cases of the beginning-of-life phase.
- Introduction of MOL: The objective is to provide characteristics, challenging issues, solution approaches, and PROMISE cases of the middle-of-life phase.
- Introduction of EOL: The objective is to provide characteristics, challenging issues, solution approaches, and PROMISE cases of the end-of-life phase.

4.6.3 Training delivery mechanisms

With the Moodle platform, several types of delivery format such as power point, text, video will be possible depending on the characteristics of contents. Using this platform the trainees can navigate through relevant training material. All modules will use material delivered in textual and power point format, Modules BC1.5, BC1.6 and BC1.7 will use video based delivery as an additional learning resource.

4.6.4 Course schedule

Table 37 presents the delivery schedule of the different module components, while Table 38 shows the envisaged timeframes for each module.

Table 37: Course delivery schedule for BC1

Module	Due date
BC1.1	01/09/2007
BC1.2	15/09/2007
BC1.3	01/10/2007
BC1.4	15/10/2007
BC1.5	15/11/2007
BC1.6	15/11/2007
BC1.7	15/11/2007

Table 38: Module timeframes for BC1

Module No.	Module name	Lecture (minutes)	Case study (minutes)
BC1.1	Introduction of PLM	60	-
BC1.2	Closed-loop PLM	90	-
BC1.3	Introduction of system architecture for closed-loop PLM	90	-
BC1.4	Introduction of whole product lifecycle	60	60
BC1.5	Introduction of BOL	60	60
BC1.6	Introduction of MOL	60	60
BC1.7	Introduction of EOL	60	60
Total		8 hours	4 hours

4.7 BC2: Business course on BOL phase

BC2 aims to provide main PROMISE concepts, technologies, and benefits in the BOL lifecycle phase and presents a business view over the benefits deriving from the application of PROMISE technologies in the BOL phase. Typical learners interested in “business” BOL course are Producers, with leading positions in their respective companies. Background of learners can range in production, logistics, finance/controlling. Most of them do not have time to travel for training courses, therefore it is decided that the most proper way to deliver course contents in BOL will be at distance. This course is to be delivered by POLIMI.

4.7.1 Instructional model

4.7.1.1 Presence vs Distance

For BOL business courses, we foresee that simple delivery mechanisms will be used rather than face-to-face communications. The courses require classic text information. No multimedia and real-time interactivity is envisaged.

Table 39: Presence and pre-requisites for BC2 modules

Module No.	Module name	Presence/distance	Pre-requisites
BC2.1	Affected value chains	Distance	None
BC2.2	Business effects on the company	Distance	BC2.1
BC2.3	Benefits and costs of adopting PROMISE BOL solutions	Distance	BC2.2
BC2.4	Business effects on partners	Distance	BC2.3
BC2.5	Cost models	Distance	BC2.2, BC2.3, BC2.4

4.7.1.2 Learner autonomy

The degree of learner autonomy is medium, that is, some possible pathways for the learner are recommended, but the learner has also the flexibility to choose his own way of learning.

4.7.1.3 Training strategy

The only training strategy used in this course is the web based lecture. The impact of BOL Promise results on the whole value chain is explained, together with the related advantages and drawbacks. The cost structure in case the BOL Promise system is adopted is also presented.

Table 40: Training strategy for BC2

Module No.	Module name	Lecture
BC2.1	Affected value chains	✓
BC2.2	Business effects on the company	✓
BC2.3	Benefits and costs of adopting PROMISE BOL solutions	✓
BC2.4	Business effects on partners	✓
BC2.5	Cost models	✓

4.7.1.4 Evaluation

Learning objects should be evaluated after use to ensure that organizational needs are being met. Evaluation for the BOL Business Courses should take place on all levels presented in Section 3.

Table 41: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	All modules
Evaluation of learning achievement	All modules
Continuous evaluation	All modules

4.7.2 Architecture design

Table 42: Module content description and target groups

Goal	Module	Content description	Learner group
knowledge – to know what in the value chain is affected by the introduction of BOL PROMISE system	Affected value chains	How BOL PROMISE system affects the value chain from different perspectives: <ul style="list-style-type: none"> • Customers / operators • Suppliers • Departments within the company • Actors • Processes 	End user

comprehension – to understand how the company may benefit from the BOL PROMISE System implementation	Business effects on the company	How BOL PROMISE system affects the company implementing the new concepts from business viewpoint.	End user
comprehension – to understand how the company may benefit from the BOL PROMISE System implementation	Benefits and costs of adopting PROMISE BOL solutions	How to quantify advantages and drawbacks for the company implementing the new BOL concepts and tools.	End user
comprehension – to understand how BOL PROMISE affects a company's partners	Business effects on partners	How BOL PROMISE affects the company's partner implementing the new concepts from business viewpoint	End user
application – to learn how to set-up cost models related to the BOL PROMISE System	Cost models	How to structure a cost model for the company implementing BOL PROMISE system.	End user

The learning objectives of each module are given below:

- Affected value chains: The learners will have an understanding of the effected value chains from various different perspectives.
- Business effects on the company: The learners will have an understanding of the BOL PROMISE system affects on a company
- Benefits and costs of adopting PROMISE BOL solutions: The learners will have an understanding of Benefits and costs of adopting PROMISE BOL solutions
- Business effects on partners: The learners will comprehend the affect of PROMISE BOL on a company's partners implementation
- Cost models: The learners will know how to set up cost models for BOL system.

4.7.3 Training delivery mechanisms

Documents and power point presentations are the designated delivery formats for all modules.

4.7.4 Course schedule

Table 43 shows each module of BOL BC2 and the date of its finalization.

Table 43: Course delivery schedule for BC2

Module	Due date
BC2.1	11/2007
BC2.2	11/2007
BC2.3	11/2007
BC2.4	11/2007
BC2.5	11/2007

Table 44 shows envisaged e-learning time for each module that the learners are expected to spend.

Table 44: Module timeframes for BC2

Module No.	Content	Lecture (minutes)
BC2.1	Affected value chains	120
BC2.2	Business effects on the company	240
BC2.3	Benefits and costs of adopting PROMISE BOL solutions	240
BC2.4	Business effects on partners	120
BC2.5	Cost models	120
Total		14 hours

4.8 BC3: Business course on MOL phase

The BC3 course provides a business view of the benefits deriving from the application of PROMISE technologies in the MOL phase. This course is to be delivered by BIBA.

4.8.1 Instructional model

4.8.1.1 Presence vs Distance

Although a certain degree of interactivity is highly required it is not foreseen that any training methods or means of delivery will demand the presence of the learner. This decision is mainly based on the characteristics of the focused learner group.

Table 45: Presence and pre-requisites for BC3 modules

Module number	Module name	Presence/distance	Pre-requisites
BC3.1	Motivation and Background	Distance	None
BC3.2	Introduction to Product Lifecycle Management	Distance	None
BC3.3	Case study – CAT application (A2 / A5)	Distance	BC3.2
BC3.4	Information flows in Product Lifecycle Management	Distance	BC3.2
BC3.5	Introduction to the concept Extended Product	Distance	BC3.3
BC3.6	Product instance specific services	Distance	BC3.2, BC3.3
BC3.7	MOL environmental legislation	Distance	BC3.6
BC3.8	PROMISE Technologies	Distance	None
BC3.9	PROMISE MOL	Distance	BC3.6

	technology's business profit-cost analysis		
BC3.10	Related publications— PROMISE dissemination on MOL	Distance	None
BC3.11	Tutorial based on other MOL Scenarios from PROMISE	Distance	BC3.2 - BC3.10

4.8.1.2 Learner autonomy

It is foreseen to reduce the dependencies of the learner using a schedule or in time interactions with other learners or trainers as much as possible. On the other hand there are some features integrated in the web based self study concept to be used which are demanding a certain degree of learner interaction. Nevertheless, due to the fact that these features are helpful but not essential it can be argued that it is up to the learner to decide on his own about his degree of autonomy.

4.8.1.3 Training strategy

Training strategy is build upon a blend of instructional strategies under the umbrella of the Moodle e-learning platform. Main components are lectures and case studies from the PROMISE project and partially collaboration based delivery mechanisms. In detail it is planned to make use of the following main strategies:

- **Case Studies:** for creating the interest and awareness
- **Lecture:** for creating the knowledge basis
- **Tutorial:** for exploring possible business potentials of the PROMISE solutions in different context

In addition to the above collaboration will be provided for supporting means for the exchange of knowledge (such as discussion forums) and feedback to the tutors although this is not scheduled in terms of timeframes.

Table 46: Training strategy for BC3

Module No.	Module name	Lecture	Tutorial	Case study
BC3.1	Motivation a & Background	✓	-	-
BC3.2	Introduction to Product Lifecycle Management	✓	-	-
BC3.3	Case study – CAT application (A2 / A5)	-	-	✓
BC3.4	Introduction to the concept Extended Product	✓	-	-
BC3.5	Product instance specific services	✓	-	-
BC3.6	Information flows in Product Lifecycle Management	✓	-	-
BC3.7	MOL legislation	✓	-	-
BC3.8	PROMISE Technologies	✓	-	-
BC3.9	PROMISE MOL technology's business profit-cost analysis	✓	-	-

BC3.10	Related publications—PROMISE dissemination on MOL	✓	-	-
BC3.11	Tutorial based on MOL Scenarios from PROMISE	-	✓	-

4.8.1.4 Evaluation

As mentioned before assessment will be done as a self-assessment. It is the aim to assess the course, its content, structure and delivery mechanism against its usability, effectiveness and learners satisfaction. Related questionnaires such as the examples in check-sheets in appendices will be integrated in the course schedule and provided by the e-learning platform Moodle.

Table 47: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	All modules
Evaluation of learning achievement	All modules
Continuous evaluation	-

4.8.2 Architecture design

The general goals for business courses on MOL in PROMISE are to teach the economic aspects of PROMISE EOL solutions and results, i.e. to focus on business benefits and costs (both fixed and potential). The content of the MOL business courses includes but is not limited to:

Table 48 Module content description and target groups

Goal	Module	Content description	Learner Group
Business Benefits	Motivation a & Background	Training objectives, strategy and schedule	end user
Concept of PLM	Introduction to Product Lifecycle Management	Focus on MOL definition	end user
Practical Example	Case study – CAT application (A2 / A5)	Case background and objectives and business benefits	end user
Details on Business Benefits	Introduction to the concept Extended Product	Provision of a possible framework for the exploitation of product instance specific services	end user
Details on Business Benefits	Product instance specific services	Predictive / preventive maintenance Accounting services Reuse / Remanufacturing Recycling / Disposal etc	end user

Concept of Product Instance Specific Information Management	Information flows in Product Lifecycle Management	Focus on information gaps between BOL and MOL; Focus on information gaps between MOL and EOL	end user
Overview on legislative	MOL related legislation	e.g. EU / worldwide directives for MOL	end user
Overview on PROMISE Technologies	PROMISE Technologies	PROMISE Technologies: PDKM PROMISE Technologies: DSS PROMISE Technologies: PEID PROMISE Technologies: Middleware	end user
Background on Technology related Business Benefits & Costs	PROMISE MOL technology's business profit-cost analysis	PROMISE MOL technology's business benefits PROMISE MOL technology's fixed-cost PROMISE MOL technology's variable cost	end user
Further readings	Related publications—PROMISE dissemination on MOL	Journal paper Conference paper Presentations Project reports Meeting reports	end user
Guided Application of PROMISE Knowledge	Tutorial based on MOL Scenarios from PROMISE	Elaboration and assessment of possible solutions in the overall context of PROMISE (not restricted to the aims of MOL)	end user

The order of delivery is indicated in the sequence above except the ones which are not restricted to a particular time in the course, namely BC3.12 and BC3.13.

In addition to the above, discussions based on the chats or VoIP conferences can be offered if demand is indicated by the learners.

The learning objectives of each module are given below:

- Motivation and Background: Creation of a common understanding and provision of knowledge on business potentials given by PROMISE technologies and concepts.
- Introduction to Product Lifecycle Management: Creation of a common understanding and provision of basic knowledge on Product Lifecycle Management.
- Case study – CAT application (A2 / A5): Provision of possible business potentials based on a practical example.
- Introduction to the concept Extended Product: Provision of a framework for the exploitation of product instance specific services.
- Product instance specific services: Provision of details on business potentials related to the MOL specific utilization of PROMISE technologies and concepts
- Information flows in Product Lifecycle Management: Provision of basic knowledge on the information flow issues related to the overall PROMISE technologies and concept

- MOL environmental legislation: Provision of a basic understanding of possible restrictions related to the exploitation of PROMISE technologies and concepts
- PROMISE Technologies: Provision of a basic understanding of the relevant PROMISE technologies to be utilized for applying the PROMISE concept
- PROMISE MOL technology’s business profit-cost analysis: Provision of means for the cost benefit analysis related to the PROMISE technologies and concepts.
- Related publications—PROMISE dissemination on MOL: Provision of sources for further readings
- Tutorial based on other MOL Scenarios from PROMISE: Guided application of the provided knowledge based on practical examples from the PROMISE project.

4.8.3 Training delivery mechanisms

As mentioned previously the course management system Moodle, will be used to enable the MOL Business Course. Training delivery mechanisms will:

- support the collaboration and knowledge exchange not only between the learners but also feedback from learners to trainers through discussion forums, blogs and wikis
- support provision of course wide structured knowledge through glossaries, list of abbreviations, common bookmarks etc
- provide additional features to the learners through translation services, or self-assessment etc

The main training material formats will be: hypertext, downloadable power point presentations, recommended bookmarks, commented bookmarks containing links to download publications, forums, chat and wikis.

4.8.4 Course schedule

In MOL BC3 training, the content will be delivered in the following formats; note that where links to other courses are suggested, this means that there are sub-modules held in common with other courses:

Table 49 presents the delivery schedule of the different module components, while Table 50 shows the envisaged timeframes for each module.

Table 49: Course delivery schedule for BC3

Module	Due date
BC3.1 Motivation a & Background	09/2007
BC3.2 Introduction to Product Lifecycle Management	09/2007
BC3.3 Case study – CAT application (A2 / A5)	09/2007
BC3.4 Introduction to the concept Extended Product	09/2007
BC3.5 Product instance specific services	09/2007
BC3.6 Information flows in Product Lifecycle Management	09/2007
BC3.7 MOL environmental legislation	09/2007
BC3.8 PROMISE Technologies	09/2007
BC3.9 PROMISE MOL technology’s business profit-cost analysis	09/2007
BC3.10 Related publications—PROMISE dissemination on MOL	09/2007
BC3.11 Tutorial based on other MOL Scenarios from PROMISE	11/2007

Module No.	Module name	Lecture (minutes)	Tutorial (minutes)	Case study (minutes)
BC3.1	Motivation a & Background	15	-	-
BC3.2	Introduction to Product Lifecycle Management	30	-	-
BC3.3	Case study – CAT application (A2 / A5)	-	-	20
BC3.4	Introduction to the concept Extended Product	15	-	-
BC3.5	Product instance specific services	15	-	-
BC3.6	Information flows in Product Lifecycle Management	15	-	-
BC3.7	MOL environmental legislation	15	-	-
BC3.8	PROMISE Technologies	45	-	-
BC3.9	PROMISE MOL technology's business profit-cost analysis	60	-	-
BC3.10	Related publications—PROMISE dissemination on MOL	10	-	-
BC3.11	Tutorial based on other MOL Scenarios from PROMISE	-	120	-
Total		5 hours 40 minutes	2 hours	20 minutes

Table 50: Module timeframes for BC3

4.9 BC4: Business course on EOL phase

The PROMISE whole life cycle business course aims to provide the economic aspects of PROMISE EOL solutions and results, with a focus on business benefits and fixed and potential costs.

Typical learners interested in “business” EOL course are End Users, with leading positions in their respective companies. Learners can come from a variety of domains, but especially IT, logistics, finance / controlling. A total of 12-24 participants are expected. This course is to be delivered by CIMRU.

4.9.1 Instructional model

4.9.1.1 Presence vs. Distance

Most of the participants do not have time to travel for training courses, hence it is decided that the most proper way to deliver course contents in EOL will be at distance. Table 51 shows a list of the modules with their pre-requisites and the presence required.

Table 51: Presence and pre-requisites for BC4 modules

Module number	Module name	Presence/distance	Pre-requisites
BC4.1	Introduction to BC4 training	Distance	-
BC4.2	Introduction to Product Lifecycle Management	Distance	-
BC4.3	Introduction to Reverse Logistic	Distance	BC 4.2
BC4.4	Disposition routes in EOL	Distance	BC 4.2 BC 4.3
BC4.5	Information flows in Product Lifecycle Management	Distance	BC 4.2
BC4.6	EOL environmental legislation	Distance	BC 4.4
BC4.7	PROMISE Technologies	Distance	-
BC4.8	PROMISE EOL technology's business profit-cost analysis	Distance	BC 4.7
BC4.9	Relative publications—PROMISE dissemination on EOL	Distance	-
BC4.10	Case study–ELV information management, Metallic components	Distance	BC 4.2 BC 4.8
BC4.11	Case study – ELV information management, Plastic components	Distance	BC 4.2 BC 4.8
BC4.12	Case study –EOL information management for heavy load vehicle decommissioning	Distance	BC 4.2 BC 4.8

4.9.1.2 Learner autonomy

For EOL business courses, we foresee that simple delivery mechanisms will be used rather than face-to-face communications. The courses require classic text information. No multimedia and real-time interactivity is envisaged. The requirements of learners can be sent to the training committees by e-mail, and can be replied as soon as possible.

The degree of learner autonomy is medium, that is, some possible pathways for the learner are recommended, but the learner has also the flexibility to choose his own way of learning. For example, the learners with little EOL knowledge are recommended to start from the beginning; while the learners with enough EOL and PROMISE knowledge are recommended to study the

case studies. Generally, the recommended necessary module predecessors are given to each BC4 module.

4.9.1.3 Training strategy

The training strategy for this course consists of content preparation, and delivery, evaluating learning outcome for each individual module as well as for the whole training process.

Two modes of delivery as part of the training strategy are envisaged for the course:

- **Self study:** Learning materials, in form of text materials, power point presentations, project reports, journal / conference publications, EU directive documents etc. are available for learners.
- **Case study:** a printed description of an application situation and its PROMISE solution. The learners encounter a real-life application under the training guidance, in order to achieve an in-depth understanding of PROMISE EOL technology.

Table 52 shows course modules and their associated training strategies.

Table 52: Training strategy for BC4

Module No.	Module name	Self study	Case study
BC4.1	Introduction to BC4 training	✓	-
BC4.2	Introduction to Product Lifecycle Management	✓	-
BC4.3	Introduction to Reverse Logistic	✓	-
BC4.4	Disposition routes in EOL	✓	-
BC4.5	Information flows in Product Lifecycle Management	✓	-
BC4.6	EOL environmental legislation	✓	-
BC4.7	PROMISE Technologies	✓	-
BC4.8	PROMISE EOL technology's business profit-cost analysis	✓	-
BC4.9	Relative publications : PROMISE dissemination on EOL	✓	-
BC4.10	Case study: ELV information management, Metallic components	-	✓
BC4.11	Case study: ELV information management, Plastic components	-	✓
BC4.12	Case study: EOL information management for heavy load vehicle decommissioning	-	✓

4.9.1.4 Evaluation

Learning objects should be evaluated after use to ensure that organizational needs are being met. Evaluation for the EOL Business Courses should take place on the levels given in the table below:

Table 53: Evaluation type per module

Type of evaluation	Modules
Evaluation of learner satisfaction	All modules
Evaluation of training delivery mechanism	All modules
Evaluation of learning achievement	BC4.1, BC4.2, BC4.3, BC4.5, BC4.8, BC4.10, BC4.11, and BC4.12
Continuous evaluation	All modules

4.9.2 Architecture design

The general goals for business courses on EOL in PROMISE are to teach the economic aspects of PROMISE EOL solutions and results, i.e. to focus on business benefits and both the fixed and potential costs of them. Specifically, in DT1.2 section 8.10.2, the goals of this training course were synthesized as shown on the following table:

Table 54: Description of goals for BC4

Types of goals	Goal No.	Goals (Give learners an understanding of)
Business benefits (GBC41)	GBC41.01	Business benefits of production processes integration and optimization by introducing PROMISE technologies
	GBC41.02	Business benefits of improved operational efficiency
	GBC41.03	Business benefits of captive market and enlarge market share
	GBC41.04	Improved relationship with customers who purchase second-hand products/materials
	GBC41.05	Develops long-term trust among business EOL partners
	GBC41.06	The business benefits that accrue from being in the network of EOL PROMISE partners as opposed to being outside the PROMISE EOL network. Higher integration and more business.
	GBC41.07	Lower information transmission costs from PROMISE EOL users.
	GBC41.08	Benefits of warehouse storage management by using PROMISE PEIDs.
	GBC41.09	The use of PROMISE to enable us to comply with environmental legislation more closely in terms of recycling etc.
	GBC41.10	Increased Return on Investment (ROL) by improving the existing process management investments and technologies
	GBC41.11	Increased responsiveness, by providing valid process information and decision support
Business Cost (GBC42)	GBC42.01	Cost of implementing PROMISE technologies among EOL partners, e.g. the cost of PEIDs, Readers, DSS, PDKM and the integration cost among them
	GBC42.02	Training cost of implementing PROMISE technologies
	GBC42.03	Cost of human resources involved in the daily running and maintenance of PROMISE EOL solutions
	GBC42.04	Cost of variability amongst the technical components and standards

Types of goals	Goal No.	Goals (Give learners an understanding of)
	GBC42.05	Potential cost of switching to other technologies (Lock-in risk)
	GBC42.06	Cost of PROMISE in relation to the loss of potential customers in the case operation outside of PROMISE technologies and standards is not possible
	GBC42.07	Potential costs of transmitting information to BOL or MOL (and discussion on compensation)

The following table outlines the content description of the EOL business courses along with the mapping of the course modules to the training goals set out in DT 1.2.

Table 55: Module content description and target groups

Module No.	Module Name	Content description	Goal
BC4.1	Introduction to BC4 training	Training Objectives Training Strategies Training Schedule	
BC4.2	Introduction to Product Lifecycle Management	Focus on EOL definition	GBC41.01 GBC41.05
BC4.3	Introduction to Reverse Logistic		GBC41.01 GBC41.05
BC4.4	Disposition routes in EOL	Reuse Remanufacturing Recycling Disposal	GBC41.04 GBC41.07 GBC41.11
BC4.5	Information flows in Product Lifecycle Management	Focus on information gaps between MOL and EOL; Focus on information gaps between EOL and BOL	GBC41.01 GBC41.05
BC4.6	EOL environmental legislation	e.g. EU / worldwide directives for EOL	
BC4.7	PROMISE Technologies	PDKM	GBC41.01
BC4.8		DSS	GBC41.06
BC4.9		PEID	GBC41.09
BC4.10		Middleware	GBC42.01 GBC42.07
BC4.11	PROMISE EOL technology's business profit-cost analysis	PROMISE EOL technology's business benefits in global market PROMISE EOL technology's business benefits in the value chain PROMISE EOL technology's business benefits in recovery production management PROMISE EOL technology's fixed-cost PROMISE EOL technology's potential cost	GBC41.01 GBC41.03 GBC41.09 GBC42.01 GBC42.07
BC4.12	Relative publication :	Relevant journal papers,	

	PROMISE dissemination on EOL	conference papers, presentations, project reports, and meeting reports published by PROMISE partners, as appropriate	
BC4.1	Case study: ELV information management, Metallic components	Case background and objectives Existing problems PROMISE solution <ul style="list-style-type: none"> • System Architecture • Field Test Results Analysis	GBC41.01 GBC41.11 GBC42.01 GBC42.07
BC4.2	Case study: ELV information management, Plastic components	Case background and objectives Existing problems PROMISE solution <ul style="list-style-type: none"> • System Architecture • Field Test Results Analysis	GBC41.01 GBC41.11 GBC42.01 GBC42.07
BC4.3	Case study: EOL information management for heavy load vehicle decommissioning	Case background and objectives Existing problems PROMISE solution <ul style="list-style-type: none"> • System Architecture • Field Test Results Analysis	GBC41.01 GBC41.11 GBC42.01 GBC42.07

4.9.3 Training delivery mechanisms

The following Moodle functionalities will be made use of:

- To manage the planning of the course: syllabus, agendas, and calendar.
- To publish course content: multimedia modules, text modules, video modules, power point modules, exercises, quizzes, tests.
- To enable different methods of communication: forum and chat based, and email.

In EOL BC4 training, the content will be delivered in the formats outlined in following table:

Table 56: Training delivery mechanisms for BC4

Module No.	Module Name	Training Delivery Format
BC4.1	Introduction to BC4 training	Hypertext
BC4.2	Introduction to Product Lifecycle Management	Hypertext Link to BC1
BC4.3	Introduction to Reverse Logistic	Hypertext Link to BC1
BC4.4	Disposition routes in EOL	Hypertext PPT presentation
BC4.5	Information flows in Product Lifecycle Management	Hypertext PPT presentation

BC4.6	EOL environmental legislation	Downloadable pdf or word documents
BC4.7	PROMISE Technologies	Hypertext Link to TC 2, TC 3, TC 4 and TC5
BC4.8	PROMISE EOL technology's business profit-cost analysis	Hypertext
BC4.9	Relative publications—PROMISE dissemination on EOL	Downloadable documents
BC4.10	Case study: ELV information management, Metallic components	Hypertext PPT presentation Demonstrator simulation Downloadable documents
BC4.11	Case study: ELV information management, Plastic components	Hypertext PPT presentation Demonstrator simulation Downloadable documents
BC4.12	Case study : EOL information management for heavy load vehicle decommissioning	Hypertext PPT presentation Demonstrator simulation Downloadable documents

4.9.4 Course schedule

Table 57 shows each module of EOL BC4 and the date of its finalization.

Table 57: Course delivery schedule for BC4

Module	Due date
All modules	11/2007

Table 58 shows envisaged e-learning time for each module that the learners are expected to spend.

Table 58: Module timeframes for BC4

Module No.	Content	Self study (minutes)	Case study (minutes)
BC4.1	Introduction to BC4 training	45	-
BC4.2	Introduction to Product Lifecycle Management	45	-
BC4.3	Introduction to Reverse Logistic	45	-
BC4.4	Disposition routes in EOL	45	-
BC4.5	Information flows in Product Lifecycle Management	90	-
BC4.6	EOL environmental legislation	Optional- learner dependent	-
BC4.7	PROMISE Technologies	45	-
BC4.8	PROMISE EOL technology's business profit-cost analysis	180	-



BC4.9	Relative publications—PROMISE dissemination on EOL	Optional - learner dependent	-
BC4.10	Case study: ELV information management, Metallic components	-	180
BC4.11	Case study: ELV information management, Plastic components	-	180
BC4.12	Case study : EOL information management for heavy load vehicle decommissioning	-	180
Total (excluding learner dependent times)		8 hours 15 minutes	9 hours

5 Summary

5.1 Summary of specifications for the instructional design of PROMISE training courses

The following table provides an overview of specifications for PROMISE training courses. Overall courses offer a blend of available training strategies and delivery mechanisms. All business are given at distance due to the learner profile whereas some technical courses are given at distance and some face to face. A variety of training strategy and delivery mechanisms are defined for each course. All TC3 modules and one module of TC2 have already been delivered in line with the priority specification given in DT1. 2. Where the course is at distance, the date for delivery refers to content publication on the online platform, whereas in presence based modules the date refers to the actual face to face delivery.

Table 59: Summary of module presence, pre-requisites, delivery mechanism and timeframe

Module number	Modules	Presence/distance	Training strategy	Pre-requisites for taking module	Date for delivery	Time (minutes)
TC1.1	Introduction to TC1 training	Distance	Self study	None	09/2007	10
TC1.2	What is PROMISE?	Distance	Self study	None	09/2007	20
TC1.3	Application areas	Distance	Self study	None	09/2007	20
TC1.4	PROMISE system Architecture	Distance	Self study	None	10/2007	20
TC1.5	PROMISE components (HW/SW)	Distance	Self study	None	10/2007	20
TC1.6	How to integrate existing systems (HW/SW) into PROMISE architecture	Distance	Self study	None	11/2007	15

TC1.7	How to implement PROMISE applications	Distance	Self study	None	11/2007	15
TC1.8	Examples of business impact using PROMISE technology (demo cases)	Distance	Self study	None	12/2007	30
TC2.1	Introduction to Decision Support in Product Lifecycle Management	Distance	Self study	Basic background in Mechanical Engineering	11/2007	60
TC2.2	Usage of a DSS	Distance	Self study	TC2.1	11/2007 after finishing the DSS	120
TC2.3	Advances in Decision Support in Product Lifecycle Management	Distance	Self study	TC2.1 +TC2.2 Good background in Mechanical Engineering and Statistics	11/2007 after finishing the handbook for DSS	120
TC2.4	Programming decision support scenarios in a DSS	Presence	Lecture	TC2.1 + TC2.2 + TC2.3 Good background in Mechanical Engineering, Statistics and Modern Programming	14/09/2006	360
TC3.1	PDKM description	Distance	Lecture	None	03/04/2007, 19/04/2007	45
TC3.2	Products	Presence	Case study	TC3.1	03/04/2007, 19/04/2007	105

TC3.3	Additional attributes	Presence	Case study	TC3.2	03/04/2007, 19/04/2007	60
TC3.4	Product structures	Presence	Case study	TC3.3	03/04/2007, 19/04/2007	60
TC3.5	Field data	Presence	Case study	TC3.4	03/04/2007, 19/04/2007	105
TC3.6	Events	Presence	Case study	TC3.5	03/04/2007, 19/04/2007	60
TC4.1	Motivation & Background	Presence & Distance	Lecture Self study	None	23/07/2007	30
TC4.2	Components	Presence & Distance	Lecture Self study Tutorial	TC4.1	23/07/2007	75
TC4.3	Physics of RFID	Presence & Distance	Lecture Self study Tutorial	TC4.2	23/07/2007	135
TC4.4	Legislation and policy issues	Distance	Self study	TC4.3, TC4.6, TC4.7	29/06/2007	60
TC4.5	RFID DIY	Presence	Tutorial	TC4.3	23/07/2007	60

TC4.6	RFID integration a. RFID Hardware integration b. RFID software integration	Presence & Distance	Lecture Self study Tutorial	TC4.3	23/07/2007	175
TC4.7	RFID based product data management	Presence & Distance	Lecture Self study	TC4.6	23/07/2007	45
TC5.1	Middleware	Distance	Tutorial Case study	none	12/2007	90
TC5.2	PROMISE Middleware	Distance	Tutorial Case study	TC5.1	12/2007	180
TC5.3	Installation and setup	Distance	Case study	TC5.2	12/2007	240
BC1.1	Introduction of PLM	Distance	Self study	None	01/09/2007	60
BC1.2	Closed-loop PLM	Distance	Self study	None	15/09/2007	90
BC1.3	Introduction of system architecture for closed-loop PLM	Distance	Self study	None	01/10/2007	90
BC1.4	Introduction of whole product lifecycle	Distance	Self study	None	15/10/2007	120
BC1.5	Introduction of BOL	Distance	Self study Case study	None	15/11/2007	120

BC1.6	Introduction of MOL	Distance	Self study Case study	None	15/11/2007	120
BC1.7	Introduction of EOL	Distance	Self study Case study	None	15/11/2007	120
BC2.1	Affected value chains	Distance	Lecture	None	11/2007	120
BC2.2	Business effects on the company	Distance	Lecture	BC2.1	11/2007	240
BC2.3	Benefits and costs of adopting PROMISE BOL solutions	Distance	Lecture	BC2.2	11/2007	240
BC2.4	Business effects on partners	Distance	Lecture	BC2.3	11/2007	120
BC2..5	Cost models	Distance	Lecture	BC2.2, BC2.3, BC2.4	11/2007	120
BC3.1	Motivation and Background	Distance	Lecture	None	09/2007	15
BC3.2	Introduction to Product Lifecycle Management	Distance	Lecture	None	09/2007	30
BC3.3	Case study – CAT application (A2 / A5)	Distance	Case study	BC3.2	09/2007	20
BC3.4	Information flows in Product Lifecycle Management	Distance	Lecture	BC3.2	09/2007	15
BC3.5	Introduction to the concept Extended Product	Distance	Lecture	BC3.3	09/2007	15
BC3.6	Product instance specific services	Distance	Lecture	BC3.2, BC3.3	09/2007	15



BC3.7	MOL environmental legislation	Distance	Lecture	BC3.6	09/2007	15
BC3.8	PROMISE Technologies	Distance	Lecture	None	09/2007	45
BC3.9	PROMISE MOL technology's business profit-cost analysis	Distance	Lecture	BC3.6	09/2007	60
BC3.10	Related publications—PROMISE dissemination on MOL	Distance	Lecture	None	09/2007	10
BC3.11	Tutorial based on other MOL Scenarios from PROMISE	Distance	Tutorial	BC3.2 - BC3.10	11/2007	120
BC4.1	Introduction to BC4 training	Distance	Self study	-	11/2007	45
BC4.2	Introduction to Product Lifecycle Management	Distance	Self study	-	11/2007	45
BC4.3	Introduction to Reverse Logistic	Distance	Self study	BC 4.2	11/2007	45
BC4.4	Disposition routes in EOL	Distance	Self study	BC 4.2 BC 4.3	11/2007	45
BC4.5	Information flows in Product Lifecycle Management	Distance	Self study	BC 4.2	11/2007	90
BC4.6	EOL environmental legislation	Distance	Self study	BC 4.4	11/2007	Optional-learner dependent
BC4.7	PROMISE Technologies	Distance	Self study	-	11/2007	45



BC4.8	PROMISE EOL technology's business profit-cost analysis	Distance	Self study	BC 4.7	11/2007	180
BC4.9	Relative publications—PROMISE dissemination on EOL	Distance	Self study	-	11/2007	Optional - learner dependent
BC4.10	Case study—ELV information management, Metallic components	Distance	Case study	BC 4.2 BC 4.8	11/2007	180
BC4.11	Case study – ELV information management, Plastic components	Distance	Case study	BC 4.2 BC 4.8	11/2007	180
BC4.12	Case study –EOL information management for heavy load vehicle decommissioning	Distance	Case study	BC 4.2 BC 4.8	11/2007	180

5.2 Partners responsible for course delivery

Table 60 shows the partners that are responsible for coordinating the delivery of the PROMISE training courses.

Table 60: Partners responsible for course delivery

Course	Partner
TC1- Technical course on PROMISE technologies at system level	SINTEF
TC2 Technical course on PROMISE DSS technology	COGNIDATA
TC3- Technical course on PROMISE PDKM technology	INMEDIASP
TC4- Technical course on PROMISE PEID technology	CAMBRIDGE
TC5- Technical course on PROMISE Middleware technology	HUT
BC1- Business course on over whole lifecycle	EPFL
BC2- Business course on BOL Phase	POLIMI
BC3- Business course on MOL Phase	BIBA
BC4- Business course on EOL Phase	CIMRU

6 Conclusions

This document has demonstrated the output of the micro phase in the adopted training model for PROMISE courses through the storyboard given for each course. The instructional model for the courses is defined based on learner autonomy and training strategy. The module contents, learning objectives as well as course delivery schedule are specified in detail. Section 3 presented a common course evaluation strategy, designed to measure the success of the courses. The evaluation not only measures the learner satisfaction with the course content and delivery but also to what extent the learning objectives have been met.

7 References

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8 Contact Persons

Please refer to the following table for a list of persons to be contacted regarding this document.

Table 61: Contact Persons

Responsibility	Company	Name	Email
T1.3 Leader	Cambridge	Alexandra Brintrup	ab702@cam.ac.uk
WPT1 Leader	Cambridge	Alexandra Brintrup	ab702@cam.ac.uk
Web-based training Leader	BIBA	Lutz Rabe	rab@biba.uni-bremen.de



Appendix A

Sub-Module Checksheet

1. Did this sub-module provide you with the opportunity to learn new content?

Yes , No

2. What did you find most beneficial?

3. What did you find least beneficial?

4. What areas of the sub-module could be improved?

5. Any other comments

Appendix B

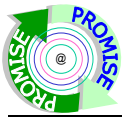
PROMISE Course Evaluation Form

This form enables you to evaluate and the course on several characteristics. Feel free to be as open and frank as you like. Your responses will be used to make changes that will improve the overall learning experience of our teaching programme.

Please circle the extent to which you agree or disagree with these statements

1 is strongly disagree and 5 is strongly agree

ID	STATEMENT	SCORE				
		Disagree			Agree	
Training Course Content						
1	I understood the objectives of the course	1	2	3	4	5
2	The objectives of the course were adequately met	1	2	3	4	5
3	The course was logically sequenced	1	2	3	4	5
5	The examples helped me to understand the course content	1	2	3	4	5
Instruction Materials						
6	The course materials were helpful in understanding the course content	1	2	3	4	5
7	The course material will be useful for my job	1	2	3	4	5
Instructional Presentation (Optional—if we use an instructor, otherwise we leave it out if performed distance learning.)						
8	The instructor appeared knowledgeable about the subject	1	2	3	4	5
9	The instructor was responsive to my needs/questions	1	2	3	4	5
10	The instructors presentation of the course content was clear and informative	1	2	3	4	5
11	The instructor was enthusiastic about teaching the subject	1	2	3	4	5
12	The instructor was prepared and organised for the class	1	2	3	4	5
13	Participants were encouraged to take part in class discussions and activities	1	2	3	4	5
15	The length of the course was appropriate to cover the content	1	2	3	4	5
16	The time given by the instructor to complete practice activities was appropriate	1	2	3	4	5
General Evaluation						
17	My time spent on this course was worthwhile	1	2	3	4	5
18	My expectations for this course were met	1	2	3	4	5
19	I would recommend this course to others	1	2	3	4	5
20	I will have an opportunity to apply the skills/knowledge I have developed	1	2	3	4	5



Things you liked **MOST**

.....

.....

.....

.....

Things you like **LEAST**

.....

.....

.....

.....

Any other comments / suggestions

.....

.....

.....

.....

Thanks for your help

Appendix C

Moodle System Evaluation

Feel free to be as open and as frank as possible as all responses will be treated in strict confidence
1 is disagree and 5 is agree
Please complete both Score and its Relevance in the following.

1. Learner Interface	Score	Relevance
a. The Moodle system is easy to use	1 2 3 4 5	1 2 3 4 5
b. The Moodle system is user friendly	1 2 3 4 5	1 2 3 4 5
c. The content provided by the Moodle system is easy to understand	1 2 3 4 5	1 2 3 4 5
d. The operation of the Moodle system is stable	1 2 3 4 5	1 2 3 4 5
e. The Moodle system makes it easy for you to find and access the content you need	1 2 3 4 5	1 2 3 4 5

2. Content	Score	Relevance
a. The Moodle system provides up-to-date content	1 2 3 4 5	1 2 3 4 5
b. The Moodle system provides content that exactly fits your needs	1 2 3 4 5	1 2 3 4 5
c. The Moodle system provides sufficient content for PROMISE EOL Business	1 2 3 4 5	1 2 3 4 5
d. The Moodle system provides useful supporting content	1 2 3 4 5	1 2 3 4 5

3. Personalisation	Score	Relevance
a. The Moodle system enables you to learn the content you need	1 2 3 4 5	1 2 3 4 5
b. The Moodle system enables you to choose what you want to learn	1 2 3 4 5	1 2 3 4 5
c. The Moodle system enables you control the learning progress	1 2 3 4 5	1 2 3 4 5
d. The Moodle system records your learning progress and performance	1 2 3 4 5	1 2 3 4 5

4. Additional factors that would enhance this system for your organisation includes: _____

5. Please identify three areas/functions that you feel would improve this training system:

a. _____

b. _____

c. _____