iLearn2Main

An e-Learning System for Maintenance Management Training

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www.ilearn2main.eu

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Outline

- Target Groups & Objectives
- Survey & Analysis of Training Needs
- Maintenance Curriculum & Courses
- The Learning Management System
- Competence Assessment
- Conclusion

Rationale

- Companies, including SMEs and larger Enterprises need to make efficient use of their assets (human, material)
- Maintenance Teaching & Training: taught subject for many years, but
  - Curricula need to be update to track technological advances
  - Need to establish more 'formal' curricula
  - Need to establish more 'standardised' means to assess competences
- www.ilearn2main.eu: e-Learning and e-Competence Assessment for Maintenance Management

Target Groups

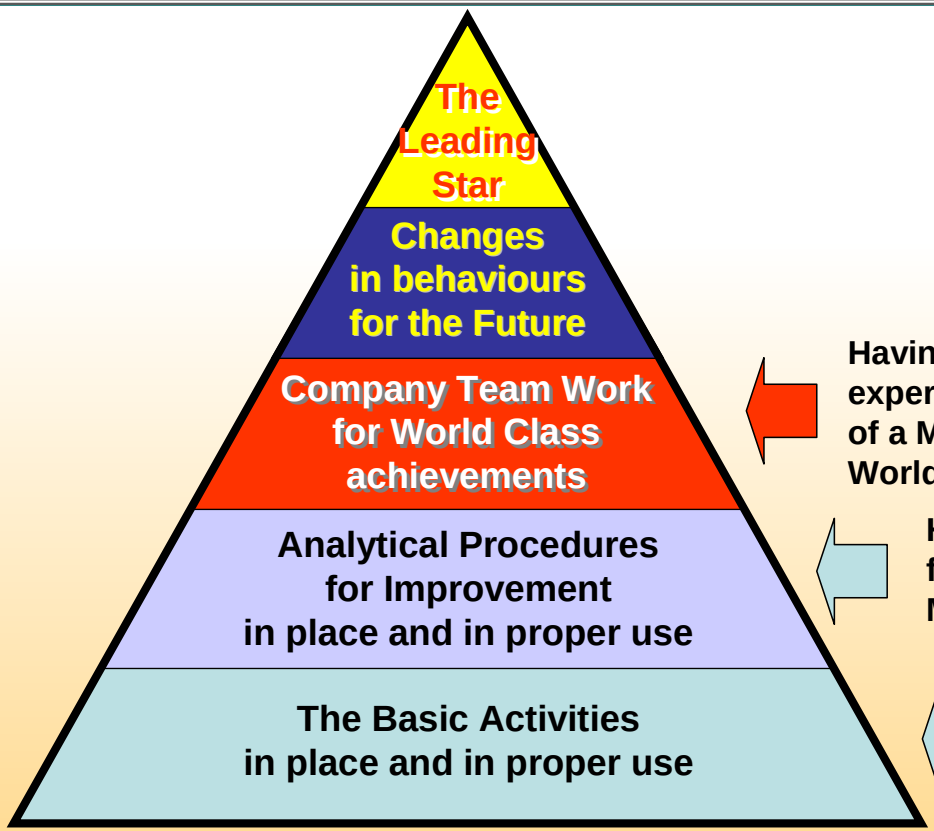
Teachers/Trainers

Personnel involved in maintenance-related training

Learners

- Managerial personnel
  - rational decisions on maintenance of industrial equipment and human resources allocation
- Senior engineering personnel
  - appropriate choices for adequate maintenance policies and technological solutions
  - Planning for implementation of maintenance policies and actions
- Other technical personnel
  - Adequate technical knowledge and skills to efficiently carry out planned maintenance tasks, or to perform rapid maintenance-related audits on industrial machinery

Objectives



Having the right knowledge and experience for the development of a Maintenance Function to World Class

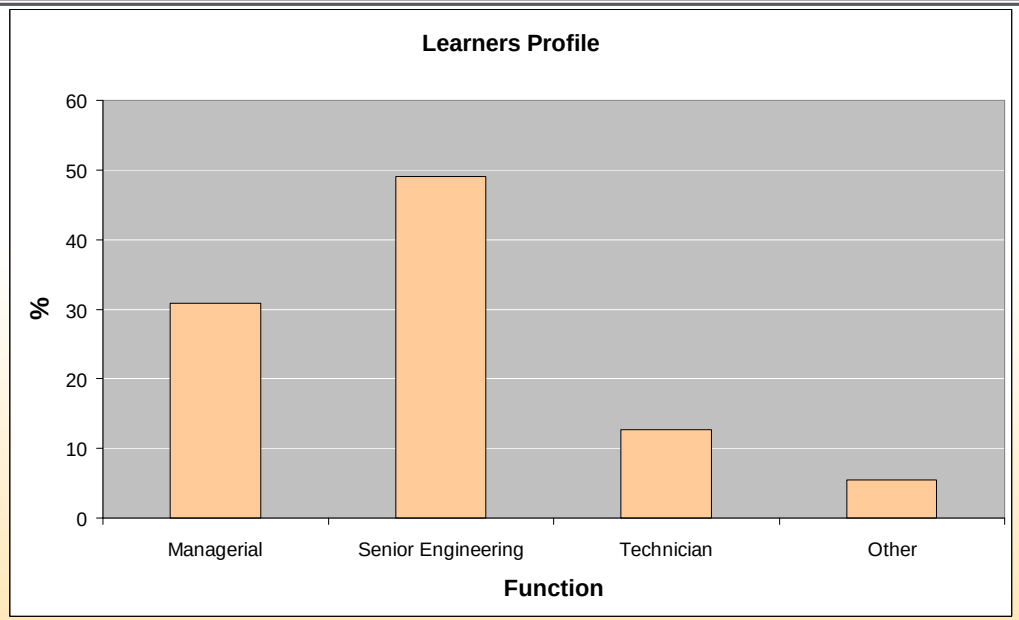
Having the right knowledge for improvement of a basic Maintenance Function

Having the right knowledge for running a basic Maintenance Function

(Jan Franlund, UTEK AB)

- Requirements and Rules to achieve a Certificate as a European Expert in Maintenance Management
- Regulations for the EFNMS Certificate as a European Maintenance Specialist

Survey & Needs Analysis



- Focus on SMEs – questionnaires
- Discussions and interviews (70)
  - learners and trainers
  - UK, Greece, Sweden, Latvia, Romania

The questionnaires comprised questions on the following:

- respondent's background, working situation and experience
- the respondent's knowledge in the field of maintenance
- areas in the field of maintenance to learn more about (wish)
- likely adoption prospects of an e-learning system.

Survey Findings

- teachers/trainers have between little or moderate knowledge in:
  - procurement, selling of service
  - laws and regulations
  - Economical control, LCC, LCP
- they seem to have at least moderate or much knowledge in the other actual areas.
- both managers and engineers/technicians ranked their training in maintenance to be at the same level
- 25% believe that their training is inadequate (low)
- BUT ! this is a snapshot of the “own view”

Managers vs Engineers

- Managers
  - only 13% have “very much” knowledge on economical issues and another 13% know “much” on the same subject
  - 44% know no more than “little” on the subject
  - not consistent with their function – clear training need!
- Engineering and technical personnel were less confident on their competence level
  - consider that they have much practical knowledge but they lack the necessary theoretical background ?
  - they understand the considerable challenges involved in maintenance and so they provide more ‘reserved’ replies ?

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Who decides ?

- 41% of engineers and technicians do not know more than “little” about laws and regulations (this proportion for managers is just 13%).
  - knowledge on this subject is mandatory to become a Maintenance Specialist according to EFNMS.
  - only a 13% of those responded indentified ‘Laws and Regulations’ as a preference topic for training !
  - learner preferences should be interpreted with great caution and should be looked upon together with their stated knowledge on the subject and the objective requirements to become a Maintenance Specialist.

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How about e-Learning ?

- 94,5 % uses computer in a daily basis
- 81,8% believe to be “very much” familiar with computers
- 100% expect to benefit “much” (40%) or “too much” (60%) from a computer based automated learning platform
- These responses bond well with potential future use of e-training for Maintenance Management
- … but computer-based systems do not always offer what is expected !

Curriculum Design

1 Performed activities on the assets (Asset Care)

- 1.1 Maintenance involvement in design, procurement and operation of assets
- 1.2 Preventive and inspection activities
- 1.3 Repair techniques and methods
- 1.4 Goal, strategies, results

2 Asset Performance Evaluation

- 2.1 Analysis of the technical performance of the assets
- 2.2 Remote control
- 2.3 Condition monitoring
- 2.4 Measurements
- 2.5 Information systems

3 Management/Economy of Assets

- 3.1 Maintenance concepts (Dependability / Availability Performance)
- 3.2 Analysis of the economical results
- 3.3 Documentation
- 3.4 Laws and regulations
- 3.5 Determination of human & material resources

(Ashraf Labib,
Univ. Of Portmsouth)

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Content Development

ATLANTIS Engineering

University of Portsmouth

UTEK A.B.

(Swedish Maintenance Society)

ATHENA R.C.

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Content Structure 1/3

1. Introduction

1.1 Objectives

Define the technique/practice/methodology that this module is about.

Aims of the technique/practice/methodology.

1.2 Learning Outcome

Learning outcome and benefits for the trainees? (after successfully completing this module you will be able to…., etc)

1.3 Summary

Summary of the module content.

1.4 Prerequisites / Related Topics:

Define which other sections need to be completed before taking this section.

1.5 Keywords:

List of most relative keywords

Content Structure 2/3

2. Theoretical Background

2.1 Prerequisites (Optional)

Define which other sections need to be completed before taking this section.

2.2 Main part

This part provides:

Basic information for the maintenance practice, methodology, tool

Relevant references and links (schools of thought, approaches)

Learning Objective: To familiarize the trainees with the most significant maintenance activities of every module and provide them *with the basics for their implementation*

2.3 Review Questions

3. Implementation

How this technique, method, tool, policy is implemented and used?

3.1 Action plan

Practical implementation guidelines and tips.

3.2 Success factors

How will you now if implementation is successful ?

Content Structure 3/3

4. Case Studies

Practical case studies, best practice examples etc.

5. Assessment Questions

Closed form (multiple choice: yes/no or right/wrong)

6. Glossary

Definitions of key terms

7. List of References

Maintenance Glossary

- Use of existing ‘Terminology’ module, traininmain project
- Use of standard EN 13306:Maintenance Terminology
- Other published papers, studies and scientific internet portals for maintenance terminology
- Terminology used and terms definitions from all the developed modules

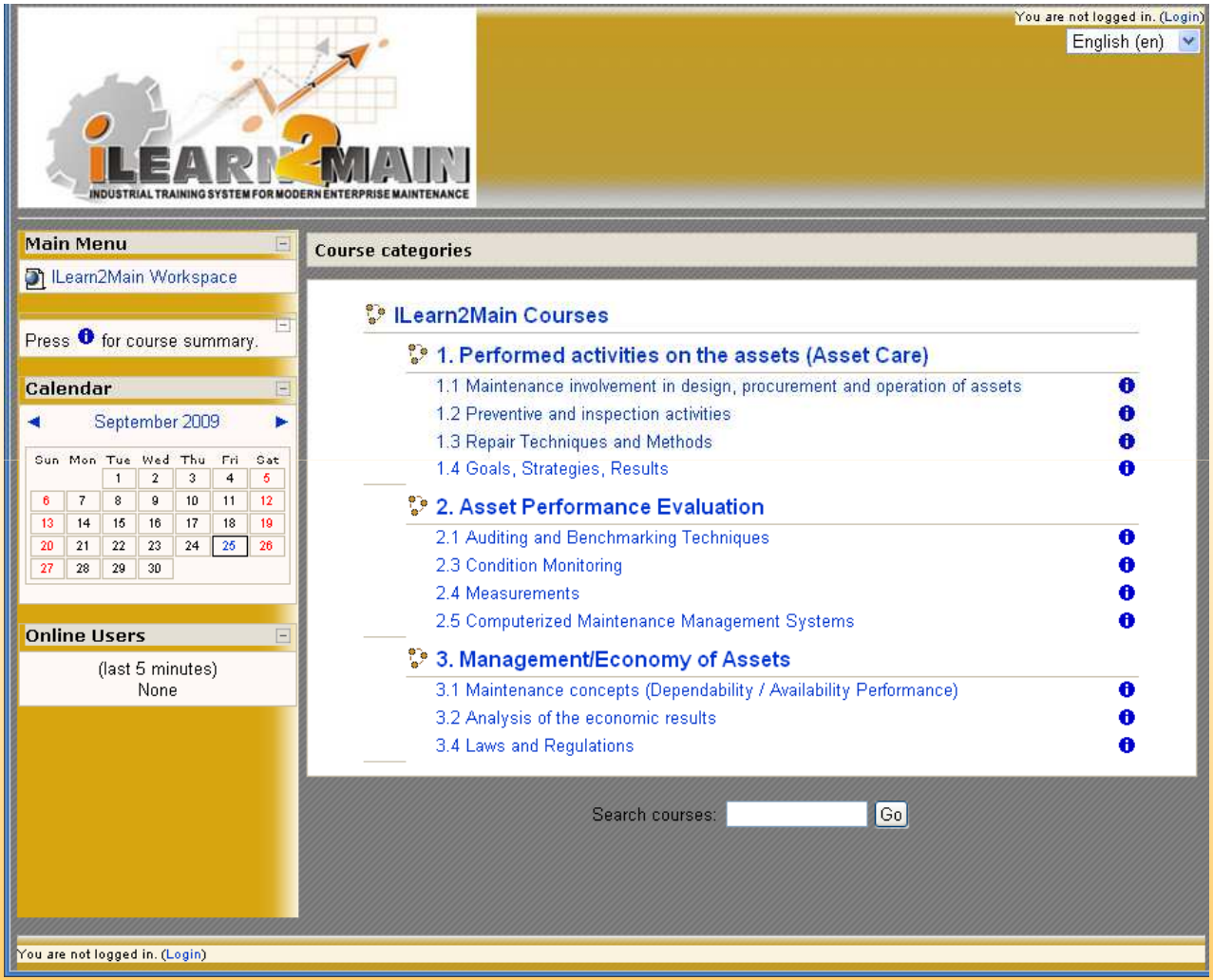
LMS Features

Open Source Learning Management Systems

Moodle (www.moodle.org)

- Design lessons with text, graphics, animations and video
- Incorporate comprehension and final assessment questions
- Define custom learning paths and pre-requisites for lessons
- Define meta-courses, which are aggregation of courses for specific subjects
- Include dynamic Glossaries with terminology
- Multiple LMS design & development support
  - Management of user roles, resources, activities, knowledge assessment, activity reports, …

The iLearn2Main LMS



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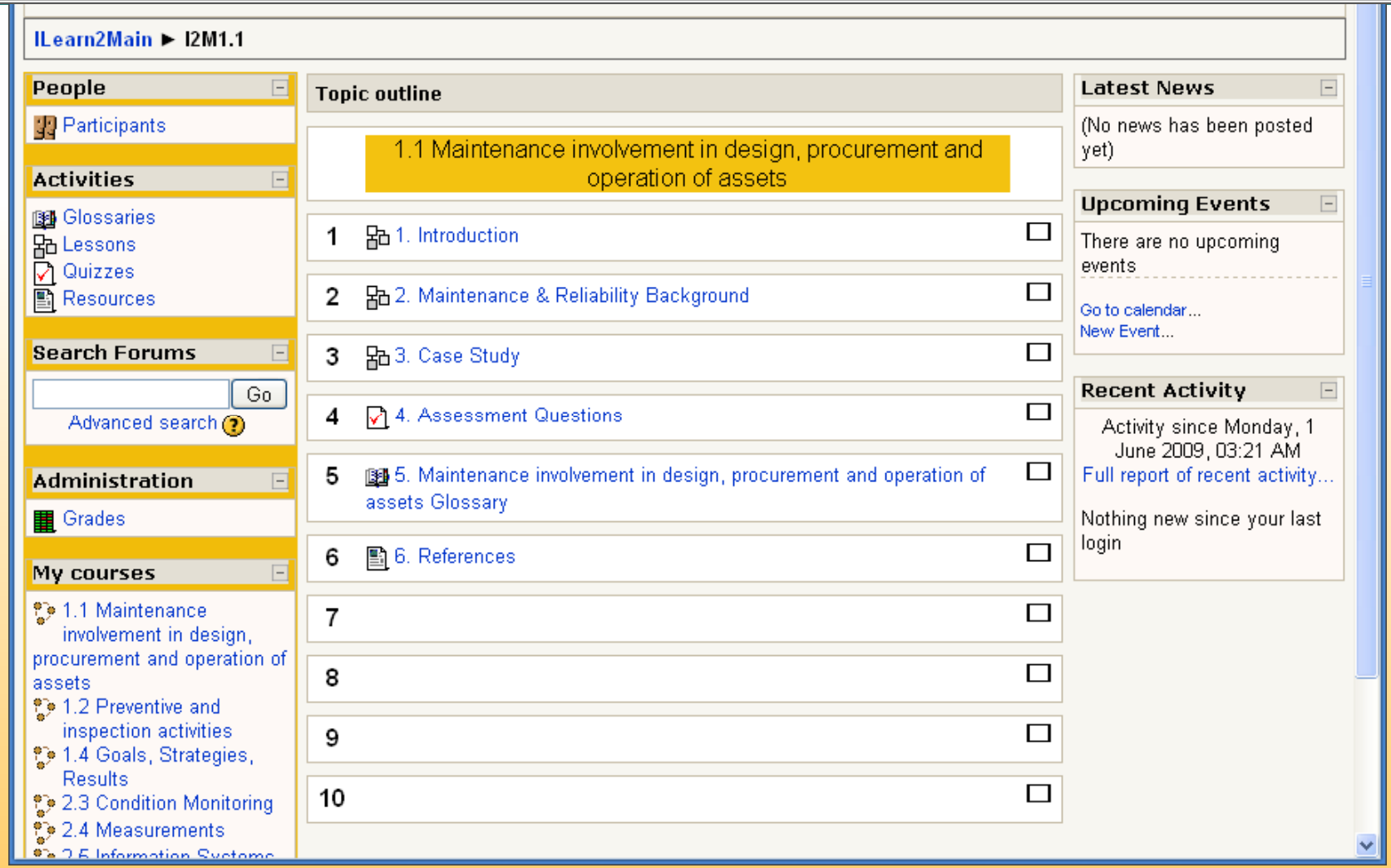
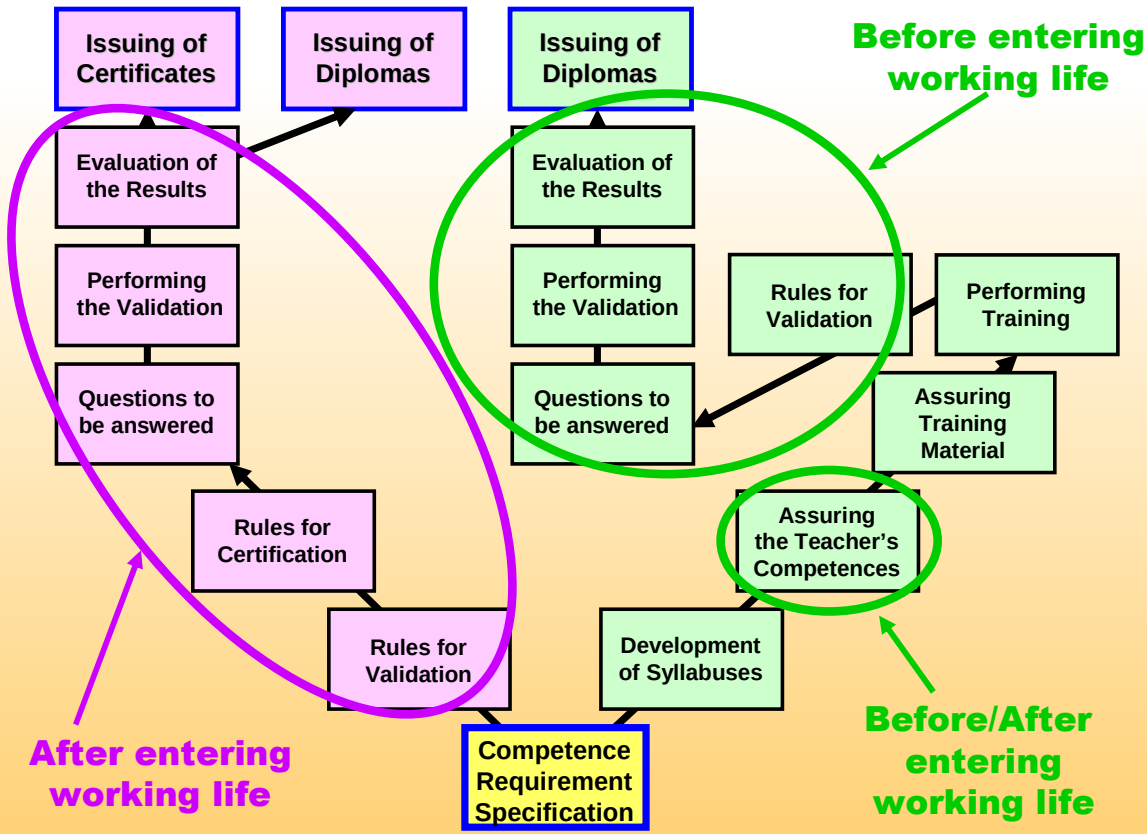
e-Learning module structure



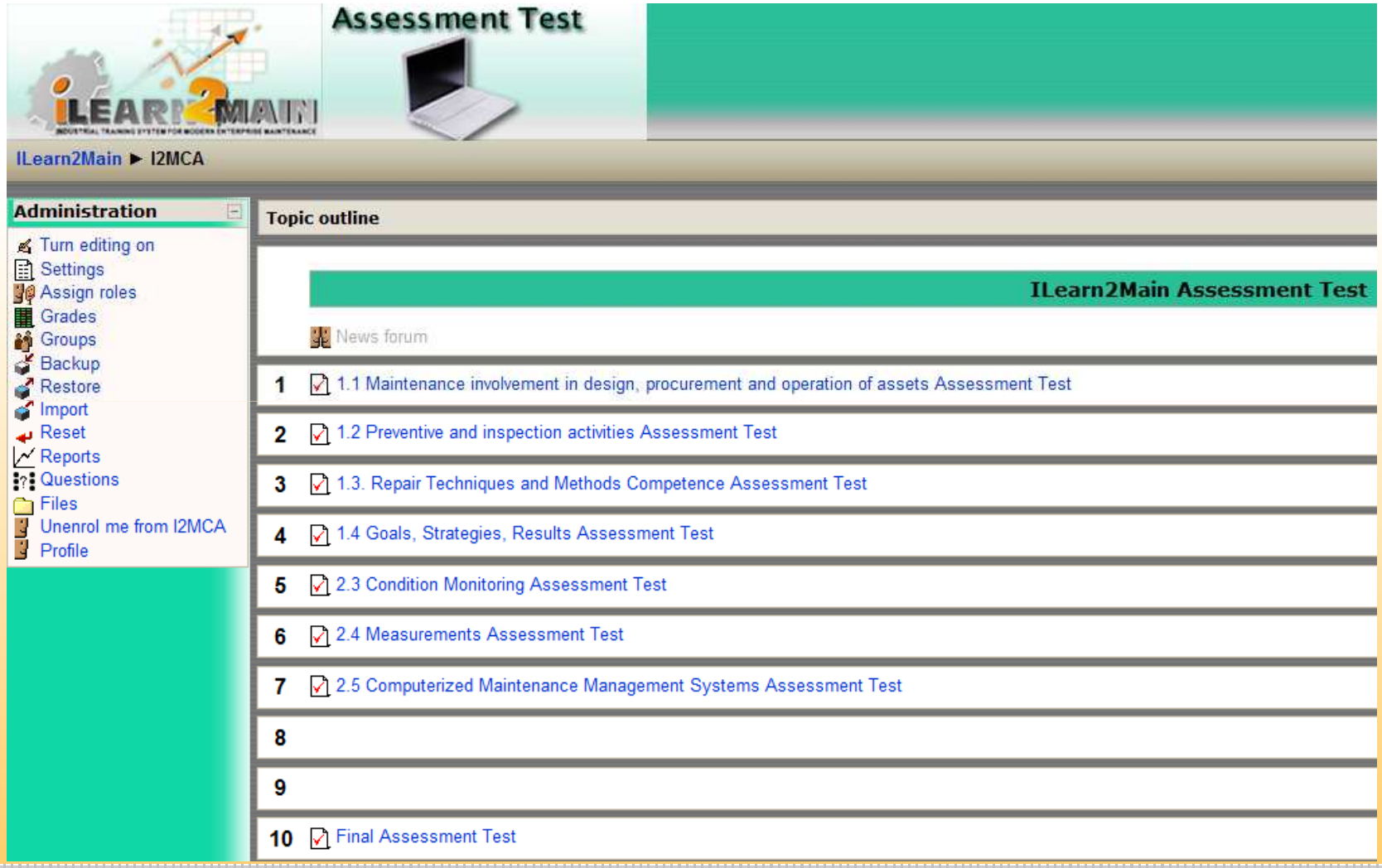
Competence Assessment

Maintenance Competence Assessment



(Jan Franlund, UTEK AB)

e-Assessment of Competences



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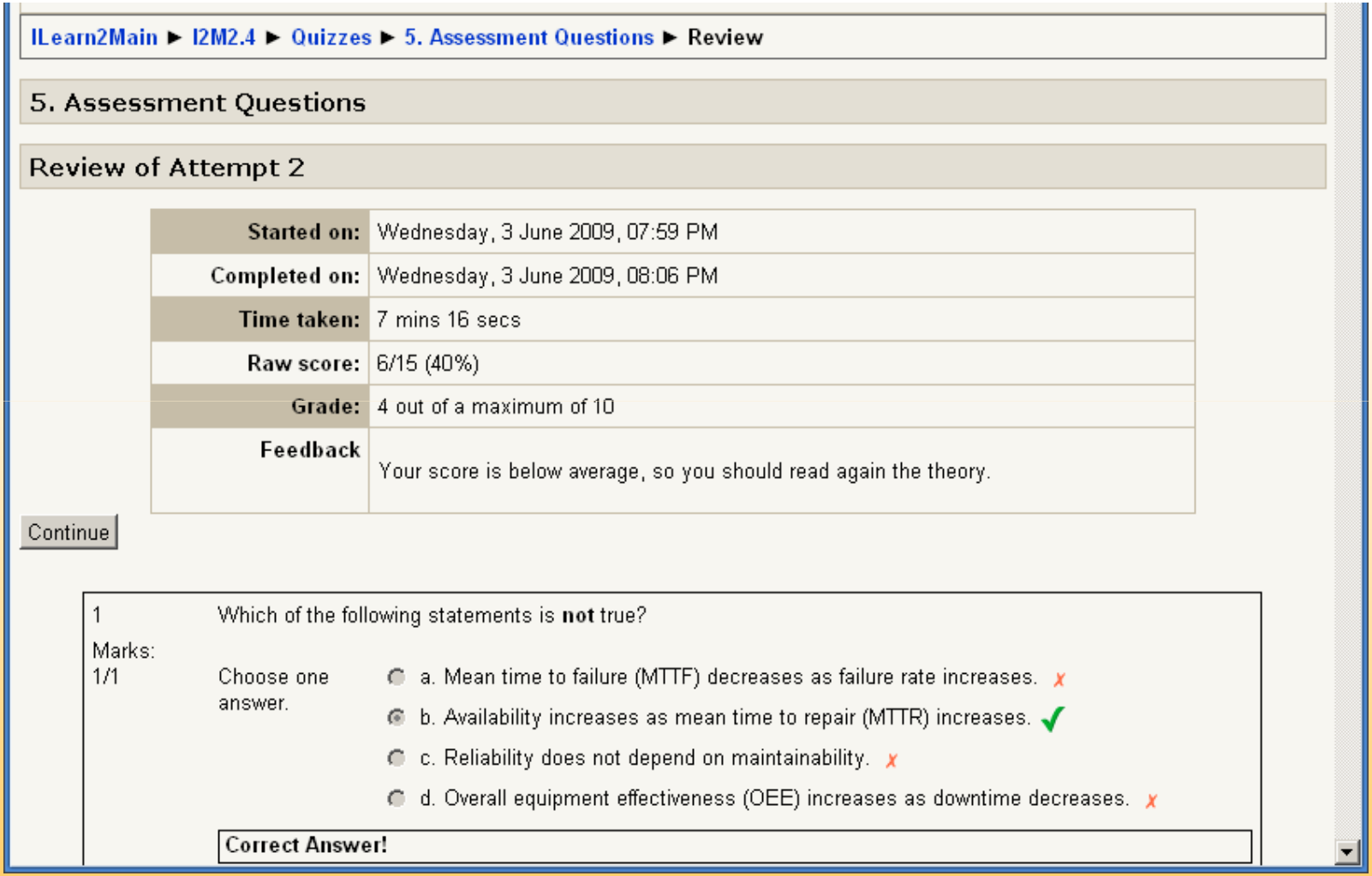
Example of Assessment Test



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5. Assessment Questions

Review of Attempt 2

Started on:	Wednesday, 3 June 2009, 07:59 PM
Completed on:	Wednesday, 3 June 2009, 08:06 PM
Time taken:	7 mins 16 secs
Raw score:	6/15 (40%)
Grade:	4 out of a maximum of 10
Feedback	Your score is below average, so you should read again the theory.

Continue

1 Which of the following statements is **not** true?

Marks: 1/1

Choose one answer.

- a. Mean time to failure (MTTF) decreases as failure rate increases. ✗
- b. Availability increases as mean time to repair (MTTR) increases. ✓
- c. Reliability does not depend on maintainability. ✗
- d. Overall equipment effectiveness (OEE) increases as downtime decreases. ✗

Correct Answer!

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Conclusion

- Maintenance Management Curriculum Design
- Content Development for Maintenance Management Training and Competence Assessment
- e-Tools to streamline Maintenance Management Training and ‘standrardise’ Competence Assessment

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About iLearn2Main

- The project is funded through the UK/07/LLP-LdV/TOI-004 contract with the UK Leonardo Authority.
- www.ilearn2main.eu
  - Contractor: University of Portsmouth
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