Innovative eLearning Tool for Quality Training Material in VET

Final Report (2nd version) Public Part

Project information

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Beneficiary organisation:	SZAMALK Oktatási és Informatikai Zártkörűen működő Részvénytársaság

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Executive Summary

iQTool project – Innovative eLearning Tool for Quality Training Material in VET – is primarily for vocational education and training institutions and to organisations that are directly or indirectly linked to VET.

The aim of the project is to develop an open source software tool integrated in LMS(s), which is suitable to assess the teaching quality management of eLearning training programmes and training materials for supporting the application of the quality measurement tool for institutions dealing with vocational training and which therefore can promote the establishment and development of quality culture.

The project is realized by a professional consortium. Coordinator: SZAMALK Ltd. (HU). Partners: MTA SZTAKI (HU), Technical University of Crete (EL), f-bb Research Institute for Vocational Training (DE), CENFIM (PT), TISIP (NO).

Project started: 01/12/2007, finished 28/02/2010.

Main results of the project.

Survey reports

- Report on Open Source LMS Research: to be able to choose one or more LMS-systems to be used as pilots for the iQTool Software
- Report on Quality Assurance Research: To be able to choose a QA approach or system to be used as basis for both the iQTool Software(WP3) and Learning materials
- Report on iQTool Evaluation Component Requirements: To be able to define the overall functionality of the SW Tool, user roles and some use cases

Software development

- The iQTools web-application to create, edit and store questions and questionnaires to be used in quality assurance
- the iQTool plugin to be used in the LMS accompanying the learning material in order to ask the quality assurance questions

Educational content development:

- Module A – eLearning content for teaching Quality Management

- Module B - An e-learning content which is suitable for teaching the application and usage of the iQTool software.

The modules are translated to the partner's languages

The project website with all results and materials related to iQTool can be found at **www.iqtool.eu**

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1. Project Objectives

The aim of the project was to develop an open source software tool integrated in LMS(s), which was suitable to assess the teaching quality management of eLearning training programmes and training materials for supporting the application of the quality measurement tool for institutions dealing with vocational training and which therefore can promote the establishment and development of quality culture.

The project implementation integrates testing of software and pilot training of the training material as well. Thus the aim of the project was to elaborate an eLearning quality tool which can be applied at European level and which enables the teaching of quality management. Also, the project aims to provide the management and quality assurance of vocational training with effective tool.

The innovative aim of the project is to develop a special software tool for the evaluation of the training materials in LMS on the basis of research work result and quality assurance methodology will be formed in this project. The advantage of the integration of the evaluation system and LMS. Furthermore, it offers for developers and teachers an opportunity to display statistically the results in the LMS(s) which helps to evaluate them.

The innovative content means the development of an up-to-date and interactive eLearning tool which helps that quality assurance of eLearning training material development in educational institutions can be carried out. It is of major importance that European educational institutions can enter the competitive education market through a quality approach.

On the short run educational institutions can improve the quality of their trainings due to the project results. This way the effectiveness of instruction also improves as the quality of the eLearning contents is also becoming better. The software to be developed will be suitable to meet the combined needs of eLearning developers, service providers and users in the field of modern quality management.

The long term beneficiaries of the project are first and foremost those institutions where the equipment is suitable for developing higher quality tools and to establish quality centered approach. Thus there will be a possibility to develop innovative eLearning contents and programmes which meet the highest quality expectations.

The students will receive higher quality education, their needs will be better served and will be more successful in the labour market using the knowledge gained through the acquired high-quality eLearning contents and programmes.

2.   Project Approach

Leonardo da Vinci Multilateral Projects 'Development of Innovation' are transnational cooperation projects that aim to improve the quality of training systems through the development of innovative contents, methods and procedures within Vocational Education and Training (VET).

Innovation is a matter of doing new things or finding new ways of doing familiar things. For Development of Innovation Projects it means that something new is developed (contents, methods, procedures etc.) as the outcome of the project. That is a new solution to help several countries to cope with a common challenge in the VET area for which there does not yet exists an answer.
These projects must be the vehicle for improving quality and for promoting innovation in vocational training. Both aims should be integrated in the proposal in such a way that tools, methods or concepts, and also specific materials which are developed during the project can be used in, or adapted for, changing environments.

The principles for the implementation of Leonardo da Vinci Development of Innovation projects are given below:

- Community support is intended for the production of tangible materials, products, methods and approaches in the field of vocational training and guidance, and not for training activities as such

- Proposals must put the innovative dimension of the project in context and in relation to the needs of the target groups or the problem to be solved

- The development of innovation may apply equally to institutional contexts and to formal, informal or non-formal practices, as well to initiatives promoted at the local, regional or sectoral level

- Maximum benefit must be drawn at European level from the results by making use of the expertise and experience of the various European bodies and/or other qualified organisations active in this field

- In order to make best use of the results and obtain feedback enabling the product, material, approach or method to be adapted and transferred, valorisation (= dissemination and exploitation of results) must be an integral part of the project's work programme

- In disseminating and exploiting the results of projects, the European dimension must be enhanced by making vocational training and guidance materials, products, methods and approaches available, where possible, in the languages of all partners

3. Project Outcomes & Results

WP2 Research

www.iqtool.eu

It was decided by the project group that the results should be presented in three reports, each focusing on different tasks necessary to prepare the work to be done in WP3 and WP4.

1) **Report on Open Source LMS Research**
   To be able to choose one or more LMS-systems to be used as pilots for the iQTool Software (WP3)

2) **Report on Quality Assurance Research**
   To be able to choose a QA approach or system to be used as basis for both the iQTool Software(WP3) and Learning materials (WP4)

3) **Report on iQTool Evaluation Component Requirements**
   To be able to define the overall functionality of the SW Tool, user roles and some use cases (WP3).

Report on Open Source LMS Research

The report is divided into seven parts: *Executive Summary, Introduction, Identification of related projects, Survey and open source LMSs, Criteria system and evaluation methodology, Evaluation results, Suggestions for selection of an appropriate open source LMS to be used in iQTool and References*.
The Research on the Open Source LMS systems was done by the partners who were assigned the technical tasks in the project, TUC/MUSIC and MTA-SZTAKI. They developed a Research plan for the task resulting in three steps to find the appropriate systems to be used for iQTool.

1) Identification of open source LMSs from related projects, based a survey of open source LMSs. *This resulted in a list of more than 60 Open Source LMS systems.*

2) Criteria system, evaluating methodology and results
   a. Phase 1: The LMSs must fulfil at least 10 criteria
   b. Phase 2: In this phase the selected systems from Phase 1 were further evaluated by eight criteria

Due to the result from the evaluation, ILIAS was chosen.
The research to find the most appropriate LMS system was very thorough, and could be an example for similar work to evaluate and select other types of Software.

Report on Quality Assurance Research

The report descries a lot of useful projects and websites where information of QAS and QM can be found.
There is an extensive survey among possible users of the iQTool system about their use of QA systems in their institutions.

This gives a good picture of the situation for the involved institutions. The results shows that many institutions could benefit from learning more about QA and QM through the iQTool software and also increase the quality of their VET materials by evaluation of it using iQTool. And at last, a short presentation of the EQO Model is given which is a generic work that covers a lot of different QA and QM approaches.

The report is divided into seven parts: *Executive summary; Introduction; Identification of Related projects, Surveys, Analysis, Reports, Quality assurance policies/methodologies/systems in VET and Elearning; Evaluation methodology and questionnaire survey results; Results of the evaluation of quality assurance policies/methodologies/systems in VET and Elearning; Results of the evaluation of quality assurance policies/approaches/methodologies/systems in VET and eLearning, and References.*

The Research on the Quality Assurance Research was done by the partners who had done similar work in other EU projects, TUC/MUSIC (Research plan), TISIP (Criteria system) SZÁMALK (Quality Management), CENFIM (Evaluation of results), TUC/MUSIC (Research reports and workshop).
In Chapter 3, a presentation of related projects; related surveys, analyses and reports and links to quality assurance policies/approaches/methodologies/systems in VET and eLearning.

In Chapter 4, a questionnaire was developed to make a survey among VET institutions to examine their use of QA systems for their VET operations. The aim of the survey was to be able to identify the most important QM in use and propose one to be used as basis for the iQTool project.

The survey contained 77 questions divided into 7 groups: *Institutional support; Analyses; Design; Development; Delivery; Student support and Evaluation, Assessment*. The results gives a good indication of the use of QA systems among the institutions taking part in the Survey.

In Chapter 5 a more theoretical analyses of available models for Quality Management and Quality Assurance are looked into.

A brief structure and main elements of the iQTool Quality Models is presented in Chapter 6. There is also a reference to a document: "Criteria System for evaluation of Quality Management of Elearning in VET".

Report on iQTool Evaluation Component Requirements

The report presents a thorough requirement analyse of the iQTool Evaluation component. This is the main **prerequisite** for the software development in WP3.

The report is divided into five parts: *Executive summary; Introduction; Overall picture of the functionality of the IQTool software tool for the evaluation of training materials; Detailed descriptions of the use cases; References.*

This report documents the results of the requirement analysis made with respect to the iQTool evaluation component. The work reported was carried out in the context of task 2.5 "Evaluation of the results" of work package WP2 taking into account the research work on quality assurance and open source LMS selection.

Two major subsystems were identified with respect to the evaluation component: The **Evaluation Component Interface** and the **Evaluation Component Repository** and the conceptual architecture were specified. The analysis also revealed four user roles, namely, the *administrator*, the *quality assurance manager*, the *publisher* and the *evaluator.* All relevant user tasks were identified and documented through the use cases.

In total 33 Use Cases are developed. Even if it is not explicitly stated, the student end-user, the main stakeholder of the project, is the same as the Evaluator. Other persons may also be Evaluators, for instance Teachers who want to use learning materials developed by others.

Software development

The software iQTool created in this work package (WP 3) is the **main product** of the project. In the coming work packages this tool should be tested with real learning material and real questionnaires for selected groups.

The aim is to create a quality assurance module which can be integrated into the selected open-source LMS(s). The learning content pages displayed on the screen can be evaluated with the help of this module. Summarised statistics can be produced for the authors and tutors from the gained data and information will help to evaluate the training material and improving them with reediting the context again or by technical changes.

The software product developed in the work package facilitate and support the quality evaluation process of the work of courseware authors. The author will receive feedback using this module and compare the goals stated in the beginning of the development of the training material with how well these goals are achieved.

The products are:

1) The iQTools web-application to create, edit and store questions and questionnaires to be used in quality assurance.

2) The iQTool plugin to be used in the LMS accompanying the learning material in order to ask the quality assurance questions.

The web-application consists of a user front end, a repository and finally of an interface to the plugin running on the LMS. The repository is for storing users, questions, questionnaires and answers.

Users can join the web-application by registration username, password and e-mail address. The system has defined several roles that the users can have: administrator, quality assurance manager and publisher. You can create, edit, view and share questions. And more you can select questions and add these to questionnaires. This questionnaire can later be reviewed by others (for example the publisher) and be published to be used in a learning environment.

The iQTool plugin is an application running in the LMS to pop up when students run through the learning material. The quality assurance manager (a role in the web-application) decides which questions should pop up and when. All data collected through the questionnaire session are stored in the database of the iQTool web-application and can be examined further through statistical methods.

The repository is connected with the application through SOAP web service layer. This separation makes it possible to connect other systems to the question repository (creating own question modules, extending it with own statistics systems, etc.). In the project only the iQTool application will use the repository.
The iQTool application provides a simple standardized JSON interface. JSON is a very simple protocol, supported by many platforms.

System specification and the functionality of the iQTool software are created on the basis of the work in WP2, i.e. the research on LMS-s and the different quality assurance systems used in Europe.

- MTA SZTAKI, the work package leader, developed the user interface of the software and managed the development infrastructure

- TUC MUSIC the leader of the system design (in WP2) developed of the underlying content repository.

- SZAMALK developed the ILIAS plugin

- CENFIM did the usability test of the system

The software has two separate components: The iQTool web-application and the iQTool plugin for the LMS. The first one, the iQTool web-application, is easy to port. It is like installing the system in another computer given a Linux platform and the chosen services running on the computer.

The iQTool plugin is created for the ILIAS LMS system and made as open software, free for everyone to use and to port to other LMS-es.

User and system documentation

Documentation for the iQTool web-application: iQTool Users' Manual and made by MTA SZTAKI. The document describes all the user roles in the system, how to administrate the roles and lastly how to create questions, assemble questions to questionnaires and how to publish the questionnaires.
The document is well written with many screen captures, easy to use and gives a clear and understandable overview of the system.

iQTool ILIAS Plug-in Users Guide and iQTool ILIAS Plug-in Administrative Guide: The first one shows how to answer the questionnaire when it appears in the iQTool plugin in ILIAS. The second one shows how to connect the learning material in ILIAS

to the questionnaire in the iQTool web-application using the iQTool plugin.

- Usability of the system, i.e. the iQTool Web application for creating questionnaires

Project websites

The project has **websites**.

1. One for publicizing and disseminating project results, and the other for developing the software tool, one of the project results. The site for the wide public is available under the domain name:

 www.iqtool.eu

This website has an intraweb part that is available only for the members of the consortium after registration.

On the project website there is an important document for the users:

iQTool Quick Start Guide.

To follow the instructions you can login to the web interface.

2. The website for the **software development** is restricted to members of WP3

www.iqtool.org

On the project website **www.iqtool.eu** you can find "**Project results**" on the public part of the site. You can find there links to the

3. **iQTool web-interface**

On the we-interface site you can find some other products of the development

Development infrastructure¶

Mailing list: iQTool-development [at]elearning.ilab.sztaki.hu

SVN repository: https://elearning.ilab.sztaki.hu/svn/iqtool

iQTool Web Management Interface: http://elearning.sztaki.hu:8080/iqtool (username and password: "iqtool_test")

MTA SZTAKI Test ILIAS (LMS): https://elearning.sztaki.hu/ilias3106m (username and password: "iqtool_test")

Development documentations¶

 iQTool conceptual design documentation

 ECOR Web Services Documentation

iQTool Web Interface User Manual

Web Interface Documentation

ILIAS LMS Plugin Administrator Guide

ILIAS LMS Plugin User Guide

LMS Plugin communication with the iQTool Web Interface

Downloadable Learning Management System Plugins¶

ILIAS LMS Plugin

The le-earning contents (modules A and B) are translated into the 6 languages

To find them directly: https://elearning.sztaki.hu/ilias3106m

Educational content development

f-bb the German partner in the project was the leader of this work package. They have produced the e-learning training material according to the project proposal. The Hungarian partner SZAMALK have contributed with most of the content used in Module A – educational content for teaching the basics of quality in e-learning, while the partner MTA SZTAKI contributed with the content of Module B. The results are two learning modules:

- Module A - Educational content for teaching the basics of quality in e-learning. Furthermore the educational content developed in the work package teaches the quality assurance elements of the different phases of delivery of e-learning and electronic education such as Analysis, Design, Development, Delivery and Evaluation.

- Module B - An e-learning instruction material package which is suitable for teaching the application and usage of the iQTool software.

The two learning modules developed in this work package was used as input in work package 5. All the people involved in the testing in WP 4 and WP 5 had to work through the learning modules produced in WP 4.

Both modules have also been translated into the respective language of each partner in the project. It is **now available in German, English, Portuguese, Hungarian, Greek and Norwegian.**

The results from this WP are very important for achieving the goals of the entire project. The modules produced will help new users of the iQTool software to understand the concept of quality in e-learning and also how to use the software. The results will also be important for the entire LdV program since the learning modules will set focus on quality in vocational education and training together with the software.

All the partners have contributed according to the project proposal.

The SCORM packages of the training modules A and B on partner's languages are available in the following the links:

https://elearning.sztaki.hu/ilias3106m

Testing and pilot training

The work in WP5 is for testing the software tool and learning packages developed in the project. The test is organized in several parts:

- Testing the software tool developed in WP3. This software should be used for evaluation of training materials delivered to learners through LMS-systems.

- Testing the learning packages developed in WP4. That is Module A: Quality Assurance in e-learning and Module B: User Manual for the iQTool software tool created in the project.

- Testing of eight learning packages developed at each partners and distributed to locale learners. These eight learning packages are pilot courses developed in accordance to the procedures built-in the tools developed in WP3.

The Cenfim partner in Portugal was in charge of this work package. Cenfim created the plans for the testing to be used by each partner that did carry out the real tests locally at each partner institution.

Dissemination, Exploitation

The products so far are the web site, the leaflet, the summary of the project and a long list of presentations. Two proposals are made for LdV Transfer of Innovation projects be the 26th of February 2010 (Hungary and Norway), where the results from iQTool will be utilised and spread to new VET institutions and new countries.

The project website contains lot more information than the leaflet. It is available at **http://www.iqtool.eu.**

The **project leaflet** is bilingual; it is available in English + one of the partner's national languages (Hungarian, Norwegian, Greek, German and Portugal).

The Project summary is translated into the six languages used in the project (on the website)

The le-earning modules A and B are translated into the 6 languages used in the project. They will be very helpful especially for practitioners in the VET institutions.
https://elearning.sztaki.hu/ilias3106m

Presentations by partners in seminars – national, transnational

4.　Partnerships

The project objectives are realized by **six partner organizations from five countries**. Each member of the consortium has excellent experience in European Union funded international projects, in eLearning and VET programmes.

P1 The coordinator organization, **SZAMALK Educational and Information Technology Ltd.** has gained experience and achievements in the quality assurance of education, eLearning, vocational training as well as EU project coordination. www.szamalk.hu

P2 TISIP the Norwegian partner was responsible for the quality assurance of the project.　TISIP is a research foundation, was founded in 1985, and do research in ICT and e-learning and has developed content for more than 70 countries. www.tisip.no

P3 Technical University of Crete, **Laboratory of Distributed Multimedia Information Systems and Applications (TUC/MUSIC**) was responsible for the research-survey work package, as they have good practice from previous Leonardo projects. They have gained experience in eLearning software development. www.music.tuc.gr

P4 Computer and Automation Research Institute of Hungarian Academy of Sciences (MTA SZTAKI) was the leader of software development. The other Hungarian partner participates in the project with its eLearning department. This department has achieved several results in eLearning development and participated in several international projects.

www.sztaki.hu/elearning

P5 f-bb, the German **Research Institute for Vocational Training** coordinated the development of the eLearning contents in this project. www.f-bb.de

P6 CENFIM Vocational Training Centre for Metallurgy and Metal Work Industry in Portugal is an institution dealing with industrial vocational training, so its main task in iQTool project was to test the project results (eLearning software and instruction material) in practice. www.cenfim.pt

5.   Plans for the Future

The **results** created throughout the project – the **evaluation software and the related teaching package** – can be directly used within the primary target group of the project. The e-learning developers, the managements, teachers and developers of the vocational training institutes are expected to take advantage of the directly available tool widely.

With the help of this the quality of the applied e-learning instruction materials and thus the quality of the whole education will improve. This is certainly a longer-term process by the end of which through the dissemination of the project results the tool will be widely used. The professional associations and governmental organisations whose responsibility is to improve the quality of vocational training and so the dissemination of results will also contribute.

The **long-term effect** of that will be felt later when the knowledge level and professional preparedness of students leaving vocational schools will also be higher as they have gained their knowledge with the help of high quality e-learning instruction materials. The better prepared professionals serve increasing competitiveness.

The members of the consortium are dedicated to **keep project results available** long after the closure of the project itself. Anyone interested in the methods, products can contact any partner through the project website, or the contact information given on the project leaflet.

The publication philosophy in the project, the **exploitation** will be based on pull strategy, i.e. letting the VET and eLearning community gain information of the existence of the iQTool software and learning modules, and leave it to the community to use the modules both as learning resources and as a quality tool to be integrated with ILIAS or other LMS systems.

The community can freely develop the software further, add new learning modules or develop a database of customized questions for evaluating and quality-assure their digital learning resources. Our task the involvement of the partnership in social networks that are related with the project topics and the registration of the project in several quality assurance and e-learning registers, like European Quality Assurance Register and European Foundation of Quality in ELearning.

6. Contribution to EU policies

The European level realisation and application is an essential objective for the consortium. Vocational training and its quality assurance cannot be treated only as a national issue. It is one of the basic aims of the EU to increase as much as possible the education level of employees in each member state.

This is the only way to compete with the competitors of Europe in the globalised world. The quality centred attitude and the continuous development of quality in all areas is essential for vocational training as well. It is outstandingly important to develop institutional quality culture and to raise it to the same level in all member states.

The **consortium partners** of the project all have extensive experience in European Union vocational training and development programs, electronic education and quality assurance. The partners have formed the consortium with the aim of developing a tool together that is suitable for evaluating e-learning instruction materials in vocational training depending on e-learning platforms based on a specified criteria system.

Though the quality assurance instruction package that goes with the tool is translated into the languages of the partner institutions and thus will enable usage on its own; the project outcomes could be used at the European level without difficulties and that the outcomes could contribute to the quality improvement of vocational training and e-learning at an international level.

As the completed project outcomes are freely available on the home page of the project, their availability is open to any European vocational training institution, developer or user. In the dissemination and exploitation phases of the project our aim is to spread the results in as wide a circle as possible at the European level.

The European added value therefore is innovative and novel tool that is developed in the project, which tool could serve vocational training and e-learning quality at the European level.