



QUIS - Quality, Interoperability and Standards in e-learning
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QUIS summary



e Learning
Designing Tomorrow's Education

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QUIS

Quality, Interoperability and Standards in e-learning

QUIS summary

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Quality, Interoperability and Standards in e-learning

The QUIS-project (Quality, Interoperability and Standards in e-learning) is a Transversal project in EU's eLearning Programme. The activities in the QUIS project are all directed towards Quality in e-learning, Interoperability and re-usability of e-learning material and development of standards. The project is also looking at cost effectiveness and cost efficiency in e-learning. The project is building on, and further develops results from earlier EU projects. Quality in e-learning is important for exchange of both learning materials and learning practices across Higher Educational Institutions in Europe. To establish joint study programs it is essential that cooperating institutions accept each others Quality Assurance Systems (QAS).

The QUIS-project started 1 January 2005 and was running for two years. It consisted of 10 Work Packages (WP) distributed between different groups among the partners. WP1 and WP10 were dedicated to administrations of the project. The other WPs are listed below.

- WP2: A survey to find the Quality Assurance Systems used in higher educational institutions in the EU area. The findings are then discussed and evaluated. The survey was done by looking into existing EU projects covering quality in e-learning.
- WP3: A Quality Assurance System to promote the European dimension of e-learning is developed. The report contains a best practice for setting up net-based education across language and cultural borders.
- WP4: An analysis of commercial and experimental LMS systems has been performed. EP², a web-based tool is developed to collect judgments on different LMS's and to help the users finding the "best fitted" LMS.
- WP5: A repository of standards in e-learning is created and an online guide for novices is presented. The online guide is produced as a topic map structure that allows semantic-based browsing in a web-browser.
- WP6: A requirement specification for a next generation of e-learning system is produced. The main focus is on the pedagogical and technological parts of a next-generation e-learning system with the Bologna process as a basis for the requirements.
- WP7: Projects about cost effectiveness are analyzed. The report summarizes earlier research done in the area of e-learning and costs effectiveness in the perspective of the user (for example the student or the educational consumers), the provider and the society.
- WP8: New models for cost effectiveness have been developed. An economic model report that could be used at Higher Education Institutions when being involved in ordering, producing, running or consuming education and especially e-learning.
- WP9: Dissemination, two-way communication and evaluation are the main parts of this work package. This includes setting up and maintenance of the QUIS web site, handling printed reports, running workshops, delivering papers for conferences and journals and the evaluation of the project activities and the projects products.

Below you will find the summaries from each of these work packages.

Please visit the QUIS web site <http://www.tisip.no/QUIS> for further information and to find all the reports and supplementary material for downloading.

WP2: Analyse projects on quality in e-learning

The main goal of the work in WP2 was to do a survey and an analysis of previous projects in the area Quality in e-learning.

The work was divided into several parts:

- Analyzing earlier EU projects taking into account the work and the result of the Bologna process.
- Collecting and disseminating relevant results of these projects.
- Collecting the results from partner institutions.
- Disseminating the findings among the partners.

The information about quality in e-learning is collected from several European countries. Bibliographic references have been reviewed and databases of the existing resources have been analysed. The resulting product is a synthesis of reported experiences from many quality projects, national quality norms and publications related to quality in e-learning.

The findings of the survey uncover that it is vital for the quality that cooperating institutions thorough study each others quality systems and agrees upon a common approach to mutual accept courses and programs offered by the other institution and vice versa.

Projects on quality in e-learning (a database of QAS and Quality in e-learning reports):

- mENU: A model for a European Networked University
- MECA-ODL: Methodology for the analysis of quality in ODL through Internet
- NETWORKERS: New models for enhancing use of e-Learning for SME lifelong learning - The experience approach
- GreTel: eLearning in Europe: needs, experiences and instruments
- E-LEN: A network of e-learning centres
- EQO: European Quality Observatory
- SEEQUEL: Sustainable Environment for the Evaluation of Quality in eLearning
- QUAL-E-LEARNING: La qualité de l'eLearning
- UNFOLD: Understanding New Frameworks of Learning Design
- EUA: Developing an Internal Quality Culture in European Universities
- Open and Distance Education Quality Council
- ODL QC Standards
- ELUE Improving quality of e-learning in universities
- e-learning project
- SEEL: Supporting excellence in E-Learning

As a conclusion of the analysis, we have found that most of the QAS projects focus on development and design, ensuring quality from teachers/developers/managers perspective. The student perspective concerning transparency of learning environments is often neglected. There is also a lack of generally accepted QAS criteria in Europe for the traditional mode of delivery.

We can distinguish two QAS models: Lifecycle model and Functional model.

The analysis of Quality projects has shown that there is currently no harmonization effort towards a common European Quality Assurance System. This study has identified accepted quality assurance approaches. Since the WP2 study is only an initial work package, further studies and development were necessary in order to create a QAS for e-learning. This work is done in the work package WP3.

In the report a process-oriented system for quality assurance is proposed. For the design and development process a slightly different approach is proposed combining process and product into one common framework.

Within education and training the aim of a quality management system is to ensure that the provision of service is both consistent and continually improving. It is recognized that there are philosophical and practical differences between education and training. These real differences should not impact upon quality management systems to any significant degree.

WP3: Develop a QAS to promote the European dimension of e-learning

Quality in e-learning is important to be able to exchange both learning materials and learning practices across higher education institutions (HEI) in Europe. To establish joint study programs it is essential that cooperating institutions accept each others Quality Assurance Systems (QAS) according to the Bologna Declaration.

Outputs:

A Quality Assurance System (QAS) report.

QUIS quality activities in HEIs on the basis of degree system

Taking into account the differences between the three levels according to the Bologna Declaration, it is suggested to divide the quality activities in three levels as well:

BSc. level:	MSc. level:	PhD. level:
Organization	Management responsibility	Management responsibility
Planning	Organization	Student care
Staff and employees	Planning	Course reviews
Receiving Inspection and Testing	Staff and employees	Staff
Process Control	Receiving inspection and testing	Learning/work environment and processes
Course developing		External partners
		Documentation/records
		Correcting/preventing action

The Quality Assurance System in the context of the QUIS project

Process oriented system, Main elements

Analysis: The task is to define exactly the target groups and their needs and on this basis make a draft note of the purpose of the training. The needs analysis is a very complex phase, since it should actually address all dimensions of needs, from business to learner requirements, bearing in mind that education is not necessarily the single solution.

Design: The process of Design is to provide a planned structure to the learning event. During this phase, findings from Analysis are used to design a course.

Development: The development uses the course description, as the result of the Design phase to create the actual course. The development process consequently goes along similar paths as the design process.

Delivery: The process of Delivery includes the final preparation and the actual running of the course.

Evaluation: Evaluation is the meaning or interpretation of data from the assessment in an institutional setting, the evaluators may be students, faculty, and accredited agencies. The results of an assessment process should provide information which can be used to determine whether or not intended outcomes are being achieved.

WP4: Analysis of commercial and experimental e-learning systems

Work Package 4 describes and analyses the main features of several Learning Management Systems (LMS) with the aim to collect and summarize the state-of-the-art of the products available both as commercial packages, open-source packages and research projects. This is done with the final goal of collecting a set of guidelines and suggestions from which the Work Package 6 of the QUIS project will profit, in order to describe and define requirements for a “next generation LMS”.

For each one of the LMSs considered, we have examined a wide set of features trying to analyze an LMS both as a software system, by describing the main features and their possible impact on the different actors using the system, and as a learning tool, by analyzing the support given to pedagogical issues in each LMS.

The examined characteristics can be collected under the following set of main categories: features available (the features available to the teacher); users roles (the support provided for different types of users: students, teachers, tutors, administration ...); relationships with LMS standards (standard used by the LMS for importing/exporting learning materials); usability (information about usability studies on the LMS); pedagogical methodologies (specific support for different pedagogical theories); installation (details about the installation); maintainability (how the software is updated); required hardware & software; licensing model (open source/proprietary); total cost of ownership; usage (how many institutions etc); Support quality (information about the available support at system level).

The analysis of each LMS has been done here mainly by working on the documentation and the information collected about each LMS. A chapter of the WP4 final report is dedicated to each of the following LMS:

A-Tutor 1.5, Blackboard Academic Suite 6.2, Claroline 1.6.1, Desire2Learn 7.3, DoceboLMS 2.0.4, it's:learning 3.0, LAMS 1.1, LON-CAPA 1.3, Microsoft Class Server 4.0, Moodle 1.5, PaKMaS, Reload 2.1.1, Sakai project 2.0.0, WebCT Campus Edition 4.1, WebTeach/TWiki, WeBWorK 2.1

To widen the analysis, we have developed a web-based system (called EP²) to collect judgments about Learning Management Systems from LMS users. The system allows the user to express his/her judgment about an LMS as seen from one of 4 different roles: student, teacher, LMS administrator, system administrator. For each role we have devised a distinct set of features, in order to allow expressing evaluations on the role-related activities. In order to define such sets of features we had to do some choices.

Our final selection should not be considered the only possible and acceptable, yet we think that these sets of features allow building an effective comparison among the LMSs.

A user can in EP² express a judgment by selecting a role, then marking the perceived quality of the various features (possibly not all of them) in the system. The users also can browse the expressed judgments and state how much they agree with each judgment examined: a judgment gains/loses importance depending on the number of agreements/disagreements collected.

The judgments can also be used to allow for the search of the “best LMS system” for a user, i.e. the LMS that has a better score in the set of features selected and weighted by the querying user.

The user searching for “his best LMS” selects the set of features associated to a given role and assigns weights to each feature s/he perceives as important. The EP² system computes the best LMS by considering both the weights given by the querying user, the marks provided through other user’s judgements and the agreement/disagreement votes expressed about the judgements. The EP² system is built as a web-based XML/PHP application.

Conclusions: We have examined several (16) Learning Management Systems, with the aim of describing their peculiarities and of suggesting ways to improve the current state-of the art. The main part of the LMS examined leaves the teacher free of designing his courses by using his preferred pedagogical methods, without forcing him to follow a given pedagogy. Thus they tend to propose a wide set of technological tools focused mainly on four areas:

- content delivery, reuse and management,
- class and student management,
- group communication and cooperation,
- self assessment – quizzes.

Such tools allow for the (hand-crafted) construction of courses that follow different pedagogical styles; there are no specific automatic tools available to help the teacher implementing more complex pedagogical settings (e.g. best practices). It should be noted that the presence of group communication/cooperation tools allows for the application of the Socio-constructivist pedagogy theories. Some effort towards the personalization of the learning experience is beginning to appear, either by defining different groups of users to which different learning paths/activities are presented, or by “releasing” learning components for student consumption only when a set of rules are satisfied. PaKMaS is a notable exception, being able to automatically build learning paths in the material; moreover, in PaKMaS the student himself can annotate the learning material and construct his personal learning paths. The LAMS and Reload systems start addressing the issues of multi-learner personalization by following the “Learning Design” methodology. Yet, there are no LMS available that use a formal semantic-based approach to the construction, analysis and delivery of learning elements, neither are available model-based tools that adapt the system to a model of the student.

WP5: E-learning standards

Since the advent of personal computer, digital technologies have become increasingly common in education. However, they have typically been applied in ad hoc and divergent forms. Moreover, the implemented systems and the developed contents are often partly or even completely unavailable to interchange and/or interoperation. Without a standardized specification each “data supplier” or “tools developer” would rather expect others to conform to its own data structure. The concept of “Standard” addresses those shortcomings and a number of organizations have proposed standards in e-learning.

The main activity of Work Package 5 in QUIS project has been to collect the definitions and characteristics of the six most widely adopted standards for educational resources and environments. Our aim is twofold. Firstly we intend to provide the novice-in-the-field with an orienting tool of an “E-learning standards in a nutshell”-kind: as a matter of fact such a simple, yet comprehensive compass is hard to find at present; information resources are rather scattered and often provided for expert users only. After each description the paper provides also references for more detailed information. On the other hand, our work is also aimed at giving useful input to other working groups participating in the project. As one of the aims in QUIS is to devise new functionalities and characteristics for “future” e-learning applications, it is very useful to know which components are already available in standards, and likely to be supported by such applications. This helps preparing to reuse existing resources without “reinventing the wheel” while focusing on actually missing aspects.

The analyzed standards were SCORM, IMS, IEEE-LOM, DUBLIN CORE, ARIADNE, and AICC.

The definition of the aspects of interest follows the categorization we devised for the construction of a topic map based on the report. Such topic map completes the overall product of the Work Package 5. The structure of the information we want to provide might be then seen as a three-layer one. The access point is the topic map, with very synthetic information about topics of interest and their relations. This is a first tool to orientate towards the resources the user is most interested in. The topic map refers to the electronic report, which includes more detailed information; finally, both the topic map and the report give references to further more extensive sources, such as for example the official sites for each analyzed standard or LMS.

In particular, for each standard the following “aspects of interest” have been covered:

1. Organizations: organizations proposing and supporting the standard;
2. Goals: the main goals pursued by the standard;
3. Components: to manage different aspects of the learning material and processes;
4. Metadata: used for the description of different aspects of the learning material;
5. Authoring tools available to create standard compliant resources;
6. Learning Management Systems (LMSs) providing management for standard compliant resources;
7. Repositories of standard compliant resources;

We used such aspects as comparison criteria. Those are an initial selection devised to help in choosing a certain standard. Nevertheless, in most cases, the specification given through a standard can be mapped to other standards, so that a smooth transition would be possible. Our proposal does not imply that different and/or further criteria may not be devised.

One of the main aspects we considered is related to metadata. In all standards we analyzed, a good share of metadata is devoted to administering and reusing resources; so educational information should be extended, in order to provide more expressiveness in describing educational contexts and targets to which such resources could be addressed. SCORM and AICC also define the communication interfaces specifying how learning resources exchange information (RTE for SCORM and API and HACP for AICC). As an overall observation, it comes out that SCORM is the standard with a wider spread, so that it is easier to find tools and resources to build one’s own educational material. This also make us consider it as the best suited to be further integrated and enhanced to provide advanced support for more flexible and powerful distance learning environments.

WP6: Requirement specification for a next-generation e-learning system

The main goals of work package 6 were to develop a requirement specification for a next generation e-learning system and to provide experience and advice to system developers, content providers and researchers in order to enhance quality within e-learning.

The QUIS requirement specification for a next generation e-learning system is divided into six main parts; 1) Project drivers, 2) Project constraints, 3) Functional requirements (with use cases), 4) Non-functional requirements (with a main focus on topic maps to realize a personalized learning environment), 5) Conclusions, 6) Appendix. The QUIS requirement specification includes about 70 functional requirements divided into the categories assessment, content, collaboration, teaching, student / learning environment and quality assurance. In addition, it contains 30 use cases, where all scenarios are described from both a student and a

teacher perspective. Qualitative methodology is used in the development of the requirement specification.

The main focus of the QUIS requirement specification is the pedagogical and the technological parts of a next-generation e-learning system, not the administrative part. The QUIS requirement specification has a holistic pedagogical approach, and covers several theories of learning, pedagogical methods and learning activities. It also covers different types of learning objectives, taxonomies and assessment tools, and defines the heterogeneous student group through multiple intelligences and proficiency stages.

The QUIS requirement specification provides new insights within the e-learning research field. We conclude that a next-generation e-learning system must be based on an eclectic learning view and not focus on a single learning view e.g. socio-constructivism. An eclectic learning view is important to ensure variation and differentiation, which are important pedagogical principles within e-learning.

A holistic pedagogical approach and an eclectic learning view require an online learning environment that provides possibilities for personalization. PLE (personal learning environment) has been suggested as a future goal within e-learning, but the concept of PLE has so far a variety of interpretations. Our definition of a PLE is an online learning environment where the student is able to customize his / her learning environment based on pedagogical and personal choices.

The need for a PLE within e-learning also entails that a next-generation e-learning system must be based on other architectures than is found in existing LMS / VLE. A future e-learning architecture must handle extensive information structures. We suggest that topic maps could be one way to achieve a personalized user interface, and based on the introduced e-learning ontology we present a prototype of a pedagogical-based PLE.

We have also experienced that a pedagogical-based PLE requires new approaches to standardization of learning objects. Pedagogical elements of existing standards are not extensively used. The experiment of using design patterns as a new metadata approach for learning objects is interesting because it focuses on pedagogical elements and uses free-text. An alternative learning object metadata standard that strengthens the pedagogical aspects is proposed.

We also conclude that there is a need for an “open source” mentality with collaborative development of learning activities, learning objects and assessment activities within e-learning. The “open source” mentality should be built into the e-learning systems to allow sharing among online teachers and online students. Marketing of learning objects could be done via PSI (Published Subject Indicators), available in the topic maps architecture.

The characteristics of a next-generation quality assurance system (at the course level) are that it should be built into all parts of the e-learning system. A course QAS should be implemented for learning improvements, not for control, and must have both a student and a teacher perspective.

The QUIS requirement specification provides a concretization of the vague concept of a “next-generation e-learning system”. The project has used the Bologna process as a basis for the work and the QUIS requirement specification contributes with a European added value, by proposing new insights and input concerning the pedagogical quality within e-learning to the ongoing Bologna process and the e-learning field.

WP7: Cost effectiveness and cost efficiency in e-learning

In WP 7 we have looked at earlier research done in the area of e-learning and costs effectiveness in the perspective of the user (student/other educational consumers), the provider and the society.

Cost effectiveness and/or cost efficiency in e-learning and distance education are important areas.

“Effectiveness is concerned with outputs. An organization is effective to the extent that it produces outputs that are relevant to the needs and demands of its clients. This implies the existence of criteria by which the organizations success in this respect can be measured.

Schools can be effective but not necessarily efficient. For example, students can be taught programming very effectively, but if the cost of doing this is ten times the cost of any comparable programme, then it has not been very efficient.

Organizations need to be both efficient and effective. An organization is cost effective if its outputs are relevant to the needs and demands of clients and cost less than the outputs of other institutions that meet these criteria. Organizations that pursue efficiencies to the extent that the quality of the output is jeopardized or poor may cease to be effective.”

Greville Rumble (1997)

During the last decade there has been written a number of articles and reports focusing on the cost of distance education related to effectiveness and efficiency. The focus is not always on e-learning, but distance education and computer based training in general. The authors usually have a “narrow” perspective focusing either on the user, the provider or the society when looking at effectiveness in e-learning. This is a potential problem for those who are going to implement these results when planning their future e-learning offer. When just focusing on one of the parts involved in the distance education and which impact cost effectiveness and cost efficiency will have on them, this most likely will lead to a solution which is not favourable for any of the other parts involved, in the long run.

The educational systems differ greatly between countries, mainly for historical reasons. Despite several mutual EU projects the organization of education still differs within the EU (and outside EU). There are differences when it comes to types of exams, credit points, intake at schools and financing. There are great differences in governmental subsidizing for the students and the educating institutions. The differences between the countries are a big challenge for us trying to make a general model for cost effective e-learning.

As we can see there are many reasons why learning institutions should deliver their courses through e-learning. In education in general there is never “enough” money. This meaning that there always has to be compromises when a teacher or a professor is developing and lecturing a course. E-learning can be positive when it comes to saving money or reducing the overall cost.

If we want to make e-learning efficient and cost effective in the eyes of the students, we have to look more closely at student satisfaction. If the students are satisfied with their education they will also likely perceive it to be effective, or at least they will consider attending more e-learning courses. They will hopefully also recommend it to other potential students, and in that way recruit new students. Student satisfaction is also important to make e-learning more recognized. Getting good grades and finishing the final exam is not always important to students. Research shows that many older students attending e-learning courses are not always attending the courses to get a good grade, but to get new and updated knowledge they can use in their present job.

It is difficult to compare different e-learning courses regarding effectiveness since they are so varying concerning student support, web material, level of difficulty, target group and so on.

This is also the case when we are trying to compare traditional on-campus classroom education with e-learning.

E-learning is being used more and more by companies in further education of their employees. In our information society new and refreshed knowledge is crucial to companies if they want to sustain competitive. Keeping all the employees updated can be very expensive. By introducing e-learning the companies can harvest many advantages - E-learning can potentially be tailor-made at a relatively low cost by the use of Learning Objects - The employees can follow the courses at their own speed, and the company does not have to shut down their business while people are upgrading their knowledge. - The employees can be encouraged or “forced” to update themselves after working hours. - By using the latest Learning Management Systems one can develop a sustainable learning network in the company where fellow employees can interact with each other in learning and knowledge activities. - E-learning and LMS make it possible to better monitor each employee’s learning effort. This will be helpful in measuring the learning effect and cost effectiveness.

WP8: New models for cost effectiveness

Our goal in WP 8 was to produce a state-of-the-art economic model report that could be used at Higher Education Institutions (HEI) when being involved in ordering, producing, running or consuming education and especially e-learning. Many institutions and e-learning networks have experienced how difficult it can be to control the cost of developing and running net-based education. Through our work with WP 7 and WP 8 we have produced models (guidelines) for cost effective implementation and operation of net-based education (e-learning), in the perspective of the user, the provider and the society.

The report discuss economic factors related to the planning, development, teaching, educational platform, student activities, examination, evaluation and administration of e-learning. We have also discussed the importance of market orientation, cooperation, competition, financing and different payment models if we want offer cost effective e-learning. The report also includes some working models concerning resource allocation and collaboration.

We have shown that before an education provider (EP) can start the development of an e-learning course they should do some upfront planning activities. It is important to find out who is ordering, paying, developing and delivering the e-learning courses. The EP should also map the overall need for resources and different possibilities for marketing. A key factor is customer satisfaction (Value), regardless of who the customer is. The customer could be a student following a course, a company ordering a course or the society (government). The model shows that it can be a good investment to allocate extra resources in the stage of planning and development of a course if this leads to increased customer value and increased effectiveness and efficiency. One way to make the entire development process cheaper is to cooperate and collaborate with other education providers.

In the process of offering and running an e-learning course there are a lot of economic factors that the EP must be aware of to be able to become more cost effective. The learning delivery methods, the choice of pedagogy and LMS, the different student activities and the way the EP offer examination and go through course evaluation are very important. The biggest cost in e-learning is often related to the number of teacher working hours spent in each course. This fact makes it extra important to balance this cost against the customer perceived value, since the quality of the course from the students’ point-of-view often is linked to the teacher time spent on each student. Using suitable tools in the LMS can save teacher time without decreasing the quality and value of the course in the eyes of the students. Another solution to reduce the teacher costs is to use cheaper student instructors for some of the tasks involved in the e-learning offering to the student. In general we can say that it is important to be aware of all these factors before the EP starts to allocate resources to the e-learning course.

The model has shown that it is possible to save money if the EP cooperates with other education providers. It is possible to cooperate in the development, marketing, support, administration and offering of e-learning courses. If EPs should cooperate there will be a need for quality assurance and standards concerning the content. The WP 8 report shows some examples.

The report strongly promotes a greater awareness when it comes to economic factors, upfront planning and the use of economic models for allocation of resources. The report also shows that cooperation can be a possible way to increase quality and customer value and at the same time save money. Furthermore the report emphasizes the need for more market orientation among the education providers.

We conclude by saying that all education providers can become more cost effective if they are able to adjust their e-learning according to the different factors and activities discussed in the WP 8 report.

The entire WP 8 report is available for downloading from the QUIS project web-site.

WP9: Dissemination, two-way communication and evaluation

The main goal for the QUIS project is to develop transversal results, i.e. results that are applicable to the whole e-learning community and to their users. The publication and dissemination strategy therefore had to take into account different target groups.

The target groups we wanted to reach were:

- Practitioners, teachers and trainers in HEI's, trainers in companies, content providers and mentors.
- Students and adult learners both involved during the development of the project and afterwards as users of the project results.
- Administrative staff and policy makers both at institutional level and at national level.
- Professional actors in e-learning, like the e-learning industry, educational authorities, training providers etc.

To reach these target groups following instruments were used:

- **The QUIS web-site:** www.tisip.no/quis

The web site is the main and permanent dissemination tool of QUIS.

Communication tools:

During the project period we asked for input from the e-learning community by inviting them to take part in the *Interested persons forum*. Here people got access to products under development and was able to give their comments and suggestions. Unfortunately there were some problems with unserious users and we had to close the forum down to avoid spam mail.

In WP4 we developed a tool: *EP²: Elearning Platform Evaluation Pool* where users of LMS-systems were able to evaluate different e-learning platforms.

In WP5 we developed a topic map based tool: *An online guide to standards*. Following topics are implemented: Authoring tools; Learning management systems; Standards; Standardisation organisations, Digital repositories and Metadata.

Reports:

All the scientific and professional reports produced during the project are available under the heading Public files of the QUIS web site.

Dissemination products:

The results obtained in QUIIS have been presented at several symposiums, conferences, workshops etc. Most of these presentations are collected and displayed under the heading Dissemination of the Public files.

There is a pamphlet available on the website describing QUIIS in Hungarian and in English. Here you will also find a complete summary of all the activities and products in QUIIS targeted at practitioners, administrative staff and policy makers within each country. The summary is available in English, Hungarian, Italian, Swedish and Norwegian. The summary will also be available in printed editions.

- **Main results/reports:**

The innovative results from the QUIIS project are produced as printed reports in English. The reports are distributed to selected target groups in each country, and are also available from the partners on request. Following reports are available:

QUIIS Quality Assurance System, Contact authors: László Komáromi, András Bardócz Tódor and Sarolta Zárda, ISBN 978-82-8055-026-2

QUIIS – analysis of commercial and experimental e-learning systems, Contact authors: F. Di Domenico, E. Panizzi, A. Sterbini, M. Temperini, ISBN 978-82-8055-027-9

QUIIS Requirement specification for a next generation e-learning system, Contact authors: Line Kolås, Arvid Staupe, ISBN 978-82-8055-028-6

QUIIS New models for Cost Effectiveness in e-learning, Contact authors: Tor Atle Hjeltnes, Börje Hansson, ISBN 978-82-8055-029-3

- **Other reports and results:**

These reports are not printed, but available for downloading from the QUIIS web site:

QUIIS analysis projects on Quality in e-learning (WP 2)

Standards for e-learning (WP5)

Cost Effectiveness and Cost Efficiency in e-learning (WP7)

As part of the work on requirement specification it was developed a prototype of a Personal Learning Environment based on Topic maps. This is available on the QUIIS web site.

Students have been involved in the project to give input to the work of the researchers. Even if their workload is not counted, two master theses have been produced and also parts of a PhD.

The QUIIS group decided to engage an external evaluator to monitor the progress of the work and to evaluate results and findings. An evaluation report is produced and is available on the web site.

Author team of QUIS reports



Contributions to QUIS reports are produced by staff members at the partner institutions. All of these persons have taken part in discussions and production leading to this and other reports. Contact authors for this particular report are listed on the front page.

The activities in the QUIS project will be directed towards Quality in e-learning, Interoperability and reusability of e-learning material and development of Standards. The project will also look at cost effectiveness in e-learning.

Quality in e-learning is important to be able to exchange both learning materials and learning practices across HEI's in Europe. To establish joint study programs it is essential that cooperating institutions accept each others Quality Assurance Systems (QAS).

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