



Quality Management of Peer Production of eLearning

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Executive Summary

This report describes the work of the consortium managing the project Quality Management of Peer Production of eLearning, in its operations of the two project years 2007 – 2009. The overall aim of the project was to accelerate the creation of peer-produced e-learning content by providing a methodology to manage its quality. This overall aim also supported the empowerment of e-learners in vocational education and training in their development from passive receivers of e-learning content towards active producers of content of their specific knowledge areas.

The specific aim of the project was to develop a solid approach and methodology on how to organise and support the quality management process of peer-produced e-learning content. The project itself did not take a position of the e-learning tools (such as e-learning platforms or Learning Management Systems) used, but developed, implementing and validated through its four pilots a systematic process for the quality management of peer-produced e-learning content. This also contributed to the main deliverables of the QMPP project, namely the nearly 90 page wide QMPP Handbook (published in English, French, German, Spanish, Italian and Finnish) and the various training sessions organised as a part of dissemination. The project also succeeded in providing key content and approach for articles in both scientific as well as professional journals as well as international conference presentations.

The project was conducted by a consortium of partners from Italy, Spain, Finland and Germany, and brought together the expertise necessary from all disciplines related to the project – namely of operating VET courses, and actors from the field of quality in eLearning. The first year of the project was mainly directed to both desk research (resulting in the deliverable of work package 2: Setting the Scene) and the developing of a quality methodology by expert panels and other participatory methods (resulting in the deliverable of work package 3). The second year was dedicated to the development of the methodological approaches (resulting in the deliverable of work package 4), the design and authoring of the QMPP handbooks (resulting in the deliverable of work package 5) and the piloting activities (resulting in the deliverable of work package 6). The project went through internal evaluation during both years (two deliverables of work package 7). The dissemination work of the project has been active throughout the project life-cycle (work package 8), including also the dissemination workshops, seminars and other dissemination events.

The clear sustainable result of the project is the Handbook in six European languages. Already it has been awakening great interest and the QMPP approach will have further dissemination in the coming years both by the consortium partners individually as well as jointly by the partners. Many of the partners continue their collaboration in related projects, which strengthens the sustainability. The QMPP project has also reached wide audiences in various national and international events, and will serve as the benchmark in the quality assurance work as an important part in the utilization of peer production in e-learning.

This report also gives details of the FMECA quality approach used in the project as well as the SUSTAIN dissemination approach taken to spread the results. Finally, it gives some ideas as to the basis for future work into the area.

More information is also available from the project website at <http://www.qmpp.net>

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1. Project Objectives

The overall aim of the QMPP project was to accelerate the creation of peer-produced e-learning content by providing a methodology to manage its quality. The approach developed empowers e-learners in vocational education and training to develop from passive receivers of e-learning content towards active producers of content within their specific knowledge areas.

Over the two year duration of the project, the QMPP consortium has developed a solid approach and methodology on how to organise and support the quality management process of peer-produced e-learning content. The project itself did not take a position on the contribution of specific e-learning tools to quality (such as e-learning platforms or Learning Management Systems), but has rather developed and implemented a systematic process for the quality management of peer produced e-learning content. The project validated the developed methodology through four pilots in three different VET entities, and thus have the opportunity to consolidate the piloting experiences to the actual toolset developed and the training sessions organised.

The specific objectives of the project were as follows:

- to create a thorough understanding of the various useful methods and tools in peer production of e-learning
- to identify key approaches of quality management in peer production of e-learning content and to benchmark good practices in peer production of digital content (in other areas than e-learning)
- to define key processes to support peer production of e-learning content
- to produce the content for the quality management tools for the pilot projects
- to validate the approach through structured piloting of its quality management approach in three different VET entities
- to produce a handbook and other tools to support the quality management of peer-produced e-learning content
- to organize a set of training sessions and seminars to support the quality management of peer production of e-learning.

The results of the project, encapsulated in the Handbook on Quality Management of Peer Production in e-Learning, which has been published in six languages, has generated considerable interest amongst:

- training professionals: people working as or with trainers
- peer producers: anyone collaborating to produce digital content for learning purposes. The nature of peer produced content means, that all peer producers effectively have the status of learners or students
- quality assurance specialists: it is envisaged that the results of this project would be particularly interesting to QA specialists working in the fields of VET and/or e-learning, and therefore they will be prioritised by the project
- training system managers in companies / public administration: this group includes anybody who is responsible for the purchasing decisions regarding training systems, and those responsible for the day-to-day administration of the same systems

- policy makers: this includes policy makers at every level from European administration down to individual educational institutions which are in a position to make decisions as to policy priorities regarding VET and regarding peer production systems
- media: including academic journals, mainstream media and specialised publications (whether on the web, print, or airwaves).

Over the past two years, the project has managed to generate significant interest in the process of quality management of peer production of e-learning. Such impact can be witnessed by numerous papers and conference presentations which have been dedicated to the project. More significantly, the consortium has generated interest from the corporate world, having received several enquiries from companies (including ones listed in the Fortune 500) as to use of the methodology, and spawned a second EU-funded project looking into related aspects, (namely CONCEDE – Content Creation Excellence through Dialogue in Education) that looks more closely at the networking aspect of user-generated quality.

A small metric of the success of the project can be generated through a simple google search. At the time of writing, a specific search for the project on google.com using the string “qmpp quality management peer production” generated 8,600 results.

2. Project Approach

The project tackled the theme of quality production using two related methodologies:

- Desk research and discussion with stakeholders
- Development and testing of quality approaches

The first phase of the project identified three main areas of activity:

- 'Setting the Scene': creates an understanding of the various useful methods and tools in peer production of e-learning. This key work package reviewed the various tools, methods and approaches of peer production in e-learning content provision as well as identified good practices in peer production. This was done through desk research and the collection of good practices by various partners in their own respective environments
- 'Benchmarking Peer Production' identified key approaches of quality management in peer production of e-learning content by benchmarking peer production practices and processes in other areas such as the creation of technical documentation, joint editing efforts etc. This was done through structured benchmarking of other areas of peer production of digital content, and the organisation of three regional one-day expert panels, which explore the experiences in peer production mechanisms, processes and practices
- 'Designing Supporting Processes for Quality Management' achieved this goal through thematic interviews in selected VET institutions of their accurate needs and experiences and also through the use of expert panels

The Development and testing phase involved three activities:

- Development of the QMPP Handbook
- Piloting the QMPP approach in four VET settings in three different countries in day-to-day peer production activities of e-learning
- Evaluating the pilots, including through the use of two cross pilot workshops.

The European added value of the project stems from three different sources. The first European aspect is that the quality management of peer production is not a national challenge, but rather a European challenge. Thus it is important to create such approaches and mechanisms on the European level and also to share them within various European countries. It could also be assumed that this challenge is not easily met only within one European country – the problem requires a wider basis to be solved.

The second European aspect is the validation of the methods of quality management of peer production of e-learning in several environments. The European consortium can facilitate the work in multiple VET entities and thus the consortium is also able to

validate its approaches in various operational environments. This richness could not be reached in a single European country.

The third European aspect is the skills structure in various professions and vocations, which is becoming growingly European. Thus the project is also creating important approaches to the sharing of e-learning content and thus enabling both shorter lead-times as well as lowering costs in e-learning content provision.

Evaluation Approach

The project utilized two different evaluation approaches. After the first project year, the responsible partner IAVANTE submitted their first evaluation report based on the FMCEA procedure to emphasize the critical aspects for the activities of the second project year. At the end of the second project year, IAVANTE assessed the overall achievements of the QMPP project.

The Failure Modes, Effects and Criticality Analysis (FMECA) procedure was used to elaborate part of this first Quality Report (first deliverable of work package 7). A failure modes and effects analysis (FMEA) is a procedure for analysis of potential failure modes within a system for classification by severity or determination of the effect of failures on the system.

FMECA is an extension of Failure Mode and Effects Analysis (FMEA). In addition to the basic FMEA, it included a criticality analysis, which is used to chart the probability of failure modes against the severity of their consequences. The result highlighted failure modes with relatively high probability and severity of consequences, allowing remedial effort to be directed where it will produce the greatest value.

The typical goal, when FMECA is performed as part of a design Project, is to eliminate failure modes with high severity and probability, and to reduce as much as possible those with high severity or high probability. On doing this, the natural result is to potentiate the existing strong points of the process (Project) that would otherwise be held back by the critical weaknesses.

This enables priority ranking by means of the so called Risk Priority Number (RPN) and criticality analysis enables to focus on the highest risks.

The higher the resulting index the more urgent the need to find a solution. In the failure prevention phase, having identified the most urgent failure modes to address by examining the RPN in conjunction with its individual elements, the FMECA team applies creativity techniques to develop solutions to prevent failures from occurring.

The second evaluation report assessed the achievements and failures of the project, and used as source material both questionnaires to the project partners as well as interviews.

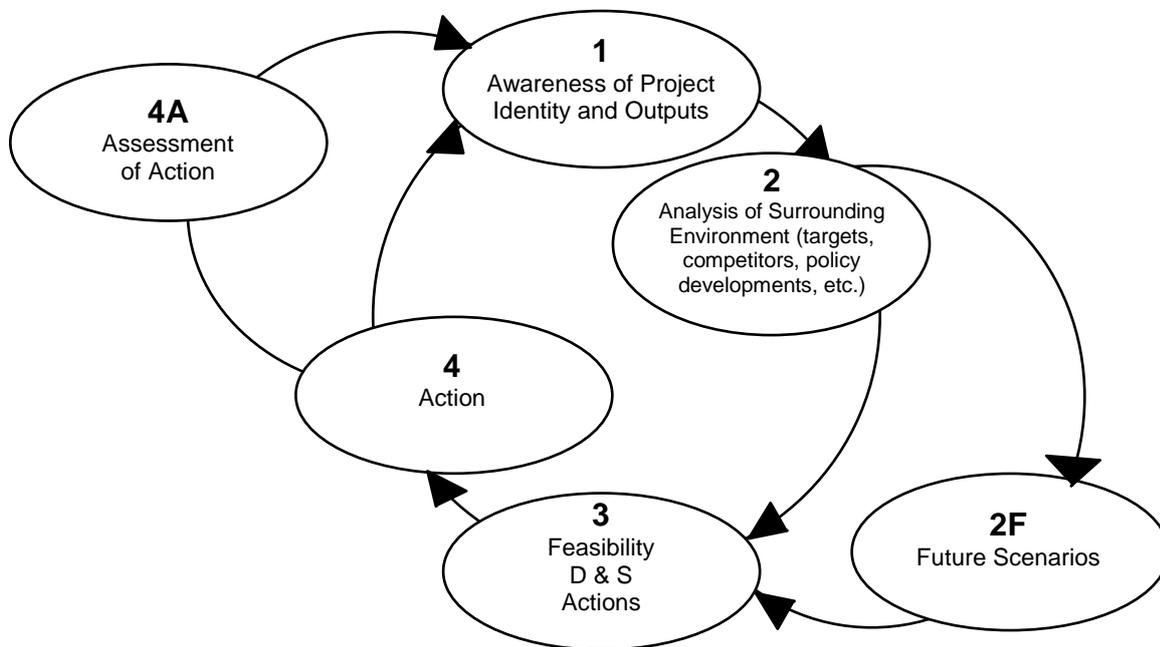
The evaluation approach was implemented through two the production of two quality reports by IAVANTE, which are based on feedback received from the partners and reported through purpose-produced grids.

Dissemination Approach

The project uses strategy uses the SUSTAIN dissemination approach, which was developed by SCIENTER within the framework of a Socrates ODL project. The approach consists of four distinct phases namely:

- Awareness of the project identity and its outputs
- Analysis of the surrounding environment
 - o Including analysis of future scenarios
- Feasibility of Dissemination and Exploitation Actions
 - o Including assessment of the actions

This approach is best visualised as following:



The first step of the approach involves elucidating the nature of the project, its outputs as well as target users and stakeholders. From here, the strengths and weaknesses of each part of the project are analysed, and possible future scenarios are extracted. Following this, the options for dissemination actions are considered, in line with the resources and priorities of the project. After this preparation phase, the actions themselves are held, also taking into account the opportunities which might be found by embedding them into already existing events.

The approach envisages that assessment activities will be carried out together with the actions, which in turn will feedback into the cycle, thus ensuring a continually current plan which is up to the needs of the project.

3. Project Outcomes & Results

The main results of the project are presented in the Handbook on Quality Management of Peer Production, which is available from the website of the project at <http://www.qmpp.net>. The handbook is the result of two years of research by the consortium, and has been piloted *in situ* in four pilots in three of the partner institutions, (with pilots having been held at the University of Macerata – Italy, IAVANTE Training Centre – Spain, and FeLC Centre – Finland).

The Handbook was authored in English, and it was translated to Finnish, French, German, Italian and Spanish. It was printed in English (200 copies), Finnish (200 copies), Italian (20 copies) and in Spanish (200 copies). However, more importantly, the pdf version of this Handbook has been provided for all interested users in all the six languages at the QMPP project website to be downloaded.

Below, find a selection of the results and concepts developed during the project:

Concepts and methods of quality development for eLearning 2.0

Quality assessment of eLearning 2.0 focuses on the learning process. There is no use of external standards and inter-individual comparisons (such as tests or assessments). Rather, methods of self-evaluation, intra-individual development processes are employed for this purpose, which are not made via tests but via reflection and evaluation of learning products and e-portfolios. Even though eLearning 2.0 is a new development as a trend, substantial experiences have already been made with the learning models of *autonomous learning* and *learning in communities*, which are the basis for it, as well as with methods for quality assessment of learning processes.

Teachers can use these methods in order to evaluate the learning progress together with students and to enable individual planning. Teachers take on the role of mentor who gives feedback and helps with reflecting the learning experiences or evaluates e-portfolio postings.

Table 1: Methods of quality development for eLearning 2.0 (Ehlers 2009)

Methods of quality development	Quality assessment by
Self-evaluation	Learners with the help of/ feedback by teachers
Assessment of e-portfolios	Teachers
Social recommendation	Peers, learning communities
Evaluations aimed at target group	Teachers

Self-evaluation

One important approach, which contains enormous potential for quality assessment of learning processes in eLearning 2.0 scenarios, is the concept of self-evaluation. The aim of it is not a complete (summative) assessment of learning achievement, but rather an improvement of learning abilities.

“Self-evaluation is defined as students judging the quality of their work, based on evidence and explicit criteria, for the purpose of doing better work in the future. When we teach students how to assess their own progress, and when they do so against known and challenging quality standards, we find that there is a lot to gain. Self-evaluation is a potentially powerful technique because of its impact on student performance through enhanced self-efficacy and increased intrinsic motivation. Evidence about the positive effect of self-evaluation on student performance is particularly convincing for difficult tasks^{1 2}, especially in academically oriented schools³ and among high need pupils⁴.“

In scientific literature, positive effects of self-evaluating processes on the learning achievements can be found (Maehr/Stallings 1972, Arter et al. 1994, Hughes et al. 1985). When undertaking these processes, students can gain insights into the profile of their own strengths and weaknesses. Rolheiser & Ross state that, if students evaluate their own achievements positively, they aim for more challenging objectives, engage in their own learning process more and mobilize more personal resources⁵. A self-evaluating process follows the following four steps:

❶ Step 1: Learners are involved in the definition of the criteria that are used for assessment. This happens in the form of negotiation. It has been shown that neither pre-determined criteria nor criteria solely developed by students are as effective as criteria that are developed together. Surveys show that criteria which are development in cooperation with learners, enhance agreement and motivation of the learners. Learners are also simultaneously coached in developing of their own goals and make experiences when choosing the level of difficulty. Furthermore, an attitude of advice develops between teacher and learner, which can be of great significance in eLearning 2.0 learning processes.

❷ Step 2: In this step, learners apply the criteria they have chosen to their own learning processes. As they do so, it can be important to provide them with examples for what such assessments can look like.

❸ Step 3: In a third step, learners receive feedback on their self-evaluation. The aim of this step is to calibrate the students' own assessments together with the teachers by using this feedback process. A triangulation of their own assessment, that of the teachers and that of the peers is taken into account.

¹ see Maehr and Stallings 1972

² see Arter et al. 1994

³ see Hughes et al. 1985

⁴ see Henry 1994

⁵ see Rollheiser and Ross 2001

④ **Step 4:** In step four, the students are asked to develop plans for developing their own competences on the basis of their self-evaluation. They discuss strategies with the teachers in order to reach these goals.

Quality assessment with e-portfolios

E-portfolios – web-based portfolios – integrate different media and services. Students collect those learning products in their e-portfolio, which are made in the course of a class or even during the whole course of their studies. Students can use electronic portfolio to show competences and reflect their learning processes. Learning results, connected with remarks by tutors, teachers and peers, feedbacks and personal reflections are collected.

E-portfolios lend themselves to quality assessment (“Are e-portfolios an assessment *of* or *for* learning?” see Barrett & Carney 2005/ Ainsworth & Viegut 2006). E-portfolios can be used when making the final assessment (summative) or for continuous improvements (formative). As can be seen in table 6, purpose, design and contents of portfolios are clearly different when used for summative assessment of the learning achievement or for formative assessment in order to support the learners.

Table 2: Purposes of an e-portfolio for assessment (based on Hornung-Prähäuser et al. 2007)

Portfolio for summative assessment	Portfolio for formative assessment
Purpose of e-portfolio is prescribed	The purposes of the portfolio are negotiated with the learner
It is fixed which learning products have to be part of the e-portfolio so assessment if possible	Artefacts have been chosen by the learner to tell the history of his or her learning process
Portfolios are usually fabricated at the end of a school term, semester or program and there is a deadline for handing them in	The portfolios are constantly updated over the course of a school term, semester or program with flexible timing
The portfolios and/ or artefacts are generally graded based on a matrix and quantitative data for an external audience	The portfolios and artefacts are evaluated together with the learner and are used to give feedback, so that the learner can improve his or her learning process
The portfolio is normally structured by specified results, aims or standards	The organization of the portfolio has been determined by the learner or has been negotiated together with the mentor/ advisor/ teacher.
Sometimes the portfolios are used to make important decisions	The portfolios are hardly ever used to make important decisions
Summative: what has been learned up to now) (past – present)	Formative: Which needs for learning will exist in future? (Present –

	future)
Extrinsic motivation is necessary	Intrinsic motivation mobilizes the learner
Audience: external, little possibility for choice	Audience: learners, family, friends

Working with the portfolio has a double function. On the one hand, it is an innovative instrument for teaching and learning; on the other hand it serves as an alternative instrument for assessment. Learning scenarios supported by e-portfolios emphasize the learning process and enable a deeper understanding of learning processes in all participants.

Concerning quality assessment, the portfolio is understood as a way from achievement *diagnosis*, which is exclusively defined externally and test-oriented, to a more strongly self-directed achievement *presentation* by the learners. E-portfolios are aimed at competences. The idea is not to emphasize the *mistakes* the learner has made but what they are capable of doing. Advocates of portfolios often stress the natural function of a portfolio for bridging purposes, i.e. the link it creates between teaching, learning and evaluating⁶. Thus, an e-portfolio is a method of evaluating achievements, which offers a combination of external and self-evaluation. Table 2 presents an overview of qualities for assessment oriented at e-portfolios in comparison to online examinations. In this process, e-portfolios can be used for evaluation/ assessment of subject-related abilities as well as self-competence. If e-portfolios are used as an instrument for assessing learners, the following aspects have to be taken into consideration:

- The new way of learning, presenting and reflection requires mentoring and a “phase of socialization”.
- E-portfolios are an instrument of development rather than for checking students’ achievements.
- A qualitative assessment supports the learner-oriented, customized approach to prove achievements.
- The high level of subjectivity when it comes to the evaluation decreases when there are several evaluators (see also peer-review).
- It needs to be clarified beforehand in which way data will be exchanged and published.

Social Recommendation and Community Participation

In eLearning 2.0 learning scenarios, communication, feedback and the exchange within learning communities is essential. With the help of social software tools collaborations can be conducted and information exchanged, as well as evaluated mutually. Three methods are of special significance and first experiences have been made:

- Social recommendation mechanisms
- Peer-review method

⁶ see Häcker 2005

- Peer-assist method

Social recommendation mechanisms are defined as those methods that serve the purpose of assessing the “true quality” of learning material in contrast to methods focused on experts⁷. According to this method, the members of a learning community evaluate materials available online. This happens for instance in databases for learning material which contain an assessment of saved learning materials on the basis of their usefulness and quality, or – in a less structured form – through learners creating link lists of materials, classes and resources available online which they deem especially valuable and qualitative.

On the one hand this method can be understood as “quality evaluation” in the course of which each learning material is assessed by learners. On the other hand it is also possible to give learners recommendations – á la Amazon – on which learning material is thought to be especially useful, so called social recommendations. Eric Duval, a Belgian professor, suggests a concept he terms “LearnRank”. It is about making a ranking of learning material based on learners’ evaluations and using it together with their “contexts” and intentions as a basic for learning recommendations. Of course, this does not guarantee that one finds the right text, but it increases the probability to find useful contents.

Peer review is a concept that has been introduced a number of times, especially in the academic sector. It deals with assessing quality by peers – that is colleagues or other learners – giving each other feedback. In the scientific sector, the texts discussed are often scientific proposals or publications. In the area of learning, especially in eLearning 2.0 scenarios, the peer-review can be used to attain feedback and quality assurance for results, learning progress and aims, which is given from other learners or members of the learning community. A simple application of the peer-review method for the purpose of quality enhancement in eLearning 2.0 scenarios is to invite different learning communities or members of different learning communities, to present them with the learning intentions, progress and the problems as well as solutions worked on and to ask them to do a review.

Peer reflection is a process aimed at creating situations for reflecting, in which the peers are asked to encourage the reflection of learning processes by means of their own experiences. One community could, for instance, share with another one how it structure their projects, why they used the material they used and so on.

One possibility to check on the quality of learning processes is learning from other people’s solution, respectively entering a peer learning process with others. One model that has recently been gaining more importance is the peer assist model⁸. It is a structured reflection in the context of a social network, which is carried out via social software. This method is clearly distinct from peer review (see table 3). It

⁷ see Duval 2006

⁸ The models of peer assist, peer learning and bench learning are so to speak the logic continuation of peer review processes.

primary aim is to simulate learning processes. By employing the method for eLearning 2.0 scenarios, social assets are used for further developing one's own solutions or for resolving learning difficulties, which come up in the learning process. Structured reflection of a learning process is possibly by broaching the issue of the learning processes, the results and documented outcomes in the peer assist process.

Table 3: Differences between peer review and peer assist processes (based on Commonknowledge 2007)

Peer review	Peer assist
aim: evaluation	aim: learning, improving knowledge
Evaluative	collaborative
The task is to criticize a paper	The task is to learn with and through a team.
Reviewers are chosen by others.	The members themselves choose the assistants.
Often, there is an attempt to reach constructive and in every case positive evaluation results "by all means"	processes for solving problems.
Some actors are always reviewers.	That who assist today can call for a peer assist process tomorrow – changing one's role is supported.
Report is mostly made available for the management.	The process is aimed only at those who called for it.

The peer assist process is a structured process that can be employed in eLearning 2.0 scenarios by using social software. It deals with linking and strengthening a learning community with the explicit aim of discussing one's own strategies for problem solving and learning approaches, reflecting and improving. Table 4 shows how peer assist can be used in eLearning 2.0 scenarios.

Table 4: Online peer assist processes (Ehlers 2009)

Phase	WEB (2.0) tools
Preparation	
„Peer assistee“ send introductions to (six) peer assistants	E-mail
A peer assist moderator needs to be found and invited.	E-mail
A peer assist wiki or blog needs to be made.	WIKI, blog, protopage, etc.
Execution	
Round 1: presentation of problem (10 min.)	Notes on peer assist wiki/ blog/ application sharing, collaboration platform

	<i>Examples: A concept developed by learners for the purpose of problem solving is presented in form of notes, a concept for a (final) paper etc. is briefly presented, a problem is presented</i>
Round 2: peer assistants can ask topical questions (30 min.)	Online chat, collaboration platform
Round 3: peer assistants make suggestions for solutions and give evaluations (45 min.)	Suggestions are entered into a forum for discussion, everyone reads the other participants' suggestions.
Round 4: moderator invites all participants to give a finishing suggestion (30 min.)	Final round as a post in a forum for discussion.
Round 5: peer assistee decides on how to continue and informs the group (10 Min.)	The peer assistee informs participants in an online chat which suggestion he or she has chosen.

Evaluation processes aimed at a target group

Today, evaluation is often used for assessing learning processes and results. A large number of contributions in scientific and praxis-related literature with processes that have turned out to be successful can nowadays be drawn upon. In the educational sector, the current practice for evaluation envisages a group evaluating a learning/teaching situation with the help of an evaluating instrument (e.g. a questionnaire). This is problematic in eLearning 2.0 scenarios as the learning progressions and PLEs are potentially different – even in one and the same class. That is why, as regards evaluation, it makes sense to resort to a practice of evaluation strongly aimed at the target group.

This can happen by admitting a target-group-specific profile of evaluation instruments. One way of doing so is for example asking the learners to not only answer questions from an evaluation questionnaire but simultaneously inquiring into how *important* respectively *relevant* they deem this evaluation item for a learning process. Is the item irrelevant to a learning process than it is evaluated to be of small importance and is consequently also not taken into account as much as other items as far as the overall evaluation is concerned. “Artificial” estimation of dimensions that are unimportant to the learning progress are thus avoided. Another advantage results from learners conducting not only an assessment but at the same time a reflection on what was of significance to their personal learning progress. The questionnaire, which should be used for such an evaluation, should cover all relevant areas in an adequate manner.

A method like this, which is aimed at a certain target group, is conceptually close to experiences that have been made in the area of responsive evaluation. According to this method, participants do not only assess given objects but are included in the definition of objects to be evaluated. In eLearning 2.0 scenarios, this can potentially lead to all participants in the evaluation process “constructing” a different

questionnaire by assessing issues differently. The results of such an evaluation procedure cannot be processed and handled in the same way as results of a “normal” evaluation. A learning group is not understood to be *homogenous* entity. In contrast, target-group-specific suggestions and solutions for the occurring results the evaluation yields will have to be found.

Enabling peer production

Peer production of eLearning requires various enabling and supporting structures. Peer production does not just happen, it can be and it must be planned and supported. We should remember that the quality approach of peer produced contents in various environments is supported by a number of compatible features.

Consider – Wikipedia enables easy creation of new entries and easy editing of the existing content. However, we should also recall that the Wikipedia is based on a well-defined database (or in fact many databases) with appropriate features, such as user account administration, content routing (including navigation), content indexing, search engines etc. Wikipedia provides also a web-based text editor, which provides also spell checking and other word processing features. It is technically possible to attach annexes, create links (most links are created automatically), create tags for contents etc. And finally: there is a clearly defined structure how to present an article and a clear route from the creation of an article to the publishing and updating of an article.⁹

Or consider the Finnish Tax Academy. Their management ensures that the peers producing eLearning content can use their working time 20 person hours per one hour of learning materials. Also in their annual job definitions is included the task of producing learning content for sharing – it justifies these peer producers to use their working hours for content creation. Importantly, the Finnish Tax Administration does not separately compensate peer production of learning materials, but wants to see it as an important part of everyday work of the subject matter experts.

Or consider Xerox and their Eureka application. They provided a clear toolset with a clear procedure to empower the maintenance technicians in the field organization to produce their practical content. They systematized the process of content creation by the provision of a clear structure and a technical interface – more importantly, they also provided a clear route of the peer-produced content from creation to updating and enabled the participation of the field maintenance technicians to this process by ratings etc. However, Xerox was providing an appropriate database application and ensuring the access to application (both for the content creation as well as the utilization of the content) for its field organization.

These cases show that quality of peer production can and must be planned. The approaches might vary according to the level of freedom in the structure and in the

⁹ of Wikipedia – see in more detail Lih 2009

setting of objectives. In the following, we have defined the enablers of quality in peer production of eLearning to consist of the following aspects:

- enabling policies and procedures
- enabling processes
- enabling tools.

Enabling policies and procedures

Although the use of peer production in eLearning might be an appropriate pragmatic way to develop eLearning in an organization, it should also be supported on a strategic level by the management of the organization. Naturally, we can see in organizations different levels of managerial support: the management measures can allow a working form or they can actively support and promote a working form.

The organizational support to peer production of eLearning can take place by several different methods. For instance, these can include the following:

- active management support in promoting peer production as a Web 2.0 approach
- use of working time and other resources of the organization for peer production (this aspect is mainly covering the teachers and supporters), including clear guidelines for the compensation policies and practices
- pedagogical support for peer production, including clear procedures for peer reviews and other joint working methods
- rewarding peer production – are peer produced outcomes rewarded in a similar way than conventionally produced outcomes (e.g. are learners accredited for peer production of eLearning, are teachers rewarded for peer production of eLearning)
- access to various (digital) resources , including also assistance in the questions of Intellectual Property Rights (IPR).

Enabling processes

We discussed above the enabling policies and procedures, which build an organizational basis to enhance the use of peer production in eLearning. However, these policies and procedures must be also supported by various day-to-day working processes.

The practical support processes by the organization can be many fold. Examples of various enabling supportive processes can include, among others, the following:

- active "communities of practice" within the organization to exchange learning experiences and good practices
- training the key actors in the peer production approach within the organization
- facilitation of active communication and experience sharing between the key actors
- support for intraorganizational and interorganizational work in the area of peer production
- practical support to peer production by the provision of appropriate tools.

Enabling tools

The number of various tools for peer production has been quickly growing – many of us use tools, such as wikis, blogs, collaborative working spaces, file sharing etc. However, for an organization it is important to ensure that it promotes tools to which all have access and which can be used easily by as wide an audience as possible. Also in peer production "access is everything". Thus the organizational challenge is not whether you are using the newest and most advanced tools, but rather that the tools you are using can serve in the best possible way your actual goals.

Unfortunately, often also the problems with the compatibility of the tools create unnecessary thresholds for many to participate in peer production. This might also mean that the technical support staff and the IT support staff are reluctant in supporting the peer production modality, as they fear that their work will increase with the technical support staff. In particular in large companies and governmental agencies there might be also clear restrictions to use many applications of "social software". Desired or not, this must be taken into consideration in the design of your activities.

In discussing the enabling tools, the following aspects, among others, should be considered:

- access to the tools used: do all potential users have an easy access
- technical features of the tools: are the tools easy-to-use
- financial impact of the tools: are the tools provided free-of-charge or are there economical limitations for use
- data security and Intellectual Property Rights: are the tools provided ensuring data security and are their IPR policies clear and acceptable
- required user support: is user support required and how is it organized
- longevity of the tools: do we expect that the tools are available in the foreseeable future?

The QMPP Quality Approach

Basis for the QMPP quality approach

The quality management challenge in eLearning content produced by peer production can, however, undermine the merits of this approach and method. The quality work methodology in peer production is at its best dispersed and fragmented. Often it has also been claimed, that the very nature of peer production is its free flow and thus any formal mechanism (including the quality approach) would be drastically against the creativity factor. At the moment there are already a number of useful tools and approaches used (such as tools for peer reviews, tools for creating own wikis, dictionaries etc.) to ensure and improve the quality of peer produced eLearning content.

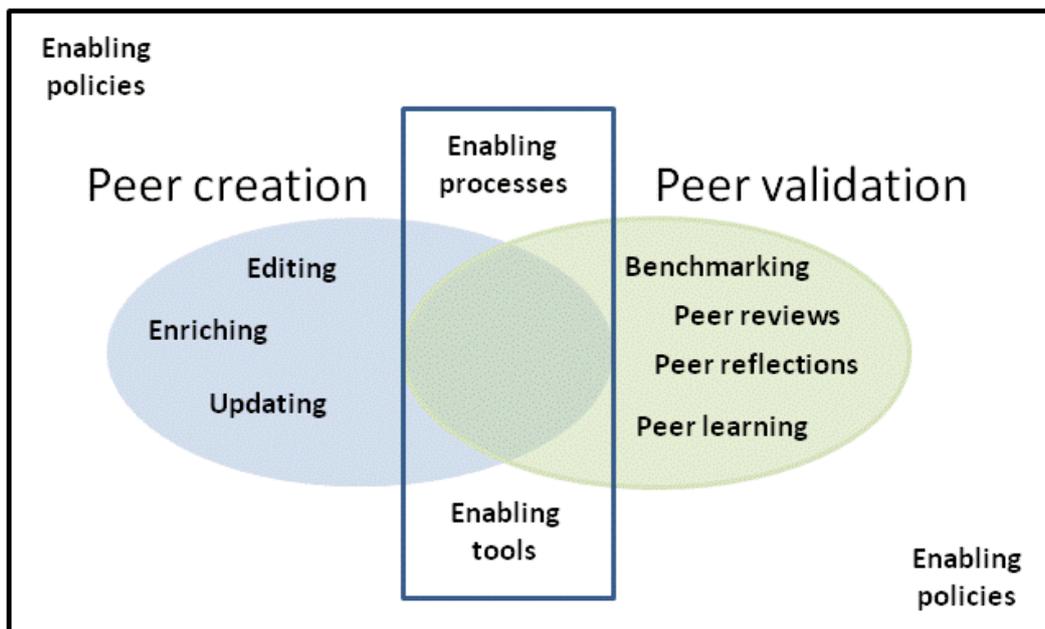
The importance of peer production of eLearning content will grow especially in the sector of vocational education and training as well as in professional continuing

education. Many organizations face challenges of shortening life-cycle of learning content as well as operational challenges in providing required learning content with short lead times and lower costs. However, it is also understood that the learning content produced by peers (based on professional experience) can be more accurate and attracting than “clinically produced” learning content by external e-learning experts.

Peer production has great potential in the area of vocational education and training. The future workforce in Europe in many professions has not only to access and handle great amounts of information and knowledge, but even more importantly to produce various elements of information by themselves as an integral part of their work. Peer production is not only a novel method to produce eLearning content, but it is also an approach to empower a wide variety of professionals to the learning content production. Thus it has also an important democratic element in bringing the work-related learning content production to the actual level of users, tutors and learning supporters.

QMPP Qualityscape

The fundamental finding in our work on quality of peer production is that quality is created as an interplay between peer production of digital content and peer validation processes. Naturally peers have different roles at different times – they can participate in the quality process as creators, but their role is essential also as validators.



In peer creation there are different modes of work, which actualize on different times. The creation work can include authoring the content (such as making a new article or video), editing of the digital content (such as proof-reading), enriching the digital content (such as adding new information or new media) or updating the content (such as updating the existing content with contemporary data).

However, the key aspect in the quality management of peer production is the active and thorough peer validation work. The peer validation work can include benchmarking (comparing with other sources), peer reviews (systematically validating your content with other peers), peer reflection (reflecting the content with other peers) and peer learning (joint learning and mutual development through continuous assessment).

In the following table (see *table 6*) we have summarized some typical activities during in the peer creation – peer validation work.

Peer creation (including peer authoring)	creating digital learning content by authoring, editing, enriching and updating using various media
Authoring	(shared) authoring of texts and other digital resources; creating images, audio materials, video materials; creating content for wikis etc.
Editing	(shared) editing of digital content (from proof-reading to translation), creating alternative navigational routes, creating collages etc.
Enriching	creating additional digital content, publishing individual works and team works, sharing or learning (b)logs, adding library links, social bookmarking etc.
Updating	monitoring existing content, updating existing content, adding specific area content etc
Peer validation	validating digital content with subject matter experts, validating content with peers, rating the validity and usability of the content etc.
Benchmarking	identifying of good cases and practices for comparative purposes, identifying of additional digital resources, identifying areas of lacking content etc.
Peer reviews	providing feedback by peers of learning goals, progress and aims within a learning community
Peer reflection	encouraging the reflection of learning processes by means of own experiences and sharing the reflections within the learning community or between different learning communities

Peer learning	joint learning also by the exchange of learning experiences and learning outcomes, such as e-portfolios
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Peer creation and peer validation

Quality management of peer production of eLearning must also focus on providing enabling processes and enabling tools for those situations in which peer-created content shall be peer-validated. The enabling policies for peer creation, peer validation and quality management must thus support the entire process of Peer Creation and Peer Validation, by providing enabling tools and suggesting enabling processes.

4. Partnerships

The consortium for the project involved a balanced selection of both active developers of e-learning methods and content as well as VET entities undertaking vocational education and training using novel methods and approaches. The range of consortium partners include Northern Europe, Central Europe and Southern Europe. However, although the consortium represents well various areas of expertise, it is still kept relatively small by size to ensure fluency in work and accurate level of participation of each partner.

The activities within the consortium were allocated according to the previous work references as well as interest expressed by the various members of the consortium. However, it is important to highlight the complementary competences of the consortium members. The various partners were also be responsible for the actual organisation of the local activities (national/regional expert panels as well as thematic interviews).

The members of the consortium are as following:

- HCI Productions Oy (Contracting Partner) - Finland
- SCIENTER (Coordinating Partner) – Italy
- European Foundation for Quality in ELearning (EFQUEL) – Belgium
- Association of Finnish eLearning Centres (FeLC) – Finland
- SCIENTER Espana – Spain
- University of Macerata - Italy
- FIM New Learning (within the University of Erlangen) – Germany
- IAVANTE Foundation – Spain

The benefits of the partnership have extended beyond the original scope of the project. In fact many of the partners have cooperated again on different activities, most significantly, the Content Creation through Excellence in Dialogue Project. However, through links developed in the project, some of the partners are also now cooperating on the development and deployment of a Virtual Simulated Patient throughout Europe, in a completely unrelated project promoted by IAVANTE.

While the work in linking up with users starts only now that the project is complete, through the use and implementation of the principles laid out in the handbook, we believe that the handbook has made a significant contribution to the state of the art, a belief which has been strengthened by the warm reception the work has received during pilots, and at the dissemination events where it has been presented. As such, we believe we can claim that the partnership has managed to engage with the European VET and HE communities on this topic, and positioned itself to continue to contribute to the topic well into the future.

5. Plans for the Future

It is suspected that the capacity of learners is still an underutilised force in the provision of learning materials. As the accessibility (in terms of physical access as well as in terms of ease of use) of ICT tools to enable peer production continues to increase, novel methods of learning will continue to be developed.

This in turn will lead to increased adoption of such systems and technologies within education institutions, and will likely also vastly increase the role of non-formal learning within a lifelong learning environment. As these changes occur, further demands will come from higher and/or vocational education institutions as well as from employers for methods to verify the quality and scope of such learning. Thus, the demand for the methodologies being developed in this project is considered to be high moving into the future.

Furthermore, it is recognised that this project is a first step, both in terms of development of such methodologies as well as in the implementation of them in learning environments. It is therefore envisaged that:

- ◆ there will be scope to conduct further research and testing in these types of learning environments
- ◆ the demand for such types of quality management will also lead to a demand for training in quality management techniques
- ◆ the entire field of collaborative learning is a growing academic field, and there will be a hunger for more academic materials
- ◆ there will be demand for consultancy services to implement such systems in already present peer learning systems
- ◆ there will be an increased demand from educational institutions (whether public, private or in continuing education) to incorporate peer learning activities in their curricula

Together, these projections present significant opportunities for future work in this topic by the consortium, both from an academic and a financial viewpoint. First initiatives along these lines are already being taken by various consortium actors:

- HCI Productions has developed an online support tool to accompany the handbook, and aid in corporate trainings it intends to provide thanks to the use of the tool
- EFQUEL (who will also perpetually host the project results and website), has made contacts and is working up a partnership with a major Fortune 500 company, based mainly on the sharing of the methodologies developed in the project and related training services
- ILI-FIM is leading a new project known as CONCEDE (already referred to) involving several partners on the project, further developing the methodologies created in QMPP in new directions
- FELC has initiated a new project ESF-funded project in Finland “Open Networks for Learning (AVO)”, which has as one key element the peer-production approach in e-learning content provision

Partners are currently in the process of finalising an exploitation and commercialisation agreement amongst themselves, to allow for further development of products along these lines into the future.

6. Contribution to EU policies

During its' lifetime, QMPP has managed to contribute to the following EU objectives::

- To support the development of innovative ICT-based content, services, pedagogies and practice for lifelong learning: Although peer production has been recognized as an important factor in e-learning content creation especially in regard with the new Web 2.0 tools (such as Wikipedia, social bookmarking, Slashdot.org etc.), the conceptualisation how to manage and organise peer production has not been widely discussed. The particular interest of the QMPP project was to concentrate on the peer production of e-learning content. Thus, the project has helped the importance of peer production of e-learning content to grow especially in the sector of vocational education and training as well as in professional continuing education.
- To support improvements in quality and innovation in vocational education and training systems, institutions and practices:
The overall aim of QMPP project was to accelerate the creation of peer-produced e-learning content by providing a methodology to manage its quality. The project developed a solid approach, methodology and toolset on how to organise and support the quality management process of peer-produced e-learning content in various VET entities. The target groups were VET entities using e-learning in their various programs, and in particular, the e-learning managers, teachers, and supporters. Thus, these beneficiaries now enjoy the benefits of peer production both by the increasing number of potential learning material developers but also utilise the potential of the learners in content creation and editing process.
- To promote ICT-supported learning, combination of ICT-based learning with other modes such as learning groups, family learning or tutoring and transnational virtual study circles:
Peer production – and thus learner-created content – in e-learning is the core of the future e-learning provision. This focus also supports the empowerment of e-learners in vocational education and training in their development from passive receivers of e-learning content towards active producers of content of their specific knowledge areas. The e-learners have been empowered to utilise their professional skills in sharing their knowledge to other peers. In contemporary work information and knowledge selection, creation, and updating are critical skills in all professional areas. Thus QMPP has also partially contributed to the competence development of the peer learners by sharpening their knowledge selection, creation, and editing skills.