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QUALITY MANAGEMENT FOR PEER PRODUCTION ON E-LEARNING

Work Package	2 – Setting the Scene
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TABLE OF CONTENTS

1. INTRODUCTION AND OBJECTIVES 3

2. DEFINITION OF THE SCOPE OF THE PROJECT – WHAT IS PEER PRODUCTION? 5

3. THE GROWING IMPORTANCE OF PEER PRODUCTION 8

4. PEER PRODUCTION IN PRACTICE IN THE VOCATIONAL CONTEXT 10

4.1 PEER PRODUCTION IN KNOWLEDGE CREATION AND KNOWLEDGE MANAGEMENT 10

4.2 PEER PRODUCTION IN VOCATIONAL TRAINING AND EDUCATION 17

4.3 PEER PRODUCTION OF NEW SOLUTIONS AND PROGRAMS 22

4.4 THE DIFFERENT CONTEXTS AND MODELS OF PEER PRODUCTION 26

5. QUALITY APPROACHES TO PEER PRODUCTION IN ELEARNING 28

5.1 QUALITY DEVELOPMENT OF PEER PRODUCTION 29

5.2 CONDITIONS FOR QUALITY OF PEER PRODUCTION 30

5.3 KEY CONCEPTS FOR THE IMPLEMENTATION OF QUALITY IN PEER PRODUCTION 32

6. TECHNICAL TOOLS AND TECHNOLOGIES FOR PEER PRODUCTION 35

6.1 TECHNICAL TOOLS AND TECHNOLOGIES IN THE "WEB 2.0" ERA 35

6.2 TECHNICAL TOOLS FOR PEER PRODUCTION 36

6.3 TECHNOLOGIES AND STANDARDS USED FOR PEER PRODUCTION 40

7. THE HYPOTHESIS FOR THE QMPP QUALITY MODEL 42

7.1 PEER PRODUCTION CYCLE 43
7.2 EXISTING TOOLS FOR PEER PRODUCTION 45
7.3 QUALITY CHALLENGES IN PEER PRODUCTION 45

8. REFERENCES 50

8.1 LITERATURE 50
8.2 INTERNET RESOURCES 53

ANNEX: CASE STUDIES AND THEIR DOMAINS 54

1. INTRODUCTION AND OBJECTIVES

This report of the work package two of the QMPP (Quality Management of Peer Production in eLearning) project lays the basis for the other work packages and piloting work of the project. Thus the key objective of the work package is to create an understanding of the various useful methods and tools in peer production of eLearning.

According to the project work plan of the QMPP project, the "objective of this work package is to create an understanding of the various useful methods and tools in peer production of e-learning. The key activities include the review the various tools, methods and approaches of peer production in e-learning content provision as well as identification of good practices in peer production. The main methods of the work in the work package are desk research and collection of good practices by various partners in their own respective environments."

The original expected outcomes of the work package were two separate reports, namely:

- state-of-the-art report of peer production methods in e-learning content provision
- state-of-the-art report of quality management approaches of peer-produced content.

However, during the data collection and the authoring process it became clear that these two aspects should not be divided into two separate reports. Thus in this work package deliverable we have combined these approaches. However, the chapter 4 of this report concentrates mainly on the quality management approaches of peer-produced content in more general terms, as the chapter 5 concentrates more precisely on peer production in e-learning. The other chapters are covering both these intertwined aspects.

In this report we

- introduce and discuss the various areas of peer production and their potential
- discuss the various tools, methods and approaches of peer production in e-learning content
- provision

- identify good practices of quality management of peer production in eLearning.

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Many authors have provided case studies and as *Annex 1* we have included a table summarizing the approach of the various case studies.

Mr. Auvinen has worked as the key author. He has been greatly assisted by the work of Dr. Ulf-Daniel Ehlers (chapter 5) and the work of Ms. Kristiina Jokelainen (chapter 6).

2. DEFINITION OF THE SCOPE OF THE PROJECT – WHAT IS PEER PRODUCTION?

Peer production can be defined to include the digital content created, edited, enriched by peers, in other words by people on the "same hierarchical level". The contemporary examples in the Internet of peer produced digital content include e.g. YouTube[1], Facebook[2], blogs, flickr[3], slashdot.org[4] etc. The various dictionaries define the term "peer" as follows:

- "a person of equal social standing, rank, age, etc."[5]
- "a person of the same rank or standing; a legal equal; a person who is equal to another in abilities, qualifications, etc."[6]

Often with the term "peer" is also linked the term "peer group", which is defined as follows:

- "a social group composed of people of similar age and status"[7]
- "a peer group is a group of approximately the same age, social status, and interests; generally, people are relatively equal in terms of power when they interact with peers"[8].

In the context of involving peers to the educational process, some use also the term "peer-to-peer education". Peer-to-peer is often linked in the technical sense with the "peer-to-peer networks", which describe mainly the technical linking of several computers with another as equals. Some authors claim also that the concept of peer-to-peer networks is increasingly evolving to an expanded usage as the relational dynamic active in distributed networks - not just computer to computer, but human to human. Thus e.g. Yochai Benkler claims that associated with peer production are the concepts of peer governance and peer property in the digital world.[9]
For our purposes it is needed to note that peer-to-peer eLearning often refers to such instances, in which the peer learners within an educational or training institution are developing eLearning contents to each other for limited use[10].

1 see http://www.youtube.com
2 see http://www.facebook.com
3 see http://www.flickr.com
4 see http://slashdot.org
5 see http://www.thefreedictionary.com/peer+ (read 16 July 2008)
6 see Webster's Encyclopedic Unabridged Dictionary of the English Language, Random House 1989
7 see http://www.thefreedictionary.com/peer+group (read 16 July 2008)
8 see http://en.wikipedia.org/wiki/Peer_group (read 16 July 2008)
9 of Benkler, see Benkler, Yochai: The Wealth of Networks. Yale University Press, USA 2006.
10 see e.g. Kotzinos, D. et al.: Online Curriculum on the Semantic Web: The CSD-UoC Portal for Peer-to-Peer E-learning. Proceeding of WWW 2005, May 10-14, 2005, Chiba, Japan.

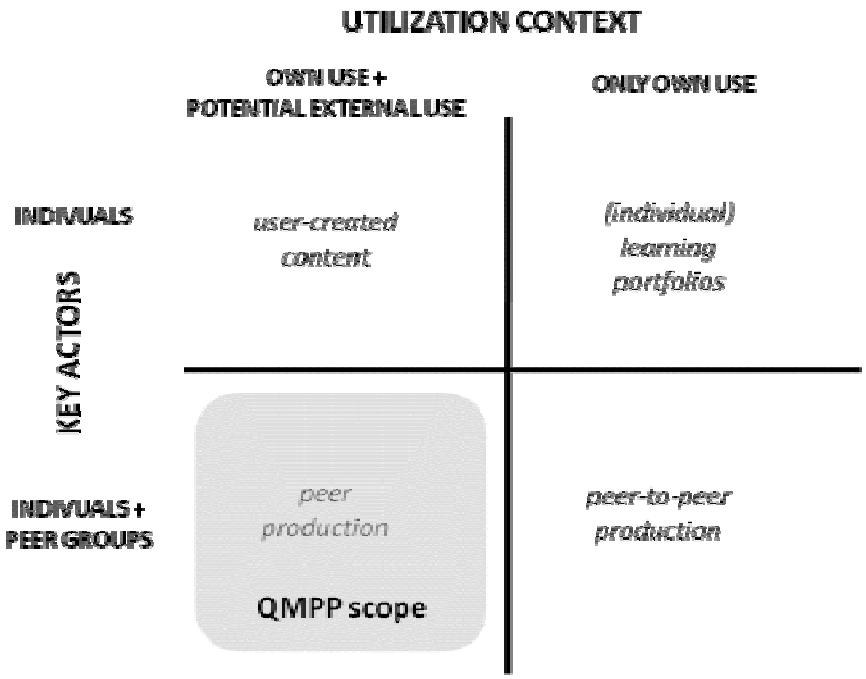
However, in this QMPP project our aim is also to utilize the peer produced content also outside of one specific educational setting.

The term of "peer production" in the Internet context has similarities with the term "user-created content". User-created content has no widely accepted single definition (see e.g. OECD's study on User-created content, 2007), but according to the guidelines by the OECD in their study, in this research paper user-created content is defined with three criteria, which are the following:

- content is made publicly available over the Internet
- it reflects a "certain amount of creative effort"
- it is "created outside of professional routines and practices".[11]

As a conclusion, in our QMPP project, we want to emphasize the experiences of peer production, which includes also the strong presence of the peer group in the various phases of the learning provision. According to our reading of the literature, the user-created content is mainly describing the digital artefacts produced by various individuals, as in our approach the communicative element is essential – and it takes often place by the strong involvement of the peer group. Thus according to the different terms and their use we can summarize them in the following picture (see *picture 1*).

Picture 1



[11] OECD - Working Party on Information Technology, 2007: Participative Web: User-created content. DSTI/ICCP/IE(2006)7/FINAL. OECD

The group emphasis is also highlighted in the discussion of "informal learning" – e.g. Jay Cross states that informal learning is strongly fueled by the communication of peers and that this communication is the critical element in informal learning.[12]

[12] Cross, J: Informal Learning: Rediscovering the Natural Pathways That Inspire Innovation and Performance. Pfeiffer 2006.

3.
THE GROWING IMPORTANCE OF PEER PRODUCTION

The potential peer production and user-created content has been supported by the development of Internet from one-way information distribution to two-way communication – the Internet browsers with their various plug-ins have been becoming essential tools for wide distributed content creation. Many scholars, such as Yochai Benkler, claim that ordinary users will enter the nucleus of digital content production.[13]

In particular, these novel opportunities have been discussed in conjunction with the development of "Web 2.0", which has opened up new opportunities also for peer production, participation of a wide amount of individuals to various discussions and development projects, as well as flexible ways to personalize digital content. The peer production mechanism has been central e.g. in the development of Linux software and the Wikipedia movement. The new working forms and their consequences have been discussed in more detail e.g. by Don Tapscott and Anthony Williams.[14]

The peer produced content can also reach through the Internet new users. Thus it can be also described as the "long tail" of learning provision – i.e. providing also such content elements, which are not used by a wide audience, but which might be critically important for certain target groups. The "long tail" idea and its opportunity for endless demand has been discussed in more detail by Chris Anderson[15].

An elementary discussion linked with the potential of the peer production has been sparkled also by the work of James Surowiecki and his notion of the "wisdom of the crowds"[16]. Surowiecki as well as Charles Leadbeater[17] have discussed the theme how "many are wiser than few" and how this knowledge creation and knowledge assessment can be distributed and thus also made more precise and efficient. However, in the contemporary discussion the widely utilized peer production has also been criticized in promoting "the cult of the amateurs" and thus promoting the content creation of amateurs without appropriate quality approach. This discussion has been initiated in particular by Andrew Keen.[18]

[13] Benkler, Yochai: The Wealth of Networks. Yale University Press, USA 2006
[14] Tapscott, Don – Williams, Anthony D.: Wikinomics. Portfolio, USA 2006
[15] Anderson, C: The Long Tail : Why the Future of Business Is Selling Less of More. Hyperion 2006.
[16] Surowiecki J: The Wisdom of Crowds: Why the Many Are Smarter Than the Few. Abacus 2005.
[17] Leadbeater, C: We-think: The Power of Mass Creativity. Profile Books 2008.
[18] Keen, A: The Cult of the Amateur: How Today's Internet Is Killing Our Culture and Assaulting Our Economy. Nicholas Brealey Publishing 2007.

Furthermore, in modern management literature the importance of co-creation experiences and their importance to the value creation has been emphasized in particular by C.K.Prahalad and Venkat Ramaswamy.[19] Their main argument is that the market is becoming a forum for conversation and interactions, and that the management and facilitation of this dialogue is the key in value creation process. Their view of the market means that the market is becoming instead of a seller-buyer-market rather the arena for co-creation of value. Furthermore, they define that the key building blocks for the interaction between users and providers of services can be defined as

- dialogue
- access to important information and resources
- risk-benefit assessment by the users
- transparency of work and working methods.

The aspect of "dialogue" is the essential element in peer production and user-created content. It is elementary that the dialogue focuses on issues that interest both the users and the providers; that there is a forum in which the dialogue can occur; and that there are clear rules of engagement that make for an orderly, productive interaction. The web-based environments provide usually such a "forum", where not only the users and the providers can meet, but also the users can meet with another. C.K.Prahalad and M.S.Krishnan develop this idea further in claiming that the co-creation of value can also occur on the global level, and that the cocreated experiences can be even more personalized.[20]

Thus it can be concluded that the facilitation of peer involvement is seen as one elementary factor in the overall improvement of learning and training provision. However, regarding the quality aspects and quality mechanisms of peer production it can be seen that relatively little attention has been paid to the quality assurance of this new production mechanism of eLearning.

[19] Prahalad, C.K. – Ramaswamy, V: The Future of Competition – Co-Creating Unique Value with Customers.
Harvard Business School Press 2004.

[20] Prahalad, C.K. – Krishnan, M.S.: The New Age of Innovation – Driving Cocreated Value through Global
Networks. McGraw-Hill 2008.

4.
PEER PRODUCTION IN PRACTICE IN THE VOCATIONAL CONTEXT

This chapter describes the peer production mechanism in two different areas: namely in education and training as well as in other related vocational areas. In undertaking the authoring of this report, it became obvious for the authors (mainly Mr. Ari-Matti Auvinen and Ms. Kristiina Jokelainen) that there was documented a very limited amount of experiences of peer production in the area of vocational education and training. However, in the areas of higher education there were some interesting articles as well as in the area of primary and secondary education. However, the key term was often "user created content" – not clearly "peer production".

The impact of peers in vocational training and practice has not emerged just recently. Many methods have been implemented in various workplaces and vocational environments for long, such methods include, among others, the following:

- work shadowing
- mentoring
- coaching
- job rotation
- communities of practice and organized knowledge sharing.[21]

4.1 PEER PRODUCTION IN KNOWLEDGE CREATION AND KNOWLEDGE MANAGEMENT

In the vocational setting, the one of the cornerstones has been the deeper understanding how knowledge should be managed. The views expressed more than ten years ago by Ikujiro Nonaka and Hirotaka Takeuchi in their work on the knowledge creation in companies, and in particular, on the models and patterns how to alter personal knowledge to corporate knowledge, and how to collect tacit knowledge and convert tacit knowledge to explicit knowledge, are essential also in organzing and utilizing peer production.[22]

[21] of the various practices, see e.g. American Society for Training and Development: State of the Industry Report 2007.

[22] Nonaka, Ikujiro – Takeuchi, Hirotaka: The Knowledge-Creating Company. Oxford University Press, USA 1995.

In our context, the essential challenge for peer production eLearning is to accelerate the transformation of personal knowledge towards corporate or common knowledge.

The essential element in successful knowledge management is that the creation and utilization of knowledge is not limited to some key individuals, but is rather seen as an elementary part of the work of all co-workers. However, it is also important to highlight that effective knowledge management can be an important – if not the most important element – in creating learning resources within a company.[23]

In particular, the opportunities have been discussed in conjunction with the development of "Web 2.0", which has opened up novel opportunities also for peer production, participation of a wide amount of individuals to various discussions and development projects, as well as flexible ways to personalize digital content. In particular, two authors have been describing the new opportunities in a interesting and valid way, namely Don Tapscott[24] and Yochai Benkler.[25]

In addition to the general description of the novel opportunities of the "Web 2.0" and its various tools and methods, one of the essential aspects to be discussed in linked with the ownership of jointly created content, which will be an important issue to solve in any organization.[26]

Case study: Eureka at Xerox[27]

Eureka project was started within the Xerox company in 1994. The challenge for Xerox was to create a working mechanism to collect and distribute technical and maintenance information for the front-line people. This was based to the notion, that within the Xerox company the majority of technical knowledge was "inside the heads of the field people" – in other words not in well-structured databases or documents.

The principal idea in the Eureka project was to support the field engineers and technicians to share in their Xerox community maintenance advice, tips and "good practices". In addition, Xerox faced two important challenges, which were the following:

[23] on this, see in more detail Ahmed, P.K. – Kok, L.K. – Loh, A.Y.E.: Learning through knowledge management. Butterworth Heinemann 2002.
[24] Tapscott, Don – Williams, Anthony D.: Wikinomics. Portfolio, USA 2006.
[25] Benkler, Yochai: The Wealth of Networks. Yale University Press, USA 2006.
[26] on the ownership aspects, see in particular: Ghosh, Rishab Aiyer: CODE – Collaborative Ownership and the Digital Economy. The MIT Press, USA 2005 and Hietanen, Herkko – Oksanen, Ville – Välimäki, Mikko: Community Created Content. Turre Legal, Helsinki 2007
[27] sources for this case study included, among others, Ahmed, P.K. – Kok, L.K. – Loh, A.Y.E.: Learning through knowledge management. Butterworth Heinemann 2002 and Brown J.S. - Duguid P.: Balancing act: How to capture knowledge without killing it. Harvard Business Review 78 (3) (2000), 73-80

- the maintenance manuals were outdated quickly and the printed versions were soon out-of-date and difficult to maintain in an accurate condition
- the maintenance manuals did not include many innovative front-line work methods or practices, but they documented rather clinically a "clinical" work practice.

The experiences Xerox collected of its front-line co-workers showed that, in addition to the official technical documentation – and in many cases instead of the official technical documentation – the front-line people used their own notepads, selected only certain important pages of the manuals and wrote their own procedural notes. A part of the unofficial practices was the "peer copying" (or if you like: xeroxing) and "peer distribution" of the self-made and self-summarized technical documents.

Within the Eureka project a simple-to-use database was constructed and every front-line person could contribute to that database and save his/her own experiences. The basis structure for the input was the following:

- *product/component/part*
- *experienced problem*
- *proposed solution*
- *chain of messages (tree metaphor of messages – e.g. a new message, answer, comment etc.)*
- *author*
- *validator.*

The database could be accessed also through a search engine, which was either a drop-down menu or free text search. The tools developed within the Eureka project included also a peer review tool (close to what e.g. Amazon uses today in peer rating of their books), by which the users could assess the usability and validity of each input. It was also important for the company, that the Eureka documents were routed to the R&D entities, which could thus receive direct, real, and timely feedback from the front-line.

Eureka provided its users also with small guides (hint books) covering the following subjects:

- authoring – what to cover, how to describe the problem and solution etc.
- validation – how to validate, what aspects to consider, what references to use etc.
- sharing – how to share my knowledge, what are the key benefits of sharing etc.
- utilization – how to use, what are the limitations of using Eureka etc.

Although the reward system of producing content to Eureka was one critical aspect to consider, in some countries the front-line co-workers spoke against monetary rewards of information to be saved into Eureka, as they claimed it might corrupt the quality of the content, would it only be provided triggered by monetary rewards.

As a summary one can state that by using the Eureka Xerox increased its confidence to their own front-line organization, their problem-solving skills and their continuous innovativeness. In addition, Xerox claims that according to its own calculations, it has saved 100 million USD (by the year 2000) in various stages of its operations by using the Eureka approach.

The Eureka case shows also, that the conventional authoring and utilization of service and maintenance documentation of modern technical equipments and systems (directed to the front-line operations) are in many aspects ineffective activities. This is caused by a number of various reasons, such as:

- the maintenance documentation is based on "just-in-case" thinking instead of "just-in-time" thinking ; a great amount of manuals and documents are authored, validated, translated and distributed although practically there is no evidence, whether these manuals and documents are ever used in the actual front-line (field) operations
- the key documentation can be described as "clinical documentation" instead of "experimental documentation" ; as the content creators are often not linked with the actual field organization and their practical day-to-day work, the actual utilization context and its prerequisites are not visible in the documentation
- the creation mechanism of technical front-line documentation is based rather on "documentation experts" than on "front-line experts" ; a majority of the documentation is either duplicating already existing documentation, but the documentation can also be too granular for front-line use
- the decreasing life-cycle of technical equipment (and, in particular, some key components or elements of software) means also often that before the full cycle of the technical documentation is undertaken (from creation through validation, translation, distribution, training etc.), actually the documentation is already outdated.

However, the most important result in summarizing the content to the most critical one and to have people from the actual front-line organization to develop these materials, is the economy of labor in daily work situations. As often noted, engineers seek to learn what is needed to do their job; there is no time to learn things completely. Thus the real issue in workplaces is to cope effectively with real-life situations. [28]

The case of Eureka in Xerox shows how the peers in their daily working environment can collect and document valuable information and refine that further into knowledge. Many areas of professional life have their own mechanisms in promoting creation and distribution of important knowledge elements; in some cases – like in the medical profession – this knowledge also passes organizational boundaries and is targeted to the wider professional audiences.

Case study: Bank of innovative practices at the IAVANTE foundation [29]

Bank of Innovative Practices (BPI) has been developed by IAVANTE foundation for the Ministry of Health in the Andalucian Regional Government. It is a platform with the aim of fostering and improving innovation and diffusion in the Andalucian health sector, by means of identification of innovative actions which will be carried out in itself and its diffusion to the rest of the system, so that they can act from pilot or exemplary experiences to the rest of the System. Each innovative practice or innovative idea is developed by a peer professional group from the system.

BPI allows the registration as participant, which offers the following alternatives that can ease peer production:

- *to inform and to be informed about the innovative practices which are being developed in the Andalucian Public Health System*
- *to create collaborative working spaces for the development of innovative practices between professionals of different organizations (belonging to the Ministry of Health for the Andalucian Regional Government)*
- *to communicate with other professionals or working parties with similar problems*
- *to value and to give one's opinion about innovative practices which are being developed, as well as to contribute with ideas and suggestions.*

The BPI provides its participants with a set of collaborative tools that allow for the peer production of content. Project teams have at their disposal a

[28] among numerous sources, see e.g. Reardon, Robert F.: Informal learning after organizational change. The Journal of Workplace Learning, Vol 17, nr. 7 (2004), pp. 385 - 395

[29] this case study has been authored by Jose Pinzon (IAVANTE)

common space where they can share documents, post links, comments and calendar events. In addition to that, there are other site-wide tools available such as a tagging system for all content and a voting system. Comments by users are allowed for every content item in the site. Users can choose the configuration of their public profile.

The registration in innovative practices which have recognition as such after the evaluation by BPI, entitles members of the team responsible of them to get a certificate. Moreover, BPI prizes are offered, pursuing the recognition of professionals' task and the repetition of those initiatives that are more innovative.

For each innovative practice (a project) or innovative idea (a proposal), there's a set of parameters analyzed by the Bank's Steering Committee. Projects are evaluated on aspects such as efficiency, effectiveness, level of innovation, gender equality, and adequacy with wider health policies. For the ideas or proposals, innovation potential, feasibility and potential impact are assessed.

However, the potential of peer production is not only limited to the knowledge creation and distribution by the professionals. For instance in the health care sector, Internet is growing in its importance as a critical resource provider for other non-professional users. In many cases, the critical amount of content in the healthcare area is created by peers – providing their experiences, hints, examples, and providing also space for empathy and camaraderie. Numerous studies show also that an important proportion of the users utilise - in addition to the "clinical content" provided by the official healthcare sector - also these user-created Internet resources.[30]

Furthermore, the close interaction with the users of healthcare is also one part in the new value creation metaphor in various industries, including healthcare. Thus it is claimed that the value creation mechanisms are moving towards "co-creation of value".[31]

[30] see e.g. Houston, T.K. – Ehrenberger, H. E.: "The Potential of Consumer Health Informatics". Seminars in Oncology Nursing 17 (2001) (1), 41 – 47 and Demiris, G.: "The diffusion of virtual communities in healthcare: Concepts and challenges". Patient Education and Counselling 62 (2006), 178 – 188.

[31] on this see e.g. Auvinen, A-M., 2007: "Personal Health Systems and Value Creation Mechanisms in Occupational Healthcare". Engineering in Medicine and Biology Society, 2007. EMBS 2007. 29th Annual International Conference of the IEEE, pp. 5882-5885.

It is also interesting to note that the corporate field has taken new technologies and solutions in peer production on board differently. The recent Finnish study showed that the wikis are increasing in various companies as an important method to document and distribute important knowledge.[32] However, in the virtual worlds the experience is negative – according to the studies of Gartner Research, the vast majority of virtual world projects launched by businesses fail within 18 months. In addition, fully 90% of business forays into virtual worlds fail because organizations focus on the technology rather than on understanding the needs of the employees using it.[33]

Case study: Wiki for Health Care Professionals (~ 'Pflege-Wiki')[34]

The Wiki for Health Care Professionals (i.e. 'Pflege-Wiki') is a multilingual (German and English) Wiki project for Health Care Professionals and especially for nurses. The Wiki (German version[35]) started in August 2004 as a private initiative and is run since July 2005 by the 'Association for the Promotion of Unrestricted Information on Nursing' ("Verein zur Förderung freier Informationen in der Pflege e.V."). This association finances the services via member fees and donations. The English version[36] was added in May 2006; in March 2008, collaboration with the Italian NursePedia[37] was established.

At the moment, the German version contains more than 4.400 articles free for use and distribution in the sections:

- *health care in practice (with subchapters like geriatric care, sick-nursing, pediatric nursing, etc.)*
- *terminology – pathology*
- *vocational education and training*
- *management & pedagogy for the health care sector*
- *academic studies*
- *professional associations; press releases*
- *links, forums, chat*
- *care facilities, ambulant care services*
- *book reviews, events, podcast.*

[32] Henriksson, J. – Mikkonen, T.: Wiki-kokemuksia suomalaisissa organisaatioissa (Experiences of Wikis in Finnish organizations). Tampereen yliopiston hypermedialaboratorio. Hypermedian verkkojulkaisuja 18, 2008.

[33] reported in Information Week at http://www.informationweek.com/news/personal_tech/virtualworlds/showArticle.jhtml?articleID=207800625 (read 17 July 2008)

[34] this case study has been authored by Thomas Fischer and Thomas Kretschmer (ILI)

[35] see http://www.pflegewiki.de

[36] see http://en.nursingwiki.org

[37] see http://www.nursepedia.net

The 'Pflege-Wiki' - like typical Wikis - offers the possibility to read, write and modify articles about subjects relevant to the health care sector. Each contribution is reviewed by the other users of the service, so that each article is produced collaboratively.

Like other wikis, 'Pflege-Wiki' records former versions of articles in order to make the history of an article / a concept visible. In rare cases it is used to re-establish an article after intended or unintended 'vandalism'.

The 'Pflege-Wiki" animates visitors not only to read, write and modify the articles, but also to add photos, to link the Wiki to personal and official websites and to distribute the articles in other media (e.g. printed). All material within the 'Pflege-Wiki' is published under the GNU General Public License and can be used and copied without any restrictions[38]*.*

Each article as well as each registered user have a discussion forum, where authors and users can get in contact or clarify certain aspects of an article. Registration is not necessary, but offers certain advantages (e.g. each article is signed with the nickname of the author; registered users have a personal page for self-presentation; registered user can 'observe' certain articles and receive a notification in case of modifications of these observed pages).

'Pflege-Wiki' offers a chat for all visitors of the wiki as well as podcasts (usually interviews with experts concerning actual problems and discussions).

4.2 PEER PRODUCTION IN VOCATIONAL TRAINING AND EDUCATION

If peer production is an inspiring method in the joint knowledge creation and knowledge refinement, it also has a lot of potential in the area of vocation education and training. The conventional approach to organized training at the workplaces is often in the human resources function (which report to the Vice-President of Human Resources) there is also a separate training unit or training department. This training department employs trainers, who often are also the persons in charge of the internal production of learning materials.[39]

Although it is highlighted that the training function should actively have a dialogue with the mainstream employees of the company / organization, often this is taking place only by means of running training needs analysis', organizing courses, collecting feedback etc.

[38] for more details please see http://en.wikipedia.org/wiki/GNU_General_Public_License

[39] of the typical training structure, see e.g. Wills, M.: Managing the training process – Putting the basics into practice. McGraw-Hill 1993.

As many authors have claimed – and Jay Cross with his concept of "informal learning" probably with the sharpest edge – the companies and organizations have hugely underutilized in their training and learning activities the potential of the employees with practical experience and thus created learning resources and materials, which do not correspond to the needs and style of the users. In addition, in many organizations much additional work is undertaken due to this "doubling" and "re-authoring" of the same content.

Case study: KONE Elevators and peer-produced technical training[40]

The model of "workplace-centered learning material production" has been implemented in various organizations – among others, the Alcan aluminum factory in Kurra Kurra (Australia) documented their approach in a sound and condensed manner. In a pilot project in KONE Elevators (the large Finnish elevator company) Australia, new models to create front-line maintenance information by the front-line people themselves were piloted.

The important basic notion was that in developing maintenance instructions and manuals for the front-line, the quality of the content can be improved by using as an author an experienced supervisor than a documentation expert or a trainer. This was simply due to the fact that the experienced supervisor knew and could govern the variety of existing front-line documentation, and thus avoid double or triple amount of work in creating the documents (thus e.g. in an maintenance documentation the general process of a maintenance operation was only described once, if it was different from the ordinary maintenance operation; if it was similar to the ordinary maintenance operation, there was just a link created to the conventional procedure). Another key element was that this method also condensed the front-line documentation, as it was concentrating on the essentials and thus it was also shorter than the "just-in-case documentation".

The key component of this model was thus the utilization of the supervisors in both content creation as well as content validation. They were supported by a number of critical tools (such as resource guides). The experience in the project showed, however, that the supervisors could more accurately than the documentation unit of the HQ identify the key essential guide lines and shortcuts – and thus they could also avoid unnecessary work phases and authoring of unnecessary (or overlapping) documents.

[40] this case study is authored by Ari-Matti Auvinen (HCI Productions Oy) based on the first hand personal experiences in working with KONE Elevators

The results showed also that the front-line initiated technical documentation was by far cheaper in its global costs (authoring, translation, printing, distribution) than centrally created documentation was. However, the basis of the meaningful work load in the front-line and thus the cost savings is the appropriate division-of-labor: the various planning documentation (e.g. CAD pictures etc.) must be done centrally, but the front-line experts are far more efficient in summarizing the created knowledge to field-friendly documentation and can effectively link the new documents to the existing mass of documents.

It could also be added, that in many cases in actual front-line maintenance work, the field engineers and technicians have as a specific problem the variety of equipment stemming from different manufacturers – e.g. nearly 40 % of the lifts KONE Elevators is maintaining are manufactured by another lift manufacturer or a single paper factory might have numerous providers of technical equipment. The documentation of the various manufacturers is seldom structured in a similar way, and the existing documentation does not cover the issues of compatability etc.).

However, the most important result in summarizing the content to the most critical one and to have people from the actual front-line organization to develop these materials, is the economy of labor in daily work situations. As often noted, engineers seek to learn what is needed to do their job; there is no time to learn things completely. Thus the real issue in workplaces is to cope effectively with real-life situations.

The previous case of KONE Elevators shows also that there often is poor linkages between the technical documentation function and the training function even in companies and organizations, which are orientated to technical maintenance and their field operations.

The discussion of the "learning organizations" which started in fact by the breakthrough book of Peter Senge in 1990[41], has been stressing that learning is becoming an essential part of everyday work. However, it is also highlighted that learning is a critical element in developing organizational cohesion through continuous learning. Also in the development of the learning organization, it was seen as essential to continuously learn for others and distribute positive learning experiences within the organization. The discussion of the learning organizations also emphasized – in the spirit of knowledge management – the importance of empowering the various learners also to contribute with their personal impact the learning and the development of various learning resources.[42]

[41] see Senge, P.M.: The Fifth Discipline – The Art & Practive of The Learning Orgnization. Century Business 1990.
[42] see e.g. Marquardt, M.J.: Building the Learning Organization. ASTD & McGraw-Hill 1996.

***Case: The Finnish Tax Academy*[43]**

The Finnish Tax Academy is in charge of the learning activities within the Finnish Tax Administration. The challenges in the work of the employees within the Tax Administration include, among others, the following:

- *quickly changing regulatory environment (and thus permanent need for updates and maintenance)*
- *expertise in taxation issues really is within the Tax Administration operational staff (and thus restricted potential to utilize external expertise).*

The Finnish Tax Academy has been an active user of eLearning since the year 2000 – in 2007 approx. 1300 employees studied at least on one eLearning course (more than 20 % of the workforce). The key of the eLearning approach is that all the eLearning courses are produced by the Tax Administration staff and experts; within the staff of approx. 6000 persons, there are more than 100 trained eLearning content providers and 110 eLearning tutors.

Authoring eLearning courses provides an important potential to enrichen the work of many experts by adding the learning provision task to their work. This is enabled by a clear workload assignment and thus eLearning content creation is an elementary part of the expert's work; for instance, an expert can use 32 person-days per course unit (20 learner hours) of allocated workload. It is also important that instead of compensating separately for the learning material provision, it is seen (in the spirit of a learning organization) as an organic part of everyday work-

The peer producers of eLearning content have been specially trained by an intensive training program, which has been organized by an external university entity. It consists of eight face-to-face training days as well as of own web-based courses and own web-based platform for communication, discussion and reflection.

The process of eLearning course content authoring has been jointly defined to include the following steps:

- *first edition*
- *peer reviews – "cross auditing"*
- *revised edition*
- *piloting with a limited audience (including structured feedback collection)*

[43] this case study is authored by Ari-Matti Auvinen (HCI Productions Oy) based on the first hand personal experiences in working with the Finnish Tax Academy, see also the Annual Report of the Finnish Tax Administration at http://www.vero.fi/nc/doc/download.asp?id=6169;1863506 (read on 18 July 2008)

- *final version*

Operational and pedagogic support is provided both by the own Tax Academy team as well as by external actors (universities, polytechnics, consultants).

As a result of this work, the Tax Administration regards eLearning as an elementary part of their learning, the Tax Academy produces or reviews more than 20 eLearning courses annually (in all they have more than 60 course on offer) and they also provide their eLearning courses to all Tax Administration employees with a free access also for self-studying.

The new opportunities for peer in different organizations has been created by the various professional online communities known as "communities of practice". Although already previously the professionals of different areas have been networking and exchanging their experiences, the Internet has opened novel avenues for sharing experiences and insights. As Moore also points out, networking is taking place both between the organizations as well as within the organizations among peers.[44]

Case: ANITEL –National association of e-learning teachers/tutors[45]

It was born in 2004 in order to provide answers and solutions to the problems met by teachers playing the role of e-tutor.It has been organized directly from teachers' perceived general need to share inputs, ideas and resources in any step of the instructional process. The association has been officially recognized: teachers who enroll and successfully complete a course are awarded a certification recognized by the Ministry of Education .

The association is designed to motivate teachers through an active exchange of experience and expertise, it plays the role of a "community of practice" for teachers in every field (hard science and social science) and covering any level of instruction (from primary school to secondary school).

ANITEL organizes different courses during each year, teachers can enroll for free and get their attendance certificate at the end; each course can differently take advantage of the following platforms (LMS, CMS and various interaction tools):

- *public portal to accomplish an informative function (at http://www.anitel.it/anitel/modules/news/)*
- *private platform for teachers' courses (at http://fad.anitel.it/)*

[44] Moore, M.G.: Network Systems: The Emerging Organizational Paradigm. The American Journal of Distance Education, (2003) 17 (1), 1–5.

[45] this case study is authored by Laura Fedeli (University of Macerata) based on personal experiences and involvement

- *mailing list using yahoo groups (at http://it.groups.yahoo.com/group/Soci_Anitel/)*
- *blog (at http://blog.anitel.org)*
- *land in Second Life (97, 239, 401).*

4.3 PEER PRODUCTION OF NEW SOLUTIONS AND PROGRAMS

The peer production as a production mechanism has been challenging the conventional production metaphor in some interesting areas. The most well-known example the development of Linux based on the open-source ideology. As Tapscott et al. note, the creation of Linux illustrates how the Internet has enabled many contributors – all acting independently in their own self-interest, create a highly integrated "good" that provides value for themselves and to others.[46]

The "open-source movement" has also been getting stronger and as Goldman and Gabriel point out, the interest in using open-source code residing in the commons by corporations is strong enough that some are starting to adapt their internal product life cycle and development methodologies to accommodate the nature of open source.[47]

Case study: Sourceforge[48]

SourceForge.net is the world's largest Open Source software development web site, hosting more than 100,000 projects and over 1,000,000 registered users with a centralized resource for managing projects, issues, communications, and code.

SourceForge.net has the largest repository of Open Source code and applications available on the Internet, and hosts more Open Source development products than any other site or network worldwide. The essence of the Open Source development model is the rapid creation of solutions within an open, collaborative environment.

Members of the Sourceforge community are responsible for developing the software that drives the web such as Apache, the world's most popular web server, and it is the tools provided by Sourceforge that they use in their work.

[46] Tapsoctt, D. – Ticoll, D. – Lowy, A.: Digital Capital – Harnessing the Power of Business Webs.Nicholas Bearley Publishing 2000.
[47] Goldman, R. – Gabriel, R.P.: Innovation Happens Elsewhere – Open Source as Business Strategy. Elsevier 2008
[48] this case study has been authored by Michela Moretti (Scienter Italy) based on the materials by Marcus Clements (Brighton Art, United Kingom) within the framework of Praxis project

A project at Sourceforge may be started by a developer or a group with a software project at one of several stages of development

- *an idea for a Software project*
- *a proposal with a specification and development plan*
- *a functioning or partially functioning software application*
- *a fully functioning software title*

In most cases the initiating developer wants to attract other developers to help with the project and has chosen Sourceforge as the best place to do it. The vast majority of projects are started by inexperienced developers, attract little or no interest from others and after a brief flurry of activity, languish in the archives until the initiator finally loses interest. At the other end of the scale a very few are extremely successful, with many of participants and thousands of downloads of the projects products by the public.

Sourceforge provides statistics about the projects it hosts with an overall 'activity rating' that is calculated from the overall popularity of the project amongst its participants and by the public.

Sourceforge consists of a large number of projects. Anybody can start a project and begin using the tools provided. There is no charge for the service; it is funded by advertising, sponsorship and user donations. When a project is started it is immediately provided with a complete set of tools to begin work. Each project on Sourceforge has the same set of tools.

During the development of a software project, a great deal of existing knowledge is utilised and new knowledge created. All software is built upon a foundation of existing software so a comprehensive understanding of the connecting modules and system within it operates is vital for a project to succeed.

Types of knowledge utilised or created in a software project:

- *technical documentation of related or connected software*
- *books & articles describing techniques or processes*
- *archived discussions from previous related projects*
- *source code*
- *help files & FAQs*

Everyone understands the value of archiving information. We only need to be asked the same question twice before it's a good idea to write down the answer somewhere and make it easily found by the next person with that question.

Thus elementary in Sourceforge are the archived discussions (nearly all important decisions made by developers collaborating on software projects will be made in some kind of archived discussion, be it archived email, a forum or a news group) and documentation (as a project continues the consensus of opinion and accumulated knowledge that is represented in the archives is compiled into a more formal structure in the project documentation). However, also cross-referencing and linking are essential elements in the successful projects.

The success of Sourceforge shows clearly both the demand in the open-source area for such a joint workspace, which enables communication among peers in often very complex issues. However, also the provision of effective tools for all various actors within the Sourceforge is one critical element of success.

The "Wikipedia movement" has been an interesting peer production exercise, as it has been able also to revolutionize the wide participation into the creation of joint content. The growing number of contributions into Wikipedia (authoring and editing of articles) has created a virtuous circle, in which more contributors mean more interaction in terms of more articles and therefore, more editing that will attract more contributors. Thus, as Rask concludes, there is a linear relationship in Wikipedia between "reach" and "richness".[49]

Case study: Wikipedia[50]

According to their own presentation on their web site (see in more detail http://www.wikipedia.org) "Wikipedia is a multilingual, Web-based, free content encyclopedia project. The name Wikipedia is a portmanteau (combination of words and their meanings) of the words wiki (a type of collaborative Web site) and encyclopedia. Wikipedia's articles provide links to guide the user to related pages with additional information.

Wikipedia is written collaboratively by volunteers from all around the world. Since its creation in 2001, Wikipedia has grown rapidly into one of the largest reference Web sites, attracting at least 684 million visitors yearly by 2008. There are more than 75,000 active contributors working on more than 10,000,000 articles in more than 250 languages.

[49] Rask, Morten, "The Richness and Reach of Wikinomics: Is the Free Web-Based Encyclopedia Wikipedia Only for the Rich Countries?" . Proceedings of the Joint Conference of The International Society of Marketing Development and the Macromarketing Society, June 2-5, 2007 (available at SSRN: http://ssrn.com/abstract=996158)ì

[50] this case study has been authored by Ari-Matti Auvinen (HCI Productions Oy) and is based on the Wikipedia site (http://www.wikipedia.org – read on 17 July 2008), on Tapscott, D. – Williams, A.: Wikinomics. Portfolio, USA 2006, and on personal experiences

In July 2008, there are 2,460,544 articles in English; every day hundreds of thousands of visitors from around the world make tens of thousands of edits and create thousands of new articles to enhance the knowledge held by the Wikipedia encyclopedia.

Visitors do not need specialized qualifications to contribute, since their primary role is to write articles that cover existing knowledge; this means that people of all ages and cultural and social backgrounds can write Wikipedia articles. Most of the articles can be edited by anyone with access to the Internet, simply by clicking the edit this page link. Anyone is welcome to add information, cross-references or citations, as long as they do so within Wikipedia's editing policies and to an appropriate standard. Substandard or disputed information is subject to removal. Users need not worry about accidentally damaging Wikipedia when adding or improving information, as other editors are always around to advise or correct obvious errors, and Wikipedia's software is carefully designed to allow easy reversal of editorial mistakes."

Wikipedia is a new social innovation, and by using peer production there has been created a new form of encyclopedia to be used in the Web. However, as the number of articles and contributors has grown, also Wikipedia has had to alter its operative mechanisms, including the creating norms on authoring and editing the articles, developing the internal quality criteria and quality processes and modifications in its user administration. In the various articles, Wikipedia also has warnings of the potential incompleteness of articles, missing references etc.

The key issue in Wikipedia has been the eagerness of various people to share their knowledge and information with other users. The "social discipline" within Wikipedia has been strong and the huge majority of authors of Wikipedia are experts in their own area. Wikipedia´s strength has also been the opportunity to comment and edit the content, and thus also to add comments from different perspectives.

In admiring the success of Wikipedia, it should also be stressed that solutions, such as Wikipedia, require also strong centralized resources – these are e.g. data structure, content structure, structure of quoting, search tools and search structure, various tools to author and edit content etc. Fluent dispersed content creation requires a strong centralized structure, which can enable various dispersed operations.

According to the quality of the content of Wikipedia, there has been a lively discussion of the trust in the Wikipedia content and also comparisons of the Wikipedia content vis-a-vis the more conventional encyclopaedia. As McGuiness et al. claim, trust is a central issue when dealing with systems and environments that use information coming from multiple, unknown sources.

Thus it is essential, how one can use trust information to help users view and filter information in collaborative and evolving information repositories such as Wikipedia. Furthermore, they propose that in digital collaborative environments, such as Wikipedia, trust can be divided into citation-based trust and revision history-based trust.[51]

Furthermore, the social impact of Wikipedia has also been discussed widely. Although some authors – like Don Tapscott – claim that Wikipedia will also remarkably narrow the "digital divide", Rask claim that also in Wikipedia countries with a higher level of human development have a competitive advantage over the countries with a lower level. He also concludes that the level of human development is crucial in participating in sharing knowledge at a global scale.[52] Based on this notion it is naturally interesting to discuss, whether the various organizations thus also vary in their work with the wikis.

4.4 THE DIFFERENT CONTEXTS AND MODELS OF PEER PRODUCTION

Based on the discussion in this section as well as the cases presented, we can present a simple classification of the various critical dimensions of peer production in eLearning and related fields. The two critical dimensions are

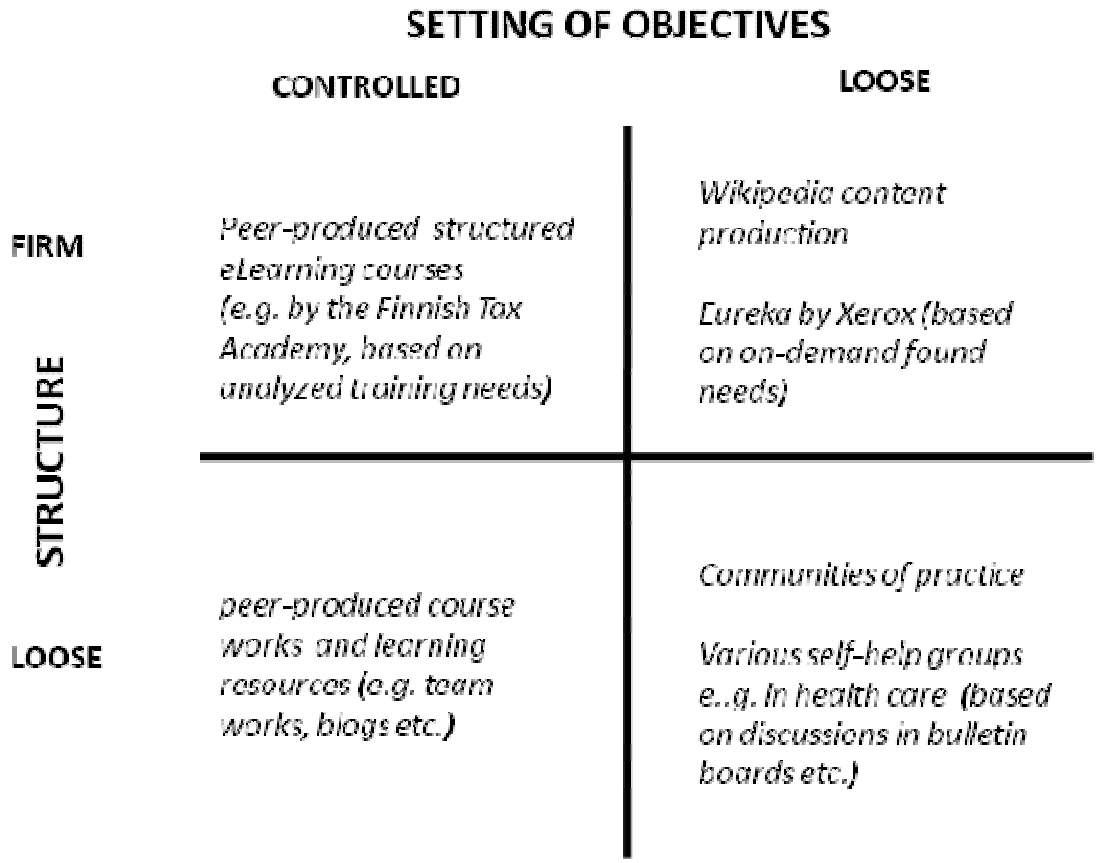
- setting of objectives – who is setting the objectives for the peer-produced content: is it controlled and unified for all potential peer producers (e.g. a framework of a "course") or is it relatively loose (e.g. in Wikipedia authoring an article of my personal interest)
- structure – what structure is given: is the structure firm (e.g. composed of certain elements, tools and requirements) or the structure loose and not pre-defined (e.g. peers can use tools and structure of their own choice).

[51] McGuinness, D.L. et al..: Investigations into Trust for Collaborative Information Repositories: A Wikipedia Case Study. WWW2006 Workshop on the Models of Trust for the Web (MTW'06), Edinburgh, Scotland.

[52] see Rask 2007

This is summarized in *picture 2*.

Picture 2



5. QUALITY APPROACHES TO PEER PRODUCTION IN ELEARNING

The quality of eLearning has been discussed and researched in many European projects as well as in many international contexts. Ehlers and Pawlowski describe, in the discussion on quality of eLearning, one can distinguish between three different aspects in the discussion, namely

- different interpretations of quality
- different stakeholders with different perspectives on quality
- different forms of quality (input-quality, process-quality, output-quality).

This discussion has also lead to different interpretations of quality – and numerous definitions from various fields are available.[53] As in particular the wide discussion on quality in eLearning in general is well captured by the recent comprehensive book edited by Ehlers and Pawlowski[54], in this context it is not necessary to repeat this discussion, but rather concentrate on the key issues which are altering in the peer production of eLearning.

In the peer production of eLearning the essential feature is that the learners are also acting as creators of the content – in the new learning settings the separation between an "author" and a "consumer" is blurring. In practice, learners are no longer purely consumers but they actively participate in the learning process and thus influence it. As the borders between user and author are blurring, so do the roles of student and teacher.

This fundamental feature is also imposing a different view on quality, as quality is often to be defined and assessed by the same group of actors as the actual creation of the learning content. However, the quality approach to peer production can be more than just an emphasis on self-evaluation and its practices.

Many quality approaches also in eLearning rely on the conventional quality cycle. This quality cycle has included – since the writings of W. Edwards Deming in the 1950s - the steps of PDCA (Plan, Do, Check, Act). This approach has been modified during the last decades in many different ways, and also applied into the area of vocational training.

[53] Ehlers, U-D. – Pawlowski, J.: Quality in European e-learning: An introduction. In Ehlers, U-D. – Pawlowski, J. (eds.): Handbook on Quality and Standardisation in E-Learning. Springer 2006.

[54] see Ehlers, U-D. – Pawlowski, J. (eds.): Handbook on Quality and Standardisation in E-Learning. Springer 2006.

Wirth has presented that in eLearning the essential steps could be:

- plan
- do
- check
- compare.[55]

As a hypothesis we can claim, that in the development of a quality approach to peer production, the quality approach would mainly address the "process quality" issues – in other words: which processes implemented are assisting the quality of peer produced eLearning content. In addition, in regarding the quality processes, the peer production of the learning materials in their quality assessment can also be linked with benchmarking – or even more precisely, on "benchlearning".

5.1 QUALITY DEVELOPMENT OF PEER PRODUCTION[56]

Ehlers discusses the quality development in what he is referring to as "eLearning 2.0". In describing the phenomenon "eLearning 2.0", he points out that it describes a number of developments, trends and points of view, which require change from teaching to learning. The new point of view essentially connects e-learning with five characteristics:

1. Learning takes places always and everywhere (ubiquitous) and therefore in many different contexts, not only in the classroom.
2. Learners take on the role of organizers.
3. Learning is a life-long process, has many episodes and is not (only) linked to educational institutions.
4. Learning takes place in communities of learning (so called communities of practice)[57]. Learners participate in formal, as well as informal communities.
5. Learning is informal and non-formal, takes place at home, at the work place and during leisure time and is no longer centered on teachers or institutions.

[55] Wirth, M.A.: An analysis of international quality management approaches in e-learning: Different paths, similar pursuits. In Ehlers, U-D. – Pawlowski, J. (eds.): Handbook on Quality and Standardisation in E-Learning. Springer 2006.

[56] this chapter is based largely on the writings of Ulf-Daniel Ehlers and his article "Web 2.0 – eLearning 2.0 – Quality 2.0 – Perspectives on a change in learning culture and quality concepts" . In Hohenstain, A. – Wilbers, K. (eds.): Handbuch E-Learning. Köln 2008.

[57] on communities of practice, see e.g. Wenger, E.: Communities of practice: learning, meaning, and identity. Cambridge University Press, 1999.

In the new environment, learners are highly self-directed, as learning does not only take place in institutions, but everywhere, during the course of one's whole life in a number of different episodes, in learning communities and social networks, using social software and individually compiled contents. Securing and developing quality in such learning scenarios thus has to focus mainly on the individual learning processes and the shown achievements (performance). The learner's perspective is more important than the organizational processes and / or the co called input factors. Quality assessment does not take place by using classical methods of expert- and standard based quality management, quality assurance or control, but by making use of more participative methods and responsive designs. The aim of the process is to reach an individualized assessment, which relates to the learning process.

Initially it seems paradox to talk about the quality of eLearning 2.0, as quality is often linked with checking by externally imposed standards. However, quality can also be understood in a development-oriented way, which means the enabling of learners to develop themselves in their own learning processes and consequently reach better results as far as quality is concerned. In this view, methods of self-evaluation, reflection and peer-evaluation are seen as more important. This kind of quality methodology does not have anything to do with normative, universally valid, but aims at improving the quality of the learning process.

In eLearning 2.0 learning approach, the learner has an important role as active constructor of learning materials (co-creator), personal learning environments and initiator of his or her own learning processes. Interestingly, this is a characteristic, which is often felt to be a barrier for integrating eLearning 2.0 into formal educational processes. This is because the competition of learners and teachers and/or other institutional actors during quality assessment seems to be insurmountable and only resolvable through a loss of power for the institution.

5.2 CONDITIONS FOR QUALITY OF PEER PRODUCTION[58]

As a point of departure, eLearning 2.0 does not require a new mode of thinking or method of quality development, such as a new and completely altered philosophy of quality – no "educational quality 2.0" is needed. However, changed basic conditions and contexts need to be taken into account. Doing justice to these different contexts, different questions need to be posed when dealing with quality development, different objects evaluated, different criteria of quality applied and specific methods of quality assurance, enhancement and development used. In short: the role of quality development is changing.

[58] this chapter is based largely on the writings of Ulf-Daniel Ehlers and his article "Web 2.0 – eLearning 2.0 – Quality 2.0 – Perspectives on a change in learning culture and quality concepts". In Hohenstain, A. – Wilbers, K. (eds.): Handbuch E-Learning. Köln 2008.

While in traditional learning scenarios it mostly means the checking and controlling of quality, in eLearning 2.0 it is becoming more the role of an enabler of learning progress. Learning methods and quality development are moving closer together. Methods such as feedback, reflection and recommendation mechanisms are becoming more important. Typical basic conditions, which need to be taken into account in quality development for eLearning 2.0 scenarios, are explained in the following:

- From reception to participation: the metaphor used for learning is changing. In eLearning 2.0, quality cannot be tied to the evaluation of a pre-determined learning environment or learning contents produced by an expert. Not the reception but the active participation is most important, that means the question in how far a learning scenario stimulates the creation of individual personal learning environments, the compilation of individual learning contents and sharing them with others.
- From inspection to reflection: quality development for eLearning 2.0 shifts the focus from conformity to a reflection of the learning process. Learners are supported in reflecting, recognizing and putting into effect their own learning progress, educational strategies, needs, etc. and in the course of their actions critically reflect the contribution of educational media. The aim is to achieve a personally ideal configuration of educational media and strategies, which is continuously developed through autonomous reflection.
- From product orientation through process orientation to performance and competence orientation: the material that is used for learning and the processes of its supplier are not the focus of quality development. Quality development focuses on the learners' performance, their individually developed learning products, steps in development and similar aspects (for example in e-portfolios), which shape their way to decision-making and responsibility.
- From planning education for the leaner to planning education by the learner: quality of learning scenarios is often attempted to be achieved through careful analysis of the need for education, a comprehensive conception phase, feedback as far as the design of learning material and development processes are concerned and the evaluation of learning processes. In eLearning 2.0, many of these processes shift from the supplier of a program to the learner. Quality concepts must therefore support the learners in their ability to develop quality through reflection, enable learner-oriented forms of evaluation and offer the necessary tools for quality development to the learners in their PLEs.

- From receiver to developer of learning materials: quality assessment in eLearning 2.0 scenarios does not follow the logic of a marketing effectiveness research to find out how the materials and characteristics of media optimally affect the learning process. It is not about learning process taking part in a unified learning scenario. Rather, the focus lies on processes of development, flexible usage and the validation of social communication processes with other learners.
- From the "learning island" LMS to the internet as a learning environment: eLearning 2.0 approach understand Learning Management Systems (LMS) as a mere starting point, as a signpost for their own search and use of material from the internet, their development and linking to other tools which can be flexibly arranged to become personal learning portals. Quality assessment then does not focus on materials from the LMS anymore but rather on the learning products and perhaps on the learning processes documented in an e-portfolio.
- From tests to performance: learning progress and achievements become visible not only in tests but rather in the learning process documented in portfolios (for example in wikis or web logs), learning products and social interactions.

5.3 KEY CONCEPTS FOR THE IMPLEMENTATION OF QUALITY IN PEER PRODUCTION[59]

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.

In particular, three concepts are worth discussing in more detail, namely self-evaluation, e-portfolios, and social recommendation by peers.

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

[59] this chapter is based largely on the writings of Ulf-Daniel Ehlers and his article "Web 2.0 – eLearning 2.0 – Quality 2.0 – Perspectives on a change in learning culture and quality concepts" . In Hohenstain, A. – Wilbers, K. (eds.): Handbuch E-Learning. Köln 2008.

In scientific literature, positive effects of self-evaluating processes on the learning achievements can be found[60]. When undertaking these processes, students can gain insights into the profile of their own strengths and weaknesses. It has also been shown, 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 resources[61].

Web-based portfolios (e-portfolios) integrate different media and services. Learners collect desired 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 also to quality assessment. Learning scenarios supported by e-portfolios emphasize the learning process and enable a deeper understanding of learning processes by all participants.

In eLearning 2.0 communication, feedback and the exchange within a 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
- peer assist method.

Social recommendation mechanisms are defined as those methods that serve the purpose of assessing the "true quality" of learning material[62], in contrast to methods focused on experts. According to this method, the members of a learning community evaluate materials available online. 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.

[60] see e.g. Maehr, M. – Stallings, R.: Freedom from external evaluation. Child Development 43 (1972), 177-185 and Hughes, M. – Ribbins, P. – Thomas, H.: Managing Education: the system and the institution. London 1985.

[61] Rolheiser, C. – Ross, J.A.: Student self-evaluation: What research says and what practice shows. In Small, R.D. – Thomas, A. (eds.): Plain Talk About Kids. Covington 2001.

[62] Duval, E.: LearnRank: Towards a real quality measure for Learning. In Ehlers, U.-D. – Pawlowski, J.M.: Handbook of Quality and Standardisation in E-Learning. Heidelberg 2006.

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 area of learning, especially in eLearning 2.0 settings, 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. 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 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 model. 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, as its 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.

6.
TECHNICAL TOOLS AND TECHNOLOGIES FOR PEER PRODUCTION

In this chapter we summarize the technical tools and the technology which are used in peer production. It is also necessary to define some key terms which are closely related into the peer production concept. Although during the recent years learning and information provision through Internet and its different services have become one of the most popular theme in educational development, it is good to keep to remember both the relatively short history of the "Internet age" as well as the utilization of some of the key concepts already earlier in different contexts.

6.1 TECHNICAL TOOLS AND TECHNOLOGIES IN THE "WEB 2.0" ERA

The key to the potential to use Internet and its services in vocational education and training stems from the fact that the metaphor for using Internet has changed from information distribution and delivery (which many call the "Web 1.0") into active participation and information creation by the users (which may call the "Web 2.0"). In particular, with the introduction of called "social media" [63] and "social networks"[64] the peer production has been recognised, not only as a challenge the traditional education, but also creating a new valuable approach into education - and particularly into the eLearning development.

Actually the term of "Web 2.0" was first introduced 2005 by Tim O'Reilly[65]. Explaining "Web 2.0" is not that simple – it should be pointed out that "Web 2.0" is not any new remarkable invention which has been the starting point for new innovations in web-based tool development. Perhaps it is better to say that it is more like common name showing all that intensive development what has happened in web-based communication. Thus it is rather an evidence for achievement of a next stage in networking and communication over the Internet. The "Web 2.0" can be seen as a concept which sums up different development trends of web-based services, applications standards, technologies and most of all how these all are used in social communication and networking.

[63] however, it is needed to be noted that the discussion of "sociomedia" in its early years stems already from the beginning of the 1990s – see e.g. Barrett, E. (ed.): Sociomedia – Multimedia, Hypermedia and the Social Construction of Knowledge. The MIT Press 1994.

[64] on early stages of social networks – see .e.g. Harasim. L. et al.: Learning Networks. The MIT Press 1995.

[65] O´Reilly, T.: What is Web 2.0? - Design Patterns and Business Models for the Next Generation of Software - http://www.oreilly.de/artikel/web20.html (read 24 July 2008)

In education and training development and implementing eLearning we also can see claim that there is a move towards "eLearning 2.0" in which different web communication and information flow tools are used in educational and learning purposes. However, the (open) social networks and social media are critical for peer production and its integration to traditional learning approaches. We understand that "social media" is describing the media environment, which enables mutual participation, information production and receiving, handling and providing it for others to use. As discussed in previous chapters, the social media have been essential in the success of user-created content We see the (open) "social networks" as a prerequisite for successful peer production.
There are basically following user-created content, which are then distributed through different platforms, technical tools in peer production.

One important feature in the recent development is also that the creative power of the users has been nurtured by the provision of different media for peer production. Thus the users are not limited to text only – they can also produce easily and cheaply their content by other media, such as photos, images, audio clips, video clips etc. Another important feature is also that in addition to the conventional computer networks, also novel networks – such as mobile networks – can be widely used.

6.2 TECHNICAL TOOLS FOR PEER PRODUCTION

In the following we describe some contemporary approaches for peer production – these might often be called also Web 2.0" tools. However, new tools and approaches emerge daily and these which are novel or upgraded versions about those one used commonly today – or totally new services. Although many tools used also in the "Web 2.0" environment have also their commercial dimension, the important feature in the development of many new "Web 2.0" tools is their open source background. These tools can be also seen as services, applications or distribution platforms, which provide platforms for peer production. With the open source approach also the business models and earning models alter – however, open source does not mean free or totally non-commercial.[66]

Blogs appear already since mid1990s when they were mainly presented as personal diaries on various Internet home pages (the name stems from the combination of web + log book). Today the blogs have turned to be – among others - efficient tools to express opinions, to distribute information and also to serve as commonly read personal diaries. Modern blogs can also easily mix different media – text, graphics, pictures, video clips, audio clips etc.

[66] see e.g. Goldman, R. – Gabriel, R.P.: Innovation Happens Elsewhere – Open Source as Business Strategy. Elsevier 2005.

What makes blogging so powerful is the linking of different "bloggers" in blogging platforms by forming so called blogospheres where information can spread extremely fast. The linking of teh different blogs has become a very important tool for peer production particularly in cases where students themselves are encourage to become peer producers and at the same time being active in commenting blogs of each other[67] [68]. The blogs are often tagged with pointing out the keywords or listed according the titles which are then visible in different blogosphere or blog account hosting sites – also typical for blogging is regular updating which will often "push" old information to be invisible and history of the blogging is thus difficult to follow.

Typical for blogging tools is that most of them are free for the users and thus the threshold to start active blogging is very low.[69]

Wikis and other text based collaboration formats are describing a webpage or set of web pages that can be easily edited anyone who is allowed access – the most well-known of the wikis is Wikipedia[70]. The fundamental idea of wikis is to provide information voluntarily, decentralised and openly. The information can be added, corrected or totally new topics can be created without changing the whole structure of the site. Information providers are also reviewers of the information. Wikis provide also a way to common structured knowledge creation and distribution and thus they can serve as an effective tool for learning.[71]

The quality of information has been staying rather solid in the various wikis - despite of minor vandalism appearing time to time in wiki-based web sites. Today is easy to create own wiki environment for various topics. There are so called "wiki farms" for hosting the sites, which have encouraged development of wikis also in universities and other educational institutions. In wikis the history of information or individual page is always visible and that helps to keep provided information valuable.[72]

Tagging and social bookmarking allow users to save their bookmarks online, tag them and share them with others. In practice it is possible to install from web (free of charge) programs which help you to store your bookmarks online, tag them and share them with your colleagues and students. Use of tagging has become common way to look for information by using keywords.

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67 on educational uses of blogs – see e.g. Williams, J.B.: Exploring the use of blogs as learning spaces in the higher education sector. Australasian Journal of Educational Technology 2004, 20(2), 232-247.

68 see also Richardson, W.: Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms. Corwin Press 2006.

69 see e.g. http://c4lpt.co.uk/Directory/Tools/blogging.html (read 24 July 2008) of the various blogging tools available

70 see http://www.wikipedia.org

71 see e.g. Parker, K.R. – Chao, J.T.: Wiki as a Teaching Tool. Interdisciplinary Journal of Knowledge and Learning Objects, 2007 (vol 3), pp. 57 – 72.

72 see e.g. http://c4lpt.co.uk/Directory/Tools/wiki.html (read 24 July 2008) of the various wiki tools available

By using the tagging the user is able to select information wanted. The key to the applications of social bookmarking is metadata (information on information), which enables the sharing of this information. The probably best known social bookmarking application is del.icio.us, in which in which users can tag each of their bookmarks with a number of freely chosen keywords.[73]

Different tools used for tagging and social bookmarking help users to search and identify information with keywords and topics and to save it all in own directory with favorites/bookmarks online. In practice they are personal websites where user can store archive their favorite web pages. The importance of tagging and social bookmarking is in sharing the important links and information sources with other users. This enables - instead of replicating the information content on certain web sites - the sharing of the links and ensure the validity of the information.[74]

Media sharing means the services which enable everyone interested to share multimedia in the public. Most common example of this service is YouTube for videos[75]. There are plenty of different sharing services for videos, photos and podcasting.

Podcasting as a term were initiated with launching of iPod - a portable digital audio player by Apple. Contemporary, the term is referring any software and hardware combination that permits automatic downloading of audio files for listening at the user's convenience. The key breakthrough for podcasting has been the audio signal compression technology – in particular, the MP3 standard.

In education the podcasting is a powerful approach as the students are familiar with the underlying technology application. By combining the audio blogging with podcasting the lectures, experts' interviews etc., it is possible to provide convenient methods in delivering the educational content. Also the students can easily add their own content using audio blogging and distribute those audio blogs by podcasting.

Podcasting is becoming increasingly popular in education. Podcasts enable students and teachers to share information with anyone at any time. An absent student can download the podcast of the recorded lesson. It can be a tool for teachers or administrators to communicate curriculum, assignments and other information with parents and the community. Remarkably, a number of leading US universities and colleges provide their selected lectures through the iTunes University site hosted by Apple.[76]

[73] see http://del.icio.us
[74] see e.g. http://c4lpt.co.uk/Directory/Tools/bookmarking.html (read 24 July 2008) of the various social bookmarking and tagging tools available
[75] see http://www.youtube.com
[76] see http://www.apple.com/education/itunesu_mobilelearning/itunesu.html (read 24 July 2008)

Newer WEB 2.0 services

The is in development a number of new services, which will also change the environment of peer production in eLearning. This following summary table is based on the publication by JISC Technology and Standards Watch from February 2007 and it is authored by Paul Anderson.[77] We have added the last three areas from other sources to the table by Anderson.

Social networking	Professional and social networking sites that facilitate meeting people, finding like minds, sharing content – uses ideas from harnessing the power of the crowd, networks effect and individual production/user generated content.
Aggregating services	Gather information from diverse sources across the Web and publish in one place. Includes news and RSS feed aggregators and tools that create a single webpages with all your feeds and emails in one place – uses idea from individual production/user generated content. Collect and aggregate user data, user 'attention' (what you look at) and intentions – uses ideas from the architecture of participation, data on epic scale and power of the crowd
Data "mash-ups"	Web services that pull together data from different sources to create a new service (i.e. aggregation and recommendation). Uses, for example, ideas from data on epic scale and openness of data-
Tracking and filtering content	Services keep track of, filter, analyse and allow search of the growing amount of Web 2.0 content from blogs, multimedia sharing services etc. Uses ideas from e.g. data on epic scale.
Collaboration	Collaborative reference works (like Wikipedia) that are built using wiki-like software tools. Uses ideas from harnessing the power of the crowd. Collaborative, Web-based project and work group productivity tools. Uses architecture of participation.
Replicable office-style software in the browser	Web-based desktop application/document tools. Replicate desktop application. Based on technological development.
Sources ideas or work from the crowd	Seek ideas, solutions to problems or get tasks completed by outsourcing to users of the Web. Uses the idea of power of the crowd.

[77] Anderson, P.: What is Web 2.0? - Ideas, technologies and implications for education. JISC Technology and Standards Watch, Feb. 2007 – at http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf (read 24 July 2008)

Virtual worlds[78]	Online virtual environment where content is created in the context of online game-like 3D digital environment to which users subscribe.
Social tagging or folksonomy[79]	Ad hoc classification scheme (tags) that web users invent as they surf to categorize the data they find online.
Peer production news[80]	Web sites combining social bookmarking, blogging and syndication with a form of non-hierarchical, democratic editorial control. News stories and websites are submitted by users, and they promoted to the front page through a user-based ranking system.

6.3 TECHNOLOGIES AND STANDARDS USED FOR PEER PRODUCTION

One essential factor behind "Web 2.0" development has been to enthusiasm to enhance the development of the new generations of web-related technologies and standards. The software applications are not necessary longer running on the user's own computer, but on the web, which seen as platform. This all is possible now when the browser technology has moved on to a new stage in its development – but also it is important to notify that the increasing bandwidth has enabled many services. Such bandwidth-intensive services are e.g. video distributions over the Internet.

The new characteristics of the web services are characterised by the increased responsiveness and interactivity of web pages. The optimization of the web traffic can be achieved by exchanging small amounts of data with the server "behind the scenes" so that entire web pages do not have to be reloaded each time there is a need to fetch data from the server. This is intended to increase the web page's interactivity, speed, functionality and usability.

If the "Web 2.0" amd thus also "eLearning 2.0" is becoming a reality, what are the future options in the technology area?

Although the views on the next stage of the Internet's evolution vary greatly, many believe that emerging technologies such as the "Semantic Web" will transform the way the Web is used, and lead to new possibilities in artificial intelligence.

[78] see e.g. Guest, T.: Second Lives – A journey through virtual worlds. Arrow Books 2007.
[79] see e.g. Pettenenati, M.C. – Cigognini, M.E.: Social Networking Theories and Tools to Support Connectivist Learning Activities. International Journal of Web-based Learning and Teaching Technologies, Vol. 2, Issue 3, pp. 42 – 60.
[80] Learning Activities. International Journal of Web-based Learning and Teaching Technologies, Vol. 2, Issue 3, pp. 42 – 60.

Something what is linked also very closely into the "Web 3.0" is its relation with so called socio-technological values with the sense of real world. That will most likely also enhance the using web-based tools and technologies more in education and particularly in development of peer production practices.[81]

Anne Fox from Experience-Based Learning Project in Denmark is describing the eLearning 3.0 following way: "eLearning 2.0 is about using Web 2.0 tools in teaching. It often implies a great deal of effort on the part of the teacher to set up blogs, wikis, and so on as well as setting up the networks that their students will use to communicate with others. eLearning 3.0 will happen when learners take on much more of the responsibility for setting up their own blogs, wikis, and podcasts and for creating and nurturing their own networks. This implies a seismic shift in the role of the teacher to that of facilitator and that learners' responsibility for their own learning becomes more than a slogan. Perhaps eLearning 3.0 will happen when we drop the "e" altogether because ICT will have become as integrated into education as, for example, electricity is today".[82]

[81] on this discussion – see e.g. http://en.wikipedia.org/wiki/Web_3.0 (read 24 July 2008)
[82] see Elearning 2.0 – A Stepping Stone to Elearning 3.0? http://www.checkpoint-elearning.com/article/4753.html (read 24 July 2008)

7.
THE HYPOTHESIS FOR THE QMPP QUALITY MODEL

This chapter discusses the hypothesis for the QMPP model – in other words the project's approach how to achieve and ensure quality in peer produced eLearning content. As discussed in the first chapters of this document, the endorsed quality approach to peer production is not seen as a standard, but rather as a quality process including different stages. There are a number of critical aspects to be taken into consideration in these different stages.

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. However, it is important to emphasize that peer production requires also enabling and supporting structures and their effective management. The key issue in this project is to develop a holistic approach to peer production, which enables also the effective utilization of this unique method.

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.

The QMPP project aims at contributing to the quality development and quality management of peer production of eLearning content. The essential work in the project is to develop a solid approach on how to support the quality management of peer-produced eLearning content, pilot the approach in three different VET entities, and to produce a joint toolset for the VET providers of quality management of peer-produced e-learning content.

The QMPP project itself does not take a position of the eLearning tools used, but is developing and implementing a systematic process for the quality management of peer-produced e-learning content.

7.1 PEER PRODUCTION CYCLE

Within the QMPP project we have developed a metaphor for the effective management of quality in peer production. It includes two important elements - these are the "peer production cycle" and the "supporting activities".

The "peer production cycle" includes the following phases:

- benchmarking – identifying of good cases and practices, identifying of good digital resources, identifying areas of lacking content, sharing learning experiences by sharing learning (b)logs etc.
- creating – (shared) authoring of texts and other resources; creating images, audio materials, video materials; creating wikis etc.
- validating – validating content with subject matter experts, validating content with peers, rating the validity of the content etc.
- editing – sharing editing responsibilities (from proof-reading to translation), undertaking peer reviews, creating alternative navigational routes etc.
- enriching – creating additional content materials, publishing individual works and team works, sharing or learning (b)logs, adding library links, social bookmarking, creating wikis etc.
- updating – monitoring existing content, updating existing content, adding specific area content etc.

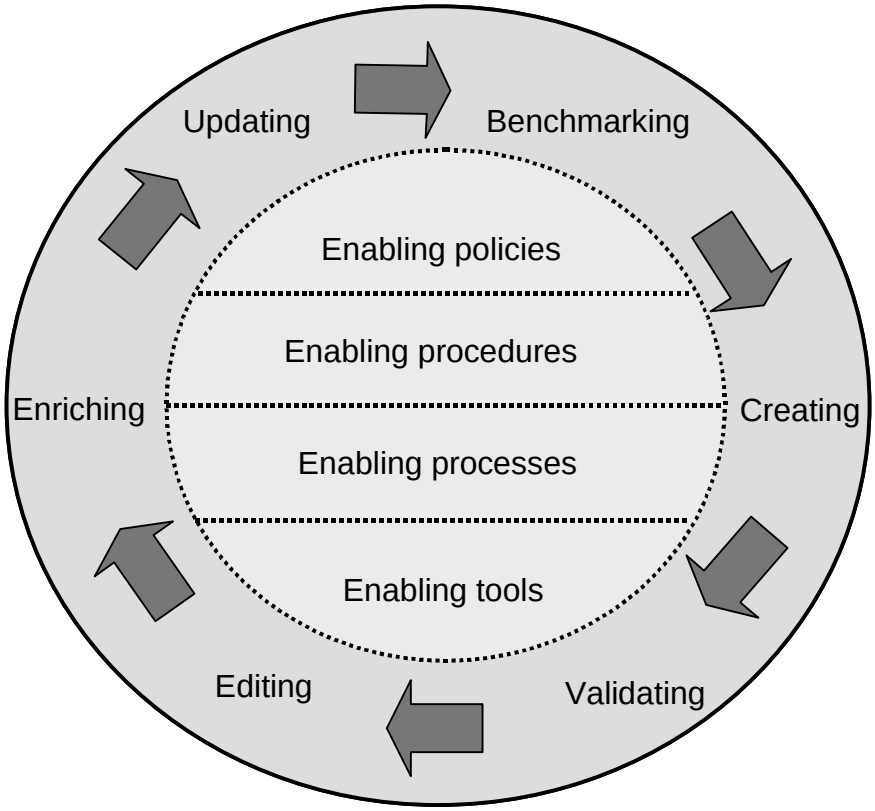
However, as stated previously, it is obvious that organizations favoring peer production must also have enabling and supporting structures. These should include the following:

- enabling policies – organizational opportunities for peer production of content (such as time resources allocated for peer production), management support for peer production, access to various digital resources to be used in content production etc.

- enabling procedures – organizational support for peer production, guidelines for peer production and peer reviews, guidelines of intellectual property rights, agreement on compensation policies etc.
- enabling processes – practical support of peer production, agreed and supported processes and workflows for peer production
- enabling tools – joint and shared tools to be used in peer production to provide effective and fluent collaborative work.

These essential elements are summarized in *picture 3*.

Picture 3



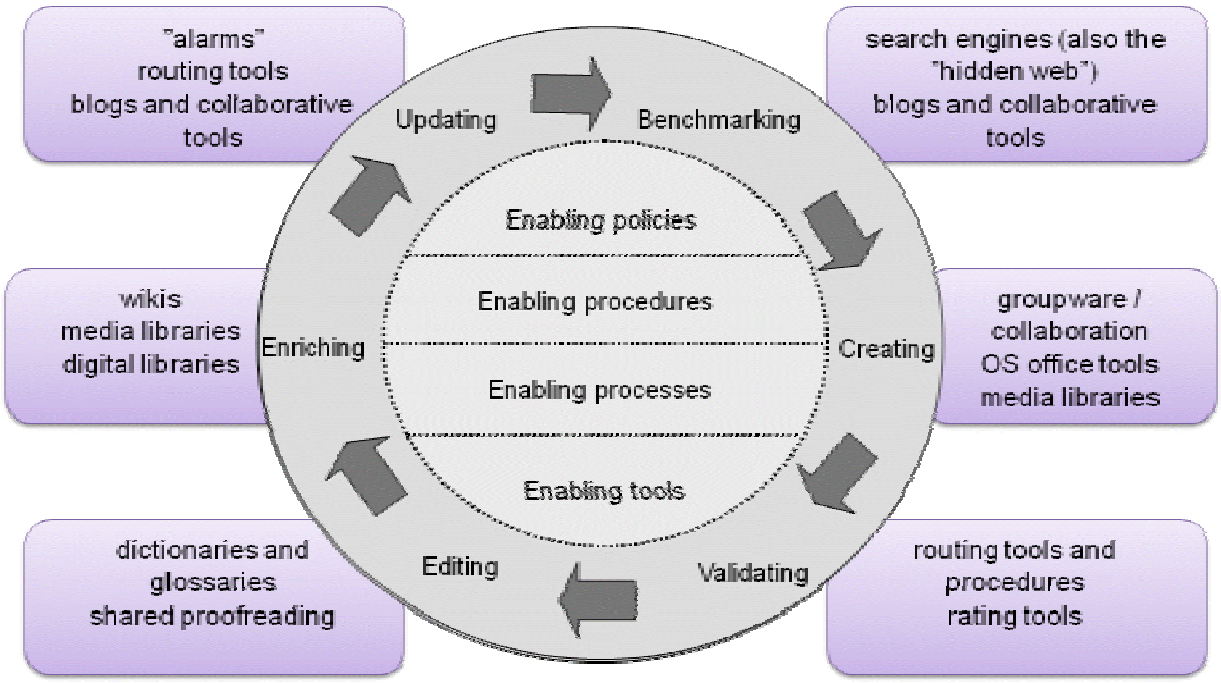
At this stage it should also be emphasized that in real life these stages are not linear or directly sequencial. In the creation phase there is naturally authoring, re-authoring etc. – thus it can rather be seen that in each phase there are subphases. Also it is obvious that, for instance, after the validating phase the creation phase is restarted and better content is provided for the validation. It is important to note that in the contemporary Internet environment these phases can be really fast and that the user communities can react really rapidly, if needed.

7.2 EXISTING TOOLS FOR PEER PRODUCTION

It should be noted, however, that in many cases there are already existing good practices (and also open source tools), which have already been tested in various environments. This project is not aiming to develop own tools or toolsets. Rather the challenge is to bring together and integrate the various tools and approaches into a working model and solution, which can easily be utilized within various organizations.

The enclosed *picture 4* visualizes the various phases of the "peer production cycle" and points out some of the already existing practices.

Picture 4



7.3 QUALITY CHALLENGES IN PEER PRODUCTION

The emphasis of the QMPP project is in testing and validating through the pilot the real challenges and opportunities of quality management in peer production of eLearning.

For the design of the experiments in piloting, it is necessary to identify the key issues in different phases. The following table (see *table* 2) summarizes the quality management challenges in each phase.

Table 2

Peer production phase	***Key concerns and key questions***	***Existing approaches and tools***
Benchmarking	▪ What content do we need for our learning activities? ▪ Is the required content already existing in a usable and available form? ▪ Can we access and use the content? ▪ Can we edit and enrich the content? ▪ Which obligations do we have with the existing content? ▪ How can we be sure of its quality? ▪ Are there (peer) references of the content?	▪ Search engines of the Internet ▪ Search engines of the "hidden web" ▪ Blogs ▪ Social bookmarking ▪ Various user groups
Creation	▪ What content do we want to create? ▪ What kind of a guiding structure for the content do we provide? ▪ What type of support do we provide for the creators? ▪ What is the division of labor between the different actors? ▪ How do we create the content? ▪ What routing of the work do we use? ▪ What is the timeframe of the content creation? ▪ How do we ensure the quality of the created content? ▪ Who can create content (open access vs. qualified peers)? ▪ How do we make sure that no third party IPRs are violated? ▪ How do we ensure the IPR issues? ▪ How do we ensure the	▪ (Open source) word processing and office tools ▪ Groupware tools ▪ (Open source) visualization tools ▪ Tools for podcasts, video casts etc. ▪ Media libraries ▪ Wikis and other structured environments

Peer production phase	***Key concerns and key questions***	***Existing approaches and tools***
	media richness and attractiveness of the content? ▪ Which media will we use in presentation and how do we ensure the required media balance?	
Validation	▪ Who should validate the content? ▪ Which mechanisms are we using in the validation (e.g. expert review vs. peer review)? ▪ How do we ensure the feedback of the validation to the creators? ▪ How do we support the validation work? ▪ What is the timeframe for validation?	▪ Routing tools ▪ Rating tools (e.g. giving "stars" to the content) ▪ Groupware tools ▪ Direct editing to the wikis
Editing	▪ What kind of editing are we promoting? ▪ Who is entitled to edit the content (experts vs. all)? ▪ How do we share responsibilities of the editing work (e.g. voluntary division-of-labor vs. free access)? ▪ How do we support the validation work? ▪ Is the versioning a part of editing (e.g. making language versions)? ▪ How is the editing work validated?	▪ Dictionaries and glossaries (to support e.g. proof-reading) ▪ Groupware tools ▪ Direct editing to the wikis
Enriching	▪ What kind of enriching are we promoting? ▪ How do we enrich the existing content? ▪ Who is entitled to enrich the content (experts vs. all)? ▪ How do we support the enriching work?	▪ Wikis ▪ Social bookmarking and shared bookmarks ▪ Digital libraries ▪

Peer production phase	***Key concerns and key questions***	***Existing approaches and tools***
	▪ How is the enriching work validated? ▪ Which media can be used in enrichment (e.g. podcasts, video casts etc.)?	
Updating	▪ How do we make sure that our content is up-to-date? ▪ How do we organize updating? ▪ Who is responsible for updating? ▪ What kind of updating are we promoting? ▪ Who is entitled to update the content (experts vs. all)? ▪ How is updating validated?	▪ Routing tools ▪ Alarms (e.g. based on calendars) ▪ Blogs ▪ Groupware

As one can understand, this table is not complete, but it serves as a working metaphor for the pilots to start the planning of their work and their key issues.

However, it should also be emphasized that the "inner circle" is also important in the quality management of peer production. Thus the issues of the organizational support are essential in making "quality happen". The enclosed table (see *table 3*) summarizes some of the key issues in the enabling and supporting structures of peer production.

Table 3

Enabling and supporting structures	***Key concerns and key questions***
Enabling policies	▪ How do we organizationally support peer production? ▪ How do we allocate time to peer production? ▪ How do we provide access to all needed resources, including digital resources? ▪ How do we compensate/award peer production? ▪ How do we ensure the appropriate approach to the IPR issues?
Enabling procedures	▪ How do we organize the support to peer production? ▪ What guidelines do we provide for peer production in its various phases? ▪ How do we ensure required resources to support peer production (e.g. validators of content)?
Enabling processes	▪ How do we communicate of the options of peer production? ▪ How do we support the workflows in peer production?
Enabling tools	▪ What tools do we provide for peer production? ▪ Which tools do we actively support?

The challenge of quality management in peer production is interesting. As peer production as a mechanism also to produce eLearning materials and content will grow fast, the appropriate quality mechanism can also ensure that peer-produced eLearning materials and contents will reach wider audiences.

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8.2 INTERNET RESOURCES

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- http://c4lpt.co.uk/Directory/Tools/blogging.html
- http://c4lpt.co.uk/Directory/Tools/wiki.html
- http://en.nursingwiki.org
- http://en.wikipedia.org
- http://www.facebook.com
- http://www.flickr.com
- http://www.pflegewiki.de
- http://www.youtube.com
- http://slashdot.org
- http://www.thefreedictionary.com

ANNEX: CASE STUDIES AND THEIR DOMAINS

This annex describes the domain and approach described in various case studies. To fully understand the classification of the case studies, please get acquainted also with Chapter 7 of this report.

	Eureka	IAVANTE	PflegeW	KONE	Tax Ac	ANITEL	Sourcef	Wiki
OBJECTIVES AND OBJECTIVE SETTING								
External objective setting		X		X	X			
Objective setting by the peer group	X		X		(X)	X	X	X
STRUCTURE OF LEARNING / COURSES								
Predefined structure of the learning			(X)	X	X			(X)
Structure setting by the peer group	X	X	X			X	X	X
GENERAL ORGANISATION OF WORK								
Voluntary division-of-labour (by the peer group)	X	X	X		X	X	X	X
Given division-of-labour				X				
FUNCTION OF THE PEER PRODUCED CONTENT								
All content based on peer-produced content		X	X				X	X
Learning supported by peer-produced content	(X)				X	X		
No or weakly defined function for pp content				X				
USER ROLES AND USER PROFILES								
Predefined roles for the peer group		X		X	X		(X)	
Roles defined by the peer group	X		X			X	X	X
Fixed roles within the peer group				X	(X)	X		
Flexible roles within the peer group	X		X				X	X
Additional learning creditation for the peer work		X		(X)	X			

	Eureka	IAVANTE	PflegeW	KONE	Tax Ac	ANITEL	Sourcef	Wiki
USER REGISTRATION								
Users pre-registered				X	X			
Registration by the peer users themselves	X	X	X			X	X	X
Acceptance of user regulations required			X				X	X
Subscription of IPRs and other rights			(X)		X			(X)
USER IDENTIFICATION								
Peers appearing with their real names	X	X	X	(X)	X	X	X	X
Peers using aliases						X		
BENCHMARKING								
Social bookmarking and sharing bookmarks	(X)		X			X		X
Annotation of bookmarks						X		
Provision of blogs and blogging opportunities		X	X			X	(X)	X
Preferred search engines used								
CREATION								
Access to (media) libraries			(X)		X		X	(X)
Access to other digital resources	X			X		X	X	
Provision of key tools (e.g. word processors)	X		X	X	X	X	(X)	X
Provision of team spaces		X			X	X	X	
Waiting period for content production	(X)		(X)			X		(X)
Automated metadata and linkages		X	X				(X)	X
VALIDATION								
Professional validation mechanism of content	X			X	(X)		X	
Provision of peer rating tools	X	X	X				(X)	X
Provision of peer rating procedure	X		X				(X)	X
Feedback from validation to creation	(X)			X	X	X		
Testing of content	(X)			X	X			
EDITING								
Provision of tools for shared editing			X		X	X	X	X
Various functionalities of editing			X	X		X		X
Free access to editing to all peers		X	X			X	(X)	X
Waiting period for content editing			(X)			X		(X)
Provision of editing tools (dictionaries etc.)			X				X	X

	Eureka	IAVANTE	PflegeW	KONE	Tax Ac	ANITEL	Sourcef	Wiki
ENRICHING								
Potential to create freely links and linkages			X		X	X		X
Provision of own wikis	(X)		X		(X)	X		X
Commenting of enriched content	X	X	(X)			X	(X)	(X)
Rating of enriched content	X	X				X		
UPDATING								
Linkages to blogs and other tools		X				X	X	
Provision of alarms					X			
Provision of routing tools	X		X					X
Provision of links to updated content	(X)	X				X	X	
ENABLING POLICIES								
Promotion of peer production in organization	X	X		(X)	X			
Awarding participation in peer production	(X)	X		X	X			
Provision of management support	X	X			X	X		
Provision of pedagogical support				X	X	X		
Provision of technical support	X	X	X		X	X	X	X
Provision of various digital resources			X	X	X	X	X	X
ENABLING PROCEDURES								
Given division-of-labour		X		X	X			
Organizational support for peer production	X				X	X	X	
Provision of house-style guides etc.				X	X	X	X	
Provision of IPR-cleared digital components					X	X		
ENABLING PROCESSES								
Provision of day-to-day support for peer production			X		X	X	X	X
Agreed processes in peer production			X	X	X	X	(X)	X
Agreed workflows in peer production	X	X	X	X	X	X	X	X
ENABLING TOOLS								
Provision of standard word processing tools	X		(X)	X	X		X	(X)
Provision of other standard digital tools		X		X	X	X	X	