

ORGANIZING QUALITY ASSURANCE: HOW TO INTEGRATE PROCESSES OF QUALITY MANAGEMENT IN AN E-LEARNING PORTAL

Stefan Iske, Norbert Meder

Universität Duisburg-Essen, Fachbereich Bildungswissenschaften
Germany
stefan.iske@uni-due.de
norbert.meder@uni-due.de

Abstract

This article describes and reflects quality management in the field of e-learning, especially the assurance of the quality of provided on-line courses of an e-learning portal. A work flow of specific processes of quality management is presented, which consist of (1) general support of authors creating on-line courses, (2) evaluation of created on-line courses, (3) feedback of learners (course users) to the author, (4) learner feedback to the quality assurance team (5) author feedback to the quality assurance team and (6) the evaluation of learner and expert-feedback. This work flow was empirically tested and implemented in the European e-learning marketplace "Columbus-Portal" which was developed in the project "Electronic Learning and Assistance Network" (ELAN) funded by the European Commission (eTen-programme).

Keywords - Quality Management, evaluation, e-learning, work flow, on-line course

1 INTRODUCTION

This article describes and reflects the general question of how to assure the quality of on-line courses and thereby contributes to the more general question of quality management in e-learning portals. In order to answer this question, a *relational approach to quality assurance* of on-line courses will be presented, which was developed within the EU-funded project "Electronic Learning and Assistance Network" (ELAN) by the consortial partner University of Duisburg-Essen (UDE).

Following a rigorous *learner-oriented approach*, quality is considered as an attribute of the *relation* between course *and* learner and not as an substantial attribute of a course: So, the learner and his characteristics plays a decisive role in establishing quality and for this reason the learner is often qualified as a *co-producer* of quality (Fig. 1) [2, 3, 6].

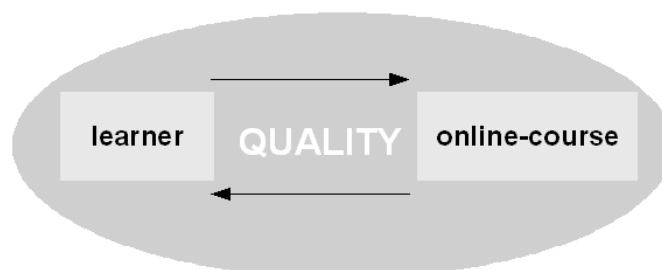


Figure 1: Relational approach to Quality Assurance

In this regard, the evaluation of on-line courses in the sense of „product quality” – e.g. based on technical check-lists referring to substantial attributes of the course – ignores the prospective learner,

is insufficient and misses a crucial point [4]: It has to be supplemented by the evaluation of *usage* and the overall evaluation of the *appropriateness* of the on-line course in relation to the learner's demands and requirements. From a quality management perspective, an on-line course is *appropriate* if it meets the individual interests, needs and preconditions of the learner and therefore promotes learning. For this reason quality is determined by the characteristics of the on-line course *in relation to* the characteristics of the learner. This fundamental characteristic of quality has to be taken into account in Quality Assurance on on-line courses.

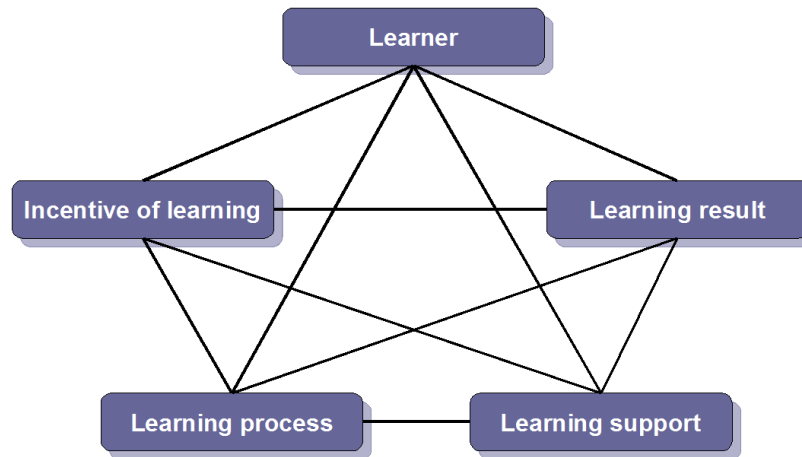


Figure 2 Dimensions of learning

Therefore, an on-line course is analysed as a specific environment which targets on promoting and facilitating learning [1, 5]. In a more general perspective this environment is a *space of learning possibilities*. This *space of possibilities* is developed as a space of four learning dimensions, which are interrelated:

1. *Incentives of learning*: Does the on-line course support an appropriate incentive for starting and continuing learning (for example: scenario, stimulation)?
2. *Learning process*: Does the on-line course support an appropriate process of learning (for example: learning activities or sequence of content)?
3. *Learning support*: Does the on-line course support appropriate help in case the learner is not able to master a learning-related problem or difficulty (for example: FAQ, Email).
4. *Feedback on learning results*: Does the on-line course support appropriate feedback to the learner about his learning outcome (for example: quiz, test, certificate)?

The specific parameter value within these four dimensions are analysed based on a *Relational Quality Criteria Catalogue (RQCC)*, see Meder / Iske in this volume). The ELAN approach can be characterised as an *relational* approach to Quality Assurance: Quality has to be related to the evaluation of *usage* („learning dimensions“) and the evaluation of the *appropriateness* of the on-line course with respect to the learner's requirements (Fig. 2).

As the term „appropriateness“ indicates, there are no universal characteristics which can be applied to every course to make it fit to every prospective learner, i.e. to make it fit to a *universal target group* [3]. Instead in any case a course refers to a *specific* target group for example with regard to learning target, required previous knowledge and skills, age, learning time and level of difficulty [7]. These aspects define the typical group of people *the course is primarily made for*, i.e. the course author *had in mind* while creating his course. This defined target group of the specific on-line course is the initial point of quality assurance.

2 WORK FLOW QUALITY MANAGEMENT

Integrating processes of quality management in an e-learning portal is a complex and challenging task [2, 3, 4, 9]. In the following the ELAN approach to Quality Assurance is described in more detail from a *process-related* perspective as a work flow (Fig. 3).

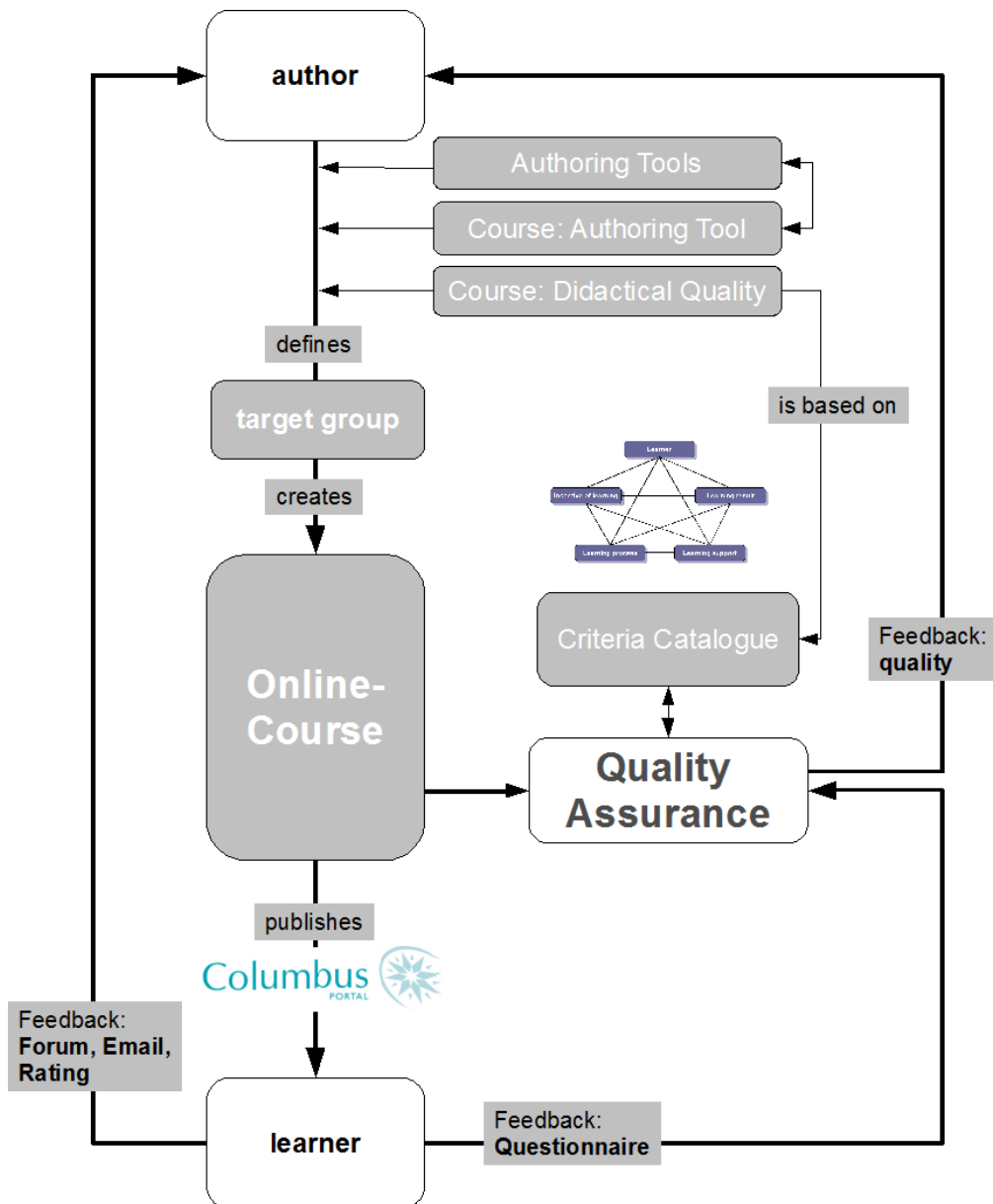


Figure 3: Work flow of Quality Assurance

In general the process of quality management is structured as follows: each *user* (learner) of the Columbus-Portal has the chance to participate and contribute to the portal as an *author*. As an author he can create on-line courses: he first *defines* the *target group* and then *creates* his course. This process is supported by a *pre-selection* of authoring tools, an course on how to use these pre-selected *authoring tools* and a *course on Didactical Quality* (CQ).¹

1 In this article, the term “didactic” / “didactical” is used in a wide definition in reference to the work of Richard Hönigswald [8]. Hönigswald defines “didactics” in a systematical-philosophical perspective as the transformation of *meaning* into *time*: meaning is always regarded in a (multi-)relational, non-linear way and therefore possesses no specific temporal structure in itself. For the purpose of transgenerational transmission, meaning is in need to be transformed into a temporal structure, in

The created on-line course is *evaluated* by a *quality assurance team* against the *Relational Quality Criteria Catalogue* (RQCC). This RQCC also provides the basis for a *Course on Didactical Quality* (CQ). The created course is *published* on the Columbus-Portal in case it is evaluated as *appropriate*, otherwise a detailed *feedback* on how to improve the quality of the course is sent to the author.

Finally the *published course* is evaluated by its users (learners). First, every learner can give direct feedback to the author based on email or postings in a forum. For a general feedback, he can use a rating-system ("stars"). On the other hand, each learner is kindly asked to provide a detailed and standardised feedback to the quality assurance team based on an on-line questionnaire. These feedbacks are aggregated, analysed and sent to the author. Furthermore the quality assurance team *compares* the feedback of the learners with the result of the application of the *Relational Quality Criteria Catalogue* in order to improve the whole quality management process and to guarantee a high quality of the provided courses.

Based on this brief overview in the following sections the concept of quality assurance of on-line courses is described in more detail as a combination of different complementary processes: (2.1) general support of authors creating on-line courses, (2.2) evaluation of created on-line courses, (2.3) feedback of learners (course users) to the author, (2.4) learner feedback to the quality assurance team (2.5) author feedback to the quality assurance team and (2.6) the evaluation of learner and expert-feedback.

2.1 General support of authors

First of all every user, who decides to create and to publish a course can become an author of the on-line portal. The previous knowledge of these users / authors is very diverse: experienced authors will not need any support in creating courses while inexperienced authors will need basal support concerning the *choice* and the usage of an authoring-tool as well as *didactical dimensions* of courses (Fig. 1): how to implement incentives of learning, how to implement learning activities, how to implement a sequence of content, how to implement learning support and how to feedback on learning results).

Therefore every author who creates an on-line course is supported in three perspectives:

1. Every author is supported by a collection of authoring tools (for beginners, intermediates and experts) depending on the authors previous knowledge, experience and skills (besides, the author can use any other authoring-tool he/she prefers, as long as the created course is SCORM-compliant [12]).
2. The author is supported by a course on how to use the specific authoring tools, which are supported in the *Columbus-Portal*. This perspective aims at software-technical support creating on-line courses.
3. The author can revert to an on-line *Course on didactical Quality* (CQ) in order to get to know the quality criteria of the Portal, to get to know general possibilities for creating on-line courses ("space of possibilities"). Based on this knowledge he can improve the quality of his on-line course. This *Course on didactical Quality* was developed within the ELAN project and is based on the *Relational Quality Criteria Catalogue* (RQCC).

The support of authors aims at technical as well as didactical support creating on-line courses and at the same time allows transparency of the applied quality criteria within the e-learning portal.

2.2 Course evaluation

The created on-line course (as the result of the authoring process, see. 2.1) is evaluated against the *Relational Quality Criteria Catalogue* (RQCC) by a team of experts as regards *didactical quality*.

1. The first step of applying the RQCC is the identification of the *typical target group* of the on-line course as defined by the author. The subsequent steps judge the appropriateness along the items of the four dimensions in relation to this target group (Fig. 2).
2. If the course is *evaluated as appropriate* in relation to its target-group, it is published on the Columbus-Portal.

the case of on-line courses: meaning is in need to be transformed into the structure of an on-line course [9, 10, 11].

3. If the course is *evaluated as inappropriate*, a detailed feedback is sent to the author containing suggestions on how to increase the quality of the course. In order to avoid intransparency of quality judgements, the author can fall back on the *Course on didactical Quality (CQ)*, which explains the applied quality criteria. On the other hand, to get acquainted with the quality standards of the portal, the author can pass the *Course on didactical Quality (CQ)* before creating his course.

Additionally the created on-line course is evaluated by a team of experts in a global way as regards content. A general prerequisite of this process of quality management is a overall *technical operability* and *executability* of the specific on-line course. The technical operability will be checked in reference to the standardised course description as created by the author („Technical Specification: Do your course require any specific technology or software (e.g. plug-ins), which is not an integral part of current browsers? Please note this specific technology here.“). The challenge of technical operability of on-line courses is especially taken into account by applying the SCORM standard as a basis for on-line courses (“Shareable Content Object Reference Model”, [12]).

2.3 Learner feedback to author

In the e-learning portal, every published course is provided with different possibilities of detailed feedback, first of all forum and email (if supported by the author). Especially the forum is a general possibility of detailed feedback like questions, suggestions, critique etc. Referring to the learner's feedback, the author can improve the quality of his course: for example he can change the content / structure of the course or clarify the course description, e.g. the definition of the target group (see 2.1). Furthermore based on the questions of learners, for example *frequently asked questions (FAQ)* can be documented in order to generate a course related and learner centred knowledge pool.

In general, these different possibilities of learner feedback aim at a learner – author dialogue as well as a learner – learner dialogue and therefore provides a basis for learner oriented processes of quality management. In the long run this approach provides a basis for the development of an e-learning community. This detailed feedback system and is an outstanding feature of the Columbus-Portal, which is attractive especially for non-professional authors as they will get feedback on their courses from experts as well as learners. Overall the *business model* of the e-learning portal provides selling of courses (implemented shop-system) as well as open access (open learning community).

2.4 Learner feedback to quality assurance team

After completing an on-line course, the learner is kindly requested to fill-in a standardised on-line questionnaire in order to feedback his detailed personal evaluation of the course. In general, this questionnaire aims at the systematic evaluation of *learner satisfaction* and refers to the evaluation of

- the Columbus portal in general (e.g. usability, layout, overall appearance),
- the course offer of the Columbus-Portal,
- the specific passed on-line course (e.g. incentive of learning, implemented learning process of course, evaluation of learning outcome, appropriateness of course description, booking process, technical execution of the specific course)
- and socio demographic data.

In addition the learner can use a feedback system of stars to rate the course in a general way.

2.5 Author feedback to quality assurance team

After creating an on-line course using a provided authoring-tool on the e-learning portal, the author is kindly requested to fill-in a questionnaire in order to feedback his detailed personal evaluation of the authoring-tool as well as the *authoring process*. Correspondingly to the learner feedback an on-line questionnaire is used, which aims at the evaluation of *author satisfaction*. It refers to the evaluation of

- the Columbus portal in general (e.g. usability, layout, overall appearance),
- the collection of provided authoring tools,
- the technical execution of the authoring-tool,

- the provided course „Authoring-Tool“,
- and the provided “Course on Didactical Quality“ (CQ),
- the process of quality management
- and socio demographic data.

This detailed author feedback provides the basis for specific improvements, concerning the *Relational Quality Criteria Catalogue* (RQCC, especially the level of *indicators*), the specific collection of provided authoring-tools, the content / structure of the course „Authoring-Tool“, the content / structure of the course „Didactical Quality“ (CQ) and the whole quality management process.

2.6 Comparing learner and expert evaluation

The aggregated data on course evaluation provided by the learner is compared to the evaluation of the expert group. By this, the *potential* appropriateness of an specific on-line course (based on the RQCC) is confronted with its *factual* appropriateness (based on aggregated learner feedback).

The result of this comparison is sent as a feedback to the author to provide recommendations of course improvements from an *empirical* as well as a *theoretical* perspective. Furthermore the results are used for validating and refining the RQCC in a process of *self-evaluation*. This process of self-evaluation leads to a *constant* and *dynamic* improvement of quality management.

The results of learner feedback and rating (i.e. based on the learner questionnaire) are reported (anonymously) to the course author to provide an insight into the *factual usage* of the course. These results may be a reason to improve the course by the author. Comments and questions of the learner will be reported to the author. Therefore, author and learner can get into contact, for example the author can support the learner coping with learning difficulties or recommending specific learning processes or providing supplementary information.

3 METHODS

The described complementary processes of quality management are based on complementary methods of data collection and analysis (Fig. 4). In the Columbus-Portal different methods are employed to assure the quality of on-line courses: On-line questionnaires, postings in forums, email and log file data.

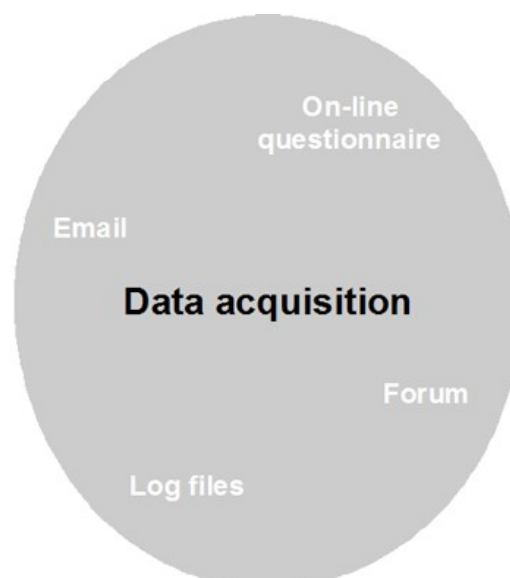


Figure 4: Methods of data acquisition

Data based on these complementary methods is used in several ways as a basis for quality management: a continuous control system is established notifying the quality assurance team in time when e.g. a threshold of negative ratings of courses is exceeded or a specific course is not appropriate to the described target group. Moreover based on the feedback of learners a democratic

user is implemented which becomes part of the general description of on-line courses (meta data) so that prospective learners can derive advantage from this feedback.

3.1 On-line questionnaire

In order to get systematic and standardised feedback from learners and authors, on-line questionnaires are implemented. Learners are kindly requested to fill-in a questionnaire after they have completed a course; authors are requested to fill-in a questionnaire after they have created their course.

- The *learner questionnaire* is introduced as follows: “You have booked an on-line course on the European Portal *Columbus*. In order to improve our offering, please fill in the following questionnaire. It will take about 5 minutes. All the *data* we collect is *anonymous* and contains no personally-identifiable information”. For example, specific items refer to the evaluation of the portal (general usability, layout, overall appearance, suggestions for improvement of usability), evaluation of the course offer, evaluation of the booked on-line course (general evaluation of course, evaluation of learning process, evaluation of incentives of learning, evaluation of learning support, evaluation on feedback on learning result).
- The *author questionnaire* is introduced as follows: “You have created and published an on-line course on the European Portal *Columbus*. In order to improve our offering, please fill in the following questionnaire. It will take about 5 minutes. All the *data* we collect is *anonymous* and contains no personally-identifiable information.” For example, specific items refer to the evaluation of the portal (general usability, layout, overall appearance, suggestions for improvement of usability), launching the authoring tool (operability of authoring tool, evaluation of course on authoring tool), process of course creation (functionality of authoring tool, strengths and weaknesses), concluding evaluation of the authoring process.

3.2 Forum

Additionally to the feedback based on questionnaires, a forum is added to each course as an opportunity for learners to post comments, remarks, questions or hints, for example in case of learning barriers. The author of the course will be notified of these posting. In general, for learner feedback to the author the use of a specific course related forum is recommended to make the feedback traceable to other learners and co-learners: Personal feedback can be discussed in the group of co-learners as well as general feedback. In these forums, authors, learners and the quality assurance team can get in contact. The overall topic of learning, authoring and quality of on-line courses can be discussed from different perspectives.

3.3 Email

While passing an on-line course and after finishing a course, the learner can sent email to the quality assurance team or to the author of the specific course. These emails will be answered by the quality assurance team as far as questions of quality management or general questions concerning the Portal are concerned. Otherwise they will be passed to the author. Moreover the author can contact the author via email, but in this case the quality assurance team will not get notice, as long as *carbon copy* (CC) is not used.

3.4 Log files

Based on server sided log files, the general usage of the portal and the specific usage of on-line courses are analysed.

First log file data reflects the usage of the e-learning portal in general. The main objective of the log data analysis is to get information about the number of visitors of the portal as well as information about visited pages (*hits*, *page views*, *sessions*). For example, results of this analysis are used to improve the usability of the Portal as well as aspects of content (course offer).

Second, log file data is analysed in order to provide statistical information for the authors about their courses: number of views of course description, number of bookings, number of completed courses, number of courses in progress, number of posted comments, etc.

4 CONCLUSION AND OUTLOOK

In this article, the ELAN approach to Quality Assurance is described in a process-oriented perspective as a work flow. The ELAN approach to Quality Assurance aims at establishing fundamental categories for both the objective and the subjective evaluation of e-learning quality and presents an innovative and so far neglected approach in the field of e-learning. The presented approach to quality assurance was empirically evaluated and implemented in the European e-learning marketplace "Columbus-Portal" which was developed in the project "Electronic Learning and Assistance Network" (ELAN) funded by the European Commission (eTen-programme).

The main advantage and outstanding characteristic of the described approach is its *relational, dynamic* and *process-oriented* character which takes into account expert as well as learner evaluation of on-line courses and therefore combines theory-driven (objective) and empirical (subjective) perspectives on Quality Assurance. The applied criteria for Quality Assurance for expert review are transparent to the learner / author as they are documented in the *Relational Quality Criteria Catalogue* (RQCC) and the *Course on didactical Quality* (CQ).

Especially the comparison of the learners and experts perspectives on quality of on-line courses provides a basis for validating and refining the *Relational Quality Criteria Catalogue* (RQCC) and the whole Quality Management in a *process of self-evaluation*, which leads to a constant improvement of Quality Assurance (see 2.6).

Based on different implemented forms of feedback and the transparency of applied criteria, authors, learners and the quality assurance team can get in contact and an open discussion about the relation of learning, authoring and quality of on-line courses is supported. In the mid and long run, this open discussion provides a basis for the development of an Open *E-Learning Community*.

The described *relational approach to Quality Assurance*, the dynamic and user-centred process of feedback and the possible development of an e-learning community are outstanding features of the overall ELAN quality management process.

References

- [1] Bönsch, M. (2000). Variable Lernwege: ein Lehrbuch der Unterrichtsmethoden. Zürich: Schöningh.
- [2] Ehlers, U. (2004). E-Learning services in the crossfire: pedagogy, economy and technology. Bielefeld: Bertelsmann.
- [3] Ehlers, U.; Pawlowski, J. (2006). Handbook on quality and standardisation in e-learning. Berlin: Springer.
- [4] European Quality Observatory, <<http://www.eqo.info/>>, (20.05.2009).
- [5] Flechsig, K.-H. (1996). Kleines Handbuch didaktischer Modelle. Eichenzell: Neuland.
- [6] Harvey, L.; Green, D. (2000). Qualität definieren. Fünf unterschiedliche Ansätze. In A. Helmke, W. Hornstein & E. Terhard (Ed.), Qualität und Qualitätssicherung im Bildungsbereich: Schule, Sozialpädagogik, Hochschule (pp. 17-39). Weinheim: Juventa.
- [7] Helmke, A. (2009). Unterrichtsqualität und Lehrerprofessionalität, Kallmeyer: Seelze.
- [8] Hönigswald, R. (1927). Über die Grundlagen der Pädagogik: ein Beitrag zur Frage des pädagogischen Universitäts-Unterrichts. München: Reinhardt.
- [9] Iske, S. (2008). Hypertext, E-Learning und Web-Didaktik. In H. Macha, M. Witzke, N. Meder, C. Allemann-Ghionda, U. Uhlendorff & G. Mertens (Ed.), Handbuch der Erziehungswissenschaft (Band 3) Paderborn:Schöningh (in print).
- [10] Meder, N. (1997). Die Abbildung von Sachverhalten in die Zeit. In: Schmied-Kowarzik, W. (Ed.): Erkennen - Monas -Sprache (pp. 277-289). Würzburg: Königshausen-Neumann.

[11] Meder, N. 2006, Web-Didaktik: eine neue Didaktik webbasierten vernetzten Lernens. Bielefeld: Bertelsmann.

[12] Shareable Content Object Reference Model (SCORM), <<http://www.adlnet.gov/>>, (20.05.2009)