

Evaluation as Impetus for Innovations in E-learning – Applying Personas to the Design of Community Functions

Stefanie Panke

Knowledge Media Research Center
Germany-72072 Tuebingen
s.panke@iwm-kmrc.de

Birgit Gaiser

Knowledge Media Research Center
Germany-72072 Tuebingen
b.gaiser@iwm-kmrc.de

Benita Werner

Knowledge Media Research Center
Germany-72072 Tuebingen
b.werner@iwm-kmrc.de

Abstract

The necessary intertwining between the evaluation on the one hand and the implementation of e-learning environments on the other hand is often hampered by organizational settings and political conditions. A possible solution for bridging the gap between evaluative processes of quality assurance and the creative activity of design is the Personas approach. These fictional, but data-based user archetypes serve as a foil to embed the needs of different user groups in the design process. Based on findings from evaluation research and experiences gained through a case study, the article incorporates the Personas method into an overall model of quality assurance for the design of educational web-portals. The transferability of the personas approach into other e-learning related settings is critically discussed.

Keywords: Personas, Portal Engineering, Quality Assurance, Educational Portal, User Centered Design, Evaluation, Community

Introduction

Formative evaluation methods for the purpose of ongoing quality assurance are not accorded the level of importance that they deserve in e-learning projects. Often, (advantageous) evaluation data, such as prestigious access rates, are used exclusively for external representation, or for justification or marketing purposes. In these instances, the quality assurance apparatus is not meaningfully implemented; instead, it is used to merely fulfill externally set norms. In addition, in state-funded projects, evaluation is often politically “decreed”. Being a requirement for the funding, the evaluation is financed into the projects through personnel positions. This frequently results in a work- and personnel-based separation of the project work areas design and evaluation. The consequence of the respective organizational structures is an insufficient coordination of the two areas. Hence, the results that are garnered from evaluation studies often arrive too late or are foredoomed to insignificance due to insufficient acceptance by the project participants.

Evaluation is too often apart from and not a part of the actual implementation of e-learning. In other

words: design and evaluation detach themselves from one another – but how can they find their way back together again? Methods are required that can produce a scientifically sound and practically applicable interlocking of the two.

Feeding back the results in the development process is the primacy of formative evaluation, but the data often provides no consistent, clear-cut picture. Interpretation of evaluation results is a creative and inventive act that should be implemented as an equitable dialog between the stakeholders involved in the project.

In this contribution, the personas approach is described as an example of a creative evaluation method. Personas as fictional user biographies offer a comprehensive context for design decisions. The personas approach is embedded in a generic model for portal development. As regards methodology, action research principles frame our work: Addressing issues which persist in our own practice allows us to bridge the gap between research and practice (Somekh, 1995).

Literature Survey

As a theoretical framework, findings from evaluation research in general, and those from works related to the evaluation of e-learning products and services in particular, are of interest. Relevant results of a literature survey are represented in the following sections.

Evaluation Research

Apart from a few precursors in the 1930s and 1940s, evaluation research developed as a direction of empirical social research in its methodological formulation in the early to mid-60s in the USA in connection with the reform programs (reform movement) under President Johnson (“Campaign Against Poverty”, see Wottawa and Thierau, 1998).

Along with these measures came the task of scientifically determining the effects of the reforms, in other words, of conducting a program evaluation. Since then, evaluation research has become a permanent fixture - or even ritual (see Schwarz, 2006) - in the implementation of innovative political measures and in the review of running programs.

“The enterprise of evaluation is a perfect example of what Kaplan (1964) once called the 'law of the hammer'. Its premise is that if you give a child a hammer then he or she will soon discover the universal truth that everything needs pounding. In a similar manner, it has become axiomatic as we move towards the millennium that everything, but everything, needs evaluating.” (Pawson & Tilley, 1997, p. 1)

Historically, Germany, Sweden, and the United Kingdom are considered first and second wave evaluation countries where evaluation developed in the 70s and 80s (see Schröter, 2004; Luukkonen, 2002). In German educational studies (pedagogics), the concept of evaluation first met with disciplinary obstacles. An empirical orientation went against the grain of the arts and humanities grounded German pedagogics, true to the motto „weighing alone doesn't make the pig fat“. In other words, educational system assessments do not equate to improved or successful system operation. In the meantime, however, evaluation is carried out as a matter of course in various domains and the shock produced by the PISA results in the German educational system has set the seal on the empirical foundation of German pedagogics.

What are the implicit and explicit goals of evaluation? Different authors set different courses. According to Wottawa and Thierau (1998), there is a clear pragmatic orientation; evaluation has the primary goal of improving upon practical measures, or making decisions concerning them. Kromrey (1995) defines the term evaluation as the analysis of programs, methods, projects or organizations by specialists or experts, who are entrusted with the role of evaluator and highlights thereby the personnel-based separation of practitioners and evaluators. Beywl (1991) gives a definition which emphasizes the scientific claims and the reproducibility of the evaluation results.

Pawson and Tilley (1997, pp. 4ff.) draw a history of evaluation research from the point of view of

methodological change. They identify four main perspectives on evaluation, namely the experimental, the pragmatic, the constructivist and the pluralist:

The underlining logic of the experimental paradigm is to achieve sufficient control to make the basic causal inference between certain variables secure (an example of the application of the experimental paradigm in e-learning research is e.g. Grubišić, Stankov & Žitko, 2005).

Pragmatic evaluation (also “utilization-focused evaluation”, see Quinn-Patton, 1997) follows the idea that research ought to be constructed so that it is better able to be used in the actual processes of policy making.

The constructivist approach (“fourth generation evaluation”, comp. Lincoln & Guba, 1989) sees all beliefs as “constructions” and therefore, researchers cannot get beyond constructions. Hence, the role of evaluation is to implement a democratic negotiation process among the stakeholders of a project.

Pluralist evaluation (also “multifaceted approach” or “mixed methods”, see e.g. a special issue edited by Johnson, 2006) tries to combine the rigour of experimentation with the practical orientation of the pragmatists, and with the stakeholder-focus of the constructivists.

Pawson and Tilley (1997) point out that each of these approaches has specific shortcomings, e.g. deficits of transferability or generalizability. Their historical overview of evaluation research as well as the selected examples cited above reveal the breadth of the evaluation terminology. There is no “recipe” to follow for implementing a project or program evaluation. An appropriate design is to be “custom tailored” in accordance with the tasks and objectives of the specific project.

Evaluation of E-learning

Given the diversity of evaluation research as a whole, what is the “state of the art” of approaches methods, and instruments when it comes to the evaluation of e-learning products and services? Which concrete objectives are pursued by quality development measures? Answers to these questions can best be found within the e-learning community itself. Therefore the authors reviewed conference proceedings of both national and international conventions of e-learning practitioners, researchers and scientists.

The annual “[Tagung der Gesellschaft fuer Medien in der Wissenschaft \(GMW\)](#)” is a focal point of scientific discussion in the German-speaking e-learning context. In a document analysis of GMW Conference volumes from the year 2000 to 2006, 50 contributions could be identified as having taken up the topic in varying forms. The topic “evaluation” was explicitly named in three Call for Papers (2000: “Quality Assurance and Evaluation Methods”, 2004: “Researched Learning”, 2006: “Quality Aspects”). The bulk of the contributions deals with the evaluation of a project and reflects the garnered experiences concerning the usage of digital media in the respective setting.

What picture does this review draw of the role of evaluation in e-learning? Even with formative project evaluations, the subsequent, retrospective nature still comes conspicuously to the fore. The role of evaluation in the conceptual phase of an e-learning design remains “uncharted territory”– in terms of scientific analysis and practical applicability. At best, surveys and interviews on the general acceptance of telemedia-based instruction are depicted sporadically. Little attention is paid to ethnographic methods of usability engineering that explore the information habits and personal goals of users independent from a concrete e-learning environment. Thus, the evaluation often presents a distorted image: Learners only exist as “users”, whose behavior can be (re)constructed through, for instance, interviews, surveys and Logfile analyses, without taking into account their expanded context beyond the respective software interface.

Do these findings reflect a “German Sonderweg”? To take a closer look at the state of the art in e-learning on an international level, the proceedings of the conferences E-Learn and ED-Media were analyzed. Both conferences attract an international audience and continuously name the topic within the call for papers. A search query in the “[Education and Information Technology Library](#)” for the keyword “evaluation” produced 96 results for the E-Learn conference (2002-2006) and 165 results for

the ED-Media conference (1998-2006). The role of evaluation in the total publications indicates the ongoing relevance of the topic. To capture the current practices in e-learning projects, a closer analysis was undertaken for the most recent proceedings of the year 2006 (Reeves, T. & Yamashita, 2006; Kommers, & Richards, 2006).

As expected, the publications cover a wide range of methods and pursue different goals, reaching from basic research concerned with (quasi-)experimental testing of hypotheses (comp. e.g. Kiili & Lainema, 2006) to field-oriented content analysis, looking for patterns in e-learning courses (Khan & Granato, 2006) or systematizing the review criteria in educational resource distribution websites (Kamei, Inagaki & Inoue, 2006). Several papers deal with usability issues – e.g. of children's websites (Bakar & Cagiltay, 2006), Open Source Learning Management Systems (Sanchez & Elías, 2006) or authoring tools (Gupta, Seals & Wilson, 2006). A conceptual model for the evaluation of e-learning is proposed by Lam & McNaught (2006). Their focus lies upon the support of teachers for the institution-wide implementation of e-learning. Whilst the paper focuses on the summative revision of activities, the authors in principle stress the cyclic character of evaluation.

The broad majority of publications describe case studies on a specific e-learning design or intervention. These articles chiefly explain which technology was used (tablet PCs, 3D-environments, portfolios, videoconferencing, etc.) in what setting (e.g. single seminar, course of study, university-wide, inter-institutional cooperation) to what end (first results of evaluation).

Although evaluation of e-learning products and services is first and foremost directed towards the goal of improvement, a crucial part of the story is seldom told: How do findings cross the bridge between evaluation and design? It appears that evaluation results are somewhat transmogrified into design improvements. However, practical experience shows that one has to pick and chose or at least prioritize from a variety of results. The next section tries to systematize the role of evaluation in the design process by exploring the breadth and depths of a concrete project, summarizing the overall flow of events and presenting a specific method for transforming data into design decisions.

Case Study

The implementation of e-learning projects in conjunction with methods of evaluation is analyzed through a case study on portal development. The experiences garnered during the implementation of educational portal e-teaching.org are transferred into a generic phase model. The emphasis of the case study lies in the description of a creative method of quality assurance, the so-called „personas approach“.

The Educational Portal e-teaching.org

The portal e-teaching.org offers comprehensive information on didactical, technological, and organizational aspects of e-learning at universities and specifically targets university lecturers in German speaking areas who want to integrate digital media into their teaching. The content is structured along the access sections shown in Table 1.

Through these access sections the user is able to find an individual way to the content based on specific interests, motivations, and different levels of knowledge (also see [English demo version](#)).

Since its launch in 2003, the portal e-teaching.org has become a well-established information resource comprising approximately 1,000 Web pages, an extensive glossary, and diverse multimedia supplements. It attracts approximately 3000 visitors per day. For a detailed description of the initial concept and structure of the portal, see Panke et al. (2004).

The construction of the portal has unfolded in roughly two phases: a pilot phase (2003-04) and a consolidation phase (2005-06).

Table 1: Access sections and learning goals of the portal e-teaching.org

<i>Access Section</i>	<i>Learning Goal</i>
<i>Teaching Scenarios</i>	Provides information on how to embed technologies as educational tools in typical higher-education teaching situations as e.g. lectures or tutorials.
<i>Media Technology</i>	Presents products suitable for implementing e-learning and describes technologies to compile and distribute digital learning material.
<i>Didactic Design</i>	Covers the design of digital media for educational purposes and describes pedagogical scenarios for specific tools, e.g. wikis.
<i>Project Management</i>	Describes how to organize the development and implementation of e-teaching projects, e.g. planning tools, curriculum development etc.
<i>Best Practice</i>	Introduces specific university projects and covers a range from high-end examples to excellent pragmatic solutions.
<i>Material</i>	Offers selected collections of literature, projects, e-journals and other web-based resources.
<i>News & Trends</i>	Includes a weblog, which informs about new content in the portal, as well as current announcements for e.g. conferences.
<i>My e-teaching</i>	Gives access to the community and includes specific local information edited by associated universities.

First, during a two-year pilot phase (2003–04) supported by the Bertelsmann and Nixdorf Foundation, a prototype of the portal was developed and tested at two universities. A major accomplishment during this time was the implementation of specific functions that allow cooperating universities to generate a localized version of the portal. Advisory service teams are able to include location-specific material to the portal via the university editor, a key function of the [Plone CMS](#). Users of the portal can view content provided by their individual institution by assigning themselves to a specific university.

Accordingly, the main emphasis in the consolidation phase (2005-06) funded by the German Federal Ministry for Education and Research, was the distribution of the portal to other universities. Currently more than 40 universities are cooperating with e-teaching.org to make the portal a vital part of their e-learning strategy. An additional aim in this phase was to motivate users to visit the portal regularly by providing communication tools to foster professional collaboration.

Evaluation of the Portal e-teaching.org

During the construction of the portal e-teaching.org, specific evaluation measures found an application in conjunction with content-related, technical and design-oriented decisions in various project phases: in the first draft, for instance, the results of comparison research on portals with a similar thematic spectrum flowed in. The portal prototype underwent an expert review. Further revisions resulted from interviews and surveys (see Reinhard & Friedrich, 2005). The usability of a previous portal version was assessed through Eye Tracking in combination with Thinking Aloud. These experimental results were completed with Logfile data, revealing the day-to-day use of the portal (see Panke, Studer & Kohls, 2006).

In retrospect, the development of the portal e-teaching.org can be characterized as a multi-level process, which is marked by iterations, as well as a cyclical operation in relation to the triad of (1) development of a concept, (2) implementation of a prototype, and (3) use of a portal version. Quality

assurance is viewed as an ongoing process running parallel to the phases described above, providing appropriate measures for the various prerequisites and objectives in the sense of a toolbox (see Fig. 1).

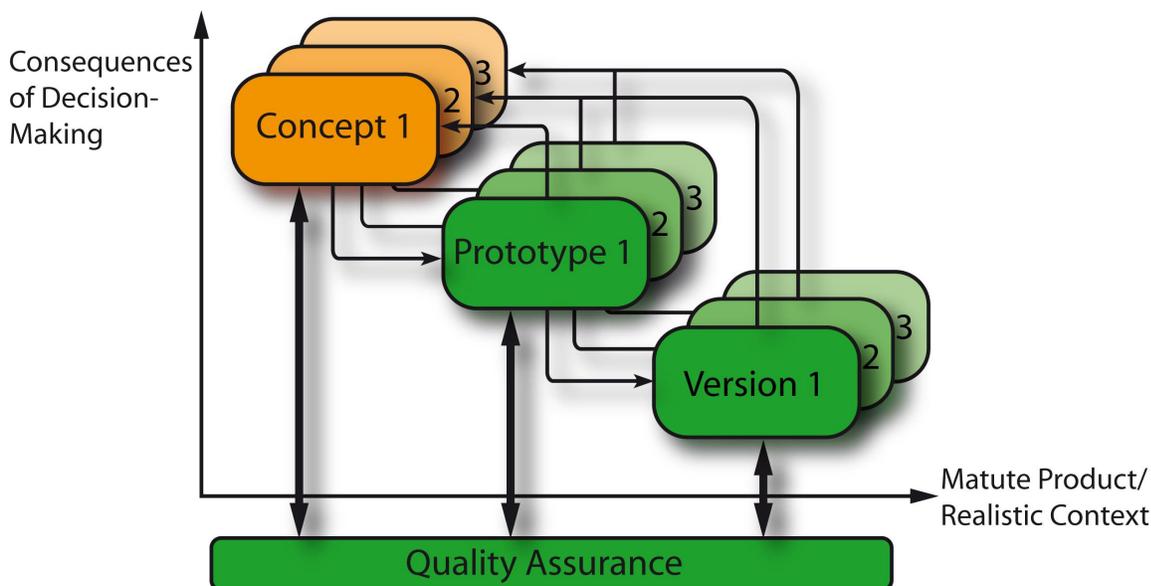


Figure 1: Iterative model of quality assurance in the construction of portals (Gaiser & Werner, in press)

The flow of evaluation and implementation pictured in figure 1 reflects *specifically* the development of educational portals. Nevertheless, it corresponds to the prevalent form of product development in the e-learning sector *in general*. Since the 1980s, results of formative evaluation and various forms of user testing are accepted as important inputs to e-learning development, and the iterative design cycle is an established *modus operandi*.

A central aspect of this model is the chronological dimension: The decisions that are made at an early stage in the development cycle have far-reaching consequences, as they substantially contribute to determining the course of the future project. The further along a project is, meaning the more conceptual, technical design or content-related decisions that have been made, the more negligible the effects of any new decisions (see also Panke, Kohls & Gaiser, 2006).

Hence, the role of evaluation in the conceptual phase of e-learning designs is of utmost importance due to the wide-reaching influence of decisions rendered. Unfortunately, as the literature review presented in [section one](#) reveals, the current practice of evaluation is not focused upon the beginning of a project. Evaluation seldom enters the stage, *before* a first prototype is developed. In the case study, the authors aim to show how creative methods of data aggregation can be used to inform specifically the *conceptual development* – the initial design of product features.

As a further functionality of e-teaching.org – forming a further cycle in the portal development process – the implementation of a domain-specific online community was undertaken in the years 2005 and 2006. The application of the personas approach, which will be described in further detail in the next section, played an important role in aggregating evaluation data for the conceptual planning of these new features.

Personas

The use of personas – fictional persons – to represent an abstract consumer originally derived from the field of marketing and, since the late 1990s – inspired by a publication by Cooper (1999) - has also been applied within the framework of software engineering to expand other usability methods (Pruitt & Grudin, 2003).

The personas approach gives the developer an authentic glimpse into the potential user's world by bringing abstract target group information to life through the presence of a specific user (Junior & Filgueiras, 2005). Acting as a kind of "projection screen", personas aid in identifying (informational) needs and possible behavioral patterns of the target group. The comprehension of informational requirements and mental models is essential for the design of complex information products and services (Sinha, 2003). Useful functionalities can be derived in conjunction with the needs, interests and possible actions of the personas. Personas and their legends deliver the necessary context for numerous design decisions in the creative process. The application of the personas method can also support the communication within interdisciplinary developer teams and offer a guideline in the development process (Ronkko, 2005). Critique of the method is especially appropriate when personas replace actual user participation in the design process (Ronkko, 2005).

To fulfill the standards of a scientific method and in order to pose an authentic copy of the real users, Pruitt and Grudin (2003) suggest basing personas on qualitative and quantitative data gleaned from target group investigations. The fictional characters created for the community design of e-teaching.org were derived from data that was collected from an online survey, from interviews with users and advisors, and from feedback e-mails.

Online survey: From April 2004 to November 2005, an online survey was imbedded into the website. In total, 237 users completed the questionnaire. Interim analyses were carried out to monitor central indicators for website quality, e.g. usability of navigation, suitability of content, perceived reliability and interestingness. In the process of composing the personas, the online survey provided the team with socio-demographical data on the background of the portal's regular visitors. The design team learned for example, that the portal is also a popular source of information for students interested in e-learning pedagogy. Another aspect which was taken up in the personas creation was the balanced gender ratio among the users.

Interviews: In November and December 2003, ten qualitative interviews with consultants and clients of central e-learning units at the project's two initial partner universities were carried out. This data, initially used to find indicators or potential obstacles for the acceptance of the website in the university context, was a rich source for the "hidden" motives of users.

Feedback e-mails: Roughly 150 feedback e-mails were received between the launch of the portal in August 2003 and the beginning of developing the personas concept in spring 2005. These e-mails were used to mirror our first sketches of personas with flesh and blood users of the portal. The e-mails were clustered into four groups, each represented by one archetypical user. This procedure resulted in the fictional users *Alfred*, *Tanja*, *Beate* and *Philipp*.

The finishing touch was accomplished in a series of group discussions with the whole design team.

In a next step, their fictional biographies were connected with core design dimensions of community building. The role of the personal identity, the technical domain, the individual added value, as well as the comparison mechanisms between active and less active participants (reciprocity) were analyzed in detail. The personas Alfred, Tanja, Philipp and Beate represent various target groups within the community (compare Fig. 2).

The 4 Personas in Comparison

	Alfred	Tanja	Philipp	Beate
Persona	Prof.Dr. Alred A. Luehren, 50, has been a professor at the University of Hannover for the past 8 years	Tanja Renger, 34, works at the University of Muenster Library	Philipp Treudt, 26, studies Linguistics at the University of Heidelberg	Beate Behrat, 39, works as an e-Learning coach at the University of Aachen
Identity	Self-portrayal as expert	Group identityt	Less relevant	Local sub-community
Domain	Member of a peer group	Member of a group with similar interests and problems	Less relevant	Alliance with the University of Aachen is to be transparent in the portal
Added Value	Presentation of personal expertise	Knowledge exchange	Information seeking	Support for the university strategy
Reciprocity	Awards, Publicity	Exchanges with others, Networking	Strengthening personal media competence	Exchanges with others, Awards

Figure 2: Matching Personas and Community Design Dimensions

People like Tanja are important for the process of community building, as they are interested in an intensive exchange of ideas. As part of her advisor capacity, Beate has time budgeted for participation in synchronous online-events and for acting as moderator. Alfred’s expertise is an important input factor for the community. His reputation is crucial for the construction of a common community identity. In order to expand the community, Philipp’s interests should also be met, as he will also contribute to the community as his expertise grows.

Results

From the developers’ point of view, the special value of the personas lay in the improved communication and depth of understanding among the various protagonists. Design and implementation of the community functions required numerous detail decisions that could hardly be reached directly on the basis of the evaluation data. Additionally, there is the respective discipline-specific viewpoint held by individual team members. For questions, such as “Would Beate use this function in this manner?”, the personas created a common framework of reference and prepared the ground for a discussion of the function in detail.

As a result of the design process based on the described personas, the community section of e-teaching.org was equipped with communication and awareness functions addressing specific needs of the target group. For instance, virtual business cards were implemented that offer the possibility of announcing conference participation or research interests. Expert chats, online trainings and virtual lectures offer further qualification opportunities. Annual partner workshops with e-learning consultants

promote networking among the e-teaching.org partner universities. The community was launched in May of 2006 and currently (May 2007) has more than 500 members. Figure three pictures the steady growth of the community within its first year.

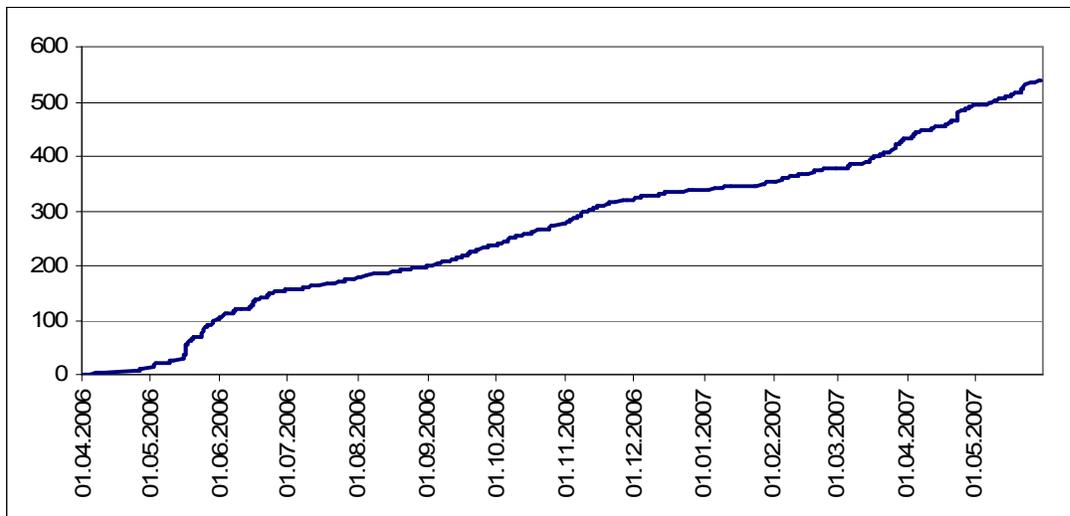


Figure 3: Members of the e-teaching.org community (total number)

Have the personas actually helped to improve the sociability of the community and does the portal e-teaching.org appeal to its target group? Analyzing the virtual calling cards reveals that the different user segments represented by the *fictional* personas can also be found in the *real* community (see figure 4).

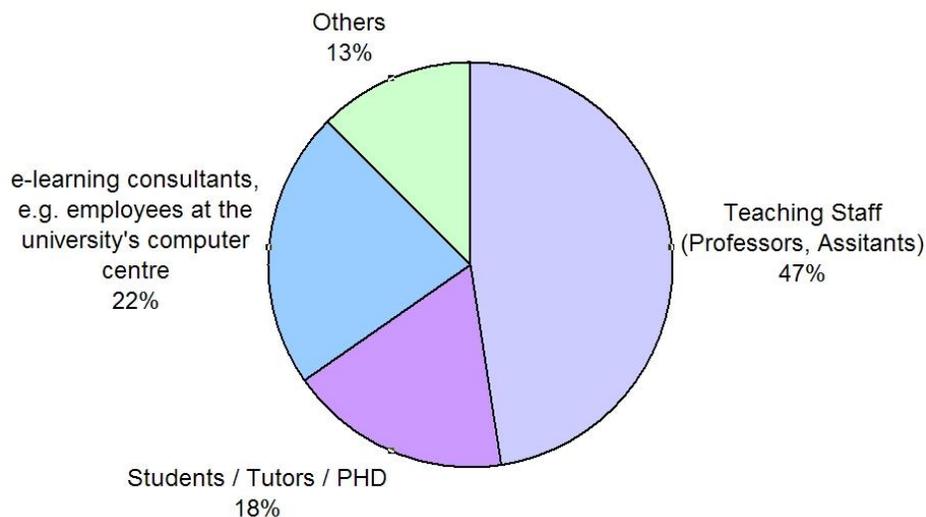


Figure 4: Professions of community members derived from their profiles (n=287).

Recapitulating our experiences, the personas proved to be a valid instrument to feed back the formative evaluation data into the development process.

Discussion

In the example of the development of community functions for the portal e-teaching.org, personas were

used for consolidating evaluation data from various sources and for making the design process fruitful. This leads to the question of how generic or transferable the personas approach is for other kinds of e-learning products or services.

Judging from the experiences of the case study, personas should only be applied within the framework of larger project teams. Discussion concerning their authenticity and ability to represent a larger group of users is a decisive ingredient for ensuring the quality of the personas. Otherwise, there is the danger that a single designer tailors the ideal user biography for his personal arguments, thereby rendering the method meaningless.

The personas approach is also recommended whenever the relationship user-designer is anonymous. A teacher who designs learning materials for a comprehensible group of recipients – i.e., a small seminar group, comprising a dozen participants – should work more towards direct participation of users. In contrast, should the task concern making conceptual decisions at the university level, be it the design of a website or the organization of a course of studies, evaluation data aggregated to personas could depict a living image of the target group.

An advantage of fictional biographies is that they remove the personal level by abstraction. Through their mediating character, personas can be useful when the acceptance of evaluation results is endangered by personal resistance, power struggles and animosities. Furthermore, the narrative context can help the project team to develop potential explanations or working hypothesis for contradictory or confusing data, thereby delivering input for ongoing research.

Conclusions

In this contribution, experiences from evaluation research and practice were described and applied to the portal domain. Tracing the roots and history of research and discussion on evaluation back to the Sixties, one can see that the topic has not lost its potential to inflame controversial debates on appropriate methods and adequate consequences ever since. However, the question of how to include routines of quality assurance into the everyday practice of designing learning material is rarely reflected in the current debate. Within the e-learning community, one can observe that evaluation often has an external function (e.g. justification of a certain approach). The internal, formative role needs to be emphasized – especially when developing concepts for e-learning content and infrastructures. Additionally, the frequently encountered personnel-based separation of evaluation and design presents a fundamental development problem. Isolated processing of the task areas only makes sense when the control function of an evaluation is in the foreground.

Through the use of a case study, general reflections on the role of evaluation in the project progression were presented, along with the application of a specific method for purposes of creative design. The case of e-teaching.org shows how personas can aggregate formative evaluation data - some of which is partially garnered through other motives. It was argued that this instrument has potential for the creative development of a new product or service.

To turn inanimate data into a vivid picture of the needs and expectations of users or learners, the Personas approach is a convincing method. It helps the development team to keep in mind that visiting a portal or using software is not an end in and of itself. Therefore, it is vital to also view the users “outside” the human-computer interface and to perceive them as whole persons, who pursue their own goals – with, without or counter to the product that was designed for them.

References

- Bakar, A. & Cagiltay, K. (2006). Evaluation of Children's Web Sites: What Do They Prefer?. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006* (pp. 569-574). Chesapeake, VA: AACE.
- Beywl, W. (1991). Entwicklung und Perspektiven praxiszentrierter Evaluation. In: *Sozialwissenschaften*

und Berufspraxis, 14 (3), pp. 265 - 279.

Cooper, A. (1999). *The Inmates Are Running the Asylum: Why High Tech Products Drive Us Crazy and How to Restore the Sanity*. Sams-MacMillan Computer Publishing.

Gaiser, B. & Werner, B. (in press). Qualitätssicherung beim Aufbau und Betrieb eines Bildungsportals. In B. Gaiser, F.W. Hesse, & M. Lütke-Entrup, (in press). *Bildungsportale – Potenziale und Perspektiven netzbasierter Bildungsressourcen*. München: Oldenbourg Wissenschaftsverlag.

Johnson, R. B. (2006, Ed.). New Directions in Mixed Methods Research. *RITS Special Issue*, 13(1). http://www.msera.org/rits_131.htm [last checked 07/05/30].

Grubišić, A., Stankov, S., Žitko, B. (2005). Evaluating the educational influence of an e-learning system, *Proceedings of the International Conference CEEPUS Summer School 2005, Intelligent Control Systems* (pp.151-156). <http://www.pmfst.hr/~ani/radovi/2005CEEPUS.pdf> [last checked 07/05/30].

Gupta, P., Seals, C. & Wilson, D. (2006). Design And Evaluation of SimBuilder. In T. Reeves & S. Yamashita (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006* (pp. 205-210). Chesapeake, VA: AACE.

Kommers, P. & Richards, G. (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006*. Chesapeake, VA: AACE.

Kamei, M., Inagaki, T. & Inoue, K. (2006). Evaluation Criteria of Digital Educational Materials in Support sites. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006* (pp. 75-79). Chesapeake, VA: AACE.

Kiili, K. & Lainema, T. (2006). Evaluations of an Experiential Gaming Model: The Realgame Case. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006* (pp. 2343-2350). Chesapeake, VA: AACE.

Khan, B. & Granato, L. (2006). Comprehensive Program Evaluation of E Learning. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006* (p. 2126). Chesapeake, VA: AACE.

Kromrey, H. (1995). Evaluation. Empirische Konzepte zur Bewertung von Handlungsprogrammen und die Schwierigkeiten ihrer Realisierung. In *Zeitschrift für Sozialisationsforschung und Erziehungssoziologie*. 15 (4), pp. 313 - 336.

Lam, P. & McNaught, C. (2006). A Three-layered Cyclic Model of eLearning Development and Evaluation. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006* (pp. 1897-1904). Chesapeake, VA: AACE.

Lincoln, Y. S., & Guba, E. G. (1989). *Fourth generation evaluation*. Newbury Park: Sage.

Luukkonen, T. (2002). Research evaluation in Europe: state of the art. In *Research Evaluation*, 11 (2), pp. 81-84.

Panke, S., Wedekind, J., Reinhardt, J. & Gaiser, B. (2004). www.e-teaching.org—Qualifying Academic Teachers for the E-University. In D. Remenyi (ed.). *Proceedings of ECEL 2004, European Conference on e-Learning*, (pp. 297-306). Reading, UK: Academic Conferences International.

Panke, S., Studer, P., & Kohls, C. (2006). Use & Usability: Portalevaluation mit Eye-Tracking und Logfile-Daten. In M. Mühlhäuser, G. Rößling, & R. Steinmetz (Eds.), *Proceedings DELFI 2006. 4te Deutsche e-learning Fachtagung Informatik* (pp. 267-278). Bonn: Gesellschaft für Informatik.

Panke, S., C. Kohls, & Gaiser. B. (2006). Participatory Development Strategies for Open Source Content Management Systems. *Innovate* 3 (2). <http://www.innovateonline.info/index.php?view=article&id=326> [last checked 07/05/30].

- Pawson, R. & Tilley, N. (1997). *Realistic Evaluation*. London: Sage.
- Pruitt, J. & Grudin, J. (2003). Personas: practice and theory. In *Proceedings of the 2003 Conference on Designing for User Experiences*. New York: ACM Press.
- Quinn-Patton, M. (1997). *Utilization-Focused Evaluation*. London: Sage.
- Reinhardt, J., & Friedrich H. F. (2005). Einführung von E-learning in die Hochschule durch Qualifizierung von Hochschullehrenden: Zur Evaluation eines Online-Qualifizierungsportals. In D. Tavangarian & K. Nölting (Eds.), *Auf zu neuen Ufern! E-learning heute und morgen* (pp. 177-186). Münster: Waxmann.
- Ronkko, K. (2005). An Empirical Study Demonstrating How Different Design Constraints, Project Organization and Contexts Limited the Utility of Personas. In *Proceedings of the 38th Annual Hawaii International Conference on System Sciences* (Hicss'05) - Track 8 - Volume 08 (pp. 220.1). Washington, DC: IEEE Computer Society,
- Reeves, T. & Yamashita, S. (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006*. Chesapeake, VA: AACE.
- Sanchez, J. & Elías, M. (2006). Usability Evaluation of an Open Source Learning Management Platform. In T. Reeves & S. Yamashita (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006* (pp. 1772-1779). Chesapeake, VA: AACE.
- Schröter, D. (2004). Evaluation in Europe: An Overview. *Journal of Multi Disciplinary Evaluation* 1(1). Online, Available: http://www.wmich.edu/evalctr/jmde/content/JMDE_Num_001.htm#_Toc86719007 [last checked 07/03/05].
- Schwarz, C. (2005), *Evaluation als modernes Ritual. Zur Ambivalenz gesellschaftlicher Rationalisierung am Beispiel virtueller Universitäten*, Dissertation. Münster: Waxmann Verlag.
- Sinha, R. (2003). Persona development for information-rich domains. In *CHI '03 Extended Abstracts on Human Factors in Computing Systems*. (pp. 830-831). New York: ACM Press.
- Somekh, B. (1995). The Contribution of Action Research to Development in Social Endeavours: a position paper on action research methodology. *British Educational Research Journal*. 21 (3), pp. 339-55
- Wottawa, H. & Thierau, H. (1998). *Lehrbuch Evaluation*, Bern: Huber Verlag.

Manuscript received 7Mar 2007; revision received 31 May 2007.



This work is licensed under a

[Creative Commons Attribution-NonCommercial-ShareAlike 2.5 License](http://creativecommons.org/licenses/by-nc-sa/2.5/)