

Advances in Computer-Supported Learning

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Chapter VI

E-Learning: Trends and Future Development

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Abstract

During the last several years, high expectations have surrounded e-learning initiatives in companies, universities, and schools. Presently, however, this optimism has often given way to disillusionment. In this paper, we will postulate three central theses to help counteract both this process of disillusionment and the problems that were encountered during the initial euphoric phase of e-learning. The theses provide a framework for realizing the potential of e-learning in a beneficial and meaningful way. Firstly, this new technology should be applied to learning only when its use reflects a new culture of learning. Secondly, e-learning has to be integrated into the existing training culture of an organization. Thirdly, the implementation of e-learning should focus on the learner rather than on technology. To substantiate these theses, we will provide examples that illustrate sustainable implementations of e-learning.

Introduction

During the last decade, there have been significant developments in computer technology. With the increased use of modern computer and communication technologies, a new buzzword was also born: e-learning. The term e-learning is used as a label for learning that takes place using new electronic media. This kind of learning, which relies heavily on information and communication technologies, is a hot topic in the field of corporate learning. According to eLearningNews (2005), many implementations of e-learning can be found in companies that are dedicated to providing further on the job training for the company's employees. However, educational institutions, such as schools or universities, were also highly optimistic about the potential of this new kind of learning. There was the hope of being able to deliver courses of higher quality to more students at less expense. In short, e-learning was associated with *very* high expectations. It was considered to be a flexible, efficient, and relatively cheap style of learning. Consequently, just two years ago, many journals had headlines such as "Learners can access learning material anytime and anywhere, whether at home or on the road." Currently, there are questions about the degree to which these expectations can be satisfied.

This chapter aims to answer these questions. To this end, we will firstly define the concept of e-learning. Based on the latest research studies, we will analyze the degree to which e-learning can satisfy the expectations that have come about in recent years. We will then postulate three theses that provide a framework for the beneficial and meaningful realization of the potentials of e-learning. We will substantiate these theses using three particular examples of e-learning within university and business settings.

E-Learning

The term of "e-learning" seems to be derived from word creations like "e-mail" and means learning with support of electronic media—in particular with the support of computers and the Internet. There are many scenarios for realizing e-learning, which include computer-based trainings (CBT), Web-based trainings (WBT), and different styles of online learning, for example, virtual lectures, virtual seminars, or virtual tutorials. Computer-based trainings (CBTs) describe programs for individual learning with computers (Learnframe, 2005), which have been used since the early 1980s. This kind of e-learning is widely used for training on the job. The term Web-based trainings (WBTs) is used for learning in network environments like the Internet or a company's intranet. WBTs rely on informa-

tion systems, for example, databases, and learning programs with, for example, exercises and tests. From this point of view, WBTs are technically higher developed CBTs, which rely on network technologies but use still the same instructional design methods as CBTs. When using the term “online learning,” one often imagines a virtual classroom, which is the space or platform in which a virtual course teaches the learning material. In this scenario, teachers and learners are based at different locations and enter one virtual classroom. Online courses rely on an e-learning platform, which is often just called the learning platform. This platform is a system that allows the creation and realization of a virtual learning center within an institution or company. As a minimum, this platform supports the administration of e-learning courses. The platform can provide different kinds of learning media and keeps track of user data. Furthermore, many learning platforms have sophisticated features. For example, they may provide media libraries, enable virtual communication between learners, offer search functions, and often supply an individual workspace for each learner (Volery & Lord, 2000). Learning platforms often reflect the particular needs of an organization or company and are developed further on this basis.

When examining the technological aspects of different e-learning scenarios, one can distinguish between distributive, interactive, and collaborative technologies (Back, Seufert, & Kramhöller, 1998). Distributive technologies are aimed at information transfer and focus mainly on the teacher, who is providing the information. These technologies make use of traditional learning paradigms, which means that the teacher transmits information to the learners, for example, by making lecture contents available online. Interactive technologies focus on the learner’s individual acquisition of knowledge and skills. They can be characterized as learner centered, because they allow interactions between the learner and the learning environment, for example, when completing tests in a WBT. In contrast, collaborative technologies support team-centered learning. In this scenario, the learning environment supports the interaction of the learners with one another. Their learning process consists of content-specific discussions and collaborative reflections. The main focus lies on the learners’ exchange of knowledge and experiences and on collaborative problem solving. These activities take place in virtual classrooms, and the learning environment provides discussion boards and chat rooms for this purpose.

High Expectations for E-Learning

The expectations of companies regarding e-learning were varied and reflected the optimism companies had when this new technology was launched. The

opportunity for flexible learning, which is independent of time and space, was rated the highest in terms of the companies' expectations (Haben, 2002). The second priority was the potential for applying e-learning as a timesaving mechanism. E-learning's ability to facilitate self-directed learning was ranked third. This was ranked even higher than the optimism concerning a reduction in training costs when using e-learning. However, the advantage of a higher quality of learning had the lowest priority in the ranking of companies' expectations. In sum, the expectations regarding e-learning were quite high. Despite these high expectations, a recent study disclosed that only a third of the major companies used e-learning (Harhoff, & Küpper, 2002). Furthermore, the expectations regarding e-learning were only satisfied to a moderate degree (Bernard, et al. 2004). To date, only the aspects of flexible learning and the reduced time needed have received positive scores (Haben, 2002; Harhoff, & Küpper, 2002).

Reservations about e-learning stem from problems with the manner in which this new kind of learning was implemented. Besides underestimating of the expense of e-learning, the lack of employee acceptance was one of the biggest problems (Bürg, Kronburger, & Mandl, 2004). A further reason cited by the companies was the lack of high quality e-learning courses offered by external providers. Furthermore, the courses available mainly covered IT applications, specific business topics, foreign languages, and trainings for particular products and did not fulfill companies' needs (Haben, 2002). A further obstacle to the success of e-learning is the lack of integration within the existing culture of training. In the common use of e-learning courses, they are viewed as being of an additive nature rather than playing a substantial part in the companies' training culture. Problems often arise when planning the implementation of e-learning due to the complexity of some projects and due to the incorrect estimation of the time required for such projects. However, despite these obstacles and problems, most companies plan to increase their application of e-learning, even if assigning reduced budgets for these projects.

The situation is similar with respect to schools and universities. In contrast to recent years during which much money was available for the foundation of virtual universities and e-learning initiatives, current optimism has decreased, and the budgets have decreased (Mandl, & Winkler, 2004). The problems are similar to those encountered within companies. Time has shown that simply adding new technologies to traditional classrooms provides few benefits for the education in schools and universities (Scardamalia, & Bereiter, 1994). Many approaches for implementing e-learning are still technology driven and lack relevance for the user.

With respect to the opportunities and limitations of e-learning, we postulate three central theses, which should be considered when implementing e-learning. Using these theses as a framework for the introduction of e-learning could counteract

the problems, which were encountered in the first euphoric phase of e-learning. Furthermore, the theses could help to build courses that are able to satisfy these expectations. Our theses are:

1. The application of new technologies and e-learning is only beneficial for learners when it is based on a new philosophy of learning and teaching.
2. E-learning has to be integrated in the existing training culture of an organization. To achieve this, integrative approaches should be applied, such as blended learning.
3. Professional strategies of implementation are prerequisite to the beneficial realization of e-learning in schools, universities, and companies. These strategies should be learner-centered instead of technology driven.

In the following section, we will elaborate upon these theses and illustrate them using examples.

Thesis 1: A New Culture of Learning

In many learning scenarios, the teacher plays an active role, and the learner simply acts as a passive recipient of the knowledge presented. This mechanism can be found in many different institutions for education and also reflects the experiences of many learners (Reinmann-Rothmeier & Mandl, 2001a). Such scenarios provide a very systematic and controlled kind of learning, which is based on two main assumptions:

1. the development of knowledge results from learning facts and routine; and
2. knowledge is an entity, which can be transferred from one person (the teacher) to another person (the learner).

Applying these assumptions in the context of teacher-centered approaches often generates inert knowledge. This can be defined as knowledge that has been learned theoretically and without any situational context. Therefore, learners often are unable to apply this knowledge to a real world situation (Renkl, Mandl, & Gruber, 1996). In an attempt to counteract this problem, a new constructivist philosophy of learning and teaching has recently emerged. The aim of this new culture of learning is to allow for the generation of applicable knowledge to fill the gap between knowledge acquisition and knowledge application (Reinmann-

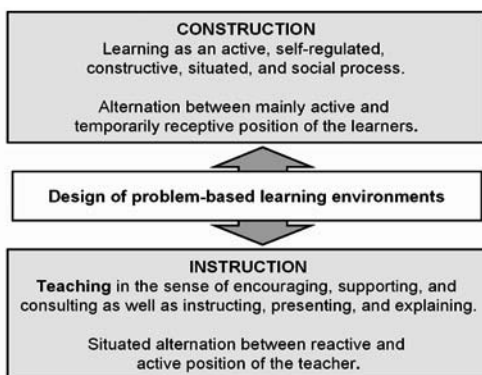
Rothmeier & Mandl, 2001a). The core of this new philosophy is active knowledge construction, which means that knowledge does not result from passive reception. In contrast, learners acquire knowledge through an active process mediated by the individual's prior knowledge, motivation, and learning prerequisites. This view of knowledge construction implies a change in basic assumptions about learning. Knowledge can no longer be considered an entity, which can be passed from one person to another. According to this viewpoint, learning is an active, constructive, situated, social, and emotional process (Reinmann-Rothmeier & Mandl, 2001a). Learning can be described in detail as follows:

- **Learning is an active process:** Only the active involvement of the learner enables learning.
- **Learning is a self-directed process:** Within the context of learning, the learner takes active control and responsibility for his/her own learning activities.
- **Learning is a constructive process:** A learner can only acquire and use new knowledge if he/she can embed the new knowledge within existing knowledge structures and interpret it on the basis of individual experiences.
- **Learning is a social process:** Learning is mainly an interactive event and is influenced by social components.
- **Learning is a situated process:** Knowledge acquisition takes place in a specific context and is linked to this context. Therefore, learning has to be viewed as a situated process.
- **Learning is an emotional process:** Emotions with respect to social values and achievement greatly influence learning. The emotional component is particularly important for the motivation of the learners.

Realizing learning environments according to these principles has shown that learners also need a certain amount of instruction to learn effectively (Mandl, Gräsel, & Fischer, 1998; Mandl, Gruber, & Renkl, 1996). This instructional support is necessary even if learners take an active role in the learning process and differs depending on individual learner prerequisites and skills (Kollar & Fischer, 2004; Renkl, Gruber, & Mandl, 1999; Weinberger, Ertl, Fischer, & Mandl, 2005). Highly self-directed learning often results in cognitive overload (Sweller, Van Merriënboër, & Paas, 1998) for the learners (Mandl, Ertl, & Kopp, in press). Learners need support when questions arise and when they encounter problems, for example by receiving feedback from a tutor (Zumbach & Reimann, 2003).

Designing problem-based learning environments (Dochy, Segers, Van den Bossche, & Gijbels, 2003; Lave & Wenger, 1991) can be a pragmatic method for

Figure 1. Construction and instruction in the problem-based learning approach (Reinmann-Rothmeier & Mandl, 2001a)



implementing this new culture of learning and teaching. The basis for problem-based learning environments is a balance between construction and instruction (Figure 1). Thus, the core of this philosophy is that an active learner receives assistance throughout the learning process by instructional design (Reinmann-Rothmeier & Mandl, 2001a). This implies that a learner has the opportunity to use self-directed learning, which promotes active knowledge construction. However, this learning takes place in a designed learning environment, which provides learning material and instruction. Problem-based learning environments are highly dependent on context, described in detail as follows:

- **Learning in an authentic context:** Learning stems from authentic problems, which are meaningful and relevant for the learners. The use of realistic problems and authentic cases provides a strong link to the situations in which this knowledge can be applied. Furthermore, authenticity increases the students' interest in the subject matter.
- **Learning in multiple contexts:** Learners find themselves in different authentic situations and are encouraged to apply the knowledge learned when dealing with different problems. To this end, the learning process may integrate different sample applications of the subject matter. Multiple contexts can support the acquisition of knowledge that can be flexibly rehearsed, applied, and developed in different situations.

- **Learning in a social context:** Learning and working collaboratively is an essential part of the learning process, for example, when the learners collaboratively solve an authentic case.
- **Learning with instructional support:** Learners receive valuable resources for their learning activities and can contact an advisor or coach when they encounter problems.

The power of problem-based learning results from two sources: collaborative learning and self-directed learning. The features of the new information and communication technologies offer great potential for the implementation of problem-based learning and for the realization of collaborative and self-directed learning scenarios. When comparing problem-based learning to traditional classes that offer only a limited opportunity for each learner to play an active role in the learning process, one can get a sound appreciation for the potential of problem-based learning. In traditional courses, the learning environment, the learning duration, and the path through the learning process are preset. In such environments, the learner only occasionally has the opportunity to be active, for example, when answering a question. Furthermore the effectiveness of such actions is very limited with respect to the time this action takes and the benefits for the learner. Moreover, there are only limited opportunities for active and constructive learning. New media offer various opportunities that can have beneficial effects on the learner's motivation, for example, the ability to choose one's own learning path through a learning environment (Deci & Ryan, 1992). Furthermore, the learner can often proceed at his/her own pace through the learning process and chose the duration and the speed of learning.

However, studies regarding the acceptance of e-learning show that the design of many learning environments is qualitatively lacking with respect to these criteria (Haben, 2002). Many learning environments lack a sound didactic structure and do not consider new learning philosophies. They often apply a systematic approach of knowledge transfer in virtual learning environments exactly as used in traditional lectures. There are many "long-winded" learning environments, which can be distinguished from a book only with respect to the method of turning pages, which is done by a mouse click. Other learning environments try to make up for the absence of any kind of didactic approach by using multimedia fireworks and animations (Mayer, Hegarty, & Mayer, 2005). However, the application of adapted didactics is essential for considering e-learning as a future approach to education.

Example: An Introductory Course in Media Didactics

As an example for the introduction of a new culture of learning and teaching and the problem-based learning approach, we will describe a university course about the didactic design of multimedia learning environments. This course was provided by the Virtual University of Bavaria (VHB) and offered to teachers, who wished to acquire specific knowledge in the area of didactics with new media. The course was designed according to the problem-based learning approach (Dochy et al., 2003; Reinmann-Rothmeier, & Mandl, 2001a) and includes virtual and co-present phases. The conception of this course has three main goals with respect to content and didactics. Participants should:

1. **become familiar with different styles** of applying problem-based learning with new media in the classroom;
2. **acquire theoretical knowledge** about problem-based learning and learning with new media; and
3. **acquire skills for planning** their own projects for applying problem-based learning with new media in the classroom.

This introductory course to media didactics starts with a kickoff workshop, which provides a general course overview, an overview of the course contents, and an introduction to the learning platform used for hosting the course. A further goal of this workshop is for students to get to know their tutors. Furthermore, students have the chance to form small groups for collaboration during the virtual phases.

These small groups work on five cases during the virtual phase. These multimedia cases show the application of new media in the classroom with respect to different subject areas. The example of “learning stages” gives an exemplary glimpse at the conception of these cases.

“Learning stages” has its origins in a classroom project about the self-directed learning of mathematics in higher education. It was developed by a school in Germany and founded by a governmental project for applying new media in the classroom. The “learning stages” project aims at disclosing an individual view on mathematics to students, which provides insights for solving practical problems by applying mathematics. Furthermore, “learning stages” should help learners through its problem-based design and by using self-directed learning with new media. “Learning stages” is directed at students of the 11th grade (secondary education). In a manner

similar to “circle training”, students work on different tasks in 21 stages, which are realized by learning programs on the computer (Altenburg, Arnold, & Schürmann, 2003). Core characteristics of the project are different content-specific views on mathematics, different levels of task difficulty and problems, which are closely related to students’ daily experiences. In the “learning stages” environment, it is mandatory for students to work on some of the stages. In addition, they may choose to work on the other stages. This project supports self-directed and collaborative learning with new media, and learners can independently control the results of their work. As the case of “learning stages” shows, the content-specific focus of the course on introduction to media didactics emphasizes self-directed and collaborative learning and the specific support of these skills for learners in the classroom.

When collaborating on the cases, students use discussion boards for their collaborative negotiation. During the entire online phase, a tutor helps learners with questions or when problems are encountered. Furthermore, learners may also benefit from using a content-specific learning unit about problem-based learning, which contains the theory and possible applications of this approach. This unit provides a background for the students when solving the cases. In addition to working on the case solutions, learners also work collaboratively on a transfer task to increase the applicability of their knowledge. In this task, the students design a framework for applying problem-based learning in the classroom by collaborative negotiation in small groups. The course ends with a closing workshop, which allows learners to present the frameworks they have designed and encourages them to discuss these frameworks. This introductory course to media didactics realizes several aspects of problem-based learning:

- **Authentic context:** The authentic context of the course involves the integration of five example cases, which are derived from realizations in the classroom. The description of such pilot projects, which already have been realized in the classroom, is therefore the basis for acquiring knowledge about the didactic realization of new media in the classroom.
- **Multiple contexts:** Cases relating to different subjects and different grades provide learning within multiple contexts. Furthermore, the didactic procedure is different in each of the cases. The discussion of these cases in newsgroups also provides different perspectives for the learners and supports them in discussing the case solutions and the project specifics.
- **Social context:** For integrating the social context, learners meet at the kickoff workshop and form small groups of four for the collaborative

negotiations that take place during the online phase. When the work on a case is finished, learners have to engage in individual or group assignments. These group assignments are discussed and solved through a shared discussion board, which is provided by the learning environment. In this way, students reflect on their own case solution and also consider the other group's solutions.

- **Instructional support:** The learning environment also provides a newsgroup for questions and problems encountered by the students. The tutors use this newsgroup for quickly providing feedback to the learners. Furthermore, the learning environment provides some cues for working on the task solution. These cues may be either a reference to literature or short summaries of the contents of the particular case. Learners and groups receive detailed feedback on their task solutions. This feedback contains evaluations of the solutions and of the group's collaborative procedure.

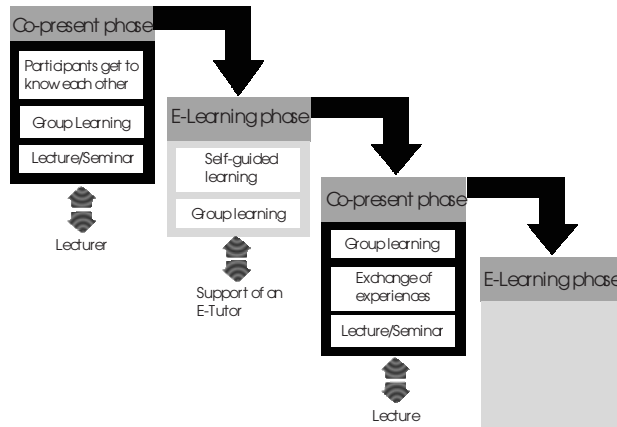
Results of an evaluation show that the acceptance of this course was rather high (Hasenbein, 2003). Learners particularly valued the comprehensibility of the learning material and the didactic design. Learners stated that the cases aided comprehension and that the authenticity helped illustrate the learning material. Furthermore, they valued the ability to navigate their way through the learning material in a self-directed manner. These attitudes are reflected in high learner motivation and also in the learner's high estimation of their own learning outcomes.

Now we will move from the example of a problem-based learning environment and will focus on our second thesis concerning a specific implementation of blended learning.

Thesis 2: Blended Learning

Experience has shown that learners in online courses appreciate having face-to-face meetings alongside their work in virtual learning environments (Reinmann-Rothmeier & Mandl, 2001b). This integration of e-learning and face-to-face learning also facilitates a beneficial embedding of virtual learning units into the traditional culture of training within companies and organizations. Blended learning is based on the integration of virtual phases and phases of physical co-presence, which offer learners the chance to meet and talk face-to-face. When learning in blended learning scenarios, learners find themselves using a combination of co-present courses and different types of net-based learning, for example, WBTs, CBTs, virtual learning environments, newsgroups, or virtual

Figure 2. A sequence of co-present and virtual phases in a blended learning course



classrooms. E-learning phases and physically co-present phases can be combined in many different ways. For example, learners can work online to prepare for a co-present course, which links to the content of the e-learning unit. In a further step, learners can reflect on the meeting in another virtual phase. This sequence can be used repeatedly if necessary. Another method is to start with a co-present meeting, which is followed by an e-learning phase and again by a co-present meeting.

In summary, e-learning courses can help learners prepare topics for presence meetings through individual work or through discussions in virtual groups. Furthermore, the virtual units can trigger reflections on the contents of a co-present meeting. Figure 2 gives a schematic sketch of blended learning.

Example: The Knowledge Master

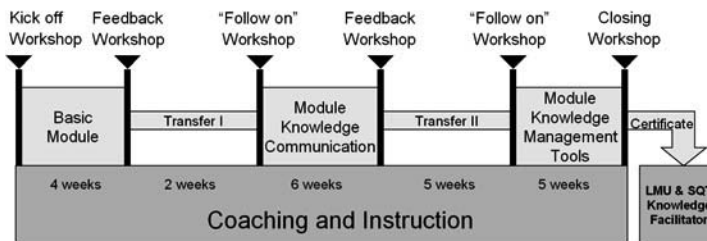
A course called the knowledge master illustrates an example of a blended learning scenario. The knowledge master is an interdisciplinary cooperation project of Siemens Qualification and Training (SQT) and the Ludwig Maximilian University in Munich (Erlach, Hausmann, Mandl, & Trillitzsch, 2002). The course was developed collaboratively by the departments of psychology, economics, and computer sciences. The half-year course provides on-the-job training with respect to knowledge management.

Goals of the knowledge master. Course participants are expected to acquire some basic knowledge in the area of knowledge management. In this course, learners focus particularly on knowledge communication and on tools for knowledge management. This focus also reflects the need for acquiring knowledge that is highly relevant to the practical problems experienced by the participants. The target group of the course includes employees at the intermediate management level, who possess only marginal knowledge in the area of knowledge management. The participants should also be interested in working within a virtual learning environment. Furthermore, a limited number of university students are accepted to the course, and thereby a limited number gain the opportunity to come into contact with practitioners.

Structure of the course. The knowledge master has a modular structure and implements the principles of problem-based learning. The didactic focus is on collaboration in small groups and on learning cases as a starting point for collaborative negotiation. The knowledge master relies on an Internet platform called the knowledge web. This knowledge web realizes the net-based communication and collaboration.

The knowledge master can be seen as hybrid learning environment, because it relies heavily on both co-present and e-learning phases, which are fundamentally linked. Within the period of half a year, learners collaborate on three different modules. There is a basic module, a module about communication and motivation, and a module about the integration of knowledge management (Figure 3). During the course, learners receive additional material and information on key knowledge management topics. This material is also discussed and explored further during the co-present workshops. These workshops take place at the beginning and at the end of each module (Figures 2 and 3). In the sequence of co-present and virtual phases, the first co-present phase plays a key role in allowing participants to get to know one another and in initiating virtual collaboration (kick off workshop). The other co-present meetings aim to support better coordination

Figure 3. Structure of the knowledge master



of the virtual collaboration between the members of the small groups and also aim to support face-to-face discussions. The workshops also allow participants to share their experiences with experts in the field, who are present at the meetings. Their presence often initiates reflections and discussions about concepts of knowledge management. Between the modules, there are so-called transfer phases. Transfer phases aim to relate the concepts learned to the individual's workplace. To this end, participants receive instructions and are encouraged to experience and to apply knowledge management concepts in "real life." The experiences gathered during the transfer phases can be shared, reflected, and discussed by the participants using the knowledge web.

The learning environment of the knowledge master realizes problem-based learning with respect to following aspects:

- **Learning with authentic contexts:** The course relies on authentic cases concerning knowledge management, which focus on psychological, business, and technical aspects of knowledge management. For example, one case deals with problems that can occur when companies merge.
- **Learning with multiple contexts:** In each of the first two modules, learners receive three cases on collaborative negotiation. One of them focuses on psychological, one on business, and one on computer-related aspects of knowledge management. Thus, learners are able to solve the cases from different perspectives, which also involve different backgrounds.
- **Learning in the social context:** Learners work collaboratively in small groups to solve the cases. They share and discuss their results using the knowledge web. Furthermore, the co-present meetings also focus on collaborative negotiation and on sharing experiences.
- **Learning with instructional support:** The learning environment provides literature and other material that is relevant for the collaborative case solutions. Furthermore, learners receive hints and strategies for virtual collaboration. A key element of instructional support is the provision of e-tutors, who support participants throughout the whole course. Learners can contact them easily when encountering problems in virtual collaboration and when they have questions regarding the cases or other content-specific aspects.

Evaluation. The learning environment is continuously evaluated for further improvement and for its adaptiveness to the needs of the learners. The acceptance of the learning environment, the learning outcome of the learners, and the learning process are evaluated using surveys, feedback panels, and by

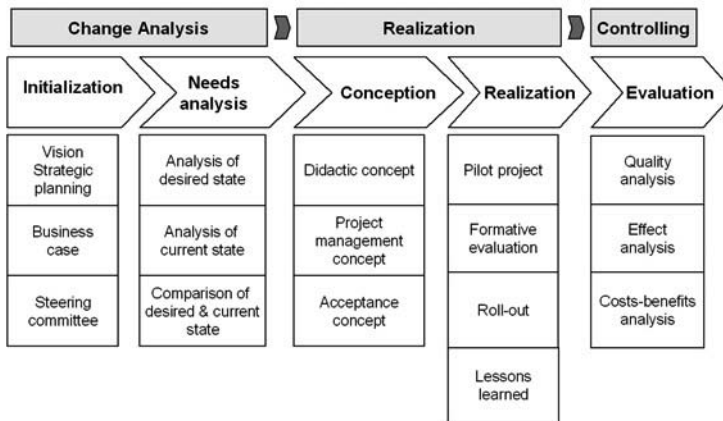
monitoring the virtual communication (Belanger, & Jordan, 2000; Scriven, 1980). Results show positive feedback from the learners with respect to all areas that were subject to evaluation. They support the acceptance of case-based learning and the combination of virtual and co-present phases (Erlach et al., 2002).

Thesis 3: Implementing E-Learning

The third thesis states that human aspects should be the driver for implementing e-learning, as opposed to technical feasibility. In general, when trying to integrate e-learning and blended learning courses in a company’s training culture, the procedure for this integration should consider the needs of the prospective course users. The following five steps describe one possible procedure for introducing blended learning within companies and educational institutions (Figure 4; Tarlatt, 2001).

1. **Initiation:** The first step for implementing blended learning in organizations is the creation of a vision for the project. This vision needs to consider an organization’s culture of training and must gain the support of the company’s management. This vision should be the basis for the development of strategic goals and for the development of a business case for the project. In addition, a steering committee provides an important forum for counteracting a potential diffusion of responsibility within the project.

Figure 4. Process model for the implementation of blended learning



2. **Needs analysis:** As a second step, the analysis of the current situation takes place. The current situation is evaluated based on the vision established and on the strategic goals. This analysis deals with the availability and acceptance of existing courses, specific opportunities for improving existing courses, and on investigating which courses may be needed that are not yet offered. Analyzing the current situation should also involve the course participants. After this analysis, a desired state is defined in collaboration with the potential participants of future courses. This definition of the desired state should be driven by the employee's particular work-related problems. Comparing the current state with the desired state reveals the needs of the organization. These needs are the starting point for particular project decisions and for a subsequent definition of operative goals.
3. **Conception:** The conception phase is the core of the procedure of implementing e-learning. In this phase, the goals are translated into clearly defined processes on the basis of didactically meaningful concepts. Furthermore, a framework for the realization phase is defined with respect to project management and acceptance. In this context, a key activity is the selection of a target group and of the contents for a pilot project. Moreover, the selection and installation of a learning platform and the selection of available CBTs and WBTs takes place.
4. **Realization:** The realization phase starts with a first pilot project for implementing the concept of e-learning or blended learning. A particular project team should be responsible for the success of this implementation. In this phase, it is essential to have a clear definition of responsibilities. A formative evaluation of the pilot project, which is the basis for continuous improvement, is crucial for the success of the whole project. Lessons learned from the implementation of this pilot project can be a model for further realizations of similar concepts in the organization. Depending on the results of the evaluation, the main project may start immediately or commence after some problems are resolved (roll-out).
5. **Evaluation:** The continuous evaluation of the project is essential for improving the processes and for ensuring a fit to users' needs. This evaluation should comprise an analysis of quality as well as an analysis of effects. Furthermore, a cost-benefit analysis can illustrate aspects for further improvement and can form a basis for the internal marketing of the new concept of learning.

In connection with our third thesis, we will illustrate some additional aspects of ensuring participant acceptance. Reservations regarding e-learning and blended learning often result from problems related to the implementation of this new style of learning. These problems have their origins in an underestimation of the

costs for e-learning courses and in the lack of acceptance of these courses by the target group (Davis, 1989; Goodhue, 1995). In this context, the issue centers on determining the key for accepting e-learning. One indicator of acceptance is the usage of a course that has been implemented (Harhoff & Küpper, 2002). From this point of view, acceptance is the result of motivated action. This means that employees have to be motivated to use the course. Recent research names four target aspects for motivation (Tarlatt, 2001): organization, technology, participation, and qualification. These are described as follows:

- **Organization:** The key aspect regarding organization is that the company management supports a culture of training. An innovation has to be integrated into the strategic vision of the company, and the importance of the innovation has to be communicated to the employees (Gratton, 1996; Raimond, & Eden, 1990). Informing the employees comprehensively as well as continuously can further support innovations (Tarlatt, 2001). In addition, integration into the business processes has proven to be a key aspect for the successful implementation of innovations. This process can be further supported by material and ideological incentives (Tarlatt, 2001).
- **Technology:** The choice of adapted technology that is suited to the particular needs of the users is indispensable for achieving acceptance. The technology chosen has to fit the demands of the users from a usability perspective and has to be meaningful with respect to didactic aspects. In general, technology should just fulfill the didactic needs (Hinkofer, & Mandl, 2003).
- **Participation:** The participation of the users is indispensable for successful implementation. This participation should start as early as possible. Starting from the needs analysis, users should be involved to ensure that the planning and the decisions meet users' needs. User feedback is also important for the planning and conception phase (Hinkofer, & Mandl, 2003). This could be facilitated by a continuous formative evaluation. In general, users should participate in making changes, rather than only being affected by them (Alexander, 1985; Brehm, & Brehm, 1981).
- **Qualification:** Further qualification of the employees can support the implementation of an innovation. This qualification should take place during the process of implementation and should be aimed at technical and methodical aspects (Tarlatt, 2001).

These aspects of motivation are crucial for creating a culture of innovation in an organization and indicate that acceptance is a key aspect of the implementation of blended learning—no matter how sophisticated the implementation process may be planned.

Example: A Pharmacy Company

We will illustrate an exemplary implementation process based on the case of a pharmacy company. While trying to introduce a new product, the company management realized a need to apply knowledge management. This knowledge management should improve the knowledge exchange between the employees, namely the pharmaceutical representatives. The management of this company decided to initiate a knowledge management improvement project because they had experienced unknown challenges when launching new products. For the implementation of this knowledge management project, the company asked the Ludwig Maximilian University to coach them through the implementation process.

The business success of pharmacy companies in Germany relies heavily on pharmaceutical representatives. The knowledge of the representatives about products, markets, and about selling products is essential for the success of a product and consequently for the success of the whole company. However, this knowledge has to be kept up to date by continuous training. In this case, the management realized that the quality of the traditional co-present trainings and the individual preparations of the pharmaceutical representatives for these trainings were quite diverse. Furthermore, these co-present trainings were viewed as extremely time-consuming, particularly when new products had to be launched. Therefore, the company started to implement a blended learning environment for their pharmaceutical representatives. This implementation was comprised of the following steps:

1. **Change analysis:** Regarding change analysis, the company management initialized a vision of improved competitive ability. For a clear conceptualization, the management set up a steering committee and both worked collaboratively on a business case for estimating the project budget. Furthermore, the steering committee had the task of defining responsibilities for the particular subareas. The project started with a needs analysis to assess the current state of knowledge processes within the work of the pharmaceutical representatives. Furthermore, this analysis aimed to disclose further needs of the company. The needs analysis involved all the persons who might have been concerned with these changes. The results

of the needs analysis showed the need for improving the representatives' consulting abilities with respect to knowledge representation, knowledge generation, and knowledge communication.

2. **Realization:** On basis of the needs analysis, the realization focused particularly on knowledge representation, knowledge generation, and knowledge communication. Regarding knowledge representation, the main goal was to improve the preparation and distribution of information with respect to new products and related research results. The improvement of knowledge distribution was realized by a flexible knowledge management platform, which allowed a meaningful informational structure and easy access from anywhere. To address knowledge generation, blended learning courses were introduced, which included online and co-present phases. Knowledge communication was improved by discussion boards and online classrooms, which supported the exchange of general and course-specific ideas. The whole realization was accompanied by a concept for ensuring acceptance. This concept was supported by company management, user adapted technology, and active involvement and qualification of the employees.
3. **Controlling:** An evaluation of the pilot project took place with respect to a formative analysis of quality and effects. The evaluation focused on the usability and acceptance of the platform and the WBTs used. Experts continuously analyzed the quality of the program with respect to content and didactics. A summative evaluation focused on acceptance, participation, learning outcomes, integration into the workflow, management support, and technology.

The evaluation of this implementation revealed that job relevance and the level of information provided by the management were highly correlated with acceptance (Bürg, & Mandl, 2005). Furthermore, the freedom in the workplace to work with e-learning, the usability, and the support of the learners also had a substantial impact. Users who accepted the learning environment also expended more effort working with the learning environment (Bürg, & Mandl, 2005; Bürg et al., 2004).

Conclusion

The initial optimism regarding e-learning as a new style of learning in schools, universities, and companies has often changed to disillusionment. In the context of this paper, we have shown that missing didactic concepts and unprofessional implementation strategies of e-learning courses can be considered the main

causes for this disillusionment. For exploiting the potentials of new media in the future, it is clear that indispensable prerequisites include the application of learner-centered didactic concepts and holistic implementation strategies.

We have stated three theses with respect to the didactic structure (thesis 1), the course organization (thesis 2), and the implementation of e-learning (thesis 3). The theses focus on different aspects of e-learning, but together they can be seen as a framework and as prerequisites for successful e-learning. This means that the theses cannot be seen discretely: ensuring users' acceptance implies that the course fits into the organization's culture of training, and it implies also that the learners acquire knowledge they can apply on their workplace.

We have illustrated three examples of the implementation of e-learning in higher education and in organizations. Each example featured the intention of the particular thesis quite distinctly. However, besides these features, each example also comprised several aspects of the other theses. Therefore, each example could illustrate the road to the future of e-learning, which is based on need-driven didactic concepts and facilitated by the technological support of a learning environment. Such e-learning scenarios encourage motivated, application-oriented learning and achieve user acceptance on the basis of a professional implementation process.

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