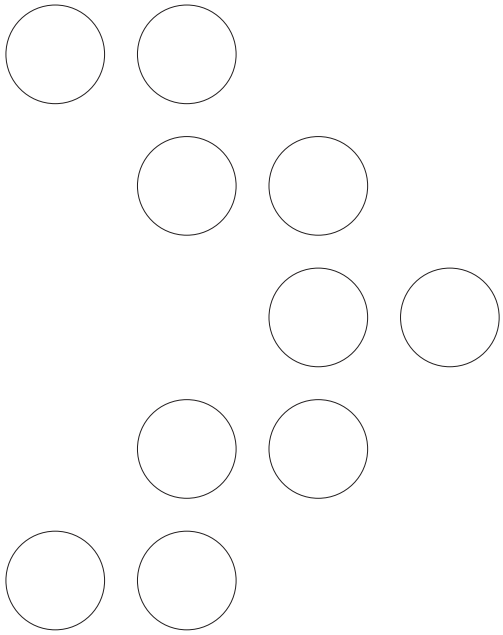
Bundesministerium
für Wirtschaft und Arbeit

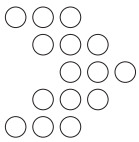
LERNET

E-learning for Small and Medium-sized Enterprises and Public Administrations

A Guide for Successful Employment and Development of Modern E-learning Solutions

Documentation No. 540





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For the sake of simplicity, the report generally uses the male form of words. The authors expressly state, however, that the report applies equally to women and men alike.

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Foreword
Federal Minister for Economic Affairs and Labour Wolfgang Clement

Competitiveness and productivity in enterprises and public administrations will be more and more determined by employee qualifications.

The need for continual up-to-date information and competence and its development is steadily growing. This is why modern in-firm training and continuing education focuses especially on finding affordable solutions. Here, Web-based learning (e-learning) offers forward-looking solutions for time-independent and demand-oriented learning at the work place, while on the road or at home. Schools must go to its students.

Until 2001, e-learning had hardly been utilised by public administrations and small to medium-sized enterprises (SMEs). Acceptance and the marketability of e-learning had largely depended on a convincing cost/value ratio. Now 15 percent of German enterprises make use of e-learning for infirm training and continuing education.The potential waiting to be fully tapped and the resulting economic prospects are very promising.

By starting its project "LERNET – Web-based training in small to medium-sized enterprises and public administrations", the Federal Ministry of Economics and Labour (henceforth BMWA) has made a contribution to popularising Web-based learning in Germany. Good practice examples covering more than 150 different subjects for about 20 different sectors have been developed in 11 projects. Innovative LERNET solutions are reflected in the development of time-efficient and cost-effective production processes and flexible financing and revenue models, which clearly focus on the means of the target groups. LERNET has proved that e-learning facilitates a high-quality, cost-effective, time-oriented and demand-oriented knowledge transfer.

The guide presents previous results and experiences of LERNET to enterprises and public administrations as well as to producers and suppliers of e-learning solutions, which may also serve as orientation. Among other things, the guide highlights key topics such as "costs" or "quality", practical tips and suggestions for implementing e-learning in one's own enterprise and where to find further information as well as a glossary with specific terms linked to the field of e-learning.

The achievements have encouraged to set new milestones within the framework of LERNET. The focal point of LERNET "content sharing" deals with developing a market for the commercial exchange of learning content with the aim to generate further time, quality and cost benefits. The second area of emphasis – "quality initiative e-learning in Germany" (Q.E.D.) – focuses on developing a harmonized quality model that should lead to low risk investments for users and better marketing possibilities for suppliers due to market transparency. Open workshops, carried out in cooperation with the German Institute for Standardization (DIN), invite actors from the commercial sector to actively participate.

LERNET's great success can be attributed to the excellence of participating enterprises and research institutions, their commitment as well as their willingness to cooperate in networks. LERNET is exemplary for a successful transfer of academic innovations to marketable solutions.

I am convinced that by continuing in this manner Germany will become an e-learning centre of international importance. I also hope that future endeavours will be just as successful.

Yours sincerely,
Wolfgang Clement

"Instruction Manual"
How to use this guide

The fact that you are reading this guide probably means that you are responsible for training and continuing education in your company or municipal administration. Maybe you are in the process of deciding whether to introduce e-learning or not, and thus require some convincing arguments. Perhaps you are a trainer or content producer, who wishes to increase the scope of his online courses. Then this guide was written with you in mind.

E-learning has already reached a certain level of circulation in companies. One needs to make a distinction here, however. Nearly every second large company (46 percent) implemented e-learning by 2001, even if only for about one tenth of the workforce respectively. In small to medium-sized enterprises, however, e-learning was and is implemented to a notably lesser degree. In 2003, 18 percent of all SMEs made use of e-learning (cf. Köllinger/Ross 2003, Pg. 64). There are no statistics at the moment on the distribution of e-learning in municipal administrations.

Nevertheless, a large number of people in charge and employees in SMEs show a positive attitude towards the new form of learning. Some of them even hit the front pages of Germany-wide newspapers, for instance the Lünen, Germany-based electroplating company Dörre where teams of young computer enthusiasts and qualified elderly employees with many years of experience developed learning units for their colleagues. In addition to that, the range of so-called "blended learning courses" (where online learning sessions alternate with classroom sessions) has increased remarkably in recent years. Blended learning courses are a popular alternative to "pure" e-learning courses.

The range of e-learning offerings for training and continuing education now cover a wide variety of topics and specialist areas. There are, however, no clearly arranged directories. Many applications concentrate in particular on information technology. Moreover, a large number of courses have been

added for attaining important qualifications (soft skills, such as leadership, communication skills). Although the offerings are very extensive, there are still large gaps. Especially rare are e-learning applications that focus on vocational qualifications for technically oriented professions and inter-disciplinary qualifications. In addition to that, most of these courses do not really motivate learners. Very often course materials are based purely on the textbooks developed for face-to-face instruction. Multimedia and interactive course materials based on reasonable teaching principles are unfortunately the exceptions.

During the course of the LERNET Project, eleven project consortia were given a chance to bridge these gaps within three years (from 2001 to 2004). In doing so, they have by all means made groundbreaking achievements and produced a wide variety of didactic and technical innovations. The readers of this guide can now benefit from the results and experiences of the LERNET Project.

The authors of this guide, that is, the LERNET team of researchers, have consciously chosen a modular structure. By doing so, the chapters do not have to be read in succession. The reader could very well start with the list of questions on the next double page . Depending on which of these questions are currently relevant to you, you may directly go to the chapters with the respective answers.

Chapters 1 to 13 outline the world of e-learning from the point of view of decision makers in SMEs or public administrations, whereas chapters 14 to 17 take on the point of view of e-learning producers. This is not to say that the chapters are not suitable for either party. More on the contrary: Going to part two as a decision maker provides you with a glance behind the curtains of e-learning producers – and vice versa – in chapters 1 to 13 a trainer or producer is given a chance to put himself in the shoes of his customers. Chapters 19 and 20 build on the discussions in chapter 1 and 5 and give an in-depth look into the organization of e-learning offers and tips on how to choose the "right" learning contents. In addition an extensive glossary is integrated which explains central terms of e-learning in a comprehensible way – please attend to the terms highlighted in green.

Side note: The printing of such a brochure quickly runs risk of becoming obsolete with regard to the sources mentioned – especially with Internet links. That is why the authors will keep on updating the references that may be accessed at the LERNET Web site (http://www.lernet.info).

Essen and Berlin, December 2004

Content

1 E-learning at a glance

What are the benefits of e-learning? What types of Web-based learning exist?

Describing e-learning as a solitary means of learning in front of a computer screen would certainly be inadequate. This explains why the notion that computer-supported training only entails learning programmes on CD-ROMs to be handled by the employee by himself is outdated. E-learning now encompasses a wide variety of different forms of learning.

Nowadays e-learning products have taken the shape of courses; that is, they are self-contained and serve to systematically present a subject area. Learning contents can also be accessed via the Internet, and, if the occasion arises, supplemented by active "discussions" with trainers and fellow learners via communication services, such as e-mail and forums (see below for more information). Often these e-learning offerings are supplemented by classroom sessions and thus are called blended learning. E-learning may also encompass so-called "learning-on-demand" solutions which serve to immediately solve problems at work.

Activities that do not qualify as e-learning include, for instance, researching the World Wide Web with the aid of search engines, because such contents are not designed with didactic considerations in mind. Also, the use of presentation tools in classroom teaching (e.g. Power Point slideshows) does not really qualify as e-learning, but – in a broader sense – as computer-supported training or rather technology-based training.

In this guide we distinguish between the four basic forms of continuing education:

- Classroom instruction (without the support of computers)
- Blended learning (classroom instruction + computer-supported online learning)
- E-learning (WBT or CBT without classroom activities)
- Learning-on-demand, which stands for demand-oriented usage of learning units, lexicons and other aids to be used whenever problems occur and need to be solved quickly during operational processes.

The last three forms of learning may be supported by an online learners' community or online tutors and instructors.

The most important functions of an e-learning programme are:

- Learning content – the actual learning material plus exercises and additional texts
- Communication tools – these facilitate the communication between learners and trainers/tutors and with other learners
- Administration tools – menus and forms which may be used to personalise the learning environment
- Skill management – functions that serve to monitor the learning success
- E-learning tools for trainers and authors – within the framework of e-learning, tutors, instructors and authors have, in addition to the four functions, a wide range of tools at their disposal, which possibly have an impact on the clarity of the e-learning solution.

This list only offers a brief overview of e-learning functions. In chapter 19 and in the glossary, you will find an in-depth explanation of e-learning tools and functions.

2 Target groups and users

Which employees are suited for e-learning? Which requirements need be met?

Generally speaking, there is nothing to be said against the idea of allowing every employee in a company to use computer-supported learning (e-learning). Normally, e-learning offerings address specific target groups. To ensure that a continuing education measure is successful, it is necessary to answer two questions first:

1. What kind of knowledge do employees or the enterprise as a whole need (assessing training needs)?
2. Which employees are capable of utilising e-learning?

To answer the first question, the training needs in the enterprise have to be assessed. In doing so, it is necessary to determine the employees' present qualifications (actual) and the ones they need (target) to contribute to achieving corporate objectives. In other words, the actual situation will be compared to the target situation in order to decide on future personnel development schemes. What such an assessment might look like will be dealt with in chapter 3 "How to identify learning needs".

Having assessed training needs, it is necessary to check whether and which form of e-learning can be implemented. Two questions are of utmost importance in this regard:

- Are the technical requirements met?
- Does the employee have sufficient computer skills? What kind of learning skills does he possess (attitude to learning, learning habits, etc.)?

The following checklist is based on the insight gained from a recent study (by nordmedia elearning Competence Center/MMB 2004).

Checklist

Necessary technical requirements

- ○ Does the employee have a computer at his disposal at his place of work? Is there a computer that may be used for learning purposes?
  If this basic prerequisite is not met, consideration should be given to either allowing the employee to have access to a computer or checking whether he can use an independent learning centre at an educational institution.
- ○ Does the employee have access to the Internet at his place of work?
  This is absolutely necessary for Web-based training and blended learning.
- ○ What is the data transmission rate of the Internet connection? Modem? ISDN? DSL? WLAN? UMTS?
  As a rule of the thumb: The faster the transmission rate, the easier it is to use e-learning courses. Downloading pictures or large files, for instance, via a modem takes a great deal of time. Prior to starting an e-learning course, it is necessary to ask the provider about the required data transmission rate.

- ○ Can the employee's computer download pictures or audio data or does the company's firewall restrict access to specific learning offerings?
  Complex multimedia contents might be blocked by a firewall. Examples of such rich media contents are the integration of large diagrams, videos, animations (cartoons), interactive databases or so-called virtual classrooms, where many learners can learn together. Again, you should ask the e-learning provider for details about this.
- ○ Is the computer equipped with a camera (webcam) or microphone?
  This equipment is necessary in some e-learning offerings for conference channels in learning groups.
- ○ What is the employee's private computer equipment like?
  Often e-learning is carried out at home. In such cases, the employee should also have suitable technical equipment at his disposal, e.g. a company notebook.
- ○ Is there sufficient technical support available, should any problems occur (at work and/or at home)?

A practical example from the LERNET project

WebTrain

The blended learning offering of the WebTrain project is directed to public administration and municipal employees who want to improve their qualifications and thus the opportunity to attain better positions. Prerequisite for this course was to have successfully completed the Administrative Assistant Course I. During the evaluation course, it quickly became obvious that only a few of the prospective participants for the blended learning course actually had this qualification. Moreover, the computer and Internet skills of the individual participants varied considerably. It was the tutor's task to reconcile the different demands of the 13 people participating in the evaluation course. In doing so, he was the primary contact person for every issue (technical, learning content, learning process and scheduling) in order to successfully guide the participants through the 24-month course.

Checklist

Assessing an employee's computer and learning skills

- ○ How familiar is the employee with computers?
  Successful e-learning requires, for example, a basic knowledge of how to use an operating system and Microsoft Office programmes (or similar software). If this is not the case, it is advisable for the employee to take an introductory (attendance-based) course in standard applications like Word or Excel.
- ○ Does the employee have the ability to obtain information on his own to solve problems occurring during work procedures?
  For example: If the employee regularly uses search engines like Google or Yahoo to do research, then it will be quite easy for him to handle forms of learning, such as knowledge management or learning-on-demand.
- ○ What are the employee's learning skills like?
  Based on our experience, employees who have not participated in some sort of professional development schemes or do not read specialist literature pertaining to their area of expertise after completing their professional training, have a lot of difficulties with e-learning at the very beginning. The amount of effort employees must make during this phase is particularly high. For such employees, the so-called blended learning programmes, which are characterised by a high proportion of classroom activities and intensive support by tutors, are very important.
  On the other hand, employees who regularly brush up their occupational knowledge by attending workshops or researching the Internet, may utilise forms of e-learning which focus more on self-organised learning.

3 Learning needs

How to identify learning needs?

In chapter 2 we discussed that it is absolutely necessary to get the employees involved in order to identify continuing education and professional development needs. Identifying these needs goes far beyond the introduction of an e-learning programme. That's why this chapter digresses into this topic. Readers who are primarily interested in the introduction of e-learning may skip this chapter (for the time being).

The point is to establish a sound basis for further personnel development measures. The objective is to train the employees in such a way that they can handle their responsibilities at the best of their ability. Today, innovations in technical areas change much quicker than they used to 20 years ago. As a result, employees need to be able to acquire new knowledge at all times.

Particularly large enterprises rely on external consultants for identifying training needs. Instruments, such as competence balancing (cf. Erpenbeck/von Rosenstiel, 2003), may also be used to assess the knowledge of employees. The goal is to balance the primary skills employees have (such as team work, market orientation, one's own initiative) and the skills required for work.

In smaller companies, such an assessment is usually not necessary. In this case, brief interviews with section managers and employees are most helpful.

Furthermore, employees often express their wishes themselves, for instance, the desire to participate in a convention or trade fair. Progress reviews also help to find out more about employee wishes. Even conversations between employees may reveal training needs.

Often enough the company itself determines what has to be learned, for example after having purchased a new machine or before launching a new product.

A practical example from the LERNET project

eQtv

Some of the LERNET projects implemented at the very beginning questionnaires to identify the current state of knowledge in the company. It turned out that nearly all employees expressed some specific needs for training.

Computer literacy needs are extremely high, followed closely by professional knowledge and skills for specific areas of work.

Basically, it is necessary to distinguish whether an employee wants to bridge gaps in his knowledge or if he wants to deal with a completely new topic? In the first case, learning-on-demand would be appropriate. In the second case, a basic course organised as blended learning is an option.

It is not only important what an employee wants to learn, but whether the course ends with a certificate or degree. There is now a wide range of e-learning courses that offer qualified certificates, e.g. certified real estate specialist (cf. LERNET project NetLlm). In doing so, a course offers a seal of quality at the same time (for more information, see chapter 9 "How to check the quality of e-learning products?"). Course degrees that are certified by the chamber of commerce and industry may just as well be regarded as a seal of quality.

It is worthwhile not to focus on individual cases. By looking at all the records of personnel reviews or competence balances, it is possible to gauge the learning needs. The more employees are interested in a specific learning content, the easier it is to contract an e-learning provider to prepare custom-tailored courses.

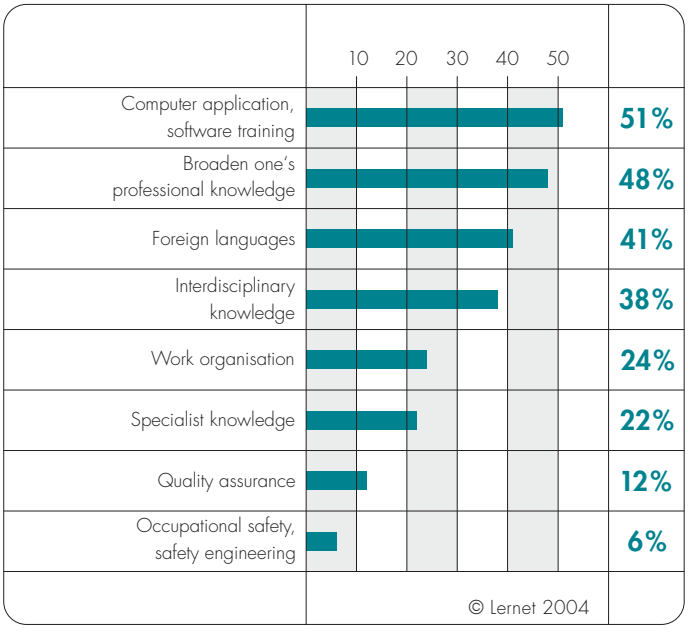


Figure 1
Learning needs: Topics asked for during the LERNET project eQtv;
Source: Fraunhofer Institute IAO.

4 Forms of learning

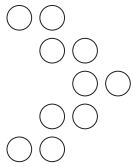
Which forms of learning are suited best for individual employees?

The introduction of e-learning in an enterprise used to be problematic, because the learning habits of employees did not really match the e-learning forms. Frequently, employees were given free rein with the expectation that they would learn on their own.

While the structure of the different forms of e-learning was briefly described in chapter 1 "What are the benefits of e-learning? What types of Web-based learning exist?", chapter 19 will cover this in greater detail. The question is, however, which forms of e-learning suit what kind of employee?

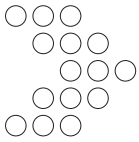
In general, it can be said that employees who like to work with computers and who grew up with computers, so to speak, are very enthusiastic about e-learning. This holds true for younger employees who have a high level of education and whose workplace has always been a computer. In such case, there is nothing to be said against learning-on-demand offerings. This target group readily accepts learning modules that can be accessed easily and completed at work. The availability of support via e-mail or a hotline is by all means helpful here.

Older employees with lower level of education or who have had little opportunity to take part in continuing education are more likely to be resistant to e-learning.



Inspiring this target group to embrace e-learning can best be achieved by offering blended learning with approx. 50 percent of the course taking place in a real classroom. In addition to that, tutorial support is a must here.

Especially employees who seldom work with computers have immense difficulties with technology during the very beginning and therefore need to be strongly motivated. Moreover, learning offerings ought to include support services by either the supplier or an internal trainer taking social and technological aspects into consideration.



It is especially challenging to plan a learning programme that, while dealing with a specific subject, needs to address employees in different positions and functions within a given company, e.g. when managers, administrative assistants, trainees and members of the IT department have to participate in a course on Internet security.

In such cases, consideration should be given to ensuring that the course has a modular structure. For instance, an internal trainer can select and adapt the material to be taught from the appropriate modules to suit the respective target group.

A big help are the e-learning courses that address different target groups and levels of previous knowledge right from the start.

A practical example from the LERNET project

WebTrain

The WebTrain project focuses particularly on supervising inexperienced e-learners. Its goal is to offer the Administrative Assistant Course II (a qualification leading to a higher position in public administration) as a blended learning solution. Until now, this course was available only as a classroom course. The target group was recruited from the entire personnel of the municipal enterprises in Duisburg.

While preparing the course, it was necessary to take into account the different levels of previous knowledge, the individual computing skills and learning experiences of the members of these business units (e.g. waste industry). As a result, the WebTrain project consortium supplemented the online independent learning phases with chat and virtual classroom sessions. By doing so, it was possible to achieve a higher motivation and a better comprehension during the learning processes.

A practical example from the LERNET project

I-can-EIB

The I-can-EIB project has come up with a solution that differentiates between the following users:

- building owner
- architect
- electrical engineer
- electrician

These are already mentioned as the target audience on the Website. The user can look at the learning material designed for the specific target group he belongs to. Building owners focus on the basics, while specialists deal with the technical installation in detail. This procedure has no impact whatsoever on how the individual learning modules are prepared. When putting together the material, particular attention should be directed to the concept of separate target groups.

5 Learning Contents

How to find the right learning content?

Where can I find an overview of the range of e-learning programmes in terms of content? What learning contents are available on the market?

Anyone who wishes to integrate e-learning in internal training programmes should consult databases on continuing education in the Internet, overviews in specialist journals and advisory reports from chambers of industry and commerce and industrial associations. In chapter 20 "List of learning contents", you will find an overview of select organisations where you can begin your search for e-learning offerings that are available on the market.

Looking at which topics are offered most frequently as integrated e-learning based on a continuing education database (see figure 2) reveals that cross-sectional competences, such as imparting specialist knowledge (e.g. double entry bookkeeping, controlling) and know-how regarding standard computer applications (e.g. Microsoft Office, Linux) and IT-based business processes (e.g. databases, programming languages), have the greatest circulation. These are followed by soft skills, which deal with how to behave or conduct oneself and communicate (e.g. rhetoric). Less common are courses that focus on teaching technically-oriented professional skills (e.g. introduction of lighting technology), or social soft skills (solving conflicts and working in a team, etc.). E-learning offers for foreign languages, law, quality assurance and new product training are available to a much lesser extent than interdisciplinary learning contents.

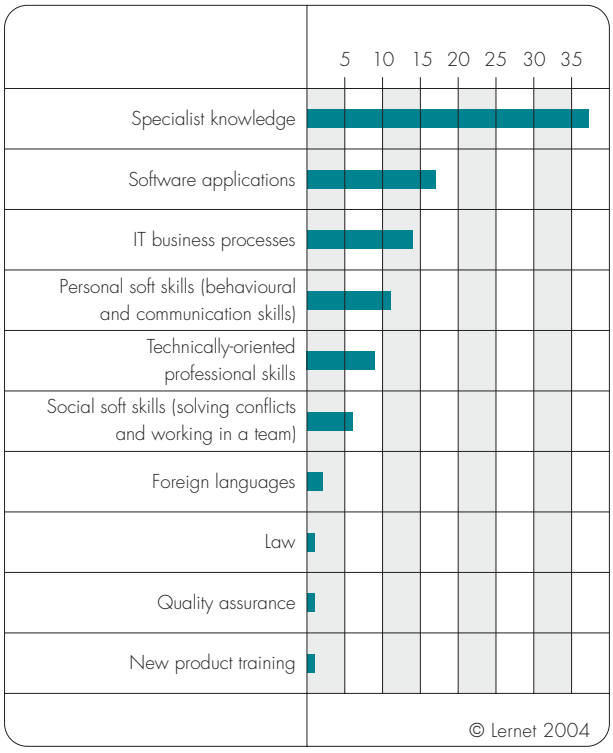
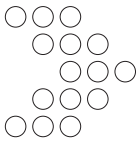


Figure 2
E-learning contents in the iltec database, frequency in percent; Source: www.iltec.de.



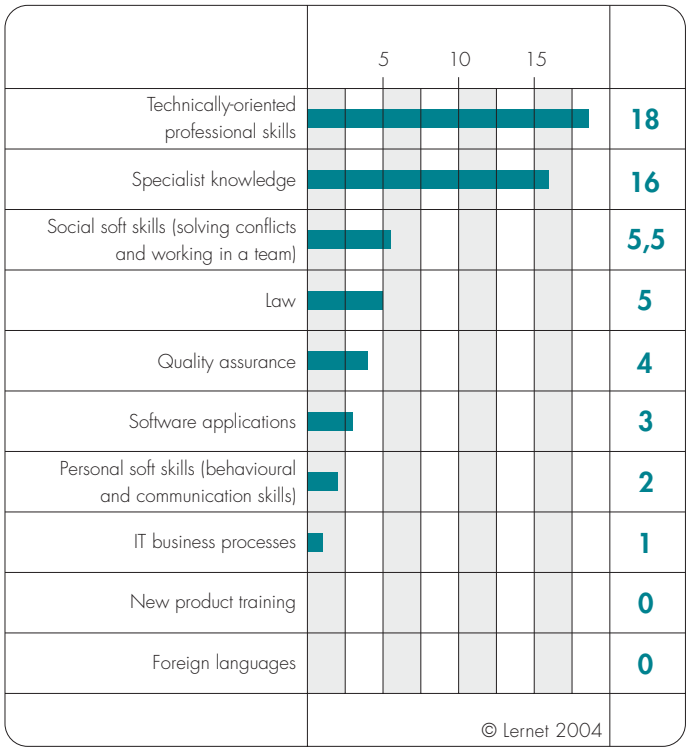


Figure 3
E-learning contents within the LERNET project (absolute frequency); Source: LERNET Accompanying Research.

Comparing the thematic orientation of the LERNET e-learning projects with the ones in the above analysis shows that LERNET has chosen a different, if not supplementary, thematic orientation (see figure 3). Technically-oriented professional skills (introduction to mobile telephone systems, UMTS or European installation bus) rank highest of all LERNET learning contents, closely followed by training in business skills (budgeting, costing and online marketing, among other things). Moreover, social soft skills, such as conducting employee reviews or solving conflicts as well as legal issues (industrial law, regulations concerning energy saving, etc.) have been included in the LERNET e-learning projects.

In addition to that, elements of "quality assurance" (e.g. information management), "standard software applications" (MS-Office for craft enterprises, etc.) have been developed as e-learning measures for SMEs and the public service.

A holistic training concept, combining technical know-how and personal skills, has been implemented within the LERNET project HALMA. Employees of a typical craft enterprise (joiner's workshop) were given the chance to simulate the effects of their decisions on key processes in the craft enterprise.

A detailed overview of the LERNET contents can be found in Appendix 1.

Besides researching on your own, it is also possible to consult e-learning advisors who as an external expert can recommend existing e-learning solutions based on a company's specific needs. In this case, you have the option of utilising the advisory services of an e-learning provider or contacting an independent consultancy.

At the moment, there is still no list of independent e-learning consultants. And the e-learning handbook (cf. China 2002) that is available contains a somewhat obsolete overview of e-learning consultants. Some good places to look, however, when searching for such consultants are associations like D-ELAN (German Network of e-learning Actors), German Trade Association for Digital Industry (BVDW) or Bitkom. On top of that, there are the chambers of industry and commerce and initiatives launched by the Federal States (e.g. e-learning competence centre of the 'Medienförderung nordmedia' in Lower Saxony).

Making use of specialist forums in the Internet and specialised Websites on e-learning can be an appropriate strategy for discussing questions with experienced e-learning users and to profit from their experiences. A case in point would be a community developed for instructors and trainers, teachers and lecturers under the name of 'foraus.de'. This community was initiated by the Federal Institute for Vocational Training and Education to focus on organisational conditions for e-learning and the requirements placed on trainers and instructors within the framework of topical forums.

Checklist

Preliminary thoughts on selecting e-learning products on the market

With regard to systematically selecting suitable e-learning offerings, it is advisable to draw up a small list of requirements based on an analysis of the situation (technological infrastructure, budget, profile of the target group). The following issues should also be taken into account:

- ○ costs which may occur, such as licence fees and online service charges
- ○ technical requirements
- ○ definition of the target group
- ○ course objectives
- ○ forms of learning (if classroom activities are planned, where and when will they take place?)
- ○ supplier references/experience
- ○ evaluation by former participants
- ○ quality standards or certificates/seal of quality
- ○ planned budget for the e-learning offer

Distribution platforms, such as webkolleg-nrw.de or iltec.de take the above mentioned criteria into account before adding e-learning offerings to their databases.

A practical example from the LERNET project

clear2b

As part of the LERNET project clear2b, an electronic questionnaire was developed, which could be useful when selecting Web-based training or WBT. The evaluation tool, BasicClear, was created on the basis of 400 criteria taken from e-learning checklists. With this tool it is possible to evaluate didactic and content-related organisational issues, communicative and motivational components as well as user-friendliness and design. Moreover, questions concerning the learning context (target group, course objectives, framework conditions such as place of instruction and learning contents) are considered.This tool is distributed via the company pallas GmbH as part of its advisory service.

Another indicator for quality with regard to e-learning offerings is the possibility to arrange individual learning units according the users' needs. In this case, it is necessary to take into consideration who is in charge of updating the individualised course modules. Some suppliers include authoring tools in their portfolio, which can be used by employees without any programming knowledge.

When drawing up e-learning offers, be it an order placed with an e-learning producer or on one's own initiative, and when selecting a Learning Management System (LMS) for managing learning contents and the individual learners, it is necessary to assess the situation. It is also a good idea to carry out extensive market research with regard to e-learning producers and suppliers. At the same time, we recommend reading (complimentary) newsletters, such as global-learning.de and e-learning-expo or specialist journals in order to stay up-to-date on current market developments.

An initial selection of suitable suppliers can be found by researching in the Internet or visiting trade fair booths, by requesting brochures and studies (e.g. regarding Learning Management Systems, reports on suppliers on the market).

Suppliers receive an outline of the project or rather a requirements specification by the person in charge of e-learning in an enterprise. This outline should contain the following clear and concise information:

Checklist

Information to be included in an enquiry for a "tailored" e-learning solution?

- ○ objective of the project
- ○ learning contents
- ○ course objectives
- ○ forms of learning
- ○ learning groups and their requirements
- ○ existing technical infrastructure
- ○ budget
- ○ composition of project teams
- ○ time frame for the project (including milestones, such as trial phase)

Which requirements should an offer made by an e-learning supplier in response to an enquiry based on the above information fulfil?

The checklist below contains the must important criteria in this regard:

Checklist

Information the e-learning provider should offer in response to a first customer enquiry

For the e-learning provider:

- ○ What kind of reference projects does the supplier have? Are the reference projects related to the requirements of the current project?
- ○ Is the supplier able to reach the customers' premises in a very short time period?
- ○ What other contracts is the supplier handling at the moment? Is he capable of dealing with another project?
- ○ What kind of market experiences does the supplier have? What is his market position and does he has a good reputation in the sector?

With regard to the e-learning offer:

- ○ Does the offer take the defined project requirements sufficiently into consideration?
- ○ Is there an initial, convincing rough estimate of fixed charges and current costs?
- ○ Does the schedule meet expectations?
- ○ Have any suggestions been made about further steps for planning and project implementation?
- ○ Is the offer easy to understand? Does it contain any alternate solutions?
- ○ Does the offer take the existing computer equipment into account (see chapter 8)?
- ○ Do the offer's requirements match the capabilities of the employees (beginners, experts, etc.)?
- ○ Does the didactic concept match the learning habits of employees? (see chapter 3)
- ○ Is the supplier capable of making necessary adjustments for your company? Please note that this may involve substantial additional costs!

Additional tips for negotiating with e-learning suppliers can be found in the brochure published by the BVDW e.V. (Federal Association of Digital Industry, formerly dmmv) (2000).

6 One's own learning contents

Is it possible to integrate one's own learning contents?

E-learning offers do not have to be self-contained. Many programmes allow companies to integrate their own contents. This can be useful,

- if a company wants to add learning contents that are relevant only to that company (logos, operation of specific machines, factory agreements, etc.)
- if contents should be updated (continuously), because the state of knowledge in specialised areas continues to progress.
- if there is already existing learning material on that subject that shall be reused (manuals, PowerPoint presentations)
- if a company wants to develop its own exercises for a learning unit.

In this case, there are a variety of options available:

1. Software suppliers provide so-called Learning Management Systems (LMS), which can be used to manage one's own learning contents. The costs of an LMS can range from several thousand euros to millions of euros, depending on the functions that have been included. A lot of suppliers offer access to demos and trial installations which can often be used for free during pilot phases. In addition to that, there are so-called ASP models (Application Service Providers) that eliminates the need to install Learning Management Systems on your own servers. The LMS provided can then be accessed via Intranet or Internet. This service is subject to fees for usage that are often based on the number of users and time used.
2. Learning contents that are provided as modular and granular units can easily be combined especially by in-house trainers and instructors in institutions of further education with their own material, even for preparing classroom instruction. All of the LERNET projects offer this option to their target groups.

A practical example from the LERNET project

clear2b

By the way, forum discussions, chat sessions or discussions in a virtual classroom are great places for finding ideas for creating, supplementing and expanding of your own learning contents. During the clear2b project, many topics and issues were discussed in forums or chat rooms with experts and then summarised by the instructors and made available to participants.

A practical example from the LERNET project

prodela

During the prodela project, the participants in the forum discussions (Community) had the chance to transform their everyday work experiences into practical examples and to make theses available for Community members. In order to ensure that the case studies have similar formats or structures, a template is made available with information about layout. All the case studies are reviewed by an instructor with regard to contents in order to correct any inaccurate or confusing passages. Community members can see the status of the practical examples ("released" or "not yet released") based on a comment added to the document.

7 E-learning costs

How much should e-learning cost maximally?

What initially inspired a lot of human resource managers were the cost arguments. There was hope that computer-supported learning arrangements would contribute to reducing employees' travel expenses and non-productive times at work. Expectations were not always met however. Frequently, the costs for "tailored" e-learning solutions were significantly higher than the savings. This, of course, is not a good argument against e-learning.

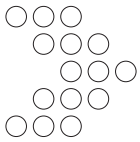
As it turns out, the planning of an e-learning course is usually much more time-consuming and expensive than classroom courses. Therefore, investments are more worthwhile for enterprises with a large work force, while small to medium-sized enterprises just do not have the "critical mass".

Consequently, SMEs have to rely on "purchased products", i.e., commercial, off-the shelf courses that are available as CBT or WBT. These products, however, do not come with any additional support or classroom activities. On the one hand, such products offer a cost savings. On the other hand, e-learning experts complain about the poor quality of these products, because they are not geared to the needs of their companies. Moreover, employees miss individual support services.

That is the point where LERNET comes into play. The eleven LERNET projects have developed e-learning offerings for different industrial sectors at affordable prices. In doing so, different accounting models are implemented:

- The advantage of modular and granular e-learning offers is that an enterprise does not have to book an entire course. It only has to pay for the contents needed for its specific learning needs. In this case, the accounting model would be pay per lesson.
  The costs for the modules are also reduced in that the supplier can use them many times. That is in different courses (e.g. the module "employee review" may be used for the courses "manager training" and "personnel development").

- To find cost-effective offers, you should not only look at pure e-learning suppliers, but also insti-



tutions for further education with classroom activities. More and more organisers are transforming their pure classroom courses into blended learning courses. Parts of the course can be completed by e-learning at home or at work, while other parts proceed as normal in the classroom. The prices for these blended learning courses are comparable with the prices of traditional classroom courses (see list of institutions for further education within the LERNET project in the appendix).

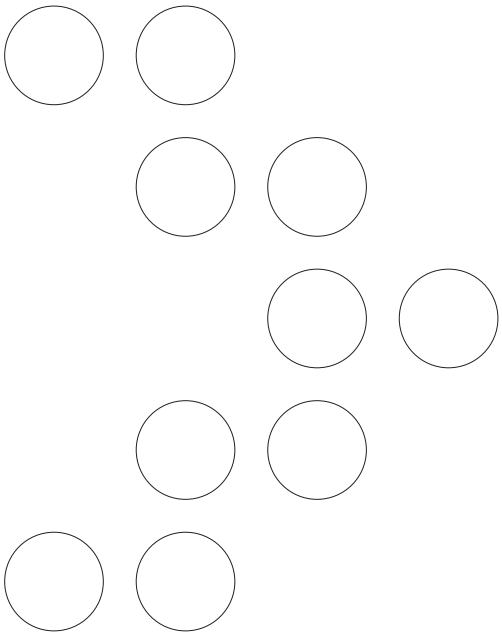
- If the learning needs are still unclear and further education should occur for the most part as learning-on-demand, a subscription model is also advisable. For an annual one-time fee the participant has access to all available learning modules and tools, if necessary, this might also be extended to a Community or personal support.

In any case, it is worthwhile for the person in charge of e-learning to determine the number of potential participants for a specific subject area as early as possible. That way, he can decide on the most appropriate accounting model.

Provider communities or content sharing platforms offer another option for selecting from a wide variety courses you want based on individual interest or needs. In this case, a number of content providers have joined together to distribute their contents jointly.

Of course, quality is with favourable prices always a moot point. How good can learning applications be when they are produced based on lean production? Seals of approval and quality standards have been developed over the past few years to help anyone in charge of e-learning gain insight on quality (for more information, see chapter 9 "Product quality").

This is what the current situation on the market looks like for decision makers. It is worthwhile to have a look behind the curtain. In chapter 18 you will find the business models from the point of view of the suppliers.



8 Technical requirements

What technical requirements are necessary?

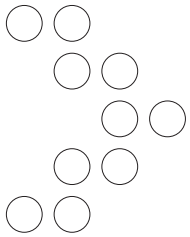
The different e-learning application cannot be used on every computer. It depends on the specific requirements of a learning software, i.e. what type of the computer equipment is necessary.

Checklist

Technical requirements for equipment and learning/work environments

Prospective customers should inform themselves early on if the respective e-learning offer has any additional requirements with regard to the equipment:

- ○ Pentium computer capable of handling multi-media and with access to the Internet
- ○ If the learning material also comprises audio, then a sound card and speakers are necessary.
- ○ A programme (such as Real Player or Windows Media Player) which can play audio files is also useful.
- ○ Complex pictures require a powerful graphics card. In this case, it is necessary to check the size of the card's memory. Furthermore, the card should be able to handle the graphic standard DirectX 8. The ability to display 3D pictures quickly also requires high-speed computer processors.



- ○ Often larger data files must be downloaded from the supplier's server. This requires not only a lot of space on the computer's hard drive or the company's server, but also a high-speed Internet connection (at least ISDN or even better DSL).
- ○ In this case it is necessary to ensure that the Internet browser has plug-ins like Acrobat Reader for downloading PDF files, Java or Macromedia Shockwave/Flash Player for displaying flash animations, Quicktime or Media or Real Time Players.
- ○ If a virtual classroom solution is selected, it is necessary to have a microphone or a head-phone and possibly a camera (webcam) installed on the computer that will be used.

Workers in many companies do not have such work stations at their disposal. In such cases, it is necessary to set up corresponding stations for learning (for more information, see chapter 12 "Time and place to learn").

Practical examples from the LERNET project

Some e-learning offers (such as NetLlm or eQtv) are based on video animations, which can be downloaded as streaming media. One programme that may be used for playing back such media is "Quick time".

Practical examples from the LERNET project

Tests conducted in individual LERNET projects have shown that e-learning often takes place during free time. The reason for this is that it is difficult to learn while at work because of interruptions due to visitors or colleagues or the company's computer equipment/system (to name just a few). Many companies and public administrations do not allow their employees to access the Internet in order to prevent them from surfing while at work.

Security also plays a role: The need to protect data from external access and eliminate the increasing risk of viruses have made firewalls almost impenetrable, which in turn complicates the use of e-learning solutions, for instance the downloading of audio files or the use of a microphone.

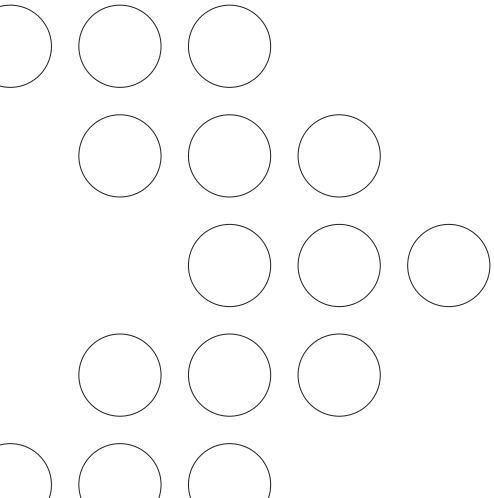
That is why many projects have shifted virtual classroom activities to evenings and have extended the hours during which learners can communicate with tutors, since participants use their own personal computers which usually have many more functions during that time.

The havoc caused by the "blaster worm" has started, however, a new trend. More and more people are protecting their own computers by setting up firewalls at home and thus blocking important Internet functions.

Even the best computer equipment does not ensure that there will be no technical problems. Many companies have installed firewalls in order to protect their data and to prevent any private abuse of Internet privileges. This does complicate Internet access to many e-learning offerings. In such cases, the work station must be set up to allow access to all relevant sites in the Internet and the downloading of necessary files. For this purpose, it is necessary to consult your company's IT administrators. It is also a good idea for e-learning providers to offer secure data connections to their products (instead of "http://", the Internet address would begin with "https://", as used in online banking for instance).

Taking care of technical problems does not eliminate another concern however, to what extent employees are able to learn at home (see chapter 12 "Time and place to learn"). In this respect, companies should also support employees in setting up their private computers.

In general, computer problems may discourage or have a negative impact on e-learners especially in the very beginning. Therefore, it is advisable to have experienced computer users test the system or to set up technical support for addressing problems that occur during the first phase. In doing so, it is necessary to ensure that support is available very early in the morning (from 6 to 8 a.m.) and in the evening (from 6 to 10 p.m.) as well as on Sundays and public holidays.



9 Product quality

How to check the quality of e-learning products?

The wide variety of e-learning programmes that are available on the market often makes it difficult to evaluate individual offers. How do you find out whether a specific application really suits your objectives?

There are various options for checking a programme before deciding whether to (or not to) implement it in your company.

- Seal of approval and certificates
- Auditing by external consultants
- In-house auditing on the basis of quality standards
- Pilot tests in your own enterprise

Seal of approval and certificates
While there are seals of approval for many products and services, there are only a few certificates for e-learning. Two of these shall be briefly described below:

- ZFU-Certification: Every commercial distance-learning programme in Germany has to be approved by the ZFU (Central Office for Distance Learning). It does not matter if the course material is available on paper or as e-learning. In this case, the course concept and its implementation are evaluated.

Figure 4
ZFU Seal of approval.

- Distribution of e-learning solutions via platforms subject to quality assurance: E-learning programmes for continuing education and training can be purchased directly from suppliers and via Web sites from resellers who also provide these contents. In some cases, only programmes that satisfy the given quality criteria are offered. A case in point would be the "Webkolleg NRW" platform, which has established its own quality criteria. Only offerings that meet these criteria may be made available via the platform. Currently, there are two partners from the LERNET project (Handwerkskammer Bildungszentrum Münster and TÜV-Akademie Rheinland) that are listed in the Webkolleg NRW database for e-learning offers.
- Other seals of approval are currently being developed. They are expected to be introduced in 2005.

External consultants
You can also make use of external consultants. Many service providers have specialised in advisory services for companies that want to introduce e-learning (for more information, see the relevant section in chapter 5 "learning contents").

Practical examples from the LERNET project

LEVER and clear2b

Concepts for advisory services were developed during two LERNET projects:
(1) In the LEVER project an advisory service concept for educational matters was tested with selected publishing houses. This concept may be transferred to other sectors as well. During the pilot project, human resource managers from the LEVER project had at their disposal senior (independent) consultants, who were very familiar with the publishing industry and its daily routines.

First, the senior consultants carried out a target/actual analysis (what are employees able to do? What do they have to be able to do in order to work effectively and efficiently within their scope of responsibility? What skills do they need to hone or learn?) Recommendations for continuing education are integrated in the company's objectives (increasing productivity, starting or expanding specific business segments, etc.), while taking into account previous continuing education strategies and employee learning habits. The implementation of the recommendations is continuously monitored and checked by the senior consultants with regard to effectiveness and efficiency. If necessary, the recommendations are revised.
(2) A multi-level consulting concept was developed during the clear2b project. The initial idea was that face-to-face counselling of start-ups (e.g. creation of business plans) focuses on specific issues, once the respective companies have in-formed themselves about the contents in question via e-learning. This concept envisaged the development of a FAQ list, which contained answers to questions frequently asked during consultations. Moreover, anybody seeking advice was able to talk to experts, with whom they could meet in closed, virtual conference rooms (see video conferencing system). The modules of this concept (FAQ and video conferencing system) can be integrated in a virtual learning environments and in Web sites maintained by associations and chambers of industry and commerce.

Internal quality inspection

A company can also perform a quality check on its own. Since prerequisites can vary significantly from employee to employee and from company to company, there are various quality standards that should be used for such inspections. The project EQO (European Quality Observatory) founded by the European Commission has defined about 70 standards, ranging from simple checklists to complex systems that take into consideration every element involved in the production and introduction of e-learning. All these standards are available in a database ("EQO-Repository"at www.eqo.info).

E-learning is frequently associated with standards like LOM, SCORM, PAS, etc. These are not exactly quality criteria or seals of approval. Rather, such standards provide a basis for exchanging the learning contents of different suppliers. By doing so, they make a significant contribution to quality assurance (cf. chapter 16 "Quality management" in the guide for producers)

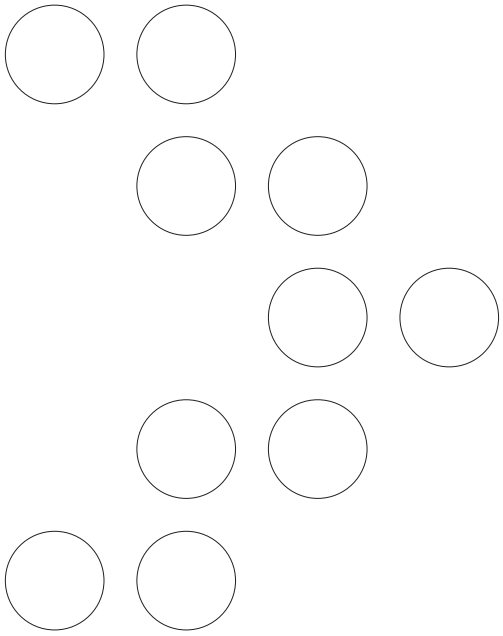
When purchasing e-learning-products it is important for users as well as decision makers to assure that the products are compliant to standards like LOM, SCORM, PAS, etc. Therefore this question should be part of the personal checklist when buying.

Pilot testing in your own company
A good idea is to have some employees test the e-learning application first before deciding whether to implement it or not. The following questions may help you to make the right decision:

Checklist

Evaluation of e-learning applications by trial users

- ◯ Are users able to find relevant information quickly enough?
- ◯ Is the navigation clear, easy to understand and remember?
- ◯ Is there any technical support or tutors available to facilitate the learning process?
- ◯ Is it possible for participants to exchange ideas and experiences with one another?
- ◯ Is it possible to set up the secure connections for accessing the learning offers?
- ◯ Do the users and authors "speak the same language"? In other words, is there a possibility that the use of specialised terminology or long, complicated sentences might discourage learners?
- ◯ Do the individual learning units have a uniform structure or layout, or is it necessary for the learner to adjust to the methodology used in each individual learning unit?
- ◯ Are the learning contents developed in such a way that learners are inspired to interact more?
- ◯ What is the user's personal impression?



Results from usability tests show that the following aspects are of utmost importance for e-learning:

- ◯ Intuitive navigation
- ◯ Functional, yet simple design (e.g. in the WebTrain project, learners did not like the animation films).
- ◯ Flexibility to adjust to the different needs of participants (ranging from sequential to self-contained learning contents)
- ◯ Stable learning environment, which can be accessed 24 hours a day.
- ◯ Technical support
- ◯ Precise feedback to the user (e.g. exact error messages)
- ◯ Orientation aids during the learning process (e.g. bookmarks, options for adding notes, progress check, exercises).

10 Motivation

How to inspire employees for e-learning?

Every person has made his own experiences with learning, with learning media and methods, and have thus developed his own learning habits. This often involves a certain amount of scepticism, including prejudices towards learning in general ("Learning is a sign of incompetence!"), towards learning contents ("Leadership skills can only be acquired by 'by doing'."), towards specific learning methods ("Role playing is not for me!"), towards certain media-based forms of communications ("Chatting is of little use for professional development.").

Unlike other forms of learning, e-learning has very specific demands with regard to the skills of users. For instance, the lack of familiarity with computers and the Internet might have a negative impact on the actual learning process and frustrate the learners.

Moreover, e-learning pushes the envelop by discounting the passive means of learning as is typical in classroom courses. Here, the user is encouraged to actively acquire contents (by working in groups or by himself) and to take responsibility for organising the learning process.

There are indeed factors that might affect the learning process. These should be avoided right from the start (see chapter 4 "Forms of learning").

What should be taken into account when designing learning processes and offerings? How to establish a favourable learning environment? The following tips and information are based on the results of several LERNET projects.

Tip 1: The introduction to the technical learning environment must definitely be integrated in the overall course. The introduction to the technical learning environment was an integral part of every LERNET project. To support classroom instructions, the participants were given a manual with the most important rules on how to use learning environment.

Tip 2: The stability of the technical system must be guaranteed around-the-clock.

The LERNET projects included technical support during learning. This service was provided seven days a week, either non-stop or eight hours a day – depending on the project. The learners accepted both ways. People did expect however the operation of the learning environment to be stable during periods with a lot of traffic, i.e. early in the morning, in the evening, on weekends and on bank holidays.

Tip 3: Different learning habits can be addressed by variable forms of presentation.

To address different learning experiences and habits, it is advisable to implement variable forms of presentation. These include audio, visual, textual and graphic presentation of contents. Moreover, learning contents can be organised in self-contained units or modules, which may be accessed sequentially or according to the learner's own preference. Tasks and exercises can also be checked by tutors in order to ensure direct feedback. This way, learners can monitor their own progress.

Tip 4: Offering incentives helps learners to accept new forms of learning.

Preferences for familiar forms of learning may have a negative impact on how learners look at new, unfamiliar forms of learning.

Variable forms of presentation and exercises help in this case as well. Moreover, material incentives might help to overcome any reservations learners may have. In some projects, it was possible to win over participants by lending them a laptop specifically for the course. In one LERNET project, prizes were raffled off among the participants who actively contributed to discussion forums.

Tip 5: Tutors and learning groups have a significant impact on the overall success (for more information, see chapter 11 "Support").

E-learning is not just e-learning. User requirements increase, when e-learning is implemented in its purest form, i.e. when learners are required to independently process learning contents via the Internet with less support by tutors and contact with other participants.

For certain learning objectives (e.g. acquisition of factual knowledge) and types of learners (autodidacts and people who like to learn) this might indeed be appropriate. Acceptance studies show however that most participants favour a combination of classroom activities and e-learning phases (i.e., blended learning), where discussions among all participants are taken for granted.

Tip 6: Stipulations regarding learning times and places are a MUST (for more information see chapter 12 "Time and place to learn").

Private and work-related responsibilities limit the amount of time available for continuing education. Thus, a well-defined cost-benefit analysis is crucial for deciding whether to participate in courses. Accurate information about the learning offerings (e.g. course objectives, learning contents, methods and time required for course) and the different modules support a targeted selection.

A practical example from the LERNET project

clear2b

In a forum set up as part of the clear2b project, participants were able to share their knowledge regarding IT security and supply chain management (for more information see chapter 11 "Support"). An external incentive system was implemented to motivate community members to actively participate in forum discussions. Participants who took part in the discussions by frequently making good contributions during a set period of time were given access to exclusive documents and the right to suggest topics for discussion. They could even win prizes. By doing so, it was possible to attract more community members. Moreover, a highly interested group of community members conducted very intensive discussions.

11 Support

Self-organised learning, learning in groups and/or tutorial support?

Support by tutors and communication between the learners are crucial for the quality of the learning process. Without these key components, e-learning is hardly accepted.

On the one hand, support is facilitated by communication tools, such as chat rooms, forums, e-mail, virtual classrooms and phone, (even call centres), while on the other hand face-to-face meetings are helpful as well.

E-learning demands great commitment from tutors and from course participants. We cannot stress this enough. Participants take greater responsibility for their learning, and with that also for the overall success of the course (for more information see chapter 10 "Motivation").

The training practitioner acts as tutor, adviser and moderator all at the same time and supervises the self-organised learning process. In order to fulfill these prerequisites, tutors have to possess the specialised knowledge and pedagogical skills for assisting participants with learning difficulties.

Every trainer involved in the LERNET projects, both from educational institutions and from companies, has completed courses to qualify as a tele-tutor, telecoach or NetTrainer (see links on trainer qualifications) in order to be able to fulfil this new role within the learning process.

Trainers in online-based learning processes frequently feel overwhelmed. They must be flexible and adapt to the times (see chapter 12 "Time and place to learn"), learning habits and objectives of the participants and must function as THE contact person learners can turn to when they have questions or problems.

Practical examples from the LERNET project

clear2b, prodela and I-can-EIB

To reduce the workload of the tutors, it was decided within the LERNET projects to compile a list of frequently asked questions (FAQ list) in order to address questions that recur.

Moreover, an e-mail-based answering tool that screens all E-Mail enquiries based on specific keywords, answers standard questions via e-mail and forwards specific questions to experts (administrators, tutors, etc.) was developed during the LERNET project prodela.

The I-can-EIB project is trying new avenues with an avatar, which reacts interactively to questions posed by users. Endowed with distinctive facial expressions, this animated character searches through a pool of questions and answers for the right answer and presents the answer either acoustically or visually.

Teaching concepts which focus on getting learners to communicate with one another show that tutors do not have to be the centre of the learning process.

In this context, community tools have become more and more popular over the past few years. These tools can be used during the actual learning phase (learning community) or after completion of training (support community or community of practice). They allow for virtual, text-based discussions in forums. Community tools also facilitate the operation of a virtual classroom or document filing system. To stimulate communication among the participants, discussions are usually guided by a facilitator and supplemented by incorporating prominent external experts.

This type of cooperative learning is the central didactic element of two LERNET projects clear2b and prodela.

A practical example from the LERNET project

clear2b

A support community was developed during the clear2b project. Via this platform e-learning participants could talk about IT security and supply chain management outside of net-based learning. Moreover, anyone who was interested but had not yet taken an e-learning course was invited to join the discussions at the community, which were moderated by a tutor (referred as "host" within the clear2b project). The tutor starts topical chats with external experts, records and edits them. The resulting documentation is then published in the document pool of the forum. Furthermore, the tutor is responsible for addressing all participants and motivating them to participate by posting their ideas. This also applies to participants who lurk in the background and just read long. Participants are also regularly informed about what is happening in the community via e-mail (pull tool).

12 Time and place to learn

Learning during work or after work? Learning at work exclusively, or on the road or at home?

Learning time

"Learning time is work time" – that is the opinion that prevails in most companies with regard to e-learning. Nevertheless, more and more employees also learn during their spare time (i.e. on their way to or from work, at home, etc.). The reason commonly given is lack of time for concentrated learning in the company.

Currently, there is a difference of opinions as to whether e-learning – and learning in general – should be shifted to the employees' free time or not. Although it is understandable, especially for employees of SMEs, to use unsalaried days for further education, it is very important for ensuring that work and learning proceed smoothly by clearly defining the times for learning and working.

Below are two exemplary models that are employed in SMEs:

- Model A: The **employer** allocates one or two hours a week which shall be used by employees for learning.
- Model B: The **employer** allocates one hour a week which shall be used by **employees** for learning; at the same time employees invest an hour of their free time for professional development via e-learning.

Moreover, time accounts should be considered. In this case, employees can save up overtime for professional development.

Labour law experts recommend establishing extensive regulations as part of the agreement on working and learning time while carefully consulting with the employee council. The following checklist contains key aspects that have to be looked at (cf. Prescher 2003).

Checklist

Elements of an internal agreement on work time and time allotted for learning

- ◯ Objectives of the Web-based measure
- ◯ Integration with traditional forms of internal and external training
- ◯ Integration with established systems for accrediting professional training (certificates, credit system, qualifications as part of retraining).
- ◯ Data security and testing

Practical examples from the LERNET project

Communicating with other course participants in chat rooms during work time was not acceptable for most of the LERNET pilot participants. They requested flexible learning times that could be adapted to the daily work routine. Fixed schedules and times for signing on to the learning platform during the day was out of question for participants. At the request of the participants, one of the projects shifted chat and virtual classroom sessions to evenings. In addition to that, key information gained during the discussions was compiled and made available by the tutor in the learning environment for downloading. Other projects did without synchronous communication altogether and focussed specifically on communication in forums.

A practical example from the LERNET project

prodela

Learning at a place of work where visitors come and go: Observations made by administrative analysts have shown that specific scenarios have to be developed to facilitate learning at work. For instance, short, self-contained learning modules were developed especially for employees who work in areas where visitors come and go all the time. By using bookmarks, participants were able to continue their learning process at any time and exactly at the point where they had been interrupted.

Learning places

E-learning is possible in nearly all places. At home, at one's place of work, in an island-like area set up by a company specifically for learning, in an educational institution or on the road (e.g. on one's way to work or home, or during other free time).

Factors that may have an impact on determining where employees should learn can be derived from the experiences gained in the LERNET projects. At first, we thought that online learning phases could be carried out both at work and at home to an almost equal extent.

However, it turned out that the greatest obstacle to learning at work was insufficient computer equipment. During the pilot phases of the LERNET projects, it also became apparent that employees hardly had any free space at work for learning. For instance, the daily work routine in many companies is dominated by the coming and going of visitors, colleagues and business partners.

If learning at work becomes impossible because of frequent interruptions, deadlines and a disruptive environment, such as an open plan office, a good alternative would be setting up island-like areas specifically for learning. These areas create an environment where learners can concentrate in educational institutions or even in enterprises; often they are located in special rooms, or occasionally in the foyer of an office building, closed off by movable partitions.

Mobile learning with the aid of a mobile phone, PDA or laptop is another viable option that is being considered more and more. This method allows learners to utilise idle time, such as train rides to or from work, for learning. SMS can also be used as a means of communication or to remind participants of deadlines for turning in exercises or to briefly test the factual knowledge of participants.

The extent in which these mobile services and further developments for e-learning are able to establish themselves will become obvious in the near future. For the most part, mobile learning constitutes the use of educational CD-ROMs in laptops or the reading of printed learning material. Establishing a mobile connection to the Internet is still too expensive for extended learning periods. Moreover, there are hardly any contents available at the moment that have been adapted to the displays of PDAs and mobile phones.

13 Training system review, learning efficiency and effectiveness

Do employees learn what they really need to? How to asses learning success? How to measure the productivity of e-learning for an enterprise (ROI)?

When introducing e-learning in a company, it is necessary to see if the decisions made in favour of e-learning are justified. That means finding answers to questions like "Are employees learning what they really need to?" or "Is e-learning worth it?" The answers to these questions can be obtained by using training system review instruments.

The training system review basically includes the planning, gauging, evaluation and improvement of company training activities. In this case, emphasis is placed on identifying the benefits of internal continuing education and the relationship between measure and targeted success at the place of work. Therefore one should be aware of the employees' training needs and determine well-defined schemes. Implementation of these schemes needs to be monitored in order to evaluate their affects on the work flow.
The training system review focuses on the following questions:

- What are the costs of continuing education?
- Which types of instruction and learning methods are particularly suited for achieving specific learning objectives? Are the measures really useful to the employees or is the investment unreasonable (effectiveness)?
- Is continuing education profitable for the company after all (efficiency)?

The terms discussed most frequently are "effectiveness" and "efficiency":
While "learning effectiveness" refers to the relation between learning success and learning effort, "learning efficiency" relates to the evaluation of a measure based on its impact on the company's productivity.

The learning effectiveness can be determined in two steps: To gauge the learner's success, instructors look at (graded) exercises, final exams, compare test results with those of other students and even log file analyses (reports that are created when Internet pages are used) which show the period and times the learners spend studying. In addition to that, it is also possible to ask course participants how they would assess their own success. Total costs are usually calculated by determining the financial expenditure and the time required for professional development (course fee, travel and hotel expenses).

When measuring the learning efficiency, it is necessary to determine when e-learning pays off for a company in spite of costs. To do so, the costs for previous further training measures are compared with the costs for e-learning. The calculation procedure presented below as an example is based on the following assumption:
A company wants to train 140 employees in business administration over a period of 448 hours. In this case, the combination of WBT and virtual classroom at a price of EUR 27 per participant hour proves to be the most cost-effective form of training.

	Traditional seminars (in Euro)	% share	CBT/WBT average complexity (in Euro)	% share	Combination of WBT/virtual classroom (in Euro)	% share
Non-productive time incl. travel expenses and costs of room and board of the participant	1.564.486	76	975.418	49	1.115.430	66
Trainer's fee incl. travel expenses and costs of room and board	126.017	6	1.176	0	18.506	1
Development costs	283.775	14	818.905	41	406.202	24
Resources: rooms/ teaching equipment	10.533	1	0	0	0	0
System maintenance incl. updating of contents and technology	50.420	2	123.552	6	94.675	6
Hardware needs	10.226	0	59.651	3	59.651	4
Total costs	**2.045.455**	**100**	**1.978.701**	**100**	**1.694.465**	**100**
Total per participant (p)	14.610		14.134		12.103	
Total per p/h	33		32		27	

Table 1
Comparison of costs for different types of learning (Wolfgang Reichelt 2001).

However, in the end the costs do not say anything about how a training measure affects the productivity of an enterprise. Corresponding analyses are very rarely carried out after a learning measure is finished. By the way, experts doubt that such empirical evidence can be provided after all. Methodologically speaking, it is very difficult to calculate for instance what the dividend of a training measure is with regard to profit maximization.

The trend is to no longer write off training measures as social contributions. Rather, they are regarded as calculable investments, which need to have a (proven) share in the success of a company. The point is to plan precisely and implement continuing education as well as monitor the job performance of the trained personnel and – if necessary – to arrange for additional measures.

During the LERNET project clear2b, an online questionnaire, called "ExperClear", was developed. With this tool it is possible to monitor the success of e-learning. At the end of the course, participants are asked to assess whether the course has been of any use for their daily work routine. This includes evaluations as to what extent the learning objectives could be achieved, if the learning programme is motivating and user guidance is self-explanatory.

The previous 13 chapters have focussed primarily on decision makers, i.e. people who need to decide on e-learning. At this point, the guide will change its focus. The following chapters will mainly address producers of e-learning content, so-called e-learning producers. This perspective might also be of interest to (potential) decision makers, since it allows them to look over the shoulder of an e-learning producer.

14 Market strategy and market niches for e-learning producers

What does the e-learning sales market look like? Which SME and public administration-specific prerequisites must be met by e-learning products?

What does the e-learning sales market look like?

Results of a current survey reveal that in principle German companies are very much interested in e-learning. As a matter of fact, 60 % of the companies state that they are checking the integration of e-learning in their training and continuing education programme (cf. Michel/Johanning 2003).

However, computer-supported learning has been accepted only by those enterprises, where continuing education already plays a big role and where business processes are based on IT applications (for instance e-procurement, e-commerce, Internet-based research, etc.). Sectors, such as insurance, banking or electrical engineering, are preordained (cf. Köllinger/Ross 2003).

For the most part, large companies make use of e-learning. While 46 percent of companies with more than 1,000 employees currently implement e-learning, only about 10 percent of the employees use the e-learning solutions made available to them (cf. KMG/MMB/PSEPHOS 2001). This type of learning is establishing itself very slowly in SMEs with less than 1,000 employees. In 2000, 24 percent of these companies took advantage of e-learning for professional development (cf. MMB/PSEPHOS 2000); and only one out of every twenty companies with a workforce smaller than 50 employees made use of e-learning in 2001.

Municipal administrations also use e-learning to a lesser extent. According to a study conducted by the Bertelsmann Foundation (2002), about 10 percent of all municipalities use e-learning as a form of qualification. A study conducted by nordmedia eLearning Kompetenzzentrum Niedersachsen/MMB (2004) shows that about 5 percent of all employees, based on the number of e-learners in administrations (including universities and state authorities), use e-learning in 2004. This share corresponds to the average number of all employees.

Which contents are currently available?

The current range of applications available on the e-learning market includes primarily applications for professional expertise, standard IT applications/business processes and soft skills. The LERNET project has however shown that the presentation of profession-related know-how can also be very attractive as sales markets. There is a backlog demand especially here.

Practical examples from the LERNET project

eQtv and WebTrain

To enter the SME market, it is advisable for e-learning producers to offer, as part of profession-related e-learning solutions, topics with the broadest possible scope and relevance to different industry sectors.

In this context, the LERNET projects eQtv and WebTrain have developed training programmes based on the topics "personnel development" and "financial accounting", which can be implemented in several sectors.

What criteria are crucial to the success of e-learning in SMEs and public administrations?
A golden rule for the e-learning market is: Avoid "irrelevant" arguments! Speak the language of your customers! Some e-learning suppliers try to win SME customers with arguments that do not really apply to them. Some years ago, e-learning suppliers made the mistake to emphasise mainly the technical aspects of their products. This approach put off a lot of potential customers, especially the ones who were more interested in the didactic side of e-learning. Decision makers are also not very interested in the wide variety of functions offered in a learning environment or its complicated graphical layout. That is why producers should find out as soon as possible what the e-learning decision makers are really interested in.

The research conducted during the course of the eleven LERNET projects identified which factors are especially important to decision makers:

Checklist

Key factors considered by decision makers when selecting an e-learning service provider and an e-learning course

- ○ Offers focus on sector and field – employees must learn to identify what they need for fulfilling their responsibilities. The learning content must suit the relevant sector and build on the prior knowledge of employees.
- ○ Transfer to specific situations within the company – employees have to learn contents that they can use at their place of work. They must be able to directly implement everything they have learned.
- ○ A high degree of support (e.g. tutors) – since employees receive little encouragement to learn on their own during their daily work routine, it is good when they are motivated by tutors and coaches.
- ○ Modular design – instructors and the employees themselves must be able to choose what learning contents are appropriate and what they need to learn for fulfilling their own responsibilities or training subjects.
- ○ Adapted to the structure of previous classroom training – since most employees have only experienced classroom instruction, the didactic concept of the e-learning course has to address these learning habits. The amount of classroom activities should be very high for employees who are making use of e-learning for the first time.
- ○ Costs which correspond with the previous budget for continuing education – the modules should not cost more that comparable classroom offerings.
- ○ Completion with certificate – people who have finished an e-learning course want to prove that they have completed continuing education, e.g. with a generally accepted certificate or a certificate of attendance (cf. chapter 16 "Quality management").

Additional tips for facilitating the cooperation between e-learning producers and decision makers can be found in chapter 20 "Marketing".

15 Cost-effective production

How to organise production processes when developing e-learning contents?

A decisive factor for the LERNET project has been the observation that SMEs often are not willing or able to invest money in learning courses tailored to their own specific needs. On the other hand, they were not satisfied with "off-the-shelf" products. For LERNET this means the shift to "mass customisation" – a good compromise between individualisation and mass production.

One approach that has been pursued intensively in some of the LERNET projects can be described as "lean production". After breaking the production process down into its constituent parts, the costs are calculated for each individual production step and partial product (such as creation of a HTML page or flash animation). Then the production process is standardised in order to maintain quality while reducing costs at the same time.

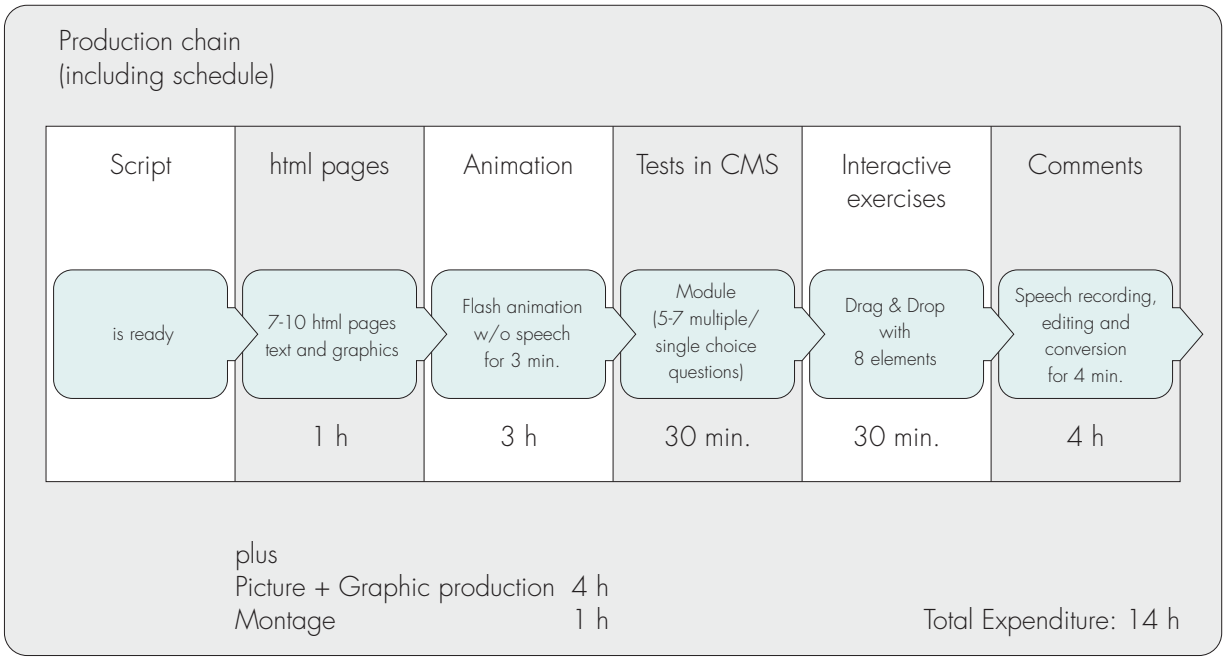


Figure 5
Example of work flow in the LERNET project VOCAL;
Source: Institute for new teaching and learning methods VIRTUS e.V..

As Figure 5 shows, the people involved in the LERNET project VOCAL needed 14 hours to produce a 45-minute learning module. This is only possible, however,

- If the learning contents are already supplied by the author (e.g. texts, pictures)
- and the production team works well together.

The production of e-learning offers based on lean production does not mean that the quality of the modules is bad. If a clearly-defined quality management system is taken account for each individual production step (cf. chapter 19), then these learning offers can indeed keep up with tailored programmes.

The modularisation and granularisation of learning units is indispensable for a lean e-learning production. That is the only way to guarantee that e-learning contents can be reused. A quasi industrial production process without it would simply not be possible. In order to achieve reusability of learning contents, a finished e-learning product for a specific target group had to be broken down into smaller, interchangeable modules during one of the LERNET-products.

This approach fulfils another important requirement for an economical e-learning production: the reusability of individual learning components. Most of the LERNET projects now pursue this reusability strategy. The success of this approach depends on observing accepted standards and norms. Individual modules can only be used in other courses if they are accurately described with the aid of metadata (for more information see chapter 16 "Quality management").

A practical example from the LERNET project

eQtv

In some of the e-learning projects having a "regular" moderator causes higher costs, since he is not always available as a speaker. Just to ensure that users can have the moderator they are used to, delivery deadlines are postponed, because the moderator may be temporarily unavailable for the next productions. The LERNET project eQtv was able to reduce its costs by frequently changing the moderators for different modules. The advantage here is that there is no break, should the course be expanded or if individual modules are to be implemented in another course, because the user has not gotten used to having only one moderator in the first place. It is important, however, to ensure that the design of the background remains uniform (cf. Figure 6).

Figure 6
LERNET project eQtv: Different moderators in front of a uniform background;
Source: av communication, Fraunhofer Institute IAO.

16 Quality management

How to assure the quality of e-learning content?

For some years now, SMEs and administrations have been focussing more and more on the quality of e-learning offers. After all, the quality of the contents is an important argument for justifying the introduction of e-learning in a company. Chapter 9 "Product quality" outlined tools for auditing e-learning offers.

Producers can ensure quality by implementing a quality management system during the production process. Here are some procedures:

- Application of standards
- Application of quality management systems
- Usage of evaluation methods
- Awarding certificates and accepted degrees

Application of standards

National and international panels have developed in recent years standards for comparing and ensuring the interchangeability of various e-learning offerings (cf. Ehlers, Pawlowski and Goertz 2003). Consistent application of these standards with regard to e-learning courses guarantees three quality objectives:

- Interoperability/portability – Contents may be combined independently from the content management system.
- Reusability – Learning objects can be used in different systems.
- Transparency – It is easier for customers to compare offers with one another.

There are some standards at the moment for e-learning that we will only briefly cover here:

Learning Object Metadata (LOM)
: Learning objects can be clearly identified by using LOM. The description encompasses attributes, such as title, catalogue entry, language, format, size, platform, costs, copyrights, etc. (cf. LTSC/IEEE 2002).

Sharable Content Object Reference Model (SCORM)
: SCORM (cf. Advanced Distributed Learning (ADL) no year) is a reference model for the integration of different standards. The objective of SCORM is to provide specifications for Web-based learning management systems, which can use and develop learning units independent of system and platform (cf. Ehlers/Pawlowski/Goertz 2003, p.13).

Application of quality management systems

DIN PAS 1032-1
: Developed by the German Institute for Standardisation (DIN), this reference model reflects every process involved in the e-learning life cycle and therefore serves as a guideline for a quality management system (cf. Pawlowski 2004). To do so, the producer must provide in-depth answers to questions that are compiled in the following checklist.

Checklist

Questions concerning quality management of e-learning production processes

- ○ What are the quality targets of an organization?
- ○ Which methods are used for quality assurance?
- ○ Who is in charge?
- ○ How do these processes relate to one another?

In addition to DIN PAS, there are other instruments that might help to improve production quality. Two sources might be helpful in this context:

- The European Quality Observatory (EQO) – founded by the European Commission – offers an Internet database for quality strategies that apply specifically to e-learning. This database contains about 60 approaches (as of 2004), that systematically arranged according to various criteria, such as "intended objectives and results", "information on costs and copyrights" or "contexts", for which the quality approach has been developed. The EQO repository can be found at http://www.eqo.info – "Quality approaches and experiences" where you will find extensive search options. After registering as a user, you may also enter new quality approaches yourself.
- A more general account of quality approaches for further education is given in the book entitled "Qualitätsentwicklung in der Weiterbildung – Wo steht die Praxis?"/ ("Quality development in further education. What has been achieved so far?") (cf. Bali/Krekel/Sauter 2004). This book contains a series of examples of further education practices, showing how the quality of further education can be measured and ensured.

Using evaluation methods

Standards contribute to the comparability of e-learning offers, whereas quality management approaches serve as a guide for developing e-learning offers. There are however situations, where an e-learning producer must know, if his product matches his target audience. Will future users really need, for example, these learning contents? Are they able to use the menus and navigation options without having to familiarise themselves with the user interface?

An evaluation based on scientific research methods can provide the producer with answers to such questions.

The following diagram shows during which production phases it is possible to investigate which questions:

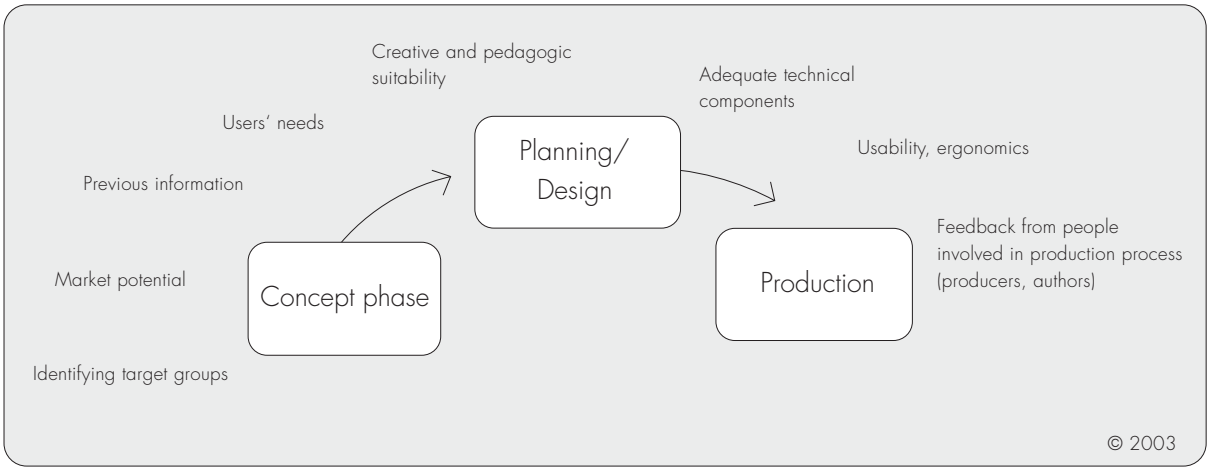
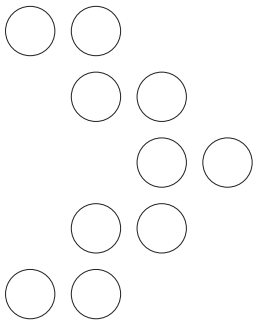


Figure 7
Problems related to the production of e-learning (based on Ehlers/Pawlowski/Goertz 2003); Source: MMB Institute for Media and Competence Research.

The following checklist contains a number of topics that are relevant for the e-learning production. These are organised according to the appropriate method (cf. Diekmann 1998) and the respective target group.

Topic	Sample questions	Methods
Identification of target groups	Which groups of people, sectors, positions in a company does the offer address?	Desktop research, Web-based research Guided interviews with experts and people in charge of e-learning
Marketing potential	Who are the competitors on the market? What similar products are currently available? How do they sell? How many potential users can be expected? What is the use or buying interest like?	Desktop research Guided interviews with experts
Previous information	Which research results from fields of technology, didactics and application can be used for product development?	Desktop research
User needs	Are there any potential users and companies that might need the learning offer? Are they willing to pay for this?	Guided interviews with experts; guided interviews and written questionnaires (to be completed by the respective recipients) addressing people in charge of e-learning and potential users
Creative and pedagogic suitability	Are the didactic and creative resources adequate for transfer of knowledge?	Guided interviews with experts and authors
Adequate technical components	Which tools (e.g. learning platforms, authoring systems or virtual classroom) are available? Can they be used for developing one's own products?	Desktop research on what the market offers Guided interviews with experts and specialised authors
Usability, ergonomics	How is the user-friendliness of the e-learning application for the future users?	Log file analysis, observation, online interviews, oral und written interviews with potential users
Feedback from people involved in production process (producers, authors)	What type of improvements do other people involved in production suggest?	Guided interview with instructors and tutors, and possibly with people in charge of e-learning

Table 2
Implementation of methods for specific questions and target groups (based on Ehlers/Pawlowski/Goertz 2003, p. 21-22).



These evaluation methods have been successfully implemented in the LERNET projects. It is advisable to consult experts when dealing with complex tasks, such as drawing up questionnaires or implementing a tracking software.

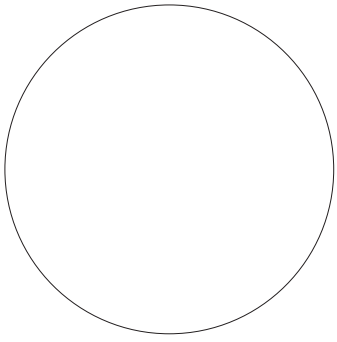
Of course, these methods can also be combined. More information can be obtained by combining methods compared to using a single method (e.g. combining interview and tracking).

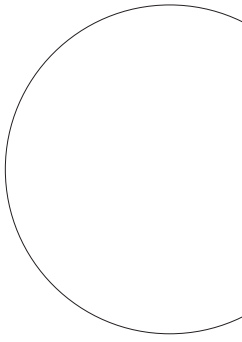
Issuing certificates and accepted degrees
Certified degrees for e-learning course are becoming more and more common in the e-learning sector. Producers have recognised that certificates offer peace of mind to employees and human resource managers – e.g. when assigning responsibilities or for career planning. In this case, people who decide on e-learning in companies rely on certificates with which they are already familiar from classroom training, e.g. certificates from chambers of industry and commerce. For instance, the LERNET project NetLIm awards such an accreditation with its real estate specialist certificate.

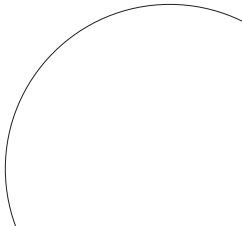
The European Computer Driving Licence (ECDL) has established itself in the meantime as a sign for quality.

Currently, the e-learning sector is working on its own quality seal, which will presumably be introduced in 2005 (see chapter 9 "Product quality"). The LERNET project "Qualitiy Initiative E-learning in Germany" (Q.E.D.) will have an active role in this process.

These standards, quality strategies, research methods and certificates do not only serve as proof of the elaborate steps being taken by e-learning producers. They also act as key marketing instruments, which will become even more important for addressing customers in the near future.







17 Marketing

How to reach SMEs and public administrations?

A basic prerequisite for addressing small to medium-sized enterprises and public administrations is to find suitable forums and means of communication. While this are relatively easy for large companies to achieve by way of relevant e-learning publications, trade fairs and conventions, it is much more difficult for SMEs.

The contact persons in SMEs and in public administrations are not specialists for e-learning. Frequently, they are human resources managers, in-house trainers, computer experts and even managers. Therefore e-learning producers should focus primarily on media and forums used by the target group.

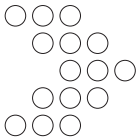
The LERNET projects have explored very different avenues while searching for the right communications strategy:

Regional marketing/direct communication
In many LERNET projects it turned out that the most promising marketing strategy was direct, personal contact. This does not really involve any telemarketing, but rather the cooperation of people in charge of e-learning within companies and municipalities in committees or working groups. Moreover, workshops and promotional events at the regional level are important opportunities to meet potential users, multipliers and company representatives. Classroom instruction is also a good forum for establishing direct contact.

When rolling out an e-learning solution, it is important to maintain regular contact with the customer, especially with small enterprises. Support services and personal meetings are very essential when dealing with companies where reservations with regard to e-learning are still rather high.

Sector-related fairs
Major IT and education-related trade fairs only play a subordinate role when addressing target groups in SMEs and public administrations. The appointment calendars of the LERNET projects are dominated by specialised trade fairs, where it is possible to meet multipliers (e.g. association representatives, officials from local guilds and chambers of industry and commerce, continuing education experts). Public presentations are at least as important as trade fair booths.

Regional fairs are of importance, too, especially when e-learning producers offer blended learning courses, which only allow a number of regional participants due to the classroom training phases.



Listings of specialised trade fairs can be found on the homepages of professional organisations and associations, which frequently serve as co-organisers. Appointment calendars of trade fair companies and tourist agencies are also useful for finding regional specialised trade fairs.

In addition to specialised trade fairs, participating in e-learning trade fairs are also important. The two most important fairs for Germany's e-learning sector are:

- the LearnTec in Karlsruhe takes place every February. It includes a conference which focuses on vocational training and education accompanied by a large trade fair
- the Online-Educa in Berlin takes place early December every year. It comprises an international conference and specialised fair.

Here you can meet managers from e-learning and further education institutions and companies, as well as multipliers from large trade associations, decision makers from large companies and prominent e-learning researchers.

Websites and demonstration versions

It is obvious that all training and continuing education providers have their own Web sites. Experience shows however that potential users have a hard time imagining the courses being offered as a result of the product descriptions. Demo versions of learning software which can be downloaded without requiring a time-consuming registration process are especially handy.

Practical examples from the LERNET project

On the LERNET Web site (http://www.lernet.info), you will find demonstrations of the following projects:

- CAD designs and basic 3D operations (NET-CA-T)
- Introduction into rafter assembly (eQtv)
- IT security and supply chain management (clear2b)
- Planning and project planning of EIB equipment (I-can-EIB)
- Accounting and administrative law (WebTrain)

Institutions of further education and training as strong partners

Institutions of further education and training, which have already established themselves within a sector and/or in a region, have a head start when it comes to marketing. They have a large network of customers and sufficient contacts with companies and administrations (see chapter 18 "Business Models").

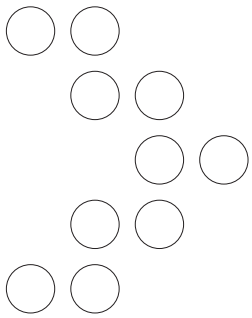
18 Business models

Which business models and cooperation partners are suited best for the distribution of e-learning applications for professional development?

The eleven LERNET projects went quite different directions when developing their own business models. Each consortium has found an appropriate form for marketing taking into consideration the respective sectors and target groups. There are similarities however. The accompanying research has identified four basic types of business models which might be of interest for other e-learning producers:

- Cooperation with a training service provider
- Subscription model
- Enhancement of classroom courses
- Content syndication model

This typology of e-learning business models shall be discussed below in greater detail.



Type 1: Cooperating with a training service provider

Cooperating with at least one training service provider turned out to be promising during the LERNET projects, since the provider functioned as a potential distribution organisation (cf. Figure 8.1. Type I). Since all projects have partnered with an institution of further education, it makes sense to jointly market the courses. The institution of further education already has a customer base as well as an appropriate infrastructure for planning and marketing the courses. Often the institution of further education is already accepted by specific target groups, e.g. by the electrical industry. During the cooperation, courses are offered to customers of the institution of further education. In this way, the institution has an opportunity to gradually change its previous programme over to blended learning concepts – and thus augment and modernise its portfolio. Examples for this model are the LERNET projects: NET-CA-T, WebTrain, VOCAL, clear2b, I-can-EIB, Go2Learning.

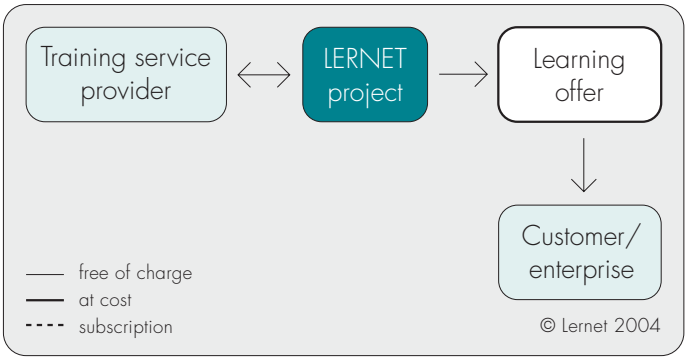


Figure 8.1
Type I: Cooperating with a training service provider;
Source: LERNET Accompanying Research.

Type II: Subscription Model

The second type is similar to the marketing of online content, e.g. via digital newspaper archives. In this case, learning content is made available within the framework of a subscription. Similar to newspaper subscriptions, the subscriber is guaranteed access to all information for a set period. This offer is directed to end costumers as well as enterprises. This distribution method is suitable for customers, whose employees want to learn "on-demand" or "informally" at their place of work. Examples of this model are the projects HALMA, Go2Learning.

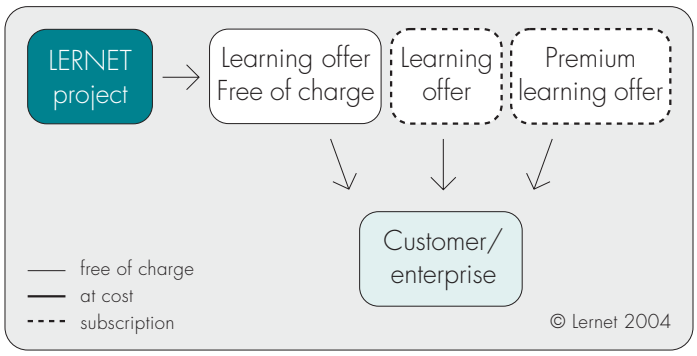


Figure 8.2
Type II: Subscription Model; Source: LERNET Accompanying Research.

Type III: Enhancement of classroom courses

The operators of this business model mainly regard themselves as content producers, which they sell to institutions of further education. The content suppliers are not responsible for the marketing and supervision of the process up to the end costumers – and by doing so, they do not have to carry out a fixed curriculum. The training service providers can freely integrate the material in their own courses. This has a direct advantage for customers:
The number of potential users increases, because anyone who is interested in further education but have different levels of prior knowledge will be addressed by the same content. Examples of this model are the projects: HALMA, Go2Learning and eQtv.

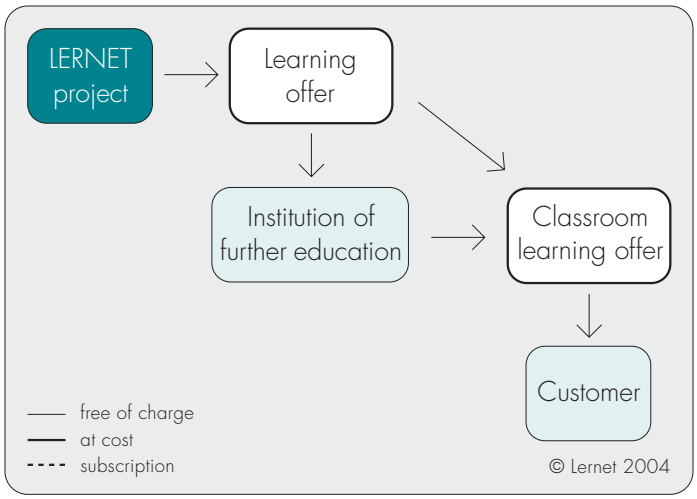


Figure 8.3
Type III: Enhancement of classroom courses; Source: LERNET Accompanying Research.

Type IV: Content Syndication Model

The Content Syndication Model combines the programmes of several content suppliers on a common platform. In this case, the suppliers can offer courses, which do not necessarily have a uniform concept or structure. More customers can be reached via the common platform, and at the same time there is the possibility of reusing specific learning modules of an e-learning offer. An example of this model is the LERNET project VOCAL.

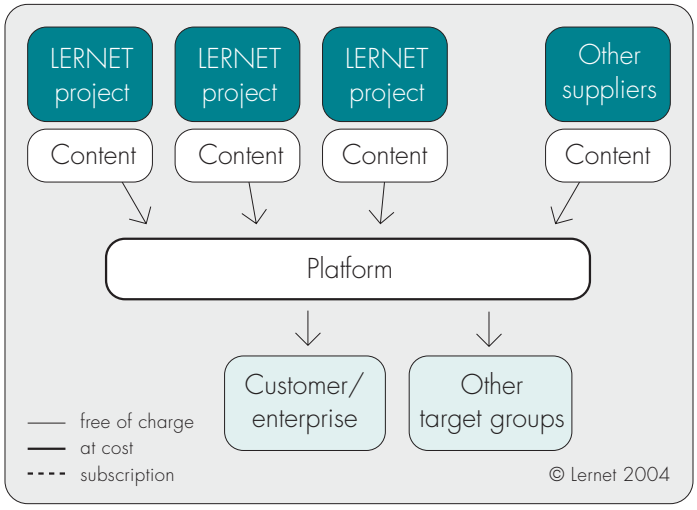
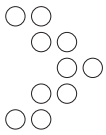


Figure 8.4
Type IV: Content Syndication Model; Source: LERNET Accompanying Research.

19 Structure and function of e-learning

What functions are beneficial to e-learners? Which tools are suitable for authors, trainers and instructors?



Chapter 1 briefly outlined the structure and functions of e-learning. This chapter will describe in detail the components involved, for the most from the perspective of users. After that, we will cover the tools used by tutors, instructors and authors.

Functions for e-learning users

Learning content, learning modules, lessons
Learning contents are the core of e-learning. They are the actual material to be learned in various forms, including tests and exercises for checking comprehension the material presented.

Exercises– to check comprehension interactive tests (e.g. multiple choice, etc.) are offered. There is also a possibility to have a tutor check longer answers.

News/Newsletter – extra information about content and organization of learning offers, e.g. by means of e-mail or special Web sites.

Online libraries – special areas in the Internet/intranet for storage of background information and texts for downloading

Glossary – in the Internet/intranet for the purpose of looking up terms

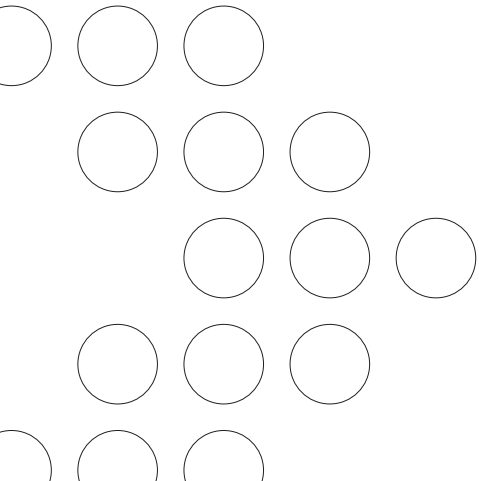
As far as the preparation of learning contents is concerned, it is necessary to differentiate between sequential and self-contained contents.

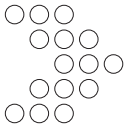
The order is predetermined in the case of sequential contents. This way, the user can assume that unit 5 builds on the material provided in unit 4.

Self-contained learning contents can stand on their own and can be worked on in any order – depending on the individual requirements of the course participants or the instructors. This principle for guiding learners can be understood best with reference to glossaries and online libraries.

In addition to contents, many e-learning offers have further functions that facilitate communication between instructors and course participants and between course participants themselves:

Community functions and communication tools
In this case it is necessary to differentiate between synchronous and asynchronous functions:





Synchronous functions

During synchronous learning, learners (and instructors) communicate at a set time from various locations/rooms via the Internet or by telephone. The most popular instruments for synchronous communication are chat, telephone hotline, video conferencing, and virtual classroom. Chat is comparable to a conference call during which participants sign on at a set time and communicate with one another only in writing via the Internet. There are various chat instruments available. One thing is important, however, and that is ensuring a certain degree of data security.

Telephone hotline: Participants can call a tutor or facilitator at a call-centre.

Video conferencing: Participants are able to discuss things in real time. In doing so, they do not only hear each other via microphone/speaker, but are also able to see each other due to real-time transmission of video (e.g. webcam).

Virtual classroom: With the aid of a specific software, participants at different locations can see and hear a lecture and submit their own verbal contributions. Virtual classrooms now combine a variety of communication forms. Thus, it is possible to chat with participants during a learning session or to send an e-mail to other participants. Unlike video conference systems, virtual classrooms usually have more features, for instance presentation aids, raising hands and so-called application sharing. This option allows students in a group to work jointly on a document, e.g. an Excel worksheet. To do so, one student in the group or the instructor must open the document on his or her computer and release it for sharing in the virtual classroom.

A practical example from the LERNET project

NET-CA-T

During the NET-CA-T project, the functions of the virtual classroom were used by instructors in order to show participants how to navigate through the CAD software "AutoDesk" and "Mechanical Desktop".

Asynchronous functions

Information transfer and learning take place at different times. Traditional correspondence courses are a typical example of a asynchronous communication in the learning process: The participants receive course material and communicate with the instructors by phone or email. E-mail, newsgroups or forums and call-me-back buttons are used as asynchronous communications instruments in e-learning.

E-Mail – Texts (as attached files) can be sent to instructors, tutors, and other course participants via Internet.

Newsgroup – Discussion groups on specific topics in the Internet or in the learning environment: This medium allows participants to communicate with one another by posting messages or texts and replies to messages.

Call-me-back button: An interactive button in the learning environment, which signals a supervisor to call back the learner.

Some of the functions can be accessed using a conventional Internet browser, such as Microsoft Internet Explorer or Netscape. In this case, they are integrated in the learning environment.

Administration tools

More extensive learning environments may possess administration tools (user-self-administration).

These tools offer students the opportunity to personalise their learning environment by up-

In-depth discussions that could interest both decision markers and producers

loading, for instance, their own documents to their virtual work centre, by modifying the colour settings of their virtual work center or by introducing themselves to the group of students by providing personal background information in the participant gallery.

User is responsible for maintaining the participants' gallery: Course participants can place their CVs, photographs and other personal information here so that other participants have access to them.

Personal filing system: The user's own data can be stored in the learning environment and made available to other participants.

Skill management functions (functions for monitoring learner progress) – Here, the participants can test their progress on their own to see how far they have gotten with the learning material, for instance by implementing bookmarks or doing exercises, multiple choice tests or completing Q&A sections, for which they immediately receive a report.

Notes on progress: Here it is also possible to add comments or marginal notes in a text field as when working in MS Word or when reading books in order to record your own comments, thoughts or even questions you have to sections during the learning process.

Furthermore, the learning process can be organised in a variety of manners:

Prior knowledge: The level of knowledge a participant has at the beginning of the course, which will be gauged in the form of a short test so that the learning material can be adapted accordingly.

Learning rate: In accordance with his requirements, the participant can decide when, how intensive or quick he can complete the units.

A practical example from the LERNET project

NetLlm

During the LERNET projects, the participants had to follow a fixed schedule for working through learning units. For instance, exercises had to be handed into the tutor by a fixed deadline or contents had to be prepared for classroom activities.

Spoken text was rejected by test participants as the only source in two of the LERNET projects. In addition to spoken material, they asked for additional written material which they could also print out.

Learning place: the learning material can be adapted to different locations, for instance mobile learning.

Additional programmes for instructors, tutors and administrators

So far we have introduced tools that the learners can use within the learning environment. There are, however, many programmes available to enterprises, which may want to introduce e-learning.

Learning platforms, also known as learning management system: A learning platform is a software, which can be accessed via the Internet and Intranet. Exercises, learning contents and communication tools can be accessed via this platform. Here it is also possible to manage learners. This software is distributed by e-learning suppliers and in general can be adapted to the individual requirements of a company where it will be used (e.g. selection of colour, integration of logos and selection of learning contents). The platform is administered by a system administrator or e-learning supplier (ASP model).

Learning environment: Within the context of e-learning, learning environment means that students have access to concept-driven and multimedia-infused instruction based on teaching methods which reasonably combine communication tools, support by tutors, learning contents, exercises, list of links, and libraries that are embedded in the Internet-based learning offer.

Authoring systems are software products, which can be used to develop e-learning offerings (e.g. WBT). Instructors and external authors can enter their learning content in the form of texts, pictures, photos and figures, which can then be adapted to the learning environment and supplemented by adding link lists, documents for downloading, exercises, etc. To do so, you usually do not need to know HTML or any other special computer programmes.

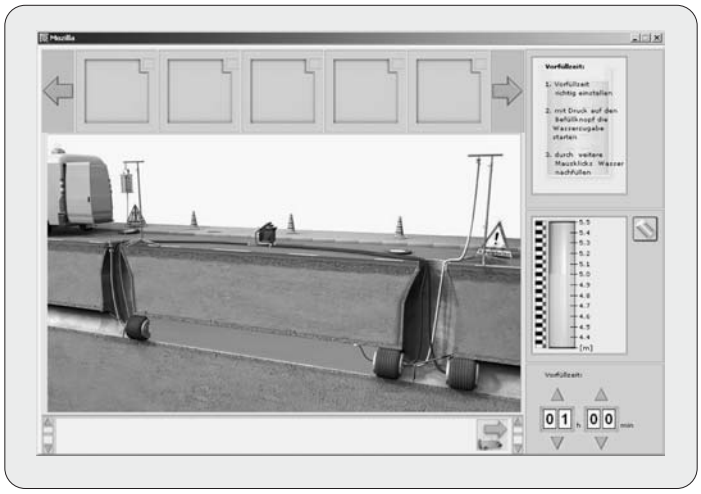


Figure 9
LERNET project Go2Learning: Simulation in sewer construction. (Demonstrator, URL http://www.unitracc.com);
Source: Stein & Partner.

Whether these service programmes can be used in one's own company or not depends on the number of course participants and the heterogeneity of the learning material. If there are more participants who need different learning contents, then it is worthwhile to implement such instruments – especially, if they are to be tailored to the needs of the company. This does involve, however, additional costs that have to be considered.

A practical example from the LERNET project

Go2Learning

During the LERNET projects, a wide variety of formats had been developed and tested. Each one was based on the objective to reflect the daily work routine of the participants as much as possible. Thus, a simulation was developed during the Go2Learning project to illustrate how to make a building site safe on a step-by-step basis.

Calculation tools, templates for correspondence and checklists for project management were made available for the engineers to download. A different project promoted communities among course participants and discussions with experts via forums in order to help learners implement the knowledge they acquired.

20 List of learning contents

Where should I look for the right courses?

Anyone looking for a specific training course for his employees is in for a challenge. Contrary to the comprehensive, yet clearly arranged catalogues that exist for books and software as offered by Amazon, for instance, there are no central e-learning directories of available Contents.

If it has already been decided however what training requirements must be fulfilled in a company (cf. Chapter 2), then there are various directories that can be found in the Internet, at trade associations and chambers of commerce or in specialised journals and relevant manuals that might help.

The following overview provides sources of information pertaining e-learning, in general, and e-learning offerings and providers.

Print and online magazines that recommend and compare e-learning applications for further professional development:

- personalwirtschaft (http://www.personalwirtschaft.de)
- E-Learning-Handbuch
- wirtschaft & weiterbildung (http://www.wirtschaftundweiterbildung.de)
- managerseminare (http://www.managerseminare.de)
- management & training (http://www.managementundtraining.de)

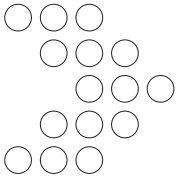
The Internet platform www.eLearningexpo.de offers a centralised overview of e-learning providers. In addition to that, it is advisable to look at the exhibitor directories of prominent e-learning trade fairs like Learntec in Karlsruhe.

To stay up to date on market developments, subscribe to industry newsletters, for instance:

- the global learning newsletter published by T-Systems (http://www.global-learning.de)
- E-Learning newsletter published by the Learning Center of Universität St.Gallen (http://www.learningcenter.unisg.ch) and
- Checkpoint eLearning newsletter for which INFObases GmbH is responsible (http://www.checkpoint-elearning.de).

Portals for marketing e-learning /blended learning applications:

- Educa Next (http://www.educanext.org): EducaNext is a portal that is geared specifically to teachers and students of universities and research institutes. Developed by the Business University of Vienna in a special project, it is now funded by the Saarbrücken, Germany-based e-learning provider IMC. You may browse the courses, which are available, free of charge.
- Eldoc - E-Learning Documentation (http://www.eldoc.info)
  The Eldoc database, which is maintained by Germany's Federal Institute for Vocational Education and Training, only contains blended learning courses on various topics of professional training.



- IHK.Online Akademie (http://www.ihk-online-akademie.de)
  The Association of German Chambers of Industry and Commerce has put together the e-learning and blended learning courses offered by 26 regional chambers of industry and commerce at one portal. Topics like work techniques, IT/EDP, business know-how should attract employees from companies (especially small to medium-sized enterprises in this case) to blended learning offerings.
- Iltec – International Learning Technology Center (http://www.iltec.de)
  The Chamber of Industry and Commerce for Munich and Oberbayern has set up a database for e-learning courses, which now contains 976 courses for a variety of fields like IT/EDP, project management, electrical engineering and others.
- kurs direkt (http://www.arbeitsagentur.de – Service from A to Z – Course)
  The training and further education database from the Bundesagentur für Arbeit (Federal Agency for Labour) includes both traditional attendance-based courses and e-learning/blended learning courses.
- LernenOnline (http://lernenonline.t-online.de)
  With e-learning offerings for computer skills, languages and soft skills T-Online focuses primarily on end users and corporate customers to a lesser extent.
- q-online (http://www.q-online.de)
  The Zentralstelle für die Weiterbildung im Handwerk e.V. (ZWH e.V. – Central Office for Professional Development of Craftsmen) compiles a list of e-learning and blended learning courses offered by Chambers of Handicrafts and their training centers and publishes it on its portal. IT/EDP, foreign languages, teletutor training are courses that can be booked via the portal, in addition to specific trade courses, for instance to prepare candidates for the master craftsman's certificate exam.
- Virtual Campus Bavaria (http://www.vcb.de)
  The portal launched by the Free State of Bavaria contains approx 200 e-learning courses, attendance-based seminars, blended learning offerings for project management, IT, soft skills and call centers. Target audience are individual users in companies and professional development institutions.
- Webkolleg NRW (http://www.webkolleg-nrw.de):
  Initiated by the Ministry of Labour and Economics of the Federal State of North Rhine-Westphalia, the online catalogue offers an overview of e-learning and blended learning courses for general education and professional development. All courses that can be booked there satisfy the quality criteria of the Webkolleg.

There is also the option of booking e-learning courses via a special distribution platform ("Content sharing"). The selection there is greater and you can even combine the contents of individual providers (cf. Chapter 7 on revenue models).

Certifying organisations that distinguish e-learning courses with a seal of quality

- ASTD: E-Learning Courseware Certification
  The ASTD Certification Institute with headquarters in the US certifies e-learning courses by awarding its E-Learning Courseware Certification Quality Seal. During certification, particular attention is placed on evaluating the instructional design of courses in terms of didactics and methods and user-friendliness of the e-learning environments.
- DistancE-Learning-Check-Seal – Forum DistancE-Learning
  The DistancE-Learning Forum, formerly Deutscher Fernschulverband e.V., certifies e-learning/ blended learning course providers and offerings as part of the DistancE-Learning-Check with a seal documenting the quality of the provider, its products, services and structures.
- Stiftung Bildungstest/Warentest
  The Stiftung Warentest has been commissioned by the Federal Ministry of Education and Research to regularly check e-learning and blended learning courses. In doing so, the courses offered, their design as well as the providers and the quality of their advice, among other things, are subject to close scrutiny.
- Weiterbildung Hamburg e.V.
  Weiterbildung Hamburg e.V. is funded by the City State of Hamburg. The initiative comprises approx. 200 educational establishments in Hamburg. The partners bear the quality seal of the initiative and thus ensure protection of their customers, fair conditions and transparent quality.
- Zentralstelle für Fernunterricht (ZFU e.V.)
  This institution was founded by the ministers of education and the arts of the Federal States in the 70s. The ZFU primarily focuses on certifying correspondence courses and recently e-learning and blended learning courses. In doing so, it checks course contents and instructional design as well as contractual and organisational aspects of the training programmes offered.

Appendix 1
Contents of LERNET Projects grouped by branches

The Project LERNET has developed a great number of learning contents for small and medium-sized enterprises and public administrations. These learning contens are listed in the following chart, grouped by the branches service, production, handicraft and administration.

For each content the list shows also the name of the LERNET project, that was responsible for this content. You find further information about the projects and contact-addresses in Appendix 4.

Service sector	Industrial Production	Crafts	Public Administration
Energy consulting – controlled ventilation of living quarters Project: VOCAL	Learning units on leak detection testing of sewer systems Project: Go2Learning	Simulation of a joiner's workshop as example of the operational process of a typical craft enterprise Project: HALMA	General administrative law Project: WebTrain
Energy consulting – Water supply systems Project: VOCAL	Learning units on "Microtunneling" Project: Go2Learning	Controlling for sanitary, heating and air conditioning technology Project: VOCAL	Budgeting Project: prodela
Energy saving directive Project: VOCAL		Human resources for sanitary, heating and air condition Project: VOCAL	Controlling Project: prodela
Performing an energy saving check for energy consultants/building energy advisors in the craft Project: eQtv		Marketing for sanitary, heating and air conditioning technology Project: VOCAL	Fundamentals of business arithmetic Projects: prodela, WebTrain
Introduction to new media like mobile devices, ebook for publishing sector Project: LEVER		Financial accounting for sanitary, heating and air conditioning technology Project: VOCAL	Double-entry bookkeeping Project: WebTrain
Basic knowledge "Digital printing for publishing sector" Project: LEVER		Solar technology and energy, instrumentation and control technology for sanitary, heating and air conditioning technology Project: VOCAL	Cost accounting Project: WebTrain
Basic knowledge "Online marketing" for publishing sector Project: LEVER		Microsoft Office for craft enterprises Project: VOCAL	Media competence Project: prodela
Supply chain management for logistics sector Project: clear2b		Information and communications technologies for craftsmen Project: VOCAL	Project management in rollout processes Project: prodela
Fundamental technology for telecommunications advisors like mobile telephony, UMTS Project: eQtv		Marketing for craft enterprises, advertisement, product life cycles Projects: HALMA, LEVER, VOCAL	Personnel management – Talks for setting operational targets Project: eQtv

Service sector	Industrial Production	Crafts	Public Administration
		Finance and accounting for craft enterprises Projects: HALMA, VOCAL	Project management in rollout processes Project: prodela
		Finance management for sanitary, heating and air conditioning technology Project: VOCAL	Quality management Project: prodela
		Labour law Projects: NetLlm, VOCAL	Information management Project: WebTrain
		Drawing of basic 2D elements using CAD software Project: NET-CA-T	Business arithmetic Project: WebTrain
		Using 3D CAD systems Basics of PaletteCAD Project: NET-CA-T	Fundamentals of business arithmetic Project: WebTrain
		Controlling for sanitary, heating and air condition enterprises Project: VOCAL	Information management Project: WebTrain
		Basic knowledge for installation of European Installation Bus (EIB) Project: I-can-EIB	Conflict management Project: prodela
		Application of European Installation Bus in building services engineering Project: I-can-EIB	Microsoft Office Project: VOCAL
		Basics in a special wood-working procedure (esp. for carpenters) Project: eQtv	New government controll mode Project: WebTrain

Service sector	Industrial Production	Crafts	Public Administration
Personnel consulting Project: eQtv			
IT security for SME Project: clear2b			

Appendix 2
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Appendix 3
Glossary

Administration Tools	More extensive learning environments may possess administration tools. These tools offer learners the opportunity to personalise their learning environment by uploading, for instance, their own documents to their virtual work centre, by modifying the colour settings of their virtual work center or by introducing themselves to the group of learners by providing personal background information in the participant gallery.
Application Sharing	This option allows learners in a group to work jointly on a document, e.g. an Excel worksheet. To do so, one learner in the group or the instructor must open the document on his computer and release it for sharing in the virtual classroom. (also see Virtual classroom)
ASP (Application Service Provider)	The provider is responsible for setting up and maintaining software solutions. Although the customer acquiries rights of use, the software remains the property of the provider.
Asynchronous Functions	Information transfer and learning take place at different times. Traditional correspondence courses are a typical example of asynchronous communication in the learning process: The participants receive course material and communicate with the instructors via e-mail. E-mail, newsgroups or forums and call-me-back buttons are used as asynchronous communications instruments in e-learning.
Attendance-based Course	An event during which instructors and learners gather physically at a certain location and at a certail time.
Authoring Systems	Authoring systems are software products that can be used to draw up e-learning offerings (WBTs). Instructors and external authors can enter their learning contents as texts, images, photos, graphics, etc., which can then be adapted for the learning environment. They can be further enhanced by adding lists of links, documents to download, exercises, and similar. To do so, you usually do not need to know HTML or any other special computer programmes.
Avatar	An animated character that answers interactive questions posed by users. Endowed with distinctive facial expressions, an avatar searches through a pool of questions and answers for the right answer and presents the answer acoustically and visually.
Blended Learning (courses)	The word "blended" stands for mixed or combined. In this case, both e-learning and attendance-based courses are combined into an integrated training/learning concept for training and professional development. Parts of the course are completed at home or at one's place of work via e-learning, while other sections are completed as usual at a training centre or in one's company.
Call-me-back Button	The call-me-back button is an interactive button in the learning environment which is designed to signal when the learner would like the instructor or technical support to contact him by phone.
CBT	CBT stands for Computer Based Training. In this case, the learner's computer does not have to have any Internet connection. Only a computer equipped with a CD-ROM or DVD drive is needed so that the learner can process multimedia learning contents (audio, video, text, graphics, diagrammes).
Chat	Chat is comparable to a conference call during which participants sign on at a set time and communicate with one another only in writing via the Internet. There are various chat instruments available. One thing is important, however, and that is ensuring a certain degree of data security.
Community	These tools can be used during the learning phase (learning community) and after completing professional development (support community or community of practice). They allow for virtual, text-based discussions in forums, virtual classrooms or document filing systems. To stimulate communication among course participants, discussions are usually guided by a facilitator and supplemented by incorporating prominent external experts.

Competence Balance/Balancing	The idea of competence balancing is based on the assumption that 70% of employees' ability to act does not stem from formal areas of education like school, college or professional development institutions, but rather from so-called informal areas (in the family, in honorary capacities, during work, through use of media). To identify these competences, more and more measuring tools have been developed recently for determining the current competence profile. Possible incentive for evaluating the competence profile is professional reorientation or the planning of professional development or simply as a type of self-test. Competence passes are currently being drawn up to document competence profiles and their further development. In other European countries like France, people can have their competence profile mapped out. Advice is then given for coaching measures based on this evaluation and the area of activity (sought).
Content Sharing (Platforms)	Provider communities or content-sharing platforms offer another option for selecting from a wide variety courses you want based on individual interests or needs. In such case, a number of content providers have joined together to distribute their contents jointly (see list of content-sharing providers in the annex).
FAQ List	FAQ stands for "frequently asked questions", which are usually presented as a list of questions with relevant answers. The goal is to provide learners in a quick manner with short and clear answers to common questions and thus spare the tutor some stress.
Firewall	Measures taken to protect a network from external access. To achieve this, it is possible to use both hardware and software solutions. Many companies have installed firewalls in order to ensure data security and prevent private abuse of Internet privileges. This complicates, however, Internet access to many e-learning offerings. In such cases, the workstation must be set up to allow access to all relevant sites in the Internet and the downloading of necessary files. For this purpose, it is necessary to consult your company's IT administrators.
Forum	Instructors and learners can communicate with one another by posting messages or replies to messages consecutively in virtual rooms. The texts contributed by users are stored on a Web site where instructors and/or learners can submit answers or comments. In e-learning, forums are used especially for informal discussions between learners and instructors. To ensure that users have a clear overview, messages and replies are frequently arranged by topics. Forums are also used by experts who would like to discuss with others topics that do not fall in classic study programmes.
Granular	The concept is closely connected with the efforts of standardisation initiatives to break learning contents down into small, self-contained units and ensure their reusability. In doing so, learning contents are classified by their objectives, suitability to target audience, etc. (as well as metadata in technical terminology). This quasi industrial approach to contents and courses reduces the costs during production and facilitates the exchange of e-learning offerings regardless of the technical system with which the contents are distributed.
Knowledge Management	Knowledge management describes a complex strategy that permits the systematic development of knowledge by employees and in turn an increase in the productivity of a company. Key components of knowledge management are the definition of knowledge objectives, identification of knowledge (e.g. participant galleries with knowledge profiles of employees), offers for acquiring knowledge (e.g. On Demand Learning), knowledge distribution and archiving (e.g. via a Community or online database with search functions).
Lean Production	To achieve a "lean e-learning production", it is necessary to break down the processes into their central components in order to able to determine the costs for each step and each subproduct (say the creation of an HTML page or a flash animation). During the next step, the production processes are standardised to attain a cost reduction while maintaining the same level of quality.
Learner Community	See Community
Learning Effectiveness	The effectiveness of student learning can be determined in two steps: To gauge the learners' success, instructors look at (graded) exercises, final exams, compare test results with those of other learners and even log file analyses (reports that are created when Internet pages are used) which show the period and times the learners spent studying. In addition to that, it is also possible to ask course participants how they would assess their own success. Total costs are usually calculated by determining the financial expenditure and the time required for professional development (course fee, travel and hotel expenses).

Learning Efficiency	When measuring the learning efficiency, it is necessary to determine when e-learning pays off for a company taking into account costs. To do so, the costs for previous further training measures are compared with the costs for e-learning. (Increase in productivity?)
Learning Environment	Within the context of e-learning, learning environment means that learners have access to concept-driven and multimedia-infused instruction based on teaching methods which reasonably combine communication tools, support by tutors, learning contents, exercises, list of links, and libraries with one another.
Learning Management System (LMS)	This software can be used to manage and distribute digital learning contents. With LMS, instructors and learners both are able to access centrally among other things user information, exercises and communication instruments.
Learning Object	Learning object is a terminus technicus that was coined as part of the LTSC standardisation initiative. They are any contents, be it digital or analog, that can be catalogued, indexed and thus reused. This general definition reveals more or less that the goal is to be able to combine self-contained modules with one another in any order and ensure their reusability. Also see the definition for granular.
Learning on Demand	See On Demand Learning
Learning Platform	See Learning Management System (LMS)
Learning Rate	In accordance with his requirements, the participant can decide when, how intensive or quick he or she can complete the units. Instruments like modular setup of the learning environment, and the allotment of sufficient time for finishing exercises should help participants create an individual schedule for learning.
LOM (Learning Object Metadata)	E-learning frequently involves approaches (e.g. SCORM) which establish general guidelines for producing e-learning courseware. The aim of this initiative is to open up opportunities for the exchange and reuse of contents. LOM was developed by the Learning Technology Standards Committee (LTSC) of the US Institute of Electrical and Electronics Engineers (IEEE). The learning object metadata is the first certified standard that catalogues and indexes e-learning contents. The metadata model is regularly adapted to the development of training technologies.
Mobile Learning	Other terms used for mobile learning are "wireless learning" or "m- learning". In m-learning, Internet or Intranet are not accessed via stationary computers or a fixed network. Instead portable devices like laptops/notebooks, cell phones, smartphones or personal digital assistants (PDA) or organizers are used. M-learning could be used, among other things, for completing short lessons or tests, for remembering deadlines for handing in exercises or changing deadlines.
Modular/Module	Granular, self-contained units are combined into modules. These modules can be arranged in different ways depending on the requirements of the target group. In addition to the relatively classic linear sequence, a more sequential, explorative arrangement of modules can be implemented.
Multiple Choice Test	Multiple choice tests contain questions with several answers from which the learner must select the correct answer.
News/Newsletter	Extra information about contents and organization of courses that are usually presented via e-mail or on Web sites under sections like "What's new" or "News" or in the learning environment.
Newsgroup	Discussion groups on specific topics in the Internet or in the learning environment: This medium allows participants to communicate with one another by posting messages or texts and replies to messages.
Notes on progress	It is also possible to add comments or marginal notes in a text field as when working in MS Word or when reading books in order to record your own comments, thoughts or even questions you have to sections during processing or reading.
On-Demand Learning	This means that the basic requirements for learning are provided to employees anytime, anywhere. This approach is comparable to industrial manufacturing processes in which manufactured parts are no longer stocked, but delivered whenever production requires them—the so-called just-in-time production.
Online Library	Background material, courseware or checklist are frequently made available for downloading in this section of online learning environments.
Participant Gallery	Course participants can place their CVs, photos and other information about themselves here so that other course participants may view them.

PAS 1031-2 (Publicly Available Specification)	The two models were developed within the framework of a DIN study group on "Quality in E-learning". The first model describes the steps from planning and development through to performance and evaluation of e-learning projects in a company. The second model contains criteria that should be taken into account during the production of e-learning offerings. This model can also be consulted when selecting e-learning products for e-learning users. In addition to that, the model may be used for accrediting e-learning offerings. With these models a preliminary stage of an industrial standard has evolved (similar to those that already exist for industrial areas like bolts or vises, for instance). The report on PAS 1031-2 – Training and professional development with special emphasis on e-learning – reference model for quality management and quality assurance – planning, development, performance and evaluation of training processes and programmes (official name under which the models are maintained by Deutsches Institut für Normung (DIN e.V.)) can ordered free of charge at http://www.normung.din.de/.
Pay per lesson	Only course modules that are called up by the learner will be charged in this revenue model or with this payment method. Depending on learning needs, e-learning participants can combine modules from different courses (e.g. a "personnel interview" in "executive training" and "personnel development").
PDA (Personal Digital Assistant)	A PDA is also referred to as an organizer or handheld. In general, it is a computer with screen packed to the size of a notepad. You can enter deadlines and address, jot down notes and plan tasks in this organizer. The entered data are usually be transferred to the hard drive of a home or office computer.
Plug-In	Plug-ins are auxiliary programmes that make it possible to open, for instance, Acrobat Reader files (PDF) or video files (using Real Time Player or similar). Internet browsers like Netscape Communicator or Internet Explorer automatically call up plug-ins, unless the IT administrator has changed the default settings. Plug-ins must be installed on the learner's computer's hard drive. In public administrations especially, access to plug-ins are carefully controlled for security reasons by firewalls or browser settings.
Pull	The learner must actively browse the Web for data and documents.
Push	Important information is sent to the learner via e-mail, for instance. A classic example of the push procedure includes regular e-mails pertaining to current articles. The aim is to promote the motivation of the learners in the learning process and to ensure further development (cf. Pull).
Rich Media	Presentation forms of digital media that can be used for processing of rich media contents include videos and animations (cartoons, flash) and which require in most cases ISDN or DSL connections for their transmission. Streaming is a technique that allows users to hear and/or view contents in almost real time.
SCORM (Shareable Content Object Reference Model)	E-learning is frequently associated with standards like LOM, IMS, AICC. The development of Sharable Content Object Reference Model (SCORM) is a widely accepted attempt to integrate the most promising approaches into a standard. SCORM offers the possibility to use resources (all forms of learning contents like video and audio content, texts, animations, which can be indexed or catalogued) in various learning management systems. As a result, it is easier to reuse contents or combine them with other contents and utilise them in different learning management systems. The model was developed in the Advanced Distributed Learning (ADL) Initiative that is part of the US's Department of Defense.
Self-contained Learning contents	Self-contained contents can stand on their own and may be completed in any order depending on the requirements of the course participants or the instructor. This principle of "learner guidance" can also be seen in the examples Glossary and Online Library (also see Sequential learning contents).
Sequential Contents	In case of sequential contents, the order is defined precisely. As a result, the user can assume that the Unit 5 builds on the fundamental information provided in Unit (also see self-contained learning contents).
Skill Management	E-learning course participants can check on their own to what extent they have completed and understood the material, among other things, by setting bookmarks or completing exercises like multiple choice tests or Q&A sections that include answer keys for prompt evaluation.
Smartphone	Although these are devices that are similar to cell phones, they have larger screens or displays and function like a PDA.
Standard	The so-called learning technology standards include AICC, Dublin Core, IMS, LOM and SCORM. The goal of these approaches is two-fold: The online learning contents should comply with a binding quality standard and it should be possible to reuse the contents in other training contexts or in different learning management systems.

Streaming Media	Streaming Media is a technique that allows users to hear (streaming audio) or view animations and images (streaming video) in real time via the Internet without requiring especially large bandwidths. In the past, transmission technology was designed such that it was necessary to download the entire audio or video file before it could be played. (Source: Baumgartner 2002; http://www.net-lexikon.de/Streaming-Media.html)
Synchronous Learning	During synchronous learning, learners (and instructors) communicate at a set time from various locations/rooms via the Internet or by telephone. Popular instruments for synchronous communications are chat, telephone hotline, video conference, virtual classroom.
Training system review	Training system review basically includes the planning, gauging, evaluation and improvement of company training activities.
Tutors	The tasks an instructor or a tutor has throughout the learning process are as follows: He or she monitors the learning process of the learners, acts as catalyst and helps learners get going, answers questions and checks exercises.
UMTS (Universal Mobile Tele-communications System)	This broadband technology is referred to as the third generation of the mobile communications standards. UMTS facilitates the multimedia use of mobile terminal equipment like cell phones and PDAs. In such cases, not only language and text are transmitted but also video and audio content. Moreover, it can support Internet connections with a data transfer rate of up to 2 Mbps (also see WLAN).
Usability	Usability refers to how easily a product can be used. While ergonomics focuses on evaluating usability and optimisation of procedures in terms of process, in other words how difficult it is to press, for instance, two small buttons on remote with fingers spread apart at the same time, the regular check for usability deals with how logical and intuitive procedures or operations are. For instance, a producer of a new software checks whether a new user can "intuitively" use the product correctly or if the user is even able to gradually explore the product, and thus determines whether and which processes must be optimised or which processes are from a technical standpoint possibly good, yet seem "unlogical" to the user and thus are deemed uncomfortable or even unusable! This usually happens before an expensive market rollout, since the consequences can be disastrous. (Source: http://www.net-lexikon.de/usability.html)
Video Conference	A video conference allows participants from different locations to see live pictures and hear live audio of other participants so that they can communicate at the same time. In doing so, it is also possible to do without video transmission, since many participants cannot concentrate on the contents due to the delayed transmission of video and audio signals.
Virtual Classroom	Using a special software, participants are able to watch a lecture and make acoustic contributions while being at different locations. Virtual classrooms now combine a variety of forms of communication. Thus, it is possible to chat with participants during a learning session or to send an e-mail to other participants. Unlike video conference systems, virtual classrooms usually have more features, for instance presentation aids, raising hands and so-called application sharing.
WBT (Web Based Training)	With the emergence of the WWW, Computer Based Training or CBT evolved into WBT. Unlike CBT, WBT is provided via the Internet or Intranet and not stored on data media (floppy disks, CD-ROM, DVD). This form of training programmes differs considerably from its predecessors by two main features: (a) Minimum requirement for WBTs is an Internet browser (e.g. Netscape Communicator, Microsoft Internet Explorer, Opera); in other words, the programmes use the corresponding standards (HTML, JAVA, Flash, etc.). In contrast, CBTs are frequently standalone applications. (b) By connecting to the Internet, it is simpler and more common to integrate communications instruments. Learners can communicate with tutors and "classmates" via e-mail, newsgroups, etc. (Source: http://www.managerseminare.de/)
WLAN	WLAN or Wireless Local Area Network is an industry standard that is used for generating a wireless Internet connection for a certain area. This standard is discussed as a cost-effective and capable alternative for popular transmission techniques like UMTS, which is used for mobile access to the Internet. It has become in the meantime a standard feature in PDAs, laptops and cell phones.

Appendix 4
Description of LERNET Projects

clear2b	E-learning Business Community for Small and Midsize Enterprises
Short Profile	Development of a web-based community platform for SMEs with education brokerage, evaluation and interface with e-consulting.
Background/Concept	Internet supported learning or information sources for small and midsized enterprises are still limited to individual offers. That is why clear2b stands for an integrated learning concept that will provide efficient and cost effective forms of Internet-supported continuing education and consulting.
Contents/Goals	The goal of clear2b is the development of a net-based community platform that will allow for comprehensive corporate information exchange and need-oriented continuing education for SMEs. The e-learning seminars in the pilot phase cover the topics "IT Security" for all sectors and "E-Business" for the logistic sector. A specific feature is the cross industry approach: content will be developed that is thematically and textually relevant for all SMEs.
Target Groups	• IT authorities and IT leaders from SMEs in all sectors • Authorities and leaders in the logistic sector or from SMEs in the sector
Realization/Features	The community platform offers diverse open and closed discussion forums for industry-specific and sector-comprehensive problem presentation and therewith access to knowledge management for SMEs. Communication with the participants and lecturers is especially important – even in the e-learning seminars on offer. In the pilot phase, clear2b will initially develop two web-based trainings (WBTs) on the topics of "IT Security for SMEs" and "Supply Chain Management/Logistics". An education broker will support and analyze communication in the community forums. The findings will be implemented in the further development of the e-learning offers. For quality assurance the use of e-learning and e-consulting will undergo a sound evaluation, which comprises a quality and efficiency analysis as well as constant learning success controls. Advisory consultations for the users are guaranteed by an extensive information offer within the framework of a knowledge management system. A professional community is in development, with the special goal of developing a "Participation Incentive System".
Stage of Development/Prospects	In addition to the learning offers, e-consulting will be integrated in the community platform. This offer of consulting services rounds off the clear2b concept of a comprehensive communicative and integrated learning platform for SMEs. As clear2b does not focus on any one specific sector, but develops contents that are of interest for all SMEs, the community platform will be useful for all SMEs in later phases of the project. Meanwhile a learning platform has been chosen, the pilot phase has been running since February 2003.
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eQtv	e-Qualification TV – new learning for small and midsize enterprises
Short Profile	Creation of an interactive business TV model for the transmission of industry and company- specific training programs for SMEs via Internet or satellite.
Background/Concept	In many businesses it is already a component of the continuing education program: business TV – an internal television channel via Internet, Intranet or satellite, on which qualification relevant content is audiovisually presented. Small and midsize businesses often do not have the necessary financial and human resources for this, but the bigger deficit is in appropriate industry and business-specific material.

Contents/Goals	eQtv is based on the concept of classic Business TV, to be used as internal TV for the information and qualification of employees. The types of broadcasting range from company news to service and operational training with interactive elements. eQtv aims for the conception and production of a business TV model that is specially designed for qualification of employees of small and midsized enterprises. The content includes topics such as telecommunications consulting, personnel development, but also trade-specific topics such as energy consulting and special woodworking procedures.
Target Groups	• Small skilled trade businesses • Midsized industry and service businesses • SMEs in all sectors
Realization/Features	eQtv will develop and test opportunities, possibilities and the feasibility of new forms of business TV for SMEs. The increasing dissemination of DSL Internet access and satellite-supported transmission creates cost effective access to qualification TV for SMEs. The further development of streaming media enables the fusion of Internet technology and business TV. eQtv's learning arrangements are based on these developments. CBT, WBT and on-site learning will be used as learning methods. Feedback functions and interactivity specifically coordinated with the learning offers are integrated. The basis for the selection of the learning content was a broad potential analysis that was directed at 10,000 businesses nationwide. The learning arrangements are currently being tested in four different projects in diverse sectors. The use of a standardized procedure for content creation through merging of video sequences, text and images is planned, as well as the integration of satellite transmission and UMTS.
Stage of Development/Prospects	As an end product eQtv will present an interactive business TV model, transmitted via Internet and satellite to training centers and end users. An operator concept developed parallelly will provide information about technical requirements and financing possibilities and assure the viability of this continuing education form for SMEs that extends beyond the project period. Demand analyses and conception phase have been completed. The development of additional content and an operators concept is currently being compiled. The pilot phase began in February 2003.
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Go2Learning	Web-based teaching, learning and work platform for the German construction industry for the support of on-site teaching and independent, self-organized learning.
Short Profile	Problem-oriented learning in virtual 3D environments in training, continuing education and further education in pipeline and drain construction.
Background/Concept	In all areas of civil engineering, the quick availability of detailed professional knowledge plays a key role in the increase of international competitiveness. Only with the most modern construction techniques and technologies can the increasing demands of the industry be met – and a prerequisite is highly qualified employees.
Contents/Goals	Go2Learning has initially been designed for the area of pipeline and drain construction. It is based on the technical books „Instandhaltung von Kanalisationen (sewage system maintenance)" and „Grabenloser Leitungsbau (drainless pipeline construction)". Special features are the 3D visualization of diverse real problems and construction processes and provision of simulation applications for interactive learning. This will be expanded by live scenarios. Go2Learning will optimize on-site learning in the training companies as well as know-how transfer to the customers in administration and communities and to the suppliers. The challenge and focus of the project is the integration of an extremely broad user group – from apprentices to students to engineers. In addition to basic knowledge, specialized professional knowledge must be offered. The creation of the professional data base is therefore an additional focus of the research project.
Target Groups	• construction industry • public administration and civil employees • pipeline and drain builders • apprentices, master craftsmen • students, engineers • teachers • architects • operators of supply and disposal networks

Realization/Features	Go2Learning will establish a teaching, learning and work platform that relies explicitly on the three dimensional visualization of contents in simulation. This will be combined with many networked modules for the presentation and exchange of industry-specific knowledge. Taking into consideration learning strategies, learning levels and learning goals, knowledge modules will be constantly and dynamically generated from a data bank for specific users. The user learns by working on concrete problems, case examples and with solution proposals. Elaborate graphics (some interactive) and animation support the learning process. Go2Learning uses a granular concept with very small, autonomous elements. Additional calculation tools will be provided for the engineers.
Stage of Development/Prospects	As a so-called „Lighthouse Project," Go2Learning will accomplish pioneering work with the example of pipeline and drain construction for the entire German construction industry that will make it possible to integrate all 25 professional groups from the German construction industry. The development of the editorial environment and the systematization of the information components and their integration in a data bank is complete. A drilling system simulator is currently being developed. In addition, the project team is working on a concept for a virtual city. The pilot phase began in February 2003.
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HALMA	Skilled trade-oriented learning arrangements for entrepreneurial thinking and trade in the age of multimedia applications.
Short Profile	Training the linking of entrepreneurial thinking and trade in a virtual skilled trade business just-in-time and just-in-place.
Background/Concept	Tight resources and long hours are characteristic of small skilled trade businesses. Because of these conditions, there is often little motivation or time for continuing education. HALMA builds on new learning concepts that take into consideration the situation at hand. The project is directed at small businesses with 8-10 employees. Using simulation, interaction and independent learning adjusted to the individual, the strengths of new electronic media will be used to advantage – even for the untrained user. A playful, entertaining design of the learning environment and the practically oriented content make it fun to learn. Skilled trade's reference point is traditionally in solid craftsmanship. In the typically small businesses of this type, entrepreneurial thinking and trade is of central importance to the success of the business. HALMA plans to develop planning and learning games that train this type of thinking and trade and is counting on a comprehensive linked perspective of operations.
Contents/Goals	HALMA takes the user into a virtual world in which he finds a simulation of the linked cause and effect structure of a skilled trade business. All important operational structures and processes will be represented. This virtual world makes it possible for the craftsman to learn for his own, real business: based on the linked thought, skills for the active shaping of the business environment will be acquired.
Target Groups	• SMEs in skilled trade • skilled trade educational institutions • all employees in a skilled trade business • private users
Realization/Features	Business strategies and cause and effect structural connections through which the business organization will experience lasting increase in productivity will be imparted. Subject areas are, for example, management behavior, order processing, investments, loans, customer satisfaction, etc. Through a comprehensive understanding of the network of connections and the training of skillful planning, the craftsman will learn to make the right decisions. In a second learning level, study modules to increase professional competence in selected areas (for example accounting, law, technology, organization) will be offered that can be used according to individual needs and which enter business management as newly acquired specialized knowledge. The level of qualification and learning can be determined by the user. A playful approach to the topic through simulation and game planning receives special emphasis. The simulations engine can also be used as a software tool in other applications.

Stage of Development/Prospects	With the supplementary specialized modules, HALMA's virtual planning games can always be adapted to meet the needs of each business. They are also easily adapted for different trades, and deliver a feasible solution base for professional learning in skilled trade businesses as well as for training and continuing education in the skilled trade training institutions. The user surface of the simulations engine is currently being optimized. The online courses are in progress and are about one-third complete. Prototypes were presented at Learntec 2003.
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I-can-EIB	Innovative CBT architecture in the Internet for the European Installation Bus (EIB)
Short Profile	Target group-specific learning on real customer orders with support from virtual tutors and multimedia study units
Background/Concept	Customers in electronic trades today demand increasingly innovative, technically skilled and comprehensive service and one-stop-shopping. The need for information in electronic businesses and by the users of new technologies is accordingly high. The existing information sources are not sufficiently structured and can only offer limited assistance. A comprehensive, diverse information system equal to the problems at hand that sufficiently informs and consults the electronics businesses and the users of EIB technology is necessary.
Contents/Goals	As far as the content is concerned, the focus of the project is the transmission of specialized knowledge over the European Installation Bus EIB – an innovative electronic installation technology, over which all electric switch and regulating controls in one building can be administered and freely programmed. In order to interest and motivate the user in EIB independently from his specific point of view, information and study units about innovative building technology will be described by neutral manufacturers. In the drafting and planning phases, a supplementary "real case" situation will be created, in which the user can select and apply certain concrete components. Authenticity will be achieved through integration of manufacturers of EIB components.
Target Groups	• developers (end users), planners • architects, craftsmen • wholesalers, manufacturers • educational institutions
Realization/Features	The project I-can-EIB is developing a central information network comprised of modular, specialized e-learning study sequences that are oriented on concrete work processes, a collection of case reports, online consulting as well as assistants for virtual projection and drawing up estimates. These components can be selected target group specifically and encourage close cooperation among all involved. For example, developers or architects receive only the information necessary to evaluate the advantages and costs of EIB. Planners and craftsmen, however, would receive technical details about installation and operation. The learning platform will initially offer product neutral information; however, in the planning phase EIB components from various manufacturers can be considered. The presence of the product on the learning platform offers manufacturers and wholesalers the opportunity of targeted advertising, for which they will also be charged. The project is a vanguard of learning in a specialized community. For example, learning partners can be „visualized" through avatars in the learning environment. Additionally, there will be a system of experts responsible for the continuous updating of the content.
Stage of Development/Prospects	SMEs (especially in skilled trades) will be supported in the introduction and expansion of EIB, and will be more competitive due to the qualifications gained by their employees. The strengthening of skilled trade businesses as a connecting link between industry and the end user encourages the expansion of new technologies. And because EIB meets the European standard, the qualification is especially relevant for the expansion of the European market. An "Author Tool" and 20 learning modules for developers have been completed at this time. Plans for a total of 80 learning modules (= Web sites) for this clientele is complete. The chat function with avatars is being optimized.

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LEVER	Learning forum for publishing
Short Profile	E-learning-supported qualifying environment for small and midsize publishers
Background/Concept	"Electronic Publishing" is currently one of the catchwords of a serious phase of upheaval in the publishing business. Electronic production and distribution of publications online and off-line calls for at least a change in work processes and work flow in the overall structure of a business. This represents, especially to small and midsize publishers, a vitally important challenge. Within the framework of LEVER, an e-learning supported qualification environment will be planned and realized in order to make possible a targeted knowledge increase for employees of publishing companies.
Contents/Goals	In the future, the short term and targeted acquisition of new knowledge will be of decisive importance. The need for knowledge must therefore be satisfied just-in-time and on demand. At the center of LEVER are materials from the areas of XML-based technologies, crossmedia publishing and industry-specific project and process management. Special weight will be given to the combination of work and learning processes, i.e., the learning will be integrated into the work flow. In addition, the creation of a network of experts as an element of the qualification environment is planned.
Target Groups	• SMEs in publishing etc. • project directors, layouters, editors, writers
Realization/Features	In order to increase the know-how in electronic publishing, conventional qualification concepts (on-site learning) will be combined with self-organized e-learning offers (e.g. WBT, CBT). The clearly structured study unit modules facilitate learning during work hours and thereby the implementation of continuing education in the work process itself. Within the framework of the interdisciplinary project design, a comprehensive qualification concept, made up of the elements of „methodology/didactics," „information technology," „business procedures," „quality assurance," „media design," „educational controlling," and „operational models," will be realized. LEVER provides cost control for the individual stages.
Stage of Development/Prospects	The learning environment LEVER will provide process oriented, organizational and information technology content for the educational needs of small and midsize publishers. Through the creation of a reference model for the planning, design and realization of an e-learning supported learning environment for small and midsize enterprises, LEVER assures the possibility of cross-industry use of the results. The content of three of the topics has been completed, and in addition, a consulting service „knowledge control" is under development. The pilot phase will begin in June 2003.
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NET-CA-T	Innovative web-based teaching modules for the teaching of new computer-aided (CA) technologies as best practice examples for wood- and metalworking SMEs.
Short Profile	Web-based training in 3D CA technologies for wood- and metalworking small and midsize enterprises in skilled trade
Background/Concept	The use of new three dimensional presentation methods in drafting has become increasingly challenging for wood- and metalworking businesses. Drafts by interior designers, architects and businesses in the metalworking industry are already often designed and presented in 3D. Now more individual customers are interested in professional presentation with the tools of the newest CA technologies.

Contents/Goals	NET-CA-T develops net-based study units that teach how to use volume-based 3D designs – according to the principle "learning on real cases". These will be integrated in a platform specially customized to the needs of continuing education for skilled tradesmen. In several virtual "rooms" on this platform – a study, a conference room, a library and a cafeteria – they will be able to find an extensive offer of multimedia continuing education tools. A second focus of NET-CA-T is the development of a teaching concept for training tele-coaches and tele-tutors in this specialized area.
Target Groups	• wood- and metalworking businesses • expert lecturers
Realization/Features	Extensive, practically-oriented training projects will be methodically/didactically developed – with supplementary highly detailed individual exercises. Woodworking businesses deal with, for example, the application of CAD, CAM and CAE technologies, which can also be used as marketing instruments. An example of this would be the photo realistic implementation and 3D presentation of drafts in given customer localities. In metalworking, on the other hand, the CAD, CAM and CAE study units will concentrate mainly on the areas of design and production (for example, tool building). Concrete content and examples of the study sequences will be determined in close cooperation with skilled trade businesses, for example through the use of questionnaires. There is a need for constant updating due to frequent software updates. The learning processes will be organized in a virtual "classroom" and supported by tools like Application Sharing. NET-CA-T is able to serve different target groups with comparable content. The project already has a differentiated marketing concept.
Stage of Development/Prospects	At the end of the project, tried and tested study units will be integrated in the continuing education portal of the Central Office for Continuing Education in Skilled Trades (ZWH) and will be available nationwide. 38 chambers of handicrafts will be able to access the learning scenarios. In addition, the solutions and concepts tested in NET-CA-T serve as a basis for the implementation of further study materials in the CA technology area in online modules. The conceptional phase has been completed. The development of content is continuing, due to the complicated 3D presentations. The pilot phase began on February 13th of this year.
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NetLlm	Web-based learning for real estate
Short Profile	Training and continuing education, on-the-job training and academic training in real estate through live communication over the Internet, DVD and CBT
Background/Concept	Real estate has become one of the largest economic sectors in Germany. But while a formal education (including university-level studies) is standard in other European countries, in Germany most of the employees in this important industry do not possess an industry-specific qualification. NetLlm will create a basis for the qualification of various user groups in this sector.
Contents/Goals	The goal of NetLlm is the development of a model, interactive study module for real estate, which can apply a the whole range of multimedia possibilities. NetLlm's teaching and learning platform will be oriented around content that is required for the exam for the Realtor (IHK) or for Property Manager (IHK). In addition to the general, uncertified training, a complete teaching and studies program will be available online.
Target Groups	• SMEs in all sectors, but especially in real estate • students • special target groups in the job market
Realization/Features	The multimedia course created in the study scenarios uses the work of a property manager as an exemplar. By simulating problems, all aspects of this job will be made realistically clear to the student. Social skills, so-called „soft skills," can be trained as well as specialized theoretical knowledge. In order to create the most realistic instructional and learning situations, NetLlm combines the modular course units with various interactive applications such as group work, live chats with experts, virtual seminars and news groups. An important factor is the consistent timing of the learning process, which allows for the most flexible use possible. The material is adjusted to the needs of the various groups.

Stage of Development/Prospects	NetLlm is expandable within the industry, and in general. NetLlm will create a continuing education system for the entire real estate sector, while the content can also be extended for further levels of qualification (e.g. commercial trader in property and apartments). In addition, the methodology and content of NetLlm can be transferred to other types of industries with similar structures (e.g. Media Specialist or Sport Specialist). Internationalization through the introduction of more languages is also planned. The first study unit is largely complete. The pilot phase began in March 2003.
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prodela	Increase in productivity through problem-oriented on demand learning in the work place
Short Profile	Creation of a multi-regional community education server for public administration in support of business learning and work processes
Background/Concept	Within the framework of a nationwide modernization of administration processes, many communities in Baden-Wuerttemberg are currently working with the so-called „New Steering Model," (NSM). This refers to the new orientation in public administration to businesslike thinking and behavior; the goal being to modernize the administrations. To support administration employees in this introductory process, prodela is developing a computer network-based learning system that is geared toward meeting individual needs of the employees.
Contents/Goals	The goal is the creation of a regional education server for communities in the Stuttgart area, which will support community employees in their daily work at their work space, in the work processes, and when needed (on demand), targeted and problem oriented. The pilot is the introduction of the new steering model, which brings with it many changes; for example, the introduction of a new software in public finance. The learners will be provided with the exact content or contact person that they need to solve concrete, existing problems. Existing knowledge will be actively targeted and extended, and the work process more productive through short-term problem solving.
Target Group	• public administrations
Realization/Features	Learning material and educational components can be accessed from a central regional learning server from a standard PC at the work place. In addition to pure computer-based content, the learning system will also offer the possibility to solve special problems by contacting professional experts. This will occur with the help of so-called "Tutoring Services", via e-mail (a system for automatic connection is available), online forums or over the phone (via call center). prodela makes a concerted effort to keep costs as low as possible, especially in regard to the target group's budget.
Stage of Development/Prospects	In order to enable continuous development of the learning material, the project includes the development of suitable programs for the creation of new content, so-called „author tools." These support a user- and situation-friendly creation and/or adaptation of the content so that existing content can be adapted or integrated to suit individual communities according to their needs. Each community can put together an individual learning system. A supplementary business model is being developed that will assure the long term economic viability of the education server. Due to the adaptability of the system, prodela is also suitable as a model for other regions. The design of the learning modules is largely complete, and a learning community is currently being created. The pilot phase began in February 2003.
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VOCAL	Virtual Online Computer-Aided Learning – web-based learning for skilled trades
Short Profile	Establishment of a multi-regional education portal with various e-learning modules and consulting offers for small skilled trade enterprises (home automation) and public administrations
Background/Concept	The use of information and communication technologies in skilled trade businesses is still low. Although many skilled trade businesses have PC technology, they are mostly used for industry and bookkeeping software, and seldom used as communication tools. Through VOCAL, skilled trade businesses will be included in the opportunity to use new information and communication technologies. The personal computer and Internet must be used as a medium for information on the one hand, and for continuing education in various areas on the other. VOCAL will create the conditions under which new media as general teaching and learning methods can be integrated in every-day work and training in skilled trade businesses.
Contents/Goals	VOCAL is developing and testing a virtual tele-learn service system with various learning modules specially for skilled trade businesses. Initially, learning sequences on the topics of energy and environmental technology, information and communication technology and business management for skilled trade businesses, and also for civil employees, will be designed. Later, the topics advertising, allocation and accounting will be added. The thematic focus will be developed for the following professional associations: "Sanitation/ Heating/Air Conditioning" "Color/Design /Building Preservation" and "Roofers"
Target Groups	• SMEs in skilled trade • civil employees
Realization/Features	VOCAL is developing an organizational structure for self-designed learning with flexible on site learning, self-designed online learning and online learning with specialists and professional authors. A media catalog is being created that will describe the functional use of old and new media. The specifically developed Course Management System is the technical platform for the presentation of training and continuing education content in the Internet. In addition, this includes a model of the evaluation of the learning success. Basic knowledge and technologies from various disciplines will be combined in an innovative system solution on this platform. Some content examples of the modular learning sequences are: controlled ventilation, energy consulting, heating and ventilation system renovation, solar heating system technology, technical calculation with Excel, office communication with Outlook and working with WIN AVA and the consideration of legal frameworks in public administration. In the future, structurally weak regions and very small businesses will be more intensely integrated in the project. Decentralized content management and first examples of content sharing also play a special role in the project.
Stage of Development/Prospects	To achieve a comprehensive qualification of the craftsmen, VOCAL will link existing education networks to form a multi-regional central education portal, including a virtual continuing education consulting service. Regional craftsmen associations, in cooperation with the educational sponsors are the central multipliers. The teaching and learning environment should be marketable as a training service (businesses, institutions and public authorities) and usable by other target groups (universities, community schools, internal training, political and social education). Several market analyses have been completed. 60 percent of the content has been created, and the first modules have been tested in practice. The pilot phase has been running since September 2002 and should be completed by the end of 2003.
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WebTrain	Net-based learning for e-government
Short Profile	Development of virtual face-to-face study programs for flexible combination of individual and supported learning in public administration.
Background/Concept	Continuing education for civil employees and public administration is almost always offered as conventional on-site training. Multimedia applications such as e-learning are not well represented in most qualification palettes. WebTrain's goal is to open up potential net-based learning media for public administration, to integrate e-learning offers in the every-day work process and thereby simplify access to professional training. This should serve to create a new training culture in public administration and community businesses.
Contents/Goals	Of high importance is the realization of a cooperative and interactive learning environment that combines knowledge transfer, team and cooperative capability. In the project, content from administrative training courses that have, until now, been taught conventionally, will be prepared as WBTs and offered online in combination with on-site learning. The content will be expanded by modules such as "new steering model" and "information management". As a new form of learning is only possible with "new" teachers, WebTrain has also developed an educational concept "online tutor" for lecturers from administration.
Target Groups	• employees from public administration and community businesses • lecturers from administration
Realization/Features	WebTrain's methodical approach is a combination of various forms of learning. A special focus is on cooperative learning phases and interactive learning experience. To accomplish this, a standard learning platform will be expanded with new communication tools, which enable the cooperation between learners, tutors and lecturers; cooperation means, for example, brainstorming, organizing, coordination, and active tutoring. The content of the platform will be designed in close cooperation with the studies institutes, which are also in charge of the official final exams. The "Employee Course II" for the community disposal business will be carried out as a pilot project. Examples of training content include: commercial finance, double entry bookkeeping, administrative law, cost accounting, investment and finance, new controlling mechanisms and information management. An early start of the training course in February 2002 allowed the WebTrain project to collect many user experiences. The target group is employees with little previous training and high pressure jobs. The use of a virtual classroom was very successful.
Stage of Development/Prospects	WebTrain is developing a flexible learning platform for asynchronous (self-study) and synchronous (with a trainer) learning with a selection of transferable tools to support cooperative e-learning. In connection with an accompanying project management to control business and content solutions models, a basis for the use of net-based learning in the e-government sector will be created. WebTrain creates an important instrument for the general modernization of administration techniques. Two learning modules have been in use since April 2002 in a pilot phase. The virtual classroom is completely integrated in the learning environment. Additional learning units are being developed for the current courses at this time.
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Appendix 5
Indices of figures, tables and checklists