

## Training clients using e-learning:

Developing an e-learning model for an international software vendor.





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|-------------------|----------------------------------|
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## Preface

In April 2008, I moved from Enschede to Nieuw Vennepe, to start my final project at a company in Amsterdam. This report is the result of my work of the past few months; my graduation project.

Back in April 2008, when I started the project, I could not imagine what would happen. Well, a lot has happened. I have experienced that how clear the plans may be, it may run completely different; and the results may be not as expected. The months have passed with ups and downs. The first phases of the project went well, it was relatively quiet and I was happy with each part I finished.

The second part including empirical research went less smooth; it appeared to be impossible to follow the plan. I did not know how to cope with this, but fortunately I had many people around who listened to me, and tried to help me out. I do not think I was the most cheerful person to speak with at that time. Reorganizing the report and plan was not the most fun part of the project, but now I am finished with it, it almost feels like time flew by.

I want to thank the people who supported me along the way, either with mental support or by sharing their ideas.

First I want to thank my supervisors; Klaas Sikkel and Roland Müller. Klaas, you got me back on track each time something went wrong or when I got stuck in my own thoughts. You could always find the bright side of unexpected events. With your support you gave me the confidence that I needed. Roland, you came with valuable ideas, and made me aware of scientific processes. I also want to thank Vinoth and Riki for their support on the practical matters in the company, and the numerous coffee-break conversations.

For mental support and interest I want to thank my family, and one person in particular; Jeroen. We discussed my problems and my achievements. You gave me critical feedback; your support made me complete this project.

With two of my closest friends I have not had deep discussion about my project, however they were very important to me. Just cheering me up, celebrating achievements, and providing some distraction. Carmen and Christien, thank you.

This report marks the end of my studies; those five years are over after my presentation next week. Five years ago I wondered if I could achieve the masters degree and now I am there. I would like to thank my fellow students for this great time. With ups and downs I climbed the hill, and now it is time to go. Time to begin another challenge.



## Management Summary

The company considered in this report develops and sells software products in a niche market. Target customers are the top financial institutions worldwide. Because clients are based all over the world, it is not easy to provide the clients with training. The company wants to investigate whether e-learning could replace or extend their current training portfolio.

This study started with a literature review on e-learning, its history, characteristics and applications. E-learning started as a means for universities to educate people living abroad. Later on commercial institutions also started to offer e-learning courses. The main advantages are lower travel costs for trainees and planning flexibility for clients. Typically, the teaching facility has to invest more time and effort in course materials and does not always receive financial benefits in comparison to classroom based training.

In literature, three models of e-learning are used frequently. The first is a self-paced course, in which there is very limited or no contact between trainer and trainee, giving the trainee maximum flexibility in picking time and place for studying. The second model uses interactive online sessions, in which trainers can explain issues and trainees can ask questions. Between the sessions some homework assignments can be provided. The third model is a hybrid form of the previous models. The course starts with one online meeting, in which all participants meet and the trainer can give instruction about the structure and contents of the course. After this first meeting, each trainee can decide on his or her own study-planning and can contact trainers if needed.

To determine what exactly the demand of trainees is, it was intended to set up interviews with trainees of the company. Unfortunately this was made impossible due to the financial crisis of 2008. As a result, only a very limited number of interviews were conducted. These interviews did however provide some important insights. It appeared that travelling costs is not the largest barrier for client to send their employees to training, but planning training time is. It appeared that a lot of trainees have to be available for emergencies; it happened before that trainees were at the training facility but had to spend most of the time on the phone with colleagues. The second important result is that personal contact and interactivity would be highly valued by trainees. The subject matter is hard to master alone and guidance from a trainer is important.

The recommended structure of an e-learning project is based in the hybrid model; two important issues have to be considered before a large e-learning project can start viz. cost effectiveness and setup of a pilot. If an e-learning course has only a limited number of participants, it may not be cost effective to develop new material for self-paced learning; development and maintenance of high quality course material is a very time-consuming task. It may therefore be less expensive to have a couple of interactive sessions with a trainer. Of course this also depends on the expected number of future trainees and the changes on the subject matter. This study could not determine whether clients value planning flexibility over interactivity, because there were only a limited number of interviews possible. Before a large e-learning project can be set up, a choice has to be made. The recommended manner is to try the hybrid solution in a pilot course and to decide after an evaluation of the pilot whether or not to develop new materials for all or only a number of courses.

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## 1. Introduction

### 1.1. Project context

This document is the result of a study to determine whether and how e-learning can be used in an international software company. The products of this company are software packages for centralized data management for financial institutions. The company has offices in the United States, Canada, United Kingdom and the Netherlands. Several departments have team members scattered around these offices. The customer base is even more geographically dispersed, ranging from several states in the US, to many countries in Europe and some in Africa and Asia.

The company's software product is a complex product, requiring expertise during installation and configuration and training for end-users. Training is delivered currently on-site at the clients' office, or in one of their own offices, requiring either a trainer or the trainees to travel a couple of days. The department responsible for training is also facing the challenge of raising more revenue and came up with a plan to broaden their training offer with one-day lasting advanced training programs on updates and new topics. For these training programs the overhead costs like travelling costs may be too high for clients to enroll their employees. A solution to reduce these travel costs is to use e-learning. This study will investigate whether and how e-learning may be a solution to deliver the new training programs, increase customer satisfaction and help to raise more revenue.

### 1.2. Research Objective

The objective of this research is to design an implementation of e-learning may be a solution to deliver the new training programs, increase customer satisfaction and help to raise more revenue. This design will be described in such a manner that it is possible to set up a pilot in order to evaluate the design and be able to improve it with the results of the practical evaluation.

### 1.3. Research questions

Summarized in only one sentence, this project is about designing an e-learning implementation, which deals with certain constraints. The central research question belonging to the above mentioned objectives and summary is:

*What would be a suitable e-learning project for this international software company?*

This question can be divided in several sub questions, which also reflect the structure of the study and this document. The sum of answers to the sub questions lead to the answer on the central question (Verschuren 1999). In the first place, some literature research has to be done, to explore e-learning. It is necessary to know how it is used, what its advantages and disadvantages are, in order to assess which parts can be valuable to the case at hand. Next to this rather general information, information specific for the case must be gathered from stakeholders. The third step is to analyze the input of both sources and design a suitable e-learning implementation. When the design is ready, recommendations about implementations will be drawn up. Testing and evaluating the design is not part of this study, due to time and resource limitations. According to this plan, the appropriate sub-questions are:

- 1) What is e-learning?

1. What does the e-learning process look like?
2. What are the advantages?
3. What are the disadvantages?
4. What are prerequisites?
- 2) What are general requirements and issues known from literature?
- 3) What are issues that stakeholders think is important?
- 4) What should the ideal solution look like?
  1. What is the current situation?
  2. What is needed to implement this?
- 5) What steps are needed to establish the ideal solution?

#### 1.4. Research method

Research can be conducted in various ways, using various models. Verschuren and Doorewaard (Verschuren 1999) considered several types of research and explained the process and in and output of these models. A study can be set up in five major strategies; case study, grounded theory approach, desk research, experiments and surveys (Verschuren 1999).

Desk research is not applicable here; we attempt to design something, desk research focuses on literature research. While desk research focuses on previous studies, this project is about empirical research. Literature is very broad, while this project is on depth. A grounded theory approach is useful when several cases are available and general conclusions on similarities and differences can be drawn. In this case we focus on a single case. An experiment involves a

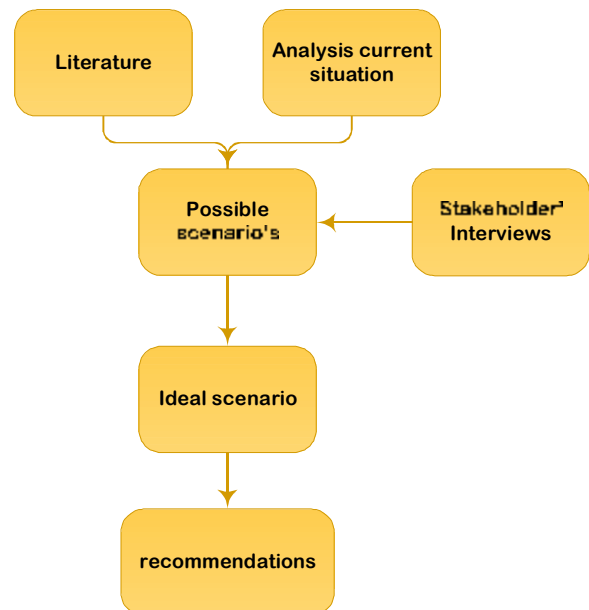


FIGURE 1 RESEARCH MODEL

change in a situation and the influence this change has on its environment. This project attempts to design this change, so the experiment is one step too far. A case study focuses on studying specific aspects in one or more environments. There is no change involved, but behavior is studied and in some cases explained (Verschuren 1999). According to these guidelines, this project can be characterized as a single case study. The project focuses more on depth than broadness; it considers only one company instead of several and will be carried out on-site, making use of labor-intensive information-gathering methods. The project is divided in phases; analysis, literature review, empirical research, design and implementation recommendations. The first three phases will be executed in this order perhaps with some iteration, for example if in the literature study a topic for analysis comes up. The fourth and fifth phase will be executed more or less in parallel; while designing the model some recommendations for implementation will arise accordingly.

Yin, defined five sources of information that can be used in research (Yin 2003). In this research we will use scientific articles for general information on e-learning. Documents within the organization and observations will be the foundation of the analysis. The final part; obtaining opinions and suggestions from stakeholders will be done by means of interviews.

### **1.5. Document Structure**

As mentioned before, the sub questions and the research plan have major influence on the document structure. This chapter introduces and explains the project context and the research plan. Chapter two studies the history and characteristics of e-learning. In chapter three we will look into the advantages, disadvantages and other consequences of using e-learning as teaching method. In the fourth chapter we analyze the current situation more thoroughly with the literature from chapter two and three in mind. In the first five chapters all required information is gathered and in chapter six we develop possible scenarios for the e-learning project. Chapter six focuses on the empirical research; we interview stakeholders to gather their thoughts and requirements regarding the proposed e-learning project. The second part presents results from the interviews, and presents the most suitable solution. In chapter eight conclusions and recommendations will be discussed.

### **1.6. Stakeholders**

The e-learning implementation developed in this project is meant for a new type of training. As a consequence, there are two stakeholders identified; the supplying company and its training customers. The first category includes the trainers and other training staff and management. The second party in this category is account management, which has to sell the training and signal additional training needs at their clients.

The second type of stakeholders is the demand organization, or the training customers. This role of stakeholder can be fulfilled by different subtypes; the actual clients of the software company, partner companies and (new) employees of the company itself. These subtypes all get the same training though they may use it for other purposes; to actually use in the daily work, or to be able to implement the software in other organizations. In this document we do not use this distinction further; all trainees are treated the same, only in the empirical part we will attempt to gather information from the different subtypes.

The third category stakeholders in this project are the sales force and company management. These stakeholders are not directly involved, because they are not affected that much; their work and goals will not be affected in the short term. Company management has set targets for the training department to become a profit centre; thus create more profit. In the long term the board should find increased revenue on the balanced scorecard due to the success of the new training offer. The sales force currently does not sell training as a separate package but as part of the package when the software is sold. In the future, the new training offer can be added to the list of services and may be presented in a list of benefits.

## 2. Exploring e-learning

Before we go into depth of what e-learning is exactly and what its characteristics are, we will first look into history. With this history in mind, we may get to understand the characteristics, advantages and disadvantages better. It can also help in determining whether or not e-learning may be a suitable way to offer the company's training. E-learning is often regarded as the 'the next generation' of distance learning, as we learn in this chapter. Therefore we also study distance learning.

### 2.1. Short History of distance learning and e-learning

Learning and teaching have been face-to-face processes as far as humans can remember until the 19<sup>th</sup> century. In the 19<sup>th</sup> century, demand for learning without attending classes emerged. People living further away from schools and universities that were willing to study demanded another way of learning because travelling to the teaching facility on a regular basis was a challenge. In 1840 the first distance learning course was provided. This course consisted mainly of correspondence between the teacher and student. Apparently this way of teaching was a success and led to the establishment of private correspondence universities in 1885. In the early 20<sup>th</sup> century technology evolved quickly and teachers of these universities recognized the benefits and possibilities of the new technologies like audio-recording and video-recording. A few years before radio-technology became wider available, some pioneers in distance learning provided radio-based instruction. The same holds for video and television, think of courses provided by the BBC in the UK, or by Teleac in the Netherlands. In 1969 the British Open University provided courses on university level for those people who were unable to travel to a university on a regular basis via correspondence (Williams 2004). Since then the use and popularity of distance learning has increased, especially on university level. As described, distance learning has always depended on the technologies available at the moment (Williams 2004). When the internet emerged in the 20<sup>th</sup> century, some providers of distance learning adopted this technology too and the type of distance learning relying heavily on the internet and ICT was often called 'e-learning'. Some researchers therefore argue that e-learning is an integral part of distance learning (Gunasekaran 2002).

A timeline of the development of distance learning and e-learning is shown in Figure 2.

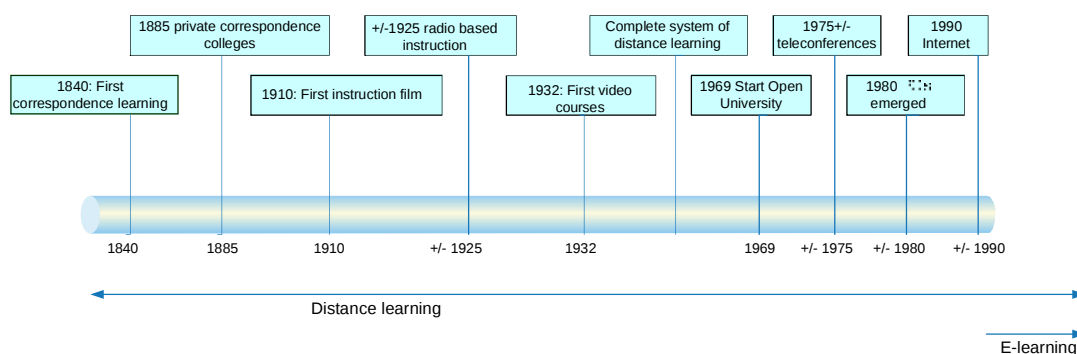


FIGURE 2 TIMELINE OF DEVELOPMENT OF DISTANCE LEARNING

The history of distance learning is modeled in a three-generation-model by Niper in 1989 (Guri-Rosenblit 2005). The first generation is called 'correspondence teaching' and refers to the period in which the course material consisted mainly of letters and other written material. The second generation is called 'multi-media teaching'. In this period the audio and video material became available via radio and television. The last generation Niper describes is the 'new interactive communication technologies', in which all the new ICT-technology can be used. The main difference here is that the new technology made it possible to let teachers and students interact with each other on a regular basis with relatively low costs. Taylor (Taylor 2001) adds two new generations to this model: the fourth generation is called 'flexible learning model', allowing students flexibility to study on a timeframe and place of their choice. Taylor foresees a fifth generation called the 'intelligent flexible model', which is an extension of the fourth generation with some intelligence added to the system, for example an online tutor which can respond automatically and adequate to questions of students. Table 1 below summarizes the generation model of Niper and the additions by Taylor.

| Nr | Generation                         | Course material                            |
|----|------------------------------------|--------------------------------------------|
| 1  | Correspondence teaching            | Written material; letters, books, articles |
| 2  | Multimedia teaching                | Audio, video                               |
| 3  | Interactive communication learning | ICT-technology                             |
| 4  | Flexible learning model            | Asynchronous interaction                   |
| 5  | Intelligent flexible model         | Use of automated feedback mechanisms       |

TABLE 1 GENERATIONS OF DISTANCE LEARNING MODELS

As we have seen already e-learning and distance learning have some characteristics in common, but differ on others. In the field these terms are used interchangeably and some organizations and institutions developed new names for processes which are more or less the same (Twigg, 2001, as cited by Guri Rosenblit, 2004). A list of alternative designations found in literature is listed in Box 1. It catches the eye that a majority of these designations contain a reference to the technology used in the learning style, with terms like 'web-based', 'online', 'telematic' and 'I-Campus' (Roffe 2002). In the next sections we will study both distance learning and e-learning in more detail.

## 2.2. Distance learning

In the history overview in section 2.1 we saw that distance learning emerged to teach people who lived on a large distance of the university. This makes it straightforward to explain the term 'distance learning' as 'learning at a distance', in which 'distance' refers to a physical difference between the teacher and learner. Some researchers agree on this and some even take it a step further; in their vision only a learning process in which teacher and students never meet each other can be regarded

Alternative names for distance learning or e-learning:

- Distance education
- web based learning
- computer-mediated communication
- telematic environments,
- virtual classrooms,
- online instruction,
- online learning
- I-Campus,
- electronic communication,
- cyberspace learning environments,
- computer-driven interactive communication,
- distributed learning,
- borderless education

BOX 1 ALTERNATIVE NAMES FOR E-LEARNING

as 'distance learning'. Other authors refer to distance learning with a strict rule of never meeting each other 'pure' distance learning'. In some distance learning courses, there are one or more classroom sessions, the reason why the first group do not acknowledge this as 'distance learning', but the second group does (Gunasekaran 2002).

A second explanation of the term distance learning is developed by Holmberg; this author argues that 'distance' can also point to a 'distance in time', thus that teacher and learners are not only separated by location, but also by time (Holmberg 1989). Distance in time refers to asynchronous communication; the two parties are not required to be available at certain timeframes. An example of this kind of communication is e-mail. Further details can be found in section 3.4.1.

Moore has developed a third explanation of 'distance' (Moore 1989; Williams 2004). Moore defined 'distance' as the social distance which emerges if people do not have a lot of interaction, thus perceive a lack of interaction and may feel lonely; *"Distance is determined by the amount of communication or interaction which occurs between learner and instructor and the amount of structure which exists in the design of the course."*

The three foregoing explanations of the term distance learning emphasize on different aspects of distance learning, but in a very general way they all describe a process of distance learning as knowledge transfer via some carrier as long as the carrier is not human, or when the contact is made available via technology. In this description will the historic explanation and Holmberg's explanation hold. It also confirms that there is not per se regular and synchronous interactivity between the teacher and students. On the other hand, it is still possible that the learner responds via the carrier.

Distance learning is mainly used by universities to educate people living too far away to attend lectures, though in the past few decades companies started distance learning initiatives to educate their staff and their customers, sometimes as part of a larger knowledge management project (Bennink 2004).

Although there are a lot of designations for distance learning, there are some characteristics which are present in most descriptions and implementations of distance learning (Guri-Rosenblit 2005). The first characteristic is the physical separation of the learner from the instructor, already mentioned in section 2.1. Since physical distance is very common, distance learning is tailored to the needs of students who are not able to attend lectures. Because of the physical separation between teacher and students, students study mostly via homework and may have occasional work in class, exactly the opposite of traditional classroom based learning. In pure distance learning there are even no classes at all and the work consists completely out of homework. As students are not grouped in classes or groups, a teacher has to interact with each student one-on-one, thus students are taught as individuals and not in groups.

Since distance learning does not require attending classes on a regular basis, it is a convenient way of studying for students who already have a job. As a result students who were unable to study under normal conditions have a second chance with distance learning.

#### *Characteristics of distance learning*

- *Physical separation*
- *Mostly homework*
- *Few class-sessions*
- *Individual learning*

BOX 2 CHARACTERISTICS OF DISTANCE  
LEARNING

Many researchers have developed a definition for distance learning, some are listed in Table 2 below. Most of them sketch a process matching the characteristics mentioned before, either one or more of the characteristics. For example number 1, from Guri-Rosenblit where she emphasizes on the physical distance between students and teacher. Unlike many definitions on distance learning, there are no restrictions to the medium of knowledge transfer.

The second definition is from Stella, who is basically an alternation of Holmbergs distance learning description mentioned before, mentioning both the time and space separation. Later on, Stella came with another definition, focusing only on technology (number 3) and mentioning an international character.

Holmberg developed a more general definition focusing on the physical distance, in which he emphasizes that students and teachers are not in the same locations. Distance in time is not made explicit, just like the definition that Guri-Rosenblit used.

| Definition                                                                                                                                                                                | Source                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <i>All forms of instruction in which classroom sessions are not the primary means of education</i>                                                                                        | (Guri-Rosenblit 2005)                                |
| <i>A subset of distributed learning, focusing on students who may be separated in time and space from their peers and the instructor</i>                                                  | (Stella 2004)                                        |
| <i>Education delivered trough satellites, computers, correspondence or other technological means across national boundaries</i>                                                           | (Stella 2004)                                        |
| <i>The various forms of study at all levels which are not under the continuous, immediate supervision of tutors present with their students at lecture rooms or on the same premises.</i> | ( Holmberg, 1989, as cited by (Guri-Rosenblit 2005)) |

TABLE 2 DEFINITIONS OF DISTANCE LEARNING

In this document a part of the first definition of Stella will be used. This definition is clear about the **difference in time and space**: "*Education delivered to students who may be separated in time and space from their peers and the instructor.*". Because the most visible difference between distance learning and learning seems to be the technology, we add this to his definition with help of the three-generation model from Niper (Niper, 1989 (Guri-Rosenblit 2005)). In this model is the technology used in distance learning nearly everything available before the internet emerged. Combing these two parts the following definition is the result:

***'Education delivered to students who may be separated in time and space from their peers and the instructor, not delivered only via internet.'***

### 2.3. E-learning

As explained in section 2.1 e-learning is sometimes considered as distance learning using the internet and other electronic or digital technology. As with distance learning, several definitions have been developed for the term e-learning, although they all describe the same process. Some of them are listed in Table 3. Bauer and Tillmann (2002 as cited by Montandon, 2003) described e-learning using the following four characteristics; Utilization of modern multimedia technology, possibility of autonomous and interactive learning, possibility of personal support and the utilization of electronic data and communication networks.

Thomas (Thomas, 1997, as cited by (Gunasekaran, 2002)) distinguished the following four functions which an e-learning implementation must provide to become successful; provision of learning materials, provision of facilities for practical work, enabling questions and discussion assessment, provision of student support services. The first two functions are also present in distance learning, though the last two are more specific for e-learning.

According to these studies, e-learning differs from distance learning on the aspect of interactivity and personal contact. In distance learning there are only limited possibilities for discussions and questions, while in e-learning there are many. Another difference lies in the field of use; as distance learning focuses more on universities teaching students living far away e-learning covers academic, corporate and customer fields (Gunasekaran 2002). Various researchers predict a growth in the use of e-learning in corporations as networked multimedia systems and learning management systems provide a lot of flexibility (Newton 2007).

Some companies also use e-learning to train their customers; an online course was developed to teach customers what was in the 200 page manual. It appeared that customers liked the online course better and the effectiveness was a lot higher. In combination with an Frequently Asked Questions-database and Ask-the-Expert service customers' need of information was satisfied in a very convenient manner (Crocetti 2002).

E-Learning is defined and described by various researchers in various different ways. Some classify e-learning as a type of distance learning, others as a means of knowledge transfer that can be used in all kinds of learning (Guri-Rosenblit 2005). Table 3 lists some definitions found in literature. All definitions distinguish e-learning on the technology-aspect, either as learning via internet or modern ICT-technology.

| Definition                                                                                                                                                                      | Source                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <i>e- Learning applies to the provision of learning trough computer-based processes or multi-media.</i>                                                                         | (Whitlock, 2000 as cited by Roffe, 2002)                       |
| <i>e-learning is internet enabled learning</i>                                                                                                                                  | (Gunasekaran 2002)                                             |
| <i>e-learning is learning which is supported and/or made possible by the use of information and communication technology (ICT)</i>                                              | (Hoppe 2003)                                                   |
| <i>E-learning means learning trough information and communication technology. This provides the learner the freedom of determining the learning process himself or herself.</i> | (Back, Bendel, StollerSchai, 2001 as cited by (Montandon 2003) |

TABLE 3 DEFINITIONS OF E-LEARNING.

The definitions above all refer to the use of ICT or internet for learning and no reference is made to physical, time or social separation of the teacher and students. In Niper's vision is e-learning nearly the same as distance learning, but using different technology. An important characteristic of e-learning is interactivity, which is in contrast with Moore's vision of having to deal with a social distance in distance learning. Combining all that, a new definition is established:

*"e-learning is internet or ICT-enabled learning in which teacher and student may be separated by time and space."*

## 2.4. Application of distance and e-learning

We have seen that distance learning and e-learning once started as a means to educate people living far away from universities. Nowadays, e-learning is also used to train workforce, as a means of knowledge sharing. There are quite some differences in both of these applications; the domains, goals and consequences of certain decisions and characteristics. In the next two sections we will investigate what academic and corporate projects look like and what the differences are.

### 2.4.1. Academic learning

As described in the history overview are distance learning and e-learning evolved at universities to teach their students living far away. The Open University is presently still educating people via e-learning and distance learning. Universities usually teach mainly theory, together with a critical attitude regarding new theory. There isn't a single description of a typical distance learning university student. Some authors see these students as 'second-chance'-students; people who haven't studied when they were younger and are trying to catch up later. Other authors speak more about students who are unwilling or unable to attend classes at the campus, such as people who have a family to take care of, have a handicap or a job. Many distance learning experiments described in literature are initiated by scientists who have a special interest in distance learning. These scientists can use their own classes as a basis and design a distance learning class on it. Other scientists designed a course to test the usability and convenience of certain technological innovations.

### 2.4.2. Corporate learning

Using e-learning in companies is a rather new phenomenon. Some companies use internet to train their customers in working with their purchased product. Others use internet to teach their employees to improve efficiency and knowledge in their job (for example projects 1, 2, 3, 4, 9 in the Appendix). These two applications have other goals and another audience. In the first case e-learning is regarded as fun substitute for reading a thick manual. In the second case distance learning is used to be able to offer personal training plans to employees and personalize the training-offer to their needs. It won't be necessary to plan a meeting that everybody can attend and it conveniently deals with potential knowledge-discrepancies between experienced employees and starters. In this case, other knowledge management and knowledge sharing initiatives are sometimes combined or related with the learning initiative (Bennink 2004). In more and more cases even growing towards one project (Norris, 2003; Rosenberg 2003 as cited by (Bennink 2004)) For example, a very comprehensive version is an enterprise-wide integrated online learning model, in which knowledge management and learning are all integrated with human resource policies and initiatives to serve the whole organization (Bennink 2004).

Another variant of corporate e-learning is via commercial offers. For rather general knowledge, thus non-company-specific knowledge, knowledge can be gained via a course offered by a third party. The main advantage is that the company only has to pay for the actual usage and does not have to invest in development and maintenance of these courses (Bennink 2004).

Employees who are sent to training by their manager, may not always be as motivated as people who deliberately chose to start a new course or study. This means the course has to be attractive and fun to do, otherwise employees may drop out of the program, or get a very negative association with it. In the last case, people tend to do just the necessary to **get 'done with it'**.

If e-learning projects are introduced in corporate settings, change management becomes very important. A clear strategy for the project has to be developed and should be aligned with the corporate strategy. Ideally it should make clear how it contributes to reach the set corporate goals and what other business benefits can be achieved (Crocetti 2002). In other words, there must be some kind of demand for these courses (Alexander 2001).

Next to a clear purpose, the project must also be supported throughout the company, which requires profound communication to spread the message. The main objective is of course to gain support from all layers and departments of the company, so everyone can take part in the project, either by taking, delivering, suggesting or improving courses. As with every course, this takes some time from an employee. Therefore it is tremendously important that management supports the initiative, assigns time and money to it and encourages employees to take part in the project, which in turn will only be if there is a clear goal and something to gain.

#### **2.4.3.Differences between academic and corporate learning**

Academic learning and corporate learning are kind of the same, only the setting seems to be different. To determine if there are other differences, we examined the case studies and projects described in Appendix: Example projects on page 59. Numbers between brackets refer to the number of the projects in this appendix.

Due to the different setting of the project, the goals also differ. Delivering (under-)graduate classes to university students implies teaching of theory and some supporting practical matter and an **'academic 'perspective. Corporate learning can have two goals, either delivering training to customers to let them work more effective (1) or efficient with the products, or training the own workforce (1,2,3,4,5,6) to achieve better results.**

Due to the setting difference, the second difference are the stakeholders; students, teachers and organization. First consider the type of student and their motivation. In educational settings these are mostly students in higher education from 18-25 years of age (2,5,7,8,10). There is also a growing minority of another type of students; people who have not been studying before and try to lift their level of education later, the so called second-chance students. These are often adults, with or without a job, who either study from curiosity to the subject matter, or use it as a means to boost their career. In corporate education, students are always already occupied with a job (1,2,3,4,9). The subject matter is nearly always closely related to their current or future work (1,2,3,4,9). Studying is not always their own choice, as is in educational settings; these people can be sent to training by their employer. In this case there may be an extra motivation such a more chances on a promotion or a salary raise (2).

Teachers in educational settings are mostly university teachers with a special interest in online learning (7). These teachers are sometimes assisted by senior students. These teachers are highly motivated, because it is their own idea to start the project, in a course that they taught before. In corporate settings, teachers are accustomed to a classroom-based way of teaching. If their management decides to change the teaching style, these teachers may be reluctant to accept and work with the new style.

When looking into the technology, a learning management system is often used that is developed outside of the corporate organization; either bought (5) or a free version is downloaded and installed. In both situations are video-conferences used and all types of students perceive this as beneficial and very helpful. Especially when recordings of the sessions are made available later on. In university programs, the project is often started to test recent developed technology of methodology in practice (8).

In relation to technology, the scale of geographical scattering is important. Having participants scattered all over the world (9, 11) or scattered around a campus (8,10) makes a difference with regards to time zone differences and cultural differences. Pilots in educational settings are often done with students scattered around a campus (8,10), sometimes with some additional students a bit further away, or even in a foreign country (1,2,11). This may be due to the fact that a lot of research is done on American campus universities, where researchers can develop pilot courses and teach these instead of the regular courses (7,8). This way of working eliminates the problem of seeking for participants, master new subject matter to develop a course around and gathering experience with a control group (7,8). In corporate settings the geographical dispersion is usually a lot wider and as a consequence faces more time planning problems next to the fact that these participants have a busier agenda than university students.

Subject matter is different per course, but one can roughly divide this in theory and practical work. In university studies, the majority seems to be theoretical, with some practical assignments similar to 'regular' courses (10). In corporate settings, there does not seem to be such a preference; however the content is frequently product-related, such as a user-course for software programs. Or the knowledge obtained is otherwise instantly applicable in the daily work (1,2,3,4,6). Assessing the amount of knowledge that is gathered is not very common. In most educational settings there are some kinds of tests, to ensure that the student really is which are important when people apply for a job. Other companies pass the responsibility for achieving the maximum out of the course totally to the student. Their line of thinking is that the student signed up for the course, so they are motivated and have the responsibility to achieve their own learning goals.

### 3. Comparing distance learning and e-learning

In chapter 2 we studied the history and characteristics of distance learning and e-learning. We found that there are some similarities and differences. In this chapter we will try to find why and in which situations e-learning and distance learning are suitable and in which they are not. The aspects we will look into are the advantages and disadvantages, the costs, the technology involved and other success factors and prerequisites. The first three aspects are derived from the research questions. The last three aspects became interesting after studying the definitions of distance learning and e-learning.

#### 3.1. Advantages

When exploring distance learning or e-learning in literature, many authors sum advantages, or even find new advantages. However, not every advantage is applicable in every situation. In section 2.4 we distinguished two applications of flexible learning; academic learning and corporate learning. In this section we explore the advantages for these situations.

We have seen before that distance learning and e-learning are developed to educate people living far away from teaching institutes. An overview of the advantages is provided in Box 3 and Box 4.

Although both distance learning and e-learning provide a lot of advantages, the perceived advantages can nearly all be categorized as flexibility of material and time, accessibility to the material, visibility of the multimedia and availability of the data (Bouhnik 2006).

##### Flexibility

Distance learning or e-learning require a lot less or even no classrooms for the teaching process. For universities this implies that less rooms and buildings are needed, which also **don't need** maintenance and cleaning any more. Next to that, planning of classroom use will be simpler, because there will be less reservations and less rooms involved. For teachers this gives more flexibility in planning, because the limiting factor of classroom space and barrier of planning lectures are not relevant any more (Rand, 1996, as cited by Vigil, 2000) (Gunasekaran 2002). In fact, when there are no classroom meetings and technology and material are available at the **teacher's** office, he gets ultimate flexibility in choosing a time and a place for the lessons, with or without discussing with the students. As classrooms are no limiting factor any more, the number of students may be increased. However, this though is still limited to **teacher's capacity**. **When opting for personalized learning, the group**

##### *Advantages of distance learning and e-learning*

- Flexibility of time
- Flexibility of location
- Flexibility of material
- Always available material
- More students to enroll
- Low travel costs
- Low travel time
- Individual personalized learning process or standardized course
- Students set learning pace
- Low social limitations in asking questions
- Student can be anonymous

Box 3 ADVANTAGES OF FLEXIBLE LEARNING

even may have to be smaller than in classroom-based learning. Enrolling in courses with many self-study-hours and flexible contact moments, it is easier to plan study around other activities, like a job, a family to take care of, etcetera. For universities, this gives opportunities to attract other types of students than the 'regular' youngsters, who don't have time to study during office hours, though can study in the evenings or weekends (Ubell 2000).

A second advantage of distance learning or e-learning is scalability; the costs for every extra student in a distance learning course are not so high because course material is already developed and the variable costs are mainly staff time for administration tasks. Sending the material to more students does not raise a lot of costs, while students have to pay the normal fee. This makes it possible to train large numbers of students quickly (Gunasekaran 2002).

When distance learning or e-learning is chosen as the means of teaching, a choice has to be made between standardized courses, or personalized courses. Due to the distributed character, students are guided through their learning experience mostly individually, because students have mostly one-on-one contact with their teachers. In both cases students can be free to set their own learning pace and create time in the planning for reviewing previous chapters in order to better understand the current subject matter (Bouhnik 2006). This enables students to set their own pace of learning and to review previous lessons (Bouhnik 2006) because they do not have to take the stakes of peer students into account (Zhang 2004).

Students enrolled in a distance learning course seem to be less dependent on teachers, but more driven find answers elsewhere, for instance searching in other study materials. Asking a teacher seems to be their second option. In classroom-based courses, teachers are more regarded as the first source of information. (Vigil 2000)

The main advantage of standardized courses is that every student gets the same material and the same quality course (Roffe 2002; Strother 2002). By standardizing courses, the structure and uniformity of all courses are the same, making it easier for students to understand the way the course is set up. The main disadvantage is that the course contents is standard and also may not be exactly what the learner requires.

When opting for personalized learning, the student decides what he gets to learn and in which timeframe. This way the student learns exactly what he needs and may stay more motivated. In this case the course material can still be standardized, but by personal coaching and one-on-one sessions between teacher and student the course can be adapted to the students needs.

In corporate education, employees usually have to leave their workplace to follow a course. With distance learning or e-learning, this may not be needed any more, or at least less often. As a consequence, costs for travelling from and to the classroom are reduced tremendously. Even more, time spent on travelling can be spent on actual studying, or working and thus making money and increase efficiency (Roffe 2002). Working people perceive the reduction of travel time as a great advantage (Strother 2002; Ubell 2000), for example because they don't get annoyed with having to find a parking lot any more. Next to that, when the course is entirely self-study, employees can pick their own time for studying, thus allowing them to study during quiet hours (Gunasekaran 2002) and be flexible; when they need to work, they can postpone study-hours (Strother 2002; Ubell 2000). An important prerequisite that has to be fulfilled to make it work is that employees really get a convenient place and time to study. When the employee has to study in a noisy room, or gets

disturbed a lot, or there is social pressure against studying, the efficiency and potential success will decrease dramatically. Though this may seem obvious, there is no research done at the social side of learning at the workplace (Remtulla 2008).

In most classroom-based training, there is time for questions and discussions. However, there is also social pressure from peer students not to ask or say 'dumb' things. People tend to keep thoughts and question for which they are unsure if peers would appreciate these for themselves. In flexible learning, students can be anonymous, to each other, or only known via a fake or nickname. This can makes students feel free to ask questions, express thoughts without limitations and maximize the effectiveness (Bouhnik 2006; Zhang 2004). Next to that, without the social pressures it is possible for for instance managers to get to the bottom, without being looked at by their employees(Roffe 2002).

E-learning allows students to study (at least the majority of the time) on the time and location of his or her own choice. According to Schoech, 2000 as cited by Bouhnik, this flexibility is the main advantage what makes e-learning programs attractive to learners. E-learning provides material electronically and in many cases via the internet; this allows every student access on any time and place as long as he or she has the right equipment (Bouhnik 2006) (Block & Dobell, 1999 as cited by (Roffe 2002)). E-learning allows the students to study topics on the time he or she is ready for it, or needs the knowledge provided in the course. Therefore students are better motivated to take the course and retain more knowledge (Newton 2007). E-learning technologies provide many types of communication and interactivity, at least at lot more than distance learning (Guri-Rosenblit 2005). Communication and interactivity can be used to personalize a course (Block & Dobell, 1999 as cited by (Roffe 2002)) and make it student-centered (Block & Dobell, 1999 as cited by (Roffe 2002)). Students can steer to a certain extent what they want to learn. Interactivity enables teachers to customize courses to fit the students needs better than with standard courses. Next to that, E-learning provides the possibility to use various types of content, like text, audio and video, and also new articles and columns (Strother 2002). Internet also enables teachers to provide content from more sources, as it takes less time to access these (Gunasekaran 2002). Lastly, E-learning can be supported by learner management systems which usually have a 'student-record'-feature. This feature keeps track of the students' use of the learning management systems and can create reports for the teacher or teaching institute to gain insight in the students and course performance (Newton 2007; Roffe 2002). Teaching institutes can then improve the courses, or give extra attention to students who do not have enough self-regulation to study on themselves.

#### *Advantages of e-Learning*

- *Access on any time and place*
- *High knowledge retainment*
- *Many tools for interactivity*
- *Personalized courses*
- *More sources accessible*
- *Keep track of progress*

BOX 4 ADVANTAGES OF E-LEARNING

### **3.2. Challenges and disadvantages**

Now we know what advantages and benefits e-learning or distance learning can bring, we should look into what the limitations and disadvantages are. First we will look into the disadvantages that e-

learning and distance learning can bring, then we will look into challenges that are often faced when considering or establishing such a project.

### **Learner perspective**

Learners are used to classroom-based courses, where teachers put a lot of effort in delivering a proper and clear presentation and students listen. This rather passive learning style enables the student to learn a part of the subject matter; doing additional exercises or reading before or after the lesson should maximize the learning effect. In flexible learning students are required to change to active learning, thus discover all subject matter by themselves. This causes that students may need to spend more time on the course material to learn the subject matter thoroughly, though the effectiveness is usually higher (Berge 2002; Bouhnik 2006).

Classroom-based courses usually take place on a university, or on a certain time and place dedicated to learning. These places have a so called 'learning atmosphere', an atmosphere in which learning is encouraged and facilitated, for example with quiet rooms and study materials. With flexible learning, learning moves out of these learning places, to place which are not necessarily dedicated to study. Especially in corporate learning projects, students must be facilitated to study by encouragements, quiet rooms, time and there shouldn't be any social pressure against studying. Students may need a very strong inner drive to complete courses if the learning atmosphere at their place of study is very weak (Bouhnik 2006).

### **Interactivity and communication**

Lack of direct teacher-student and student-student communication has been the Achilles heel of distance education for centuries (Guri-Rosenblit 2005). Various researchers argue that interaction is one of the most important factors to e-learning, though many distance-learning initiatives lack interpersonal, direct non-mediated interaction (Bouhnik 2006) (Berge 2002). Contact between teachers and students can be established either by synchronous or asynchronous communication. In synchronous communication, people have direct contact like on the telephone. Asynchronous contact can be established via letters, e-mail or message boards. A person can post something, and other persons can react later, on a time that is convenient for them. A lack of contact possibilities also lowers the level of discussion between the students (Bouhnik 2006), while discussion contributes to understanding of the subject matter and thus affects the effectiveness directly.

Moore, (Moore 1989) distinguished three types of interaction; interaction with the content, interaction with the instructor and interaction with peer students. With interaction with content Moore means the process establishing new knowledge and combining it with the current body of knowledge. After this process, students are actually able to use the obtained knowledge for other purposes than only in practice exercises. The form of the information presented has a large influence on this process and choosing the right form will make the learning experience more worthwhile and valuable for the learner (Bouhnik 2006). Moore posits that the physical distance between students and teacher can result in a psychological and communicational gap, requiring other behavior to overcome these gaps (Moore 1989). The teacher should encourage each student in its learning process individually. The teacher's expertise in interaction is a vital ingredient to encourage learner-learner-interaction. The more interaction a learner has with the subject matter, the better he can build the new information in his knowledge base, which is the basis thoroughly understanding the subject matter (Liaw 2008).

Learner-learner-interaction helps learners to overcome their isolation and strengthen their relationship with the group. Students perceive e-learning group discussions as more equitable and more democratic than traditional classroom discussions, which is possibly a result of the challenge to control and steer online discussions by the teacher or dominant students. In all three kinds of interaction plays the system a major role, a reason why Bouhnik proposes a fourth type of interaction; interaction with the system, suggesting that interaction is the main factor influencing student's satisfaction. E-learning provides more interactivity than distance learning (Block & Dobell, 1999 as cited by (Roffe 2002)); there are many applications and technologies which enable students and teacher to have a discussion, more details about this can be found in section 3 on technology.

In a classroom there are possibilities to ask questions about specific topics and for other ways of explanations. This problem can be solved by involving interactivity in the course, allowing students to ask questions and alternative explanations (Guri-Rosenblit 2005). Without possibilities for contact like in pure distance learning, the focus of the course may be very narrow; it is reduced to the content the course materials provide. Both trainers and students have nearly no possibilities to adjust the subject matter to the specific needs or reality or even to go into depth on a certain topic.

### **Developing course materials**

Developing a course is not an ad-hoc task; it requires a lot of knowledge and skills to set up a good framework. In flexible learning this is even more important than in classroom-based courses, since there is not always a trainer available to hide or cover the gaps, or motivate students to proceed (Bouhnik 2006). The framework provides structure to the students, so they know what they are working on, what comes up next and how it all fits together. Paradoxical here is that too much framework and uniformity can also affect students in a negative manner. If courses look much like each other, students can get bored and motivation decreases. In short, there is not one single way that is always completely suitable, students needs and learning styles differ too much for that (Zhang 2004).

A complication with creating course materials is that situations change, thus subject matter may also change. Course materials thus have to be updated and changed according to changing expectations, without lowering quality and keeping it structured and clear (Roffe 2002). In companies, Research and Development departments improve and change functionality of products, which may also be added to training materials. Next to changing subjects, expectations of trainees can change. This can range from technical changes, for example providing videos instead of animations, or a content shift. **In the latter case, think of shifting from a very technical 'how-does-it-work'-contents to a intuitive 'what-can-it-do-for-me' contents.**

Research showed that it is in practice very hard to maintain good materials and keeping it up to date (Daniel, 1996, Guri-Rosenblit 1999, as cited by (Guri-Rosenblit 2005)). Research on the process on material development found that this process may cause these problems. Course materials are mainly developed by course developers, with some assistance from subject-matter-experts and teachers. In the next phase, the students learn via the course material. Because the material is meant to enable learners to learn on their own, less expensive staff like teaching assistants guide and help students during the learning process. The problem lies in the fact that course developers and experts do not get direct feedback from students and therefore experience difficulties with changing the material to better suit the demand. The solution proposed is that developers should be

part of the actual learning/teaching process and get feedback on the material directly from the students (Guri-Rosenblit 2005).

In some cases, misunderstandings about ownership of materials can become a serious problem. For example, it is not clear who has the copyright or intellectual property rights of the course materials; it is **the professors', or the universities'**? The same holds for people working in Research and Development departments, though usually there are contracts that deal with the question whose intellectual properties inventions and work are. On the learner side other legal issues appear in relation to purchasing costs. Issues on this side are for example the use of fair use policies and the question if the material is meant for one person only, or can he/she is allowed to share it with peers, friends or colleagues. A related and consequence of this issues is a procedure about dealing with piracy (Berge 2002). Although these issues are discovered in university distance learning initiatives, some or all of them may be also applicable to corporate distance learning initiatives.

### Implementation issues

Organizations and especially individual people often resist to changes, it is more or less the first rule in change management. When implementing distance learning or e-learning the teaching staff may dislike the idea of having to change work procedures, or does not have enough confidence in the plan and thus resists against the planned change. Using tools like frequent communication and involving stakeholders from change management can help to overcome this barrier to avoid the implementation become slow and difficult (Berge 2002). A related barrier is that people may feel threatened by the new technology. A common fear is that their job will not be necessary any more, for example in this case, teachers may feel threatened that distance learning makes their role superfluous (Berge 2002).

Resistance to change can also occur at the learning party. In 2002, Roffe concluded that for most learners e-learning was too new to adopt it soon, but nowadays in 2008 people are more used to using internet a web based technology; which can have reduced this barrier already. To reduce the barrier even further, one can let the learner try e-learning and test it before they actually have to work with it. Roffe also found that when learners tried e-learning, they clearly perceive the use of e-learning and are willing to use it (Roffe 2002).

|                                                | C | A |
|------------------------------------------------|---|---|
| Challenge: Legal issues                        |   | X |
| Challenge: Threat of sameness                  | X | X |
| Challenge: Maintaince of the course material   | X |   |
| Challenge: Resistance to change                | X | X |
| Challenge: Lack of a firm framework            | X |   |
| Challenge: Weak social links and interactivity | X | X |
| Disadvantage: Small focus                      | X | X |
| Disadvantage: Absence of a learning atmosphere | X |   |
| Disadvantage: High starting costs              | X |   |

|                                                   |   |   |
|---------------------------------------------------|---|---|
| Disadvantage: Learning process requires more time | X | X |
|---------------------------------------------------|---|---|

TABLE 4 APPLICABILITY OF DISADVANTAGES ON CORPORATE AND ACADEMIC E-LEARNING

### 3.3. Financial perspective

In the previous sections some extra costs and cost savers are already named, like saving on travelling costs and increasing revenue by admitting more students. In this section we investigate further on the financial consequences of flexible learning. A summary of the text can be found in Table 5 and Table 6.

Many researchers conclude that distance or e-learning is cheaper than classroom based learning; while others conclude that effective distance or e-learning is frequently more expensive than class-based learning (Bates 2001, Guri-rosenblit 2001b, Matkin 2002, Ryan 2002 as cited by (Guri-Rosenblit 2005) (Rand, 1996, as cited by Vigil, 2000) (Gunasekaran 2002). The main cause for this difference is that some researchers studied corporate e-learning and others 'regular' or university e-learning. In the corporate projects, e-learning appears to be cheaper; since a huge reduction on traveling costs was possible. Studying at the workplace reduces the travelling time and transport and hotel fees (Guri-Rosenblit 2005; Vigil 2000). In university learning the initial traveling costs were already low, which made the financial benefit of reducing these a lot smaller.

Every distance learning or e-learning project starts with curriculum design and evaluation; designing a course is never an easy task, but in classroom-based courses teacher's can compensate gaps or errors in the material when delivering the course by putting extra effort in explaining the correct subject matter. In e-learning the teachers have fewer possibilities to correct weak points in course material. Next to that, students must be enabled to master the subject matter on their own, which requires much more implicit didactics in the course material. This requires qualitative very good courses and course material. Some e-learning initiatives are supported by course developers, who have both expertise on didactics and technology to support education. In most cases is curriculum design more expensive than in classroom-based courses (Roffe 2002).

During a course, students can encounter problems, either technical problems or questions regarding the course material or subject matter. Technical support may be needed to help students and teachers to solve their technical problems and guide them in the use of technology. Without proper use of technology or when experiencing technical difficulties students and teachers cannot take part in the learning process as efficient as possible. Technical support can also imply system administration tasks for maintaining the e-learning environment (Roffe 2002). Some organizations offer online tutors who can help students back on track when running into problems. These tutors typically have not got expert-knowledge on the subject matter and thus have to refer students with specific questions to the teachers (Hoppe 2003). In each of these cases, it takes time to resolve problems, which raises the costs. The risk of extra costs is related to the degree of personalized learning, or standardized self-learning. In the latter, less questions should arise, thus less time for solving should be needed.

Every teaching organization has to keep a student administration; the most obvious reason is to keep track of payment and granting access to course materials (Roffe 2002). For e-learning, Learning Management Systems can simplify these tasks, as these can keep track of test results, progress and some even of payment and automatically grant access to course sites (Gunasekaran 2002; Huddleston 2008; Roffe 2002). Another ongoing activity is promotion of the courses, to attract students and convince potential students to enroll in a course (Roffe 2002).

The most discussed cost saving is travel reduction of both students and teachers (Gunasekaran 2002). Travel reduction has many financial consequences, for the teaching organization, students and their employer. With less meetings, less classrooms are needed, either the organization can rent less rooms, offer their rooms for rent, or even sell these (Guri-Rosenblit 2005).

A second large cost saver for employers is time-saving; because employees can study at convenient timeslots, they do not have to be out-of-office for a fixed planned period and schedule their study-time at quiet timeslots. This reduces the need to hire employees to fill in for the employees on training and reduces planning overhead. (Hamburg 2005)

Revenue can be made in e-learning via different revenue-models. One way is via membership; fees are paid to get regular access in regular e-learning services. A reduced version uses subscriptions, allowing customers to participate in certain requested services. A third option is acting as a third party; offering commercial courses to other organizations, like information brokerage (Hoppe 2003).

In short, on both the student and teaching facility there are some financial implications. Next to the obvious travel aspect, many changes are due to time and labor intensive tasks. One example found in literature is of a project at university Georgia Tech (Ubell 2000). In this project the differences in costs and time are studied and their conclusion was that a third of the e-learning budget is spent on salaries, because next to trainers, additional administrative and technical staff was hired. Other cost pools are training costs, software licenses, e-commerce applications, web design tools, upkeep of computer and telecommunications infrastructure and the bill for venturing into virtual space. Table 5 and Table 6 summarize the financial implications for both the demand and providing side.

| <b>Cost saving</b>                | <b>Extra costs</b>                                  |
|-----------------------------------|-----------------------------------------------------|
| Travelling costs (students)       | Students need more to time to master subject matter |
| Hotel costs                       |                                                     |
| Reduce slack-time for employees   |                                                     |
| Reduce hiring temporary employees |                                                     |
| Reduce planning overhead          |                                                     |

TABLE 5 OVERVIEW COST IMPLICATIONS ON THE CLIENT SIDE

| <b>Cost Saving</b>          | <b>Extra costs</b>                              |
|-----------------------------|-------------------------------------------------|
| Travelling costs            | More time and energy on development of material |
| Less rooms needed/less rent | Provide technical support                       |
|                             | Hire of more tutors                             |
|                             | Promotional costs                               |
|                             | Alternative administration                      |

TABLE 6 OVERVIEW COST IMPLICATIONS ON THE TRAINING OFFERING SIDE

Calculating the Return on Investment (ROI) is a cost-calculation which is used often to calculate whether or not a certain project is more cost effective. Although it is used often for various kinds of projects, it is not often used to calculate effectiveness of the investments in e-learning projects. The general formula that should be used for e-learning projects is (Total costs for classroom based training) – (total costs for e-learning) divided by (Development costs for e-learning) – (development costs for classroom training) (Huddleston 2008). The problem with this formula is that it is very hard to determine and predicts the costs of development and maintenance of course material.

### 3.4. Technology

Technology made both distance learning and e-learning possible. Without presses to create books, or telephones to make voice communication possible, distance learning may not have existed. In this chapter we will investigate technologies used with distance learning and e-learning and the range or purposes it serves like facilitating interactivity, student administration and practical work (Thomas, 1997, as cited by (Gunasekaran, 2002)). The second part of this chapter deals with other non-functional issues that may have major influence on the success of distance or e-learning projects.

#### 3.4.1. Functionality

Facilitating distance learning or e-learning requires the initiator to take care of a range of issues; a lot of these can be (partly) taken care of by technology. Technology can facilitate dissemination of course material, interactivity, support and administration. For e-learning, there are various packages on the market which combine the majority or all of the necessary tasks. These Learning Management Systems will not be reviewed in this thesis, because they offer more or less the same functionality, though have a different implementation, thus differ more on the non-functional requirements. **LMS' are used in a lot of e-learning projects to have a central place for the project and a system that facilitates what is needed. However, according to Boehle, is interoperability and integration the Achilles' heel of the industry, meaning that some components do not work smoothly together (Newton 2007).** This section is meant to find out which functionality may be needed, which serves a basis to select a suitable Learning Management System, though this is beyond the scope of this project. However, this list cannot be considered as a complete list, which can be used for selecting an LMS. Instead, one first has to analyze which of the functionality an requirements is really needed for the knowledge transfer and administration (Huddleston 2008).

#### *Distance learning material*

##### *Written material*

- Letters
- Books
- Articles

##### *Audio material*

- Radio
- Tapes
- Telephone
- Audio conference

##### *Video material*

- Television
- Tapes
- Digital television

##### *Interactivity*

- Letters
- telephone

BOX 5 EXAMPLES OF DISTANCE  
LEARNING MATERIAL

The ideal e-learning system should, according to Latchman, work like an online classroom. This online classroom should have a similar level of synchronization of various online contents as in a traditional classroom lecture is available. More specifically, students should be able to simultaneously observe and listen to an instructor and watch PowerPoint slides or transparencies, just as in a classroom (Latchman, 1999 as cited by Zhang).

### Course material

Technology added a lot of types of course material in both distance learning and e-learning. It started with written text in various forms, later on audio and video were added (Williams 2004) and eventually the internet emerged, making e-learning possible. In Box 6 a list of types of course material is categorized in four types. Each type has its own characteristics, most importantly its own degree of media richness. This media richness indicated how much information a medium can carry. With written text some imagination is needed, audio is more explicit, and video even more explicit. Students seem to prefer richer carriers over simple carriers, like video over written material (Allen, et al, 2002 as cited by Williams).

Not only the type of course material has changed over time, also the carriers; tapes were replaced by CDs and satellite-connections by internet. Each of these carriers made another form possible. With tapes audio could be sent and the learner got flexibility in picking the time to listen or watch the contents. When moving to CD's, different kinds of material could be sent at the same carrier, like video and text files on one CD. With telephones vocal communication was already possible, however in less developed places there was no connection. Satellites made synchronous connectivity possible for rural places.

E-learning makes primarily use of the internet to facilitate teachers and students to share and access media and also communicate with each other. In a list is shown of the course material used in e-learning. Some researchers predict that new technology as wiki's, podcasts, social networking and games may also get in use for e-learning, or lead to mobile-learning (m-learning) (Newton 2007).

Course material needs learner-content-interactivity (as defined by Moore, as described in chapter 2), though the learners should be in control of the process and satisfying their needs. A lack of learner-content-interactivity together with unstructured presented instructional content can cause frustration at the learners (Zhang 2004).

### Interactivity

As described in section 3.2, interactivity is a very important issue in both distance learning and e-learning. Interactivity between teachers and students can be set up in various ways. Several options for synchronous communication are phone calls, calls via Skype, videoconferencing or chat boxes. Although there is direct contact, and possibilities for explanations, participants must be aware of the

#### *E- learning material*

- *Video-on-demand*
- *Streaming media*
- *Downloadable material*
- *Live webcasts*
- *Virtual classrooms*
- *Virtual laboratories*
- *Simulations*
- *Online assessments*
- *Dynamic tests with feedback*
- *FAQ-database*
- *Learner community*
- *Live mentoring or tutoring*
- *Message boards*
- *Chat forums*
- *Chat sessions with peers*
- *Web-based management tools*
- *Student progress tracking*

BOX 6 EXAMPLES OF TECHNICAL COMPONENTS FOR E-LEARNING.

fact that it is harder to communicate this way than in a personal face to face conversation. Asynchronous communication like via message board or e-mail is even harder to use. Because of the asynchronous character, it takes more time to receive reactions, and there is a larger risk on miscommunication. Words can easily be misinterpreted. Online learning environments can facilitate message boards or chat-boxes, to encourage participant to contact each other. The more easily the environment can be structured to meet communication needs, the more enjoyable and trouble-free participation in the course will be (Guglieme trenti, 1998).

### **Support**

Support is an important issue in e-learning, according to Alexander even a key success factor (Alexander 2001). It is very important to offer sufficient support to trainees to keep them satisfied. As mentioned before, e-learning students are not always patient, because they chose for e-learning because of the time and place flexibility, which they then also expect to have for support. Technical support is not only needed for students, but should be also available to teaching staff. Teaching staff is a key success factor in e-learning projects. Without a staff which is encouraging trainees in the use of technology and using it in the right way themselves, a project has a higher chance of failure.

Support involves both technical support and support regarding the contents of the course. As with the actual teaching, not all support requires synchronous communication; knowledge bases and discussion forums can also help in resolving problems. It is also not by definition needed to have 24/7 'live' support available; participants can also make appointments with the teachers; or the teachers can have office hours' in which trainees are allowed to contact them. Another option is the use of a knowledge base of Frequently Asked Questions-database, where trainees can search for answers on their questions (Gunasekaran 2002). More examples can be found in Box 6.

### **Student Administration and coordination**

Coordination of e-learning courses can also be supported by Learning Management Systems. As in other groupware applications shared calendars can be made available to schedule sessions and tasks (Andriessen 2003). Apart from facilitating the actual knowledge transfer process, Learning Management Systems provide also tools for student enrollment, progress tracking and results recording (Gunasekaran 2002; Huddleston 2008; Roffe 2002).

### **Facility for practical work**

Courses do not always teach theoretical knowledge, some skills and experience can also be taught. E-learning can also facilitate this practical part of the course; for example by providing online quizzes and assessments (Gunasekaran 2002; Roffe 2002) to check if the trainee has interpreted the subject matter correctly. Other skills can be practiced via virtual laboratories or simulations (Hoppe 2003; Roffe 2002). Practicing skills can increase the learning efficacy; it is a form of the previously discussed learner-content-interaction.

### **3.4.2. Non-Functional aspects**

Technology is an important factor in the success of an e-learning project, though there are other factors which can even cause failure even if the technological structure is perfect. The first important issue in this field is the competence of the teacher to work with technology. Choosing the right technology for teaching a certain topic can have direct influence on the effectiveness of the course, a teacher has to decide whether interaction is needed, or other multimedia can improve quality and

effectiveness. To be able to pick the right technology, teachers need some experience with the technologies and be able to use it properly. Picking the wrong type of technology can cause irritation at the students. Students can get very annoyed when teachers stumble with the technology during sessions (Berge 2002).

Roffe found that technology is perceived by some people as hard and complex to use; any technological minor problem like the need to install a plug-in can limit adoption of online learning (Roffe 2002). This finding suggests that e-learning technology should be very simple to use, like plug and play. Next to that, consistency in site lay-out, navigation and interface is preferred by students (Roffe 2002). People dislike having to go through an extensive search before finding what they were looking for. This yields also across information sources, preferably do all websites and documentation have many lay-out and structures in common, to easing searching for information (Young, 2001 as cited by (Gunasekaran 2002)).

Even though an e-learning system can be set up that is works like plug-and-play, there may be students facing unexpected errors. If students encounter problems, the problems should be solved immediately, as this kind of negative experiences **directly influences the student's satisfaction** negatively (Kedar, Baruch and Gruvgald, 2003 as cited by Bouhnik). Next to technical problems, much effort should be put into the design of the e-learning system. Various researchers found that inadequately designed and equipped e-learning systems can result in frustration and confusion. The worst consequence is that it demotivates students to go on with the course (Hara and Kling; Maki, Maki, Patterson and Whittaker as cited by Zhang). Colette also found that Electronic learning systems must be designed and constructed with care, using a scientific approach which embraces well-designed procedures and techniques (Colette, 2001 as cited by Gunasekaran).

Typically, e-learning that depends on an electronic system, makes use of the internet, which thus requires both teachers and students to have stable internet access. For audio and video conference are respectively microphones or headsets and webcams needed. A pretty obvious though important issue is that technology and the network should be maintained properly to keep it running (Alexander 2001). As this seems to be basic and straightforward prerequisites, company policies may not always allow full internet access at all workplaces. For example, people working at Dutch ministries or tax office may not be connected to the internet for security reasons. In these cases it may be an option to set up a separate studying room or workplace where the prerequisites can be met. In other companies it may be necessary to check with the IT helpdesk if certain pieces of software can be installed by the users, or that it requires action from the IT department.

### **3.5. Quality and effectiveness**

Flexible learning looks like a nice and convenient way of studying, but on the other hand teaching via e-learning can also be perceived as **'teaching trough a straw'**. With his the teacher meant that everybody has to be very precise and complete to make the other person(s) understand what they mean. These limitations can influence the quality and effectiveness badly. There has been done some research in this field, conclusions were that both distance learning and e-learning can deliver high quality and effectiveness (Gunasekaran 2002; Stella 2004; Strother 2002). These conclusions are based on experiments, like the experiment of McCollum. McCollum (McCollum, 1997) describes an experiment in which a professor split the class in two; one class was provided with a web based

course and the other half with traditional classroom based learning. After examining the results of the test, it appeared that students who took the web based class scored better than the students who took the classroom based course.

Other researchers tried to figure out which factors influence the quality and effectiveness of flexible learning. Some concluded that the required active learning style encouraged students to learn better than the students who adapted the more passive learning style of classroom-based training (Gunasekaran 2002). More specifically, if students have full control over their learning process, they performed significantly better on a test than the students in traditional classroom based groups (Zhang 2004). Having full control over the learning process involves many things, like setting the learning pace, being able to review previous chapters and put more effort in certain interesting topics. Though having control over the process seems to be very important, there are other factors that have a major influence, like media characteristics, learning context, technology and learner characteristics (Zhang 2004). Other research showed that interactive learning activities, multimedia instruction and e-learning system quality are all predictors of e-learning effectiveness (Liaw 2008).

Experiments and studies proved that distance learning in general can indeed be of good quality and very effective, however there is no simple method yet to determine if a single course is effective and of good quality. Berge states that there is a lack of proper evaluation methods to assess the quality of distance learning initiatives (Berge 2002). Despite the fact that distance learning is used for more than a century, only recently principles, guidelines, or benchmarks to ensure quality of distance education are being developed by various organizations (Stella 2004). An example of these quality assessment models is C-RAC 2000 (Stella 2004). This model assesses distance learning in six categories: institutional context and commitment, curriculum and instruction, faculty support, student support and evaluation and assessment. The Quality Assurance agency in UK, (QAA, 1999) developed another quality assessment for e-learning. This assessment tests the courses on six aspects; system design, program design, approval and review, management of the program delivery, student development and support, student communication, representation and assessment. Lee came up with a set of factors to assess when assessing learning environmental satisfaction; interaction, information and system (Lee 2008).

Powell et al and Roffe both tried to categorize the factors influencing the effectiveness of respectively distance learning and e-learning. Their findings can be found in Table 7. When comparing these findings it catches the eye that Roffe's instructional and organizational factors have a lot in common with Powell's institutional factors, thus that Roffe gives these factors a lot of weight. Both researchers give some weight to personal factors, especially personal characteristics. The third conclusion here is that only Powell gives life changes also some weight, while Roffe does not mention these factors.

| Powell et al (1990)<br>(Williams 2004)                                                                                                | Roffe (Roffe 2002)                                    |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Predisposing characteristics<br>prior education, socio-economic and demographic<br>status, motivational and other personal attributes | Personal factors<br>motivation, ability and attention |

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#### Life changes

Personal illness, relocation, altered employment status, family problems.

#### Institutional

Quality and difficulty of instructional materials, access to and quality of tutorial support and the administrative and other support service provided.

#### Instructional factors

Course design and trainer's competences.

#### Organizational factors

Climate, timing, management and learner support.

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TABLE 7 COMPARISON OF FACTORS INFLUENCING EFFECTIVENESS AND QUALITY

### 3.6. Success factors and prerequisites

Although there are many success stories about the implementation of distance learning, there are also many examples of projects having difficulties or that failed completely (Gunasekaran 2002). In the previous sections some success factors and prerequisites have already been mentioned and discussed, like technology. However, there are more factors that can influence the success of the initiative. Besides the actual learning material, there are also support facilities that must be in place to increase the chance of success. For example the administrative support must be in place; administrative, financial and students administration, to keep track of students and the financial aspect (Berge 2002).

Alexander, according to (Gunasekaran 2002) developed a list of prerequisites which have to be met in order to establish a successful e-learning project. Basically, this list provides issues that we discussed in this chapter, to be thought about thoroughly in order to give the e-learning initiative a firm and stable place in the current organization. This internalization of the e-learning initiative requires according to Henry (Henry, 2001 as cited by Gunasekaran) a major commitment from the management, similar to the commitment needed for mission-critical organization-wide initiatives.

As e-learning is a very different type of teaching as classroom based-learning, the development of course material is also different. Teachers used to classroom based training need help in developing e-learning courses. Some institutes hired people whose job description lies somewhere between technical support engineer and educational staff member (Ubell 2000). These people work with the instructor on the material and help to create a structure for it. Afterwards, they can assist in **maintenance of the course site. A more extensive approach is Bates' vision, in which special centers** for course development are established (Bates, 2001 as cited by GuriRosenblit).

The chances of successful use of e-learning are higher when the participants are confident with using technology (Liaw 2008). Students who are already familiar with compute technologies can concentrate on the subject matter, instead of on controlling and getting to know the learning environment.

### 3.7. Assessments

Assessing **the student's performance in online courses to test whether or not students have gained a significant piece of knowledge provided by the course is the last phase of the course.** However, not

all online course providers perform such a test. Some institutions do not grade students via a test, but on their degree in participation in on-line discussions, like at Teachers College in New York City. (Ubell 2000) Crocetti distinguishes two kinds of assessments; on individual or classroom level and on organizational level. In the first case it is about the course and its contents, most Learning Management Systems provide tools to support this. In addition, Learning management Systemes can also provide grade books to keep track of the progress of students. The second case is about the impact a training has on the day-to-day working activities (Crocetti 2002).

### **3.8. Impact on stakeholders**

From the previous sections can be concluded that starting and implementing e-learning requires a lot of changes and adaptations from the stakeholders in the process. In this section these changes and requirements are summarized briefly to provide an overview.

#### **3.8.1. Impact on trainees**

Trainees who enroll in an e-learning course must realize that this requires quite another way of studying than regular classroom based courses. First of all is the level of interactivity with peers and teachers limited; although technology facilitates a lot of interactivity it cannot fully substitute face-to-face communication. E-learning courses require often a lot of commitment and self-control to finish courses in which the pace is not set up front and there are no structural sessions and deadlines (Lee 2008). The advantage of e-learning is that it facilitates time and space flexibility allowing reduced travel need and planning of study in slack time. This flexibility enable students to combine a job or other activities with studying.

Some prerequisites where students have to think about and have to arrange is access to the needed technology. E-learning requires students to have access to a computer (either a laptop or desktop) with a stable (broadband) internet connection. Some perhaps obvious skills a trainee should have are being able to work with computers and office software. If a student is already familiar with computer use, he or she can focus on the course, instead of also having to learn how to deal with the technology.

Research on perceived satisfaction from e-learning participants showed that e-learning system quality, multimedia instruction, interactive learning activities and perceived self-efficacy have a large effect on the perceived satisfaction (Liaw 2008).

#### **3.8.2. Impact on teaching staff**

Teaching staff are in this section both teachers and course material developers as well as other training staff members. As the knowledge transfer process changes, there will also be changes affecting staff members. The first issue is that staff must be familiar with working with computers; this holds even stronger for the actual teachers because if they make a bad use of technology the student satisfaction will decrease instantly. Also, some behavior and best practices that work in a classroom, may not work in a virtual class. Teaching in online courses is not as people nowadays are raised with, so they may need some extra training to get familiar and well acquainted with this style of teaching (Cohen 2001; Kazmer 2004).

Another issue is transfer of control; as students get in control of the learning process, teachers must be very flexible in changes of content focus and learning pace. Additionally, if the strategy is on

individual learning, training staff will have to dedicate time to interaction with their students, for solving their problems and answering their questions. This requires another way of planning, because a trainer is involved in several courses in parallel.

Training staff should also be aware of the fact that if students master the subject matter on their own, with the presented course material, that the course material must be thoroughly reviewed. Course material may be less rich than the traditional course material, thus requires another way of transferring knowledge. Also, some errors present in CBT-material can be corrected during lectures by the trainer, in e-learning, this will not be possible that easily, so the material must be very good. The last issue regarding course material is that teaching via video can be different from teaching in a classroom, subtleties may get lost and students may be losing focus earlier than in a classroom.

### **3.8.3. Impact on demand and supply organizations**

Establishing an e-learning project independent of the exact purpose does not only affect teaching staff and students, but also the organizations behind these stakeholders. The teaching institute or supply organization has to develop faculty workload policies which relate to e-learning and a provision of time release for faculty engaged in e-learning developments (Alexander 2001). (Human) resources must be made available and procedures have to be developed. The project must be aligned with other business units like the sales department or account management. These departments must be aware of the new service in order to sell them. Next to that, the e-learning project must be aligned with the company strategy and add up to corporate goals to gain support from employees around the company (Crogetti 2002). And most important, clients must ready for it and more or less effort should be put in letting clients accept the new way of learning (Kazmer 2004).

On the demand side or learner side the organization also has to make some adaptations. First of all the organization must allow employees to take e-learning courses and provide tools and technology to facilitate it. Due to reduced travel times personnel planning will be made a bit easier, since the training timeframes are shorter and sometimes allow flexibility in time. The organization should also create a learning atmosphere and encourage employees to study.

## **3.9. Summary**

As literature showed us, there is no perfect e-learning solution for every situation. E-learning is considered as the next generation of distance learning, making use of internet. The most obvious advantage is a reduction of travel needs, as participants work all or most of the time on a place they can chose themselves. This place flexibility together with some flexibility in picking a timeframe for studying are also important advantages. The main disadvantage is limited interaction. Not only the amount of interaction, but the quality of interaction is also an issue. Communication via internet is less rich than a face to face conversation and as a consequence has a higher risk of miscommunications.

E-learning is sometimes considered as a low-cost alternative for classroom-base learning. It appeared however that with a low number of students or a high degree of personalized learning, a cost reduction is not guaranteed. Development of course materials and guidance of students both require a lot of time and energy from the teaching facility.

E-learning projects are often supported by learning management systems; some of these simulate a classroom. These environments offer a place for course material, as well as means to communicate. Internet technology enables teachers and trainers to communicate, share materials, support administration, facilitate practical work. If the technology is used effectively, the quality and effectiveness of e-learning projects can be better or as high as traditional courses. Except for technology, also the skill set and motivation of both trainers and students have a major influence on the quality and effectiveness.

Independent of the setting in which e-learning will be introduced, communication about its purposes should be clear. Trainers should be involved in the change process, to make them aware of the project, and motivate them to work with the new materials. In every organization that considers starting an e-learning project there should be a plan about how the e-learning project fits in the organization, and helps to reach company goals.

## 4. Analysis

Now we have gained some knowledge about e-learning projects, we can analyze the situation of our case to determine what aspects are crucial and which may not be important. Based on this analysis, we can develop a couple of possible scenarios in the next chapter.

### 4.1. Training Demand

The company is an international software vendor which develops software for financial institutions. Their training department develops and delivers training to different kinds of audience. First of all end users receive training, in order to work properly with the software. There are several kinds of end-users; the administrators; the technical people and other so-called 'business users', people who work on the business side of the client organization. Next to clients the department also trains new employees of its own company, to give them some more background information before starting their job. The training that both these trainees receive is a multiple day course, going over all relevant training modules, that takes place either at the customer site, or in one of the AC training facilities. A day typically covers one or more modules. The trainer explains the theory with assistance of the PowerPoint presentations and sometimes performs a live demonstration. After this, the trainees can read the material and work on the exercises, while the trainer is available for extra help or questions. Then the trainer wraps up the module and the next module will be done.

The training department developed the materials that are used in training courses. In some cases materials are developed on the basis of documentation from the technical writers. Other materials are created together with developers or experts. A standard procedure is not developed yet. The research and development departments are working hard on improvements and extensions of the product and aim to for regular releases. As a consequence, training material has to be updated regularly and trainees should be pushed to also receive training or in these changes. Up until now, this does not happen, because these training would be so short, that it takes more time to travel to the training facility; thus travel and overhead costs are too high. Some clients do have certain training needs after their initial training. For these specific demand a trainer develops a tailored training or workshop and often travels to the client site to deliver the training there. Updating the companies own employees is a responsibility for other departments. The initial and update-training for clients is the topic to study in this project.

### 4.2. Applicable Advantages of using e-learning

In the literature review a lot of advantages of both distance learning and e-learning are found. We already concluded that not all advantages and disadvantages are applicable on every situation. In this section we will see which advantages may be applicable to this project.

The first major advantage of flexible learning will be the low travel need and planning convenience. In most trainings provided currently, either trainees or trainers have to travel, causing travelling costs. Also, trainees have to plan a timeframe for the training, which is not per se the most convenient time, though because of the group meetings, rescheduling is very hard. Also, customers may enroll more employees in courses, because the overhead and travelling is less and easier to

plan. When an individual approach will be used, trainees can get a more personalized course, enabling them to go deeper into their questions and thus satisfying their needs. Furthermore this gives even more flexibility on the learning pace and more freedom in asking questions. As long as students do not need a lot of synchronous support, it is a very scalable system. On the other hand, group instruction can reduce cost even further and enables discussion, allowing students to internalize the subject matter.

In case a learning management systems is used which supports this, the learning management system can keep track of the activity and progress of trainees. Some even offer virtual grade books, allowing training staff and line managers to check the progress easily on a regular basis. This functionality would also make it easier to check prerequisite knowledge of trainees when enrolling them in a certain course.

### **4.3. Applicable Challenges and disadvantages**

Interactivity seems to be an important challenge in this project, because of the subject matter. According to the trainers, the subject matter is often very technical and not very easy to master and questions arise quite often. This requires an interactive approach with sufficient support facilities and the thread of the learning process taking more time can play a role. Maintenance of course material is also an issue, since the department is dealing in a highly challenging environment; there is limited staff available, but a lot of material has to be maintained and updated accordingly to the changing products.

Legal issues that are out of the scope of this project, though should be considered by the company when implementing e-learning, are legal and paying issues. This is about on which basis customers can use the material; is it only usable by the people signed up for the course, or are they allowed to share it with colleagues. A related issue is the tuition fees; fees can be charged per course, or per trainee, or per month or year.

One threat is very relevant more for the trainees; because the learning atmosphere is usually lacking at their workplace, it may be hard to keep focused and finish the course. Next to this, trainees need an internal motivation to study, because it may be the case that the actual study time may be more than in traditional training. Trainers may have to encourage and motivate their trainees a bit extra.

Resistance to change does not seem to be a large problem. Some customers already ask for e-learning courses, including interactivity. The product of the company is a very complex software package. Future users of this system, thus trainees, must have a solid basis of computer skills. It is known that people with a certain level of computer skills are usually open for new computer applications.

### **4.4. Applicable Cost issues**

As with benefits and disadvantages, not all cost reductions are relevant to this project. Cost savings aspects that are applicable are the reduction of travelling and hotel costs for both the company and his customers. Customers can save some costs on planning, because they can plan smaller timeframes for learning purposes. In case the training will totally asynchronous, the training can

even be scheduled in and employee's slack time. The cost saving on rooms is relatively low, because the training facilities are within the offices, but these may be also used for other purposes than training, for instance department meetings. Administration of students is already done, but may be managed easier with a new learning management system that facilitates e-learning. On the other hand two cost pools will rise; more time and effort has to be put into the design of the course material. The second cost pool is establishment of technical support; procedures and (human) resources must be in place to help students who have problems with the training or the technology.

| Cost saving                        | Extra costs                                       |
|------------------------------------|---------------------------------------------------|
| Travelling costs (students)        | <i>More time for curriculum/material design /</i> |
| <i>Travelling costs (teachers)</i> |                                                   |
| Hotel costs                        | <i>(Technical) support needed</i>                 |
| Reduce slack-time for employees    |                                                   |
| Reduce planning overhead           |                                                   |
| <i>Less rooms needed</i>           |                                                   |

TABLE 8 APPLICABLE COST ISSUES

The above mentioned are primarily ongoing costs and costs savings. Starting costs are not considered and found in literature. Time and effort (thus costs) have to be made in updating the course material, selecting and implementing a suitable Learning management System and introducing the new service to the customers.

#### 4.5. Available Technology

##### Training material and practical work

There are various forms of training material developed and used in training sessions, PowerPoint Presentations ( Slide ware), which contain the outline of the theory. The trainer tells about the underlying rationale and explains the information on the slides in more detail. Further theory and background information provided as reading material. Trainers can give a 'live demo' on the training environment, showing the functionality studied in the module. Some demonstrations are made by the training developers and the screen is captured at that very moment. This short movie (.swf) shows what happens or what to do in certain scenarios and is especially helpful when trainees review the module after the training. The last type of material consists of exercises, because sometimes theory alone is not enough and trainees have to master the skills studied. For these purposes exercises are developed, to let the trainee try and play with the software in the training environment. The contents of modules can vary a lot; there are theoretical, practical and technical courses. De department developed a systems to determine which materials may be helpful for certain kinds of modules..

##### Training material

- *Slideware*
- *Reading material*  
*(articles,*  
*documentation)*
- *(live and recorded)*  
*demo*
- *Exercises*
- *Training laboratory*
- *Assessments*

BOX 7 CURRENT TRAINING MATERIALS

### Interactivity and collaboration technology

Nowadays several technologies are used to keep in touch with colleagues like e-mail and Skype for instant messaging and calling. For international meetings there are video-conference materials available, allowing colleagues in different offices to have a meeting in which they can see each other. Interactivity by digital means with trainees is not yet experienced, because there was always face to face contact. However, technologically speaking it should be possible to set up a web server to provide discussion boards, FAQ's and chat applications, but the human resources maintaining it and using the systems require more organization.

#### *Interactivity technology*

- *Instant messaging*
- *Video-conferencing*
- *E-mail*
- *Desktop-sharing*

Box 8 CURRENT INTERACTIVITY  
TOOLS

### Administration

Student administration is now executed manually with self-developed excel-documents. A central system or document containing all information about the courses and trainees does not exist yet. An LMS can improve this administration a lot. However, customers can get access to the course materials via the current LMS already.

### Learning Management System

Already in 2002 a project on distance learning was initiated. Internet services emerged and cost saving were predicted. In an early phase the project was bend into the current training portfolio. It appeared that providing training material to customer was hard, since system administrators blocked e-mail attachments. The only solution was to print the materials, and send it via postal mail. Next to this the training department could not assure updated material, because it then had to print and send the material after every update. Another disadvantage of this way of working is that it is impossible to limit the time of availability and thus have a risk that customers keep relying on old material. At that time, the department chose to use a learning management system as a material storage, and use this during classroom-based training.

### Risks and challenges

Technology can bring a lot of functionality and benefits, but is also not always fully dependable. It happens that power supply fails, or there are problems with internet connectivity. Even with back-up facilities things can go wrong. If either of this happens, a training session may not take place because the technology is not available. For these situations there should be a second plan available; either postpone activities or use other channels to obtain a similar result. For example, when internet connectivity fails, telephone sessions can be an alternative.

The second main challenge is the availability of (technical) resources. Especially for videoconferences there are in most offices only one or two rooms with videoconference-materials available for all employees. These rooms are already used frequently, so some extra planning is necessary to avoid double reservations and therefore unexpected postponements or cancellations. Another option is to use laptops with webcams and headset, these can be used in every office with a broadband and stable internet connection.

#### **4.6. Quality and assessments**

Quality is one of the key values of the company. The products must be of great quality and dependable. As part of this strategy the training must also be of good quality. Customers are currently satisfied with the level of training provided now. However, there are more and more customers demanding for pure e-learning. To ensure that their employees really understood the material they would appreciate assessments. For some training modules assessments are available, due to technical problems it is very hard for training staff to get the results of completed assessments. Each training is also evaluated through trainees via an evaluation form. The results of the last evaluations showed that trainees are very satisfied with the quality and contents of the courses.

## 5. Possible Scenarios

Now we have explored literature on the subject, we have some hints, clues and best practices available. The next step is to find out what exactly suits this case. In general, literature is very general and as situations differ, there is not one single best solution. In this chapter we will design some example implementations of e-learning, tailored this specific situation. First the abstract idea of the scenario is described and then a vivid scenario (Lauesen 2002) is developed based on that. These example implementations or scenarios will be discussed with relevant stakeholders, in order to find out which elements are appreciated and which are not. This yields primarily for functional aspects, but we will also take non-functional constraints like costs and resources into account. The result will serve as a basis for interviews in the upcoming chapter.

Topics that will be present in the scenarios are found in the literature review. For some functionality there are various options, each of them having their own characteristics and consequences for stakeholders. We compare the scenarios in Table 9, based on characteristics and variables found in literature.

The first scenario is a course which mainly consists of virtual meetings or interactive sessions. This model is mainly used when there is not a lot of course material available, or students need a lot of assistance from a teacher.

Scenario two is based the completely online course as described by Bennink. The bottom line is a completely online course, including audio- and video-material and interactivity tools without meetings. This model is often used if students are geographically scattered in a region and meetings are hard to organize or expensive due to travelling (Bennink 2004).

The third scenario is a hybrid form of the first two scenarios. In this scenario a course starts with a virtual meeting, in which a trainer can give instruction of the course and its contents. After this first meeting, trainees can proceed on their own with the course on their own with the available course materials.

### Scenario 1: E-learning with interactive sessions

#### *Basic idea*

In this scenario students are taught in groups, completely via internet. Trainees can be from the same customer, or distributed among various customers and even spread around the world. Teachers and trainees plan timeslots to have online meetings, which are comparable to an online classroom. With the use of webcams and audio devices everybody can see and hear each other. In the session trainees can ask questions about the subject matter and discuss this with peer trainees and the trainer. The trainer can present new functionality and features, or explain an upgrading process and while sharing his desktop with the trainees showing them the slides where he is talking about. In the same way the trainer can give a demonstration to all trainees, just by sharing the desktop.

Next to attending the sessions, trainees have to study some material on their own and work on some exercises. In between the live sessions trainees have access to a Frequently-Asked-Questions database to search for known solutions to problems they are facing with their homework. In the

learning management system all necessary documents can be found, as well as a message board to ask questions or discuss issues.

### *Vivid scenario*

Jim enrolls in the course after agreement with his manager. The sessions will be on Monday, while he will complete the self-study on Wednesday. In the first session an introduction is held by the teacher, then a demonstration of the e-learning environment follows and the last part is an introduction in the subject matter and some assignments and homework for next week is assigned. Jim studies hard on Wednesday and completes his homework. In the second session the homework is discussed and problems are solved. On the next Wednesday Jim runs into problems and looks on the discussion board and FAQ-database and resolves his problem so he can complete his homework. This goes on for a couple of weeks. The course ends by taking a test via the internet, consisting of open questions and multiple choice questions.

### *Justification*

This scenario allows for all participants flexibility of location; it discards travel needs. Because of the 'live' sessions all trainees have some drive to go on with the course and finish it. On the other hand, this discards flexibility of time, since participants must be available at certain timeframes. Especially while working with participants from different time zones this can be a problem. The sessions help to cope with the interactivity problem; they offer interactivity with teachers and peers. Support for issues in between the sessions is covered by the message board and the FAQ-database. It allows participants to discuss and look up problem they encounter, or answers question that arise. By using this, not all participants are forced to attend another session because someone has a problem, but everybody is able to help if they want to. From technology perspective this does not require a lot of changes. AC already uses an LMS that has a document storage; a discussion board can be set up fairly easy; and conferencing technology is also available. Perhaps the capacity of conferencing hardware is not sufficient. Course material is also in principle available; no special material is required because of this format. The only big change is for teachers; teachers do not have to give one course full-time in a couple of days, but can spread it over several sessions thus require another planning of their work activities. However, teaching in a digital classroom requires some other skills than teaching in face-to-face sessions. The downside for trainees is that because of the group wise character and the pre-structured course they are very limited in steering the course to get answers on their specific situation.

## **Scenario 2: Self-paced e-learning**

### *Basic idea*

This scenario focuses on individual learning, purely via the internet. Theory and assignments are accessible via the Learning Management Systems. Lectures and presentations are available via video; captured during a 'live' session or created specifically for this purpose. Among the course material will also be some assessments with automatic feedback from the e-learning system. Larger assignments are available in the document storage and executed by logging in on a virtual server accessible via the internet. After finishing assignments trainees can ask for an evaluation of their work by teachers, who can give this either via e-mail or during a virtual meeting. Student support is offered via FAQ-databases, discussion forums and trainees can make an appointment with teachers for a virtual meeting, or communicate via other means within certain office hours.

***Vivid scenario***

Jim enrolls in a course. He logs in on the e-learning environment and reads the syllabus explaining the agenda and structure of the course. Jim takes a quick tour and then logs off. A few days later he logs on again and starts with the course. Jim watches the available recorded lectures, reads the material and practices with assignments on the virtual laboratory. After he did the assignments he informs the teachers via e-mail and asks for feedback. The teacher presents his feedback via e-mail and offers to plan a virtual meeting if he has any questions on it. Jim studies both at home and at his desk at work, depending on the tasks he has to do and the degree of quietness he needs. In case it is too busy in a certain week to make time to study, Jim can postpone his studying tasks for a week.

***Justification***

Flexibility is the keyword in this scenario. All participants have flexibility of time and place; in other words both the teachers and the students can be at a place which is convenient for them, at convenient timeslots. The downside of this ultra flexibility is that there is not a lot of contact; the interactivity between participants is very low. From cost perspective this scenario is also very nice, since there are only costs for the course itself and no travel costs, thus also no travel time required. Material can be re-used a lot and as a consequence variable costs are very low. To make this scenario work students must have a strong motivation to complete the course, because there are not a lot of deadlines and other obliged events. The advantage here is that a student can set its own pace and spend more time on hard sections and less time on already known knowledge. Because of the low level of interactivity it is harder to get in depth of a specific aspect of the subject matter.

**Scenario 3: Hybrid model: Self paced e-learning with kick-off session*****Basic idea***

In this model the start of the course is marked with a 'live' session, either face-to-face or via videoconferencing. During this kick-off session the teachers can introduce the subject and the concepts. Teachers can also explain the planning and set-up of the course, guiding his students. Trainees can ask their general questions. After this first session the course will continue as an asynchronous course, allowing the students all flexibility and setting their own pace. Recorded lectures, assignments reading material, PowerPoint slides, all material is available at the e-learning environment. Learning support can be offered via e-mail or conferencing during office hours or on appointment basis.

***Vivid scenario***

Jim enrolls in a course which starts on Wednesday afternoon at two o'clock. Jim and his manager adapt the schedule so Jim can attend the first session in the video room. They also agree on the principal study-timeframe on Thursday morning. Jim attends the first session on Wednesday afternoon. He meets his peer students and the teacher in this virtual meeting. The teacher explains that the course takes about 10 hours of self-study depending on the prior knowledge. He also demonstrates the learning environment to make sure that all students can find everything they need. Then the teacher explains the basic concepts of the course, to give them a head start. After two hours Jim is tired and the session is over. On Thursday morning he starts studying, as agreed on with manager. Jim reads the material, but does not understand it. He decided to send the teacher an e-mail with his question. The teacher decides that the question is too hard to answer via e-mail and proposes to have a telephone-session. They agree on a timeslot; the call is made and Jim's

problem is solved. The next week it is very busy at work and he has to work instead of study. The third week he proceeds with the course and eventually finishes it when he passes the test.

### Justification

Synchronous teaching has the disadvantage that everybody must be available at the same time. One important disadvantage of asynchronous teaching is that it is harder to coordinate. A model often used to overcome both of the barriers partly, is this hybrid model. The advantage here is that all participants meet each other, either in person or virtual, which is a good start for bonding and avoiding the loneliness challenge. The teacher gives his students a head start in the course, by providing them information about the rationale behind the course and the bottom line or concepts. After this head start, the students should be able to complete the course on their own. Of course they are not completely alone; they can discuss topics with each other and consult teachers. Consulting teacher can be done via e-mail or discussion boards, appointments can be made for synchronous communication like chat or telephone.

|                               | Scenario 1                                                       | Scenario 2                                                                                 | Scenario 3                                                                                 |
|-------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Process / Idea</b>         | Completely synchronous groupwise                                 | Completely online, Asynchronous course                                                     | Completely online, Kick-off session                                                        |
| <b>Knowledge transfer</b>     | Conferences ware                                                 | plus slide<br>Video lectures<br>Slide ware<br>Reading material                             | All material                                                                               |
| <b>Support/questions</b>      | Conference sessions/<br>appointments                             | Appointments<br>Discussion boards<br>FAQ-base                                              | Appointments<br>Consulting hours                                                           |
| <b>Practical work</b>         | Demo                                                             | Assignments<br>Virtual laboratory                                                          | all                                                                                        |
| <b>Costs</b>                  | No travelling costs<br>Low variable costs<br>Time cost per group | No travelling costs<br>Low variable costs<br>Reduced overhead<br>Less lecture rooms needed | No travelling costs<br>Low variable costs<br>Reduced overhead<br>Less lecture rooms needed |
| <b>Flexibility</b>            | Place flexibility                                                | Place flexibility<br>Time flexibility                                                      | First session: place-flexibility<br>Rest: place and time flexibility                       |
| <b>Group/individual</b>       | Groupwise                                                        | Individual                                                                                 | Group or individual                                                                        |
| <b>Adaption trainer/staff</b> | Learn to teach via                                               | Student must have strong motivation to                                                     |                                                                                            |

|                                      |                                    |                            |                                                |
|--------------------------------------|------------------------------------|----------------------------|------------------------------------------------|
|                                      | videoconferences                   | learn                      |                                                |
|                                      | Other planning                     |                            |                                                |
| <b>Adaption trainees</b>             | Learn to focus on videoconferences | Self-paced study           | Self-paced study                               |
| <b>Technical part</b>                | LMS                                | LMS                        | LMS                                            |
|                                      | Document storage                   | Document storage           | Document storage                               |
|                                      | Discussion board                   | Discussion board           | Video-conferencing                             |
|                                      | Video-conferencing                 | FAQ-base                   |                                                |
|                                      |                                    | Virtual lab.               |                                                |
| <b>Re-use</b>                        | Only reading material              | All material               | Except for first session; all material         |
| <b>Student control</b>               | low                                | high                       | medium                                         |
| <b>Space for Personal objectives</b> | no                                 | Medium                     | medium                                         |
| <b>Interactivity</b>                 | high                               | Low, only with material    | With material, peers and teacher if requested. |
| <b>Advantages</b>                    | Anonymity                          | Anonymity                  | Semi-Anonymity                                 |
|                                      |                                    | Low social pressure        | Low social pressure                            |
| <b>Challenges</b>                    |                                    | Weak social links          | Quality of course material                     |
|                                      |                                    | Quality of course material |                                                |
|                                      |                                    | Threat of sameness         |                                                |

TABLE 9 OVERVIEW OF POSSIBLE SCENARIOS

## 6. Interview

Obtaining information from literature is very valuable, but the majority of it is very general. To find a solution for this specific case, specific requirements from stakeholders from this project must be gathered from these persons. Gathering this information can be done via surveys or interviews.

Surveys have the advantages that the research population can be very large and the every participant is treated in the same way. The disadvantages are that it is a very limited medium, it is impossible to go into depth on a certain topic, body language cannot be taken into account and the interpretation of participants on the questions cannot be corrected by an interviewer.

Interviews are a very rich means to obtain information. In a conversation can be openly talked about topics and there is an opportunity to go into depth in certain topics, if the ideas of the participant are interesting. When going into depth of an issue, it is possible to find out why the interviewee has the specific opinion; in other words; the rationale behind the opinion. The next step in this project is to design a suitable e-learning project, so we need to know why stakeholders have certain opinions and what their main concerns are. The disadvantage is that it takes a lot of time; the interview must be done, a transcription must be written and it must be confirmed by the participant. Because of the intensive nature the research population cannot be very large.

### 6.1. Interview rationale

By means of conducting interviews with stakeholders, we attempt to find their opinions and attitude towards e-learning, as well as their intention to use it. The second goal is to find out what aspects of e-learning are important in a convenient e-learning project. The interview will be neither a free or structured (Steehouder 1999). It will be a semi-open interview; the interviewee can talk freely and the interviewer extracts the answers to the predefined questions. With this strategy we will not interfere with the current mindset on the interviewee, because it may be that the interviewee first thinks of aspects we have not covered. During the interviews notes will be made by the interviewer and a report will be written within 2 working days after the interview. The interviewer will verify with the interviewee whether his or her opinions are interpreted well.

Interviewees will be quoted anonymously, but their job or stake in the project may allow insiders to identify them. It is important for analysis purposes to be able to link certain opinions to certain types of stakeholders, but names are not necessary and a may be perceived as violation of personal privacy.

### 6.2. Research population

Interviews are a way of getting input on the ideas we gathered before. In order to come up with a model that has a high chance of acceptance by all stakeholders, we have to give all stakeholders a chance to give their opinion. The stakeholders identified in this project are: customers, partners and training staff. We chose to focus on clients and staff, because the company aims to gain more revenue via e-learning. As partnering companies do not pay for the training itself, this stakeholder is of less importance than paying clients. Since customers are scattered around the Earth, we decided to try to get a selection of customers representing different parts of the world. It is known that culture and expectation about issues differ around the world. In this way the group is as heterogeneous as possible. The aim is to interview both the experienced trainers and five to ten employees of client companies, preferably working in different roles.

At least, this was the plan. The financial crisis of 2008 forced to change the plans. It appeared to be impossible to reach potential trainees. These people worked at the heart of financial institutions and suddenly got many sorrows and problems. Even for account management of our company it was extremely challenging to keep in touch with their contact persons.

As a result only a very limited number of interviews is conducted. Both trainers and two trainees who were on training are interviewed. The interviews with trainees were in a lunch break, which made it more like a panel-interview. Due to time limitations we could not go really in depth.

The form with questions used in the interviews can be found in Appendix: Interview structure, on page 63. The opinions of the interviewees can be found in Appendix: Interviews on page 65. The results of the interviews can be found in the next chapter.

### 6.3. Results from interviews

All interviewees can imagine nice opportunities for e-learning, though trainers think the financial gains may not be very high. The company develops a very exclusive product and focuses on large customers instead of many. This implies that there aren't many clients to train. As revenue is the product of price and amount, the number of trainings should increase. This fits well with the plan to start offering additional update-training to clients. The trainee-client though doesn't see a lot of opportunity here. Implementations of the software package differ on several aspects from client to client. A standardized course won't satisfy all the information needs, so personalization is needed. Trainers confirm that current modules contain about 80 % standard content and 20% differs per client. This 'gap' can be filled with interactive sessions, though an on-site live session is preferred for educational reasons. Interactivity should be definitely part of the courses, to make the course interesting, avoid boredom and give opportunities to ask and answer questions. Group courses are highly valued by trainees, but based on experience in the previous years trainers don't think there will be many enrollments at the same time. One trainer also remarks that the learning style of students differs per person, some people rather work on their own and others need more help and communication to master the subject matter.

All agree on that support should be present. There is no real preference for the form. The current technical support helpdesk can deal the technical part, trainers can have consulting hours, or appointments can be planned. Synchronous communication is preferred, because it is easier to explain issues and enable a trainee to ask and interrupt.

Trainees think the combination of slides and a vocal explanation as in the classroom-based course would also be suitable for e-learning courses. They really value practice and also see this as a mandatory part of a course. Trainers agree with this, but one remarks that the explanations should be videos created for this purpose and definitely not a recording of a classroom session to increase efficiency and give a brief but complete explanation. Technology like internet, slide ware and videoconferencing materials seem to be generally available, or can be made available. Trainees also see opportunities for learning at their workplace, though there can be no guarantees given that the study-time will be uninterrupted.

Opinions differ a bit with regards to tests and certification. Both trainees value self-tests, to enable them to determine if they have learned the subject matter. Relating certificates to official tests is not

that important and requires a lot of time and energy to realize a proper program. All agree on that the responsibility of actual learning lies with the trainee, as they are professionals.

Trainers knew that e-learning is by their management regarded as a means to increase revenues, but they definitely see planning convenience as the main advantage for clients, being the reason to sign up. Trainees confirmed that planning convenience seems to be the main advantage.

#### 6.4. Comparing scenarios and interview results

Now we know what stakeholders think, we have to determine which of the developed scenarios is the best one for this situation. In Table 11 we marked the positive aspects of a scenario green, and negative aspects red. This way we can compare the scenarios in an objective way. This comparison style is inspired by multi-criteria analysis, though we don't value certain aspects over another.

|                               | Scenario 1                                                       | Scenario 2                                                                                 | Scenario 3                                                                                 |
|-------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Process / Idea</b>         | Completely synchronous groupwise                                 | Completely online, Asynchronous personal course                                            | Completely online, Kick-off session                                                        |
| <b>Knowledge transfer</b>     | Conferences plus slide ware                                      | Video lectures<br>Slide ware<br>Reading material                                           | All material                                                                               |
| <b>Support/questions</b>      | Conference sessions/<br>appointments                             | Appointments<br>Discussion boards<br>FAQ-base                                              | Appointments<br>Consulting hours                                                           |
| <b>Practical work</b>         | Demo                                                             | Assignments<br>Virtual laboratory                                                          | All                                                                                        |
| <b>Costs</b>                  | No travelling costs<br>Low variable costs<br>Time cost per group | No travelling costs<br>Low variable costs<br>Reduced overhead<br>Less lecture rooms needed | No travelling costs<br>Low variable costs<br>Reduced overhead<br>Less lecture rooms needed |
| <b>Flexibility</b>            | Place flexibility                                                | Place flexibility<br>Time flexibility                                                      | First session: place-flexibility<br>Rest: place and time flexibility                       |
| <b>Group/individual</b>       | Groupwise                                                        | Individual                                                                                 | Group or individual                                                                        |
| <b>Adaption trainer/staff</b> | Learn to teach via videoconferences<br>Other planning            | Student must have strong motivation to learn                                               |                                                                                            |

|                                      |                                    |                                                                       |                                                |
|--------------------------------------|------------------------------------|-----------------------------------------------------------------------|------------------------------------------------|
| <b>Adaption trainees</b>             | Learn to focus on videoconferences | Self-paced study                                                      | Self-paced study                               |
| <b>Technical part</b>                | LMS                                | LMS                                                                   | LMS                                            |
|                                      | Document storage                   | Document storage                                                      | Document storage                               |
|                                      | Discussion board                   | Discussion board                                                      | Video-conferencing                             |
|                                      | Video-conferencing                 | FAQ-base<br>Virtual lab.                                              |                                                |
| <b>Re-use</b>                        | Only reading material              | All material                                                          | Except for first session; all material         |
| <b>Student control</b>               | low                                | high                                                                  | Medium                                         |
| <b>Space for Personal objectives</b> | no                                 | Medium                                                                | Medium                                         |
| <b>Interactivity</b>                 | high                               | Low, only with material                                               | With material, peers and teacher if requested. |
| <b>Advantages</b>                    | Anonymity                          | Anonymity<br>Low social pressure                                      | Semi-Anonymity<br>Low social pressure          |
| <b>Challenges</b>                    |                                    | Weak social links<br>Quality of course material<br>Threat of sameness | Quality of course material                     |

TABLE 10 OVERVIEW OF POSSIBLE SCENARIO

Two requirements that come front in the interviews, is the requirement of synchronous communication, and the requirement for planning flexibility and individual courses, as it seems unlikely that there will be several enrollments at the same time. Considering these demands and the scenarios, scenario three seems to be the most suitable. It provides flexibility, but also synchronous communication and interactivity and can even provide both group and individual courses. Considering only these issues would be a very short route, we will discuss all topics from the comparison table one by one.

Literature taught that course materials and ways of knowledge transfer must be picked carefully and materials should be developed and updated with care. Trainees are very satisfied with the current training; both the slides and the additional explanations of the trainer. They are confident that the current materials are a good basis for e-learning courses. One trainer agrees, but makes clear that **additional videos should be made, containing the explanations. These video's should be brief but complete** and definitely not a recording from a classroom session. All agree that live videoconferences would also be a nice solution. In short, all three scenarios seem to be workable solutions on this point.

Next to qualitative course materials, literature showed that support is also important, especially when courses should be personalized or tailored to specific demands. Trainees confirm this, but **don't have a clear preference on this. They do prefer synchronous communication, because it is easier to explain and ask questions.** Trainers do have specific ideas, one would like consulting hours,

allowing trainees to get in touch at certain timeframes, the other one prefers the helpdesk to take care of questions and have an e-mail address ready for other questions. In the latter case, trainers can choose the time to handle questions at moment that are suitable for them, these aren't necessarily suitable for trainees, unless e-mail or other asynchronous communication is used. A solution like message boards or FAQ's is not valued as a good solution. The subject matter is hard to master alone, when questions arise, it is even harder to explain the question or the answer via written communication, a 'live' call works better. In addition, questions that end up in an FAQ, should be added to the course material, so an FAQ shouldn't be necessary. On this point both the first and third scenario would be acceptable; the second can do but is definitely not preferred.

Costs reduction and planning flexibility are in literature considered as two of the most important reasons to change toe-learning. In this case, flexibility is regarded as the first priority for clients and cost reduction as the first priority for the company. Reduction of travelling costs lower training costs a lot, as this includes intercontinental flights and hotel stays. Due to the exclusive character of the company, prospect are that there will not be numerous potential new trainees. A small number of trainees means that variable costs will be less important than fixed costs, and scale advantages will not be in reach. Chances are that only a handful of trainees will take a certain course every year, but the material should be updated regularly anyway. The first scenario has a very low reuse-level, since all is customized to the trainee. All scenarios offer nearly the same cost reductions, there is no clear preference. Flexibility on the other hand is considered as very important, clients need their employees to be at their workplace a lot and it is very hard to set them free for training. Even during training they can get called and have to spend minutes or hours assisting their colleagues at the office. Scenario One offers most flexibility, allowing trainees to pick both place and time flexibility. Scenario three is a noteworthy second on this point; only one session is fixed by time, the rest is free.

Literature is not clear on when a group approach and when an individual approach is better, apart from the course being 'standard' or customized to the trainees needs. Trainers make clear that there may not be a choice because the numbers of trainees are quite low. On the other hand, clients on the 'business-side' may prefer group discussions, while technical people prefer an individualistic approach. Trainees don't see problems with privacy and social pressure mentioned in literature when using group approach. Scenario three seems to fit best with these circumstances. It is possible to train trainees alone and relatively easy train groups, conferences then have the deal with more participants and planning may be harder.

Trainers and trainees may have to change a way of working with regards to learning, when using e-learning. Literature taught that teaching via internet requires other pedagogical skills, as technical skills. Also, trainees may need more 'drive' and energy to complete the course, or a tutor or an encouraging trainer to keep him going. Scenario three seems to require the least adaptations; there is interactivity enabling trainer and trainee to create a relationship, videoconferencing is a very rich way of communicating reducing the chance of miscommunication and because of the contact encouraging trainees to proceed and finish a course.

On the technical side, all three scenarios should be possible, but the third scenario only uses technology that the training department is already familiar with. Message boards and FAQ's can probably be set up, but there the staff should familiarize itself with it for training purposes. In current training an LMS is used to provide slides and assignments to trainees and slide ware is used

in class. Training via videoconferencing is used for training new trainers and have company or department meetings. On the other hand, both trainees and trainers are convinced that they are very familiar with IT-technology and can get used to new tools pretty easy. In literature technology-adoption is regarded as a serious threat to an e-learning project, but fortunately this does not seem to become a problem in this case.

In interviews all people made clear that a degree of personalization is needed, since the implementation of the product differs per client. The third scenario seems to fit best, as this gives the opportunity to go through standard material in a group and may have additional sessions on the specifics of an implementation. These additional sessions may also be used to deal with questions and allowing trainees to steer their learning experience.

### 6.5. Validation

The end result of this project is a model of e-learning that is suitable for this company. It can certainly not be considered as the ideal solution for companies, as there never is one right solution, only a suitable solution for a specific situation. The discussion here is whether or not this model really is suitable. To find this out, a pilot should be done and extensively evaluated. This however is not a part of this project, so we will validate the model theoretically. To validate an end-result, we start by validating the parts and steps that were needed to develop the end result. We started with a literature review on the subject matter. The literature used here is found via several search engines, all published in journals thus reviewed by critical scientists. Other sources of information for the analysis are observations and conversations with stakeholders. Based on the issues raised in literature and in the analysis, an interview model is developed. Interviews are held with a group of available stakeholders. The weak point in here is that there is no guarantee that these stakeholders have raised all opinions living with other stakeholders. This means there are chances that other stakeholders have other preferences and the proposed model is not covering these preferences.

A limitation of this study is the very limited amount of interviewees. Due to the financial crisis the field in which the company operates was in crisis and it became impossible to arrange appointments with (potential) trainees. In addition, there was a severe time limitation on the interviews with trainees. There was only one opportunity to do the interview, which was during lunch break of their training. The result was a 25 minute interview with both trainees at the same time. Because of this, there was no time to really go into depth with them; after a quick answer on a range of questions it was already time to stop. Despite the interview problems, the recommendations are pretty reliable. **Opinions and experiences of interviewees don't differ** on many aspects; Interviewees share most of their viewpoints and do not differ so much from what we learnt from the literature review.

Another limitation is that this model is not validated in practice. To investigate thoroughly is the **developed model is acceptable; a pilot course should be set up. Practical problems can't be all** predicted, most of them can come front while testing a model with a pilot. Next to that, stakeholders have a positive attitude now, but they can change after they have really experienced an e-learning project. Merely the same holds for the cost and time investments; it is impossible to make a realistic estimation of the time and effort that is needed to develop course materials and set up the course.

If the model will be also applicable in similar cases, depends on the similarity. If travel costs are also very high, subject matter relatively the same, technological skills of both trainers and trainees high and there are also no large groups expected as potential trainee, then it may be a good option. On the other hand, it is impossible to have two exactly the same situations, there are always minor differences, that may require minor or major changes in the model. For example if the company is in a place without stable electricity or internet, or if the subject matter is more practical than theoretical.

## 7. Conclusions and Recommendations

In this case, an international company with clients scattered over the world, wants to provide more training to its customers, to increase customer satisfaction and increase revenues. The company is investigating e-learning because travelling costs and accompanying overhead seem to be the main barriers for clients to decide to take more training.

Learning via internet is often called e-learning. E-learning-projects are often started to save costs of learning, but also to provide 'personalized' learning. When e-learning is used to save costs, the subject matter is usually standard for all trainees and there are many trainees to offer the same course. Trainees work alone and have limited guidance of a trainer. This is the well-known mass-scale-effect. As a consequence a lot of time and effort has to go into development and maintenance of the course material, which are time-consuming and therefore expensive tasks. On the other hand, personalized learning focuses more on the specific learning demand of trainees. With a lot of interaction and personal attention, the subject matter can be adjusted to the learning demand. This type of e-learning can cost even more than classroom-based training, because of all the personal attention, requiring more time from trainers.

In both cases, e-learning provides flexibility for trainees. Trainees can pick their own timeslot to study and can influence planning class-sessions. This flexibility allows trainees to combine their day-to-day activities with training in a more convenient way. Due to the independence of trainees, they may lose interest and motivation to complete the course. The teaching facility may need to monitor progress and force to keep in touch and keep the trainee motivated. From didactic perspective, e-learning is another expertise compared to classroom based learning. Face-to-face communication is limited and media richness of for instance e-mail, telephone and chat is less than a face-to-face conversation. Teachers have to adjust to these limitations and all course materials should be even more checked on correctness and completeness, because opportunities for correction and questions are limited.

In interviews with current trainees it became clear that barrier for enrollment in a course is creating a planning to enable employees to attend training, instead of costs. It is very hard for clients to enable some of their employees to attend a training elsewhere. Even when they are at the training facility, they may receive phone calls from their colleagues, which also happened in the past. E-learning could solve this problem, by keeping the employees in or around their office and allowing them flexibility in picking their training time. On the other hand, the subject matter is experienced as hard to master and some guidance of trainers would be necessary. Trainers also emphasize that about eighty percent of a course module is standard, but there is always a part that is customized to the client's implementation.

If we compare these two requirements to the two main types of e-learning, both of them will not satisfy all the requirements. The cost-saving type needs many trainees, while this company has only a limited number of clients. The personalized type seems to fit with regards to the content perspective, but it requires planning of interactive sessions. An e-learning project that would fit most of the requirements is a mix of these two types. A course starts with an online meeting in which all participants meet each other via internet. In this meeting, the trainer can give the trainees a head

start, by explaining the structure of the course and perhaps some content-related issues. This online meeting can be held via Skype, or WebEx, which are both available in the company. Skype is easier to access; it can be installed on the company's laptops and with a webcam and headset there is no specific room required for conferencing. WebEx is not used in every office because the expensive hardware is usually only set up in one specific room. To gain flexibility, a tool like Skype is preferred.

After the first online meeting, each trainee works on his or her own with the course material. Course materials can consist of articles, slide ware, videos, demos and assignments depending on the subject matter, (technical) availability and trainers' preference. Current course materials can be used as a basis for the new materials. New materials should be more complete; an extra explanation from a trainer should seldom be necessary to understand the subject matter. Examples are slide ware with extra explanations in the notes-space, or videos with a trainer explaining subject matter. Course materials can be found at the online learning environment. This gives them ultimate flexibility in picking the time and place of studying. A trainer can be consulted via e-mail or telephone, when the trainee needs assistance. Trainers or their assistants should monitor progress and contact trainees **who haven't been in touch recently to keep them motivated**. In longer courses, trainers can offer regular consulting hours to make it easier for trainees to contact them.

As mentioned before, teaching using e-learning requires other skills than classroom-based teaching. Therefore trainers need some experience before actual courses are offered. Common strategies to gain this experience are via a training, or by trying it on a small scale, preferably in-house. For example by giving a pilot-training to new employees who are based in another office, or to consultants who are in between projects. These people are motivated to learn and have the right equipment.

The above is a theoretical description of suitable e-learning project, but there are two important factors that should be explored further; cost effectiveness and setup of a pilot. If an e-learning course has only a limited number of participants, it may not be cost effective to develop new material for self-paced learning. It may be less expensive to have a couple of interactive sessions with a trainer. Of course this also depends on the expected number of future trainees and the changes on the subject matter for instance because there are new releases of the product planned. On the other hand, if clients require a self-paced course and are willing to pay more for it, which is a good argument to develop new materials. The company can also choose to try the hybrid solution and decided after evaluation of the pilot whether or not to develop new materials for all or only a number of courses.

## Appendix: Example projects

In this appendix some e learning projects are described. These projects are taken into account in the comparison in section 2.4.3.

### *Referred Projects*

|                                                                                               |    |
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### *Project 1: North Dakota State University (Olsen 2006)*

At North Dakota State University e-learning has become the way to educate and train their IT staff and to external clients. They also provide software training and had to problem of high costs when trainers had to go elsewhere to deliver training. It often took a full week for a trainer to deliver a training of two days, because of all the travel, set-up and clean-up time. The request for training increased, but the capacity did not grow correspondingly. The training staff decided to use the BlackBoard system and WebEx conferencing system to experiment with e-learning. Training is now delivered via live-sessions with WebEx and material and training modules are available via Blackboard. The back-up plan when Web-ex fails is to use the telephone. In this case, costs per participant are reduced to about fifty percent. Lessons they have learnt are:

- Remote training events require an environment free of interruptions or distractions
- Schedule some extra time before the sessions to test the connection
- Keep the meetings relatively short
- It can be helpful to have an assistant on the remote site for back-up and technical issues
- Room lightning and camera positions are important; in bad cases, it is harder for participants to concentrate and feel comfortable
- As a trainer, greet participants when they enter just as in real life
- Just as in real life, encourage participants to introduce themselves
- Use readable name cards
- Encourage shy people to speak up
- Use open questions to encourage discussions
- Look directly in the camera; make contact with you class.

- Use two computers for the trainer; one for the WebEx- connection, one as a workstation, some programs will slow each other down.
- Provide telephone numbers for in case the technology fails.
- Use some good humor.

### *Project 2: Training iT staff at University of Montana (Laakso 2007)*

The relatively small university of Montana had students employed as IT consultants to solve the IT-problems for students and other employees of the university. As it goes when employing students; students work for a certain period and then graduate and leave. With this, a lot of experience and knowledge also leaves and new students have to be trained when they start working. The university could not afford very frequent training classes and also was it very hard to make such a class interesting for both starters and experienced consultants. They started an experiment to train the consultants fully online; obliging them to take a certain amount of training modules per semester and raise their salary according to their level of knowledge. The student-consultants welcomed the idea and so it started. It appeared that this worked fine, as long as the student-consultants have a regular meeting with their supervisor, in which they also discussed the status of their learning. Without this extra stimulator it was perceived that students postponed the learning and came into troubles when the deadlines of their courses and IT-learning were all at the same time. The university used an already existing training package from SkillSoft and adapted it to their specific needs. It is also known that the contents of the course are quite generic and can lead to an official Microsoft certification. Students liked the new system very much, 90% of them even rated it as 'good' or excellent'.

### *Project 3: E-learning in a constructing company for life-long-learning (Wall 2008)*

An American construction company realized that life-long-learning is also vital for their employees to keep up with innovation and the competition. After realizing that using internet for this would be a convenient technology, the format of an online simulation game was chosen. Like in management games learners formed teams, which had to deal with changing circumstances and had to guide their virtual company through it. By experiencing the problems and dilemmas in this virtual world, they got to understand the subject matter thorough and could use this knowledge in their daily work. Contact with trainers was mediated by a learning management system where discussion boards and other course material were available. The main benefits of such a program found in this research are

- Developing a greater understanding of the problems and decisions that are involved in running a modern construction company
- Its practical and competitive nature enhances the learning environment
- It improves team working, communication and IT skills
- It develops analytical and problem solving techniques
- It enables performance to be benchmarked against other competing teams

***Project 4: E-learning in a Norwegian Service Company (Morch.A.L. 2004)***

The company got attracted to e-learning because research showed that competitors used it already to train their staff and the training costs are significantly reduced. Next to that, management would like to keep personnel longer than the average 12 months by facilitating them with training to improve their work conditions. Training was done via classroom based sessions and new employees asking more experienced colleagues for help when issues arose. The online learning system is designed with help from several stakeholders ranging from managers to assistant shop attendants. Although there was enthusiasm about the project, the project did not become a full success story. Some employees are not familiar enough with computers and prefer the old way of searching for information. Other information is simply not (yet) available. In this case there is chosen for a 'knowledge management' approach, there aren't 'lessons' or courses, but employees can look up information in the system, just as when they would ask a more experienced colleagues.

***Project 5: A case of online learning at Rivier College (Sabin 2007)***

At this university, some experiments with online learning have taken place with undergraduate and graduate courses in the IT curriculum. Some courses were offered both in a fully online and a hybrid variant. Afterwards, the results of these courses were compared, as well as the opinions from students gathered by a survey. Important results from the survey regarding the online variant are that the 'anytime, anyplace'-nature of online learning very important is for students. Web-based video-conferences are perceived as very valuable, especially when a recording was made available afterwards. This conferencing was less helpful for laboratory sessions than for explaining matters. Researchers acknowledge that their students have a high technical insight and do not need a lot of changes and learning before they are ready to use online tools. Even more, this IT-minded sample demands more and more of technical tools. Online learning is typically chosen for the functional benefits (anytime, anyplace, easy access to trainers, practicing matters), development of communication skills is not that important for students. In these experiments, trainers found that it is not possible to transfer well-known classroom practices to an online class; adaptations have to be made. An important factor for this is that people or not as comfortable in communication in online classes as they are in real life.

***Project 6: NHS Learn (Williams 2004)***

NHS Learn was a pilot in which digital television was used to broadcast learning material among NHS staff and prospective staff for developing their professional skills and knowledge. These people worked in hospital trust locations and academic institutions. Via digital television were recordings of lessons and seminars broadcasted, in addition to course material available at the workplace. The broadcasts were also recorded at the local study centers, enabling students to pick their own viewing time.

***Project 7: McCollum's experiment***

McCollum (McCollum, 1997) describes an experiment in which a professor split the class in two; one class was provided with a web based course and the other half with traditional classroom based

learning. After examining the results of the test, it appeared that students who took the web based class scored better than the students who took the classroom based course.

***Project 8: University of Arizona (Zhang 2004)***

Zhang executed an experiment with first and second year students in different curriculums. The goal of the study was to evaluate an E-learning approach called 'Learn By Asking' (LBA). The group of students was split in two, one group entered a regular classroom based course and the other group entered an e-learning course. In the e-learning course lectures and laboratory experiments were admitted via internet. Evaluation was done via a survey and comparing test results.

***Project 9: Institute of Industrial Engineers (Robins 2006)***

The institute of industrial Engineers started an online course for participants from all over the world. The course spans 10 weeks and is meant for people who already have a job with the subject matter involved. Some on-the-job-projects have to be done and there is a final exam. During the course a project is done and all issues at hand can be discussed with fellow participants. The course leads the participant through the process and offers course material to enable participants to complete their project the right way.

***Project 10: University of Phoenix and Maryland University College (Guri-Rosenblit 2005)***

Both universities offer online courses, in addition to regular courses. They limited the number of participants to 8-15, to ensure high levels of interactivity and quality. Because interactivity is labor intensive, Phoenix University decided to charge more for online courses.

***Project 11: Nova Southeastern University (Lieblein 2001)***

Nova Southeastern University started online courses in 1983 and developed an online classroom. Students live scattered among the US, in every state there are some students, as well as in 34 other countries. The university first mandated students to attend certain meetings on campus, though later on removed this rule. Later this was replaced by the choice of an on-campus orientation, or receiving a CD-ROM containing start-up information. Technology used in the courses depends on the choice of the teachers; they can pick their tools from a range of available tools. Neither is there one standard way of assessing students' performance. Possibilities used are assignments, regular exams and take-home open book exams.

## Appendix: Interview structure

This form is used as a note-taking form during the interviews. Before the actual interview started, an introduction was given by the interviewer in which she explained the purpose and the subject of the interview. This was already explained when the appointments were made, and repeated now. Afterwards the interviewer thanked the interviewee and explains what the next steps will be.

### General information

- 1) Name (to be anonymized) .....
- 2) Nickname .....
- 3) Firm (to be anonymized) .....
- 4) E-mail address .....
- 5) Gender Male / Female
- 6) Age 20-30 30-40 40-50 50 60 >60
- 7) Computer-skills
  - a. Familiar with slideware (PowerPoint) Yes No
  - b. Familiar with videoconferencing Yes No
  - c. Familiar with internet browsing Yes No
  - d. Familiar with VoIP Yes No
  - e. ....
- 8) Experienced with e-learning courses Yes No
- 9) Experienced one of the classroom based courses offered by AC-training? Yes No
- 10) Job role operator/ System Administrator Business Analyst  
Manager
- 11) Country of residence .....
- 12) Level of education finished high school Bachelors Masters Doctorate

### Questions about e-learning

Currently AC offers only classroom based training, either introduction training, or training on demand. There are voices suggesting that learning via internet would be a nice addition or replacement for these expensive and intensive training. Also, it would enable AC to offer smaller update-training, or training on a special topic which takes less time than the current training. For example a training for current users about the new features of a new product, or a new release.

- 13) Do you think that e-learning is a suitable solution for this kind of training? Yes No
- 14) What do you think is important while considering e-learning for this course?
  - a. What are the main advantages that you imagine? .....
  - b. What are the disadvantages that you imagine? .....
  - c. Do you think it will become a success? .....
- 15) Are prerequisites met?
  - a. Do you have access to a computer with stable internet? Yes No
  - b. Do you have access to videoconferencing? Yes No
  - c. Is there time to study? Yes No
  - d. Is a quiet studying location available? (without disturbing)

- e. Is there a learning culture present? (company culture)      Yes No
  - f. Are there security/firewall issues that you are aware off?      Yes No I don't know
  - g. Are you allowed to install plugins like flash or silverlight?
- 16) Would you mind if the courses are taught in groups, with people from other companies?
- 17) Would you like if there are self-assessments available?
- 18) Would you mind if results are made available to your manager?
- 19) Would technical support be a top priority?
- 20) Would interactivity be a top priority?

### Questions about scenario's

About each of the scenario's (notes on the overview-table)

- 21) Do you think this scenario is feasible for you?      Yes      No
- 22) What are the strong points in this scenario?      Why?
- 23) What are the weak points in this scenario?      Why?

### Other questions

- Please tick the boxes of the cost pools that you think will be applicable for your situation in the table below.
- Which of the listed advantages are most important for you?
- Which of the listed disadvantages are most inflicting on your situation?
- Do you think assessments will be valuable for AC?
- Would you appreciate it if group work and discussion are included?

### What is more important?

- Flexibility of time      personal contact
- Interactivity with teachers      lower costs
- Standard course      room for personal questions
- Individual course      group course (one party or multiple parties)
- Offline available material?

### Wrap-up

- Would you like to keep informed about this research project?      Yes      No
- Can I contact you if I have any more questions in the near future?      Yes      No

Appendix: Interviews

Interview I: Trainer 1 .....66

Interview II: Trainer 2.....68

Interview III & IV: trainees .....69

### *Interview I: Trainer 1*

Paul works in the training department as a trainer. He is about 30 years old and holds a bachelors degree in Economics, though he has a special interest in computer science. He already gained some experience with e-learning in previous jobs. In the past year Paul familiarized himself with the software product and the training materials. His main task is to deliver training on the software product to new customers, partners and (new) staff.

In the past few months Paul has trained two consultants to become a trainer. This process can also be described as distance learning, since the two consultants were in the New York office and Paul in Amsterdam. Using e-mails, telephone and videoconferencing and the training materials this seems to have worked fine since both consultants already have delivered one or more training sessions.

In Paul's opinion e-learning can be a very valuable extension to the training curriculum. It may attract customers to train more of their employees because the overhead costs are probably a lot less. Paul he also thinks it may not be possible to deliver all modules via e-learning, at least not when the project starts. Gaining some experience with relatively simple and short courses may be very helpful to design an e-learning module for the complex modules. Perhaps it is a good idea to start with some short courses (one (part of a) day) on new functionality that came in with upgrades and new versions. The training department would like to provide this kind of training, but the travel and overhead costs for customers to fly in are very high. This makes it pretty unlikely that if we offer such course enough customers apply.

Paul thinks that the main advantage of e-learning is that costs are reduced, especially flight and hotel costs. On the other hand he like the prospect of flying around the world for work and when e-learning becomes the standard he will miss the traveling. The main disadvantage would be less interactivity. In the courses he taught before, there were a lot of questions and discussions, which were very helpful for trainees to understand the subject matter. In his experience, it is easier to explain things in synchronous communication than in asynchronous communication. Even stronger, in his opinion a good e-learning courses offers always interactive sessions.

All together, Paul thinks e-learning is a very attractive way to train people. On the other hand, the software is pretty exclusive; there are not numerous customers. Paul estimates that the potential growth of paying trainees will be at maximum 10 %. Because there are not that many customers, there are not a lot of potential trainees and it is not very likely that trainees will sign up with a group. In his opinion there should be plans on how to treat single sign-ups and group sign-ups. For the majority (estimated 80%) of modules single sign-ups can be combined into a group, because these are relevant for all customers. In some cases however, a personal approach is needed because the implementation of that issue isn't standard and the trainee should be familiarized with the specific implementation.

Within the training department there is consensus that they should deliver quality. Therefore we also do not want people to quit before the end of the training. This should be continued in e-learning courses, although it is harder to get peoples commitment and catch their attention when other job-related tasks beg for attention. A good option would be to have some deadlines and develop a personal training plan for trainees, to give them ultimate flexibility but also have some sessions to evaluate the process and keep them motivated. Paul has the experience that the training facility

should motivate their trainees, because trainees often lose interest if they have to train all on their own.

Also, the end of training should be clear, a self-assessment or test would be a nice tool to have here. In **Paul's** opinion are assessments very valuable; it can act as a proof that courses realized the desired goal and is also motivating for trainees as a point to work to and get the motivating feeling that a task is completed.

Paul prefers knowledge transfer via virtual lectures; in the simplest form the current type of slides with a recorded explanation from a teacher. The explanation has to be brief and complete and definitely not a recording of a classroom lecture, but an explanation specially designed for this purpose. Knowledge transfer must be as media-rich as possible, to make sure that the trainees get the real message. He does not think that e-learning can get the level of face to face training, 'but we should try to make it as attractive as possible'.

Support seems to be a bit harder, because there is always a barrier to overcome before people contact other people. Paul thinks it is very important to encourage trainees to contact the trainers when they have questions and thus reduce the barrier. An FAQ should not be necessary; ideally all frequently asked questions should be answered in the course. Also, Paul prefers answering questions during consulting hours, which is also feasible in his opinion. When using consulting hours, communication can be synchronous, with makes it easier to explain issues and get the trainee to understand the subject matter.

Later on Paul thinks that the most important advantage of e-learning is flexibility, especially for customers. Customers can save money and reduce planning problems because of the time flexibility. In his opinion scenario 3 seems the best way to do implement e-learning. The problem with the second scenario is the lack of deadlines.

|                      | Scenario 1                                              | Scenario 2                | Scenario 3   |
|----------------------|---------------------------------------------------------|---------------------------|--------------|
| <b>Feasibility</b>   | Do-able                                                 | Do-able                   | ++ preferred |
| <b>Strong points</b> | interactivity                                           | Reduced planning overhead | Interactive  |
| <b>Weak points</b>   | Group approach, groups are not likely to sign up a lot. | No deadlines              | No deadlines |

TABLE 11 PREFERENCES OF TRAINER 1

### *Interview II: Trainer 2*

Jacob is a trainer at the training department. Before becoming a trainer he worked at the same company as a consultant. He worked at the company for eight years and has a lot of knowledge about the products. His main task is to deliver training and flew around the world to provide customers with on-site training. He hasn't got experience with e-learning, but knows his clients' needs pretty good.

In Jacob's view, e-learning can be a very valuable addition to the current training offerings. However, there are some difficulties. Trainees differ a lot from very technical IT-people to real business users. In his experience, business-users like the group element and discussing subject matter. These people may not like an individual approach, but prefer the classroom-based training.

On the other hand, the technical people have a more individualistic nature and prefer to work alone and would appreciate personalized e-learning. In addition, customers are having a lot of difficulties of setting technical people free for training purposes. It is not rare that trainees are called during training to solve problems at work. For this group of trainees the planning problem is very complex and makes it hard for them to do a training.

Reducing the travel needed for training, the on-site training will probably be reduced and as a consequence his travelling will be reduced too. He does not really like that prospect, but accepts that.

After talking about the scenarios, Jacob proposes a fourth scenario. In this scenario virtual classes are offered on a regular basis, for instance monthly. Trainees can study on their own and pick a virtual class from the schedule. In this way interactivity can be offered interactivity on a semi-flexible way.

Jacob does not think extra support should come from the training department. A lot of questions will be about the product. Within the company there is a helpdesk available for customers when they face problems or have questions. Jacob thinks that the questions from trainees would fit there too. Problems with training material should be directed to the training department, preferably via e-mail. The trainers can then look for an answer and decide how communicate, either via e-mail or telephone.

Assessments are a tricky subject for Jacob. When adding assessments and certificates, trainees may have to face consequences at their work, because of the certificate. Some customer companies may relate salary raises to achieving a certificate. When issuing certificates there should be a proper test-mechanism in place and all this costs a lot of time and energy from the training department. In his opinion, there is no real gain for the company to issue certificates and offer extra performance tests. It is the own responsibility of the trainee to study, but self-assessments would be a valuable addition to the current situation, enabling trainees to determine for themselves if they have studied enough and to show their manager that they know the subject matter to a certain extent.

Jacob does not think there will always be more than one trainee for a course. The target audience is pretty small because there are not that many clients, so there should be possibilities to guide single people trough a course, but also scenario's available for groups. Single trainees can be combined into groups, as the majority of the courses are standard. The part about the customer-specific implementation should be dealt with in an interactive.

### *Interview III & IV: trainees*

Sam is a middle-aged man working for one of the clients and taking a classroom-based training at the time of the interview. He is **familiar with office IT use, but hasn't got experience with videoconferencing**. Sam did take a few e-learning courses in the past. These courses were unguided; trainees had to find their way through it themselves. Sam thinks it is a pity that there were no feedback facilities, he thinks this should be definitely present in the e-learning.

John is a middle-aged male, taking the training just before he will start as a software engineer at the company. At the time of the interview he was in the middle of a **classroom-based training**. He **hasn't got experience with e-learning, but is acquainted with 'office' IT-use and the use of videoconferencing for meetings with colleagues**.

Both trainees think that e-learning can work out fine for the full-blown training they are following at the moment. John has experience with videoconferencing and can imagine a virtual classroom based on this technology to be a good substitute for the current classes. However, the men also make clear that the training teaches them a lot of theory, but as with a drivers license, the actual learning takes place **with a lot of practice 'at the floor'**. **Both men think that using e-learning for training on extra functionality that come with software upgrades or new packages may not be such a good idea**. There are no two implementations of the software the same, so the training need of trainees may differ accordingly. Sam adds that this may be better done in an on-site training.

The main advantage the two men see is the planning flexibility. Especially Sam likes the idea of not having to be out of office for training and plan study activities at quiet moments. John adds to that that travelling is not his favorite activity and like that to be reduced. On the other hand is the main disadvantage that is can be hard to really get the peace and quiet to actually study in a convenient **manner**. **They don't think that direct colleagues will disturb them during study time, but nobody has influence on situations that really rely on them**. They may get called anyway. Next to that, colleagues in another room **may call or come by and disturb because they don't know about the study time**.

Both men think that it must be technically possible to introduce e-learning. Stable internet connections are available, as is videoconferencing and even extra functionality can be made available via IT service desks. On the other hand, software should work in the simplest way possible, they find it very annoying if they would have to configure and install a lot of things. Next to that, **they don't feel they will be discouraged at work to take some time for studying**.

**Sam and John don't think assessments are really necessary. They find it a trainee's own responsibility to understand as much as possible and get the maximum out of the training**. They also **don't value self-assessments that much**. It is a nice to have, but definitely not very important. They value interactivity as much more important. In their opinion interactivity with teachers and peers is even necessary; in the current class are so many questions that any other way of solving these would be very inconvenient. John adds that synchronous communication with a trainer is in his opinion the best way to get complete answers, really understand the subject matter and prevent communication errors.

Both men prefer courses taught groupwise. In their experience is the knowledge sharing optimal and this deepens the course quite a bit. As clients are no direct competitors it should be no problem to

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mix people from different clients. John adds that learning from each other and each others questions is really an extra advantage.

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