Blended Learning and SMEs

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Blended Learning: Towards the Best Mix for SMEs

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Abstract. Experience has shown that instructor-led trainings have some advantages that cannot easily be overcome by technology enhanced learning. Direct interaction with an instructor and among the group is often perceived as motivating and more personal. For small groups, in-class trainings can be more cost effective. On-line learning often requires a considerable amount of self-management and progress-monitoring from the learners. Small and medium enterprises (SMEs) are very sensitive to these issues. As customized in-house solutions that are used by global players (e.g., corporate LCMS or learning portal, content tailored to specific needs of company) are usually not feasible, SME rely on what training providers offer, i.e., instructor led training. The first part of the workshop will look at the prerequisites for Blended Learning in SMEs and insights in an e-learning provider's perspective. The second session will aim to develop guidelines and recommendations for Blended Learning in SMEs. The Invited Talk will provide the experience of an e-learning provider who mainly targets customers or learners in SMEs. Two practice reports describe the experiences with blended learning in a research project in a corporate setting and an implementation project in an institution of higher education. In synthesis, this workshop aims to assess the state-of-the-art of Blended-Learning in SMEs and to identify research gaps and opportunities. The state-of-the-art will take the form of best-practice reports, guidelines and heuristics. This will serve as important input for practitioners such as training providers and course designers. Discussion is encouraged throughout the workshop. At the same time we also anticipate that the synopsis of evidence will identify a major lack of convincing concepts and data for Blended Learning in SME that will inform and encourage further research.

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Blended Learning and SME's: the Challenge for NCI Library: USB Key as a Learning Tool

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Introduction

The proliferation of the internet as and instructional medium has given rise to the growth of numerous types of online training. Distance learning, e-learning or blended learning are phrases exchanged frequently, as students and corporate employees log on to instructional sites at college, at the library or between staff meetings.

Although thousands of small businesses are established each year only a small number remain in operation within ten years of their inception [1]. Major contributing factors to the failure of many small firms are a lack of attention given to the development of a robust plan, goals and objectives, organising and resourcing for the new venture and the development of people assets.

Relying on instructionally solid features and simplicity in technical implementation it is no surprise that corporate managers and academic stakeholders are including synchronous education in their budget and strategic plans.

This is where NCI comes into its own. NCI is offers a series of tailor made management development programmes for both public and private sector organisations. These programmes will lead to qualifications at the level of certificate, diploma and bachelors degree. Through the In-Company Training and Education Division, National College of Ireland aims to develop and deliver a suite of programmes designed to enhance the management capability of junior to middle level managers.

A cross section of our current client list includes, Glanbia plc, Midland Health Board, C&C Group plc, VHI Healthcare, Dublin Port Company, Symantec, Dublin Bus and AXA Insurance.

The web has promoted exploration, reflection, application, discovery, and overall has encouraged learner behaviours associated with higher – order learning [2]. Blended learning, a mix of self paced (asynchronous) work and instructor led (synchronous or face to face) elements is being promoted by many in the training and executive education fields as the best way to capitalize on the strengths of elearning, while maintaining the benefits of traditional training.

E. G NCI Certificate in Managing teams –

The interaction is through personal conferences and one to one discussion with lecturer, conferences with class and lecturer and online class discussion forum.

How the Programme Works.

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Everything is done on-line using your PC and a connection to the Internet. You will work in a virtual classroom environment with other students from elsewhere in Ireland and/or abroad.

The Programme will be delivered on-line as follows:

Each week the lecturer delivers a formal lecture electronically to the class. As a student all you need to do is attach to NCI Online log-in using the id and password that will be assigned to you and pick up your lecture notes from there. Assessment will be done on a continuous basis. Assignments will be delivered online to you by the lecturer. You can complete these off-line and reconnect to submit them to the lecturer.

You will interact with the lecturer and with other students on-line through a number of means.

Personal conferences where one to one discussions take place between you and the lecturer.

Discussion conferences where discussions can take place between all of the class and the lecturer.

Student lounge conference where you and other students have a forum to discuss general topics with each other, like a virtual coffee room.

With blended learning as a method of teaching The library took up the gauntlet and realised this is where we needed to adopt a blended learning approach to the issue of information sourcing and literacy. Step one was the information sourcing and the concept of the Learner information key was formulated.

Because of technology limitations presented by the target user base (on- off campus/ online and in-company education , the college explored the various delivery options available to use. The main issues that arose are the issues of access, course speed, data tracking and security, maintenance issues, media elements and client preference.

In providing information sourcing and with the growth of the information society ultimately we decided on web-based delivery when possible, but it meant that we had to balance the need/ desire for a rich media solution with the reality of the low bandwidth of many of our users.

Adult learners need to be challenged, and our material needs to be interactive in order to move learners from cultural awareness, to knowledge acquisition to skill development. Although these criteria are essential to us, we also know that we must continue to solicit feedback and evaluation from our clients to better understand their requirements for intercultural training based on business needs , target populations and technical requirements.

The paper is a brief look at the practical experience of producing a ‘blended’ information source for learners at the National College of Ireland, in the academic terms 2005/6 and 2006/7. I will be looking at the experiences of the pilot programme in 2005/6, and the decision to proceed with the process in 2006/7, and to expand its distribution to all learners and staff at the College.

The decision to proceed with a different type of information device was taken initially for environmental and cost reduction in relation to printing/photocopying costs, to use a medium that was easy to produce and distribute and to encourage saving of material(s) rather than printing/copying. In order to achieve this, a USB key was chosen as the preferred method. As test groups all off campus learners(off site/distance) users were chosen as were first year students in a 3 year undergraduate

degree, flexible learners (who study away from campus, but attend 1 week in 4), and postgraduate learners.

As a librarian, I am conscious that there a large number of the students attending at NCI, have difficulty in getting correct information and many of them seem to have a negative experience. At a recent conference I attended one of the speakers spoke of giving learners what they want from information sources (libraries etc.) and not what we as professionals think that we want.

The pilot programme was set up and delivered in a 6 week timeframe, with no set parameters or formal feedback. When the decision to go ahead with the process in 2006/7 academic term was taken, it was decided to:

Have formal feedback
Memory/USB key to be titled Learner Information Key or LIK
Work with NCI web interface, but also work separately
Market the product (design, packaging,information sheet, information)
Learner Information Key to be given to all NCI learners, faculty and staff
Set up efficient distribution system
Costs shared between various college departments as per previous USB key

The information contained on the key is from all department college wide, however, some departments are more proactive than others and we would hope to improve on the volume/range of information available in future years.

Contents: Brief Overview

Library Information: guides, contact details, borrowing facilities etc.
Learner Services Information: learner handbook, realising your potential,
IT Facilities and Services: acceptable usage form, I.T. guide, etc.
Off campus Information: course information, project cover sheet, programme outlines
Learner life: Examinations regulations, Learner handbook, counselling information, disability services, careers service, learning support
School of Business: Project coversheet, contact information
School of Informatics Information: Project coversheet, contact information
Faculty & Staff will also get the following information
HR Department: personnel forms policies and procedures, payroll information,
Library Information for Faculty: Video listings, case study information, staff Facts4U
(Learner Information Key has 256Mb with c. 50Mb of this with pre-loaded, permanently).

Establishing Specifics of What we Wanted:

We had some idea of what it was that we wanted. The NCI learner key for 2006/07 was to be an improvement on the 2005/06 version. However, we were not sure of exact numbers required or of the finer details, such as USB key type, the colour and position of logos, the packaging and availability of lanyards etc. Not knowing these details from the outset let to delays in obtaining a final quote and placing the order as various e-mails to the chosen supplier had to be sent in order to establish the additional cost/possibility of each new detail/as it arose e.g., change in numbers, additional logo on back of USB key and lanyard, possibility of BIWIN brand USB key not working.

Obtain Quotes from Suppliers:
Quotes from two suppliers were obtained. We requested quotes from both companies who supplied quotes last year. One firm responded immediately, the other took quite some time to prepare a quote. Additional quotes were not sought as we didn't know of other firms who could supply the goods. Price was the main factor that determined our choice of supplier.

Compilation of Data to be Preloaded (Both Content and Interface):
Each department was asked to upload all documents/information, they wanted to provide to learners on the USB key, in a shared Folder on the NCI network by a certain date.

The deadline passed and only some departments had provided the required information. After numerous e-mails and phone calls all departments eventually 3 provided the information required. However, this delayed the start of production. In addition, some files had not been converted to PDF format in advance. This delayed the process again. Some departments provided a substantial amount of information whereas others did not. This may leave some learners feeling resentful.

Efforts were also made to obtain a quote for the design of an interface to display, in an easy to read and aesthetic manor, all the information to be made available. One company was recommended to us. However, they proved most unhelpful and took some time in replying to our request. At the end of the day a member of our I.T. staff designed and built the interface. The same member of staff virus checked and loaded the data onto CD as requested by the supplier.

The delay in creating the interface also let to a delay in the start of production of the USB keys.

Breakdown of Costs:
The cost was distributed between departments within the College, based on student numbers and requirements of other departments, such as Human Resources, Information Technology and Library.

School of Business	20%
School of Informatics	10%
Library	20%
Continuing & Professional Development	20%
Human Resources	10%
Information Technology	10%
Learner Life (academic affairs)	10%

Placement of Order:
When a final quote had been agreed and all the required data compiled a purchase order number was produced and an order was placed with the supplier. The preloaded data was virus checked and loaded onto CD and couriered to the supplier as requested.

Communication:
The modes of communication for this project were meetings, phone calls and e-mail. Communications between the chosen supplier and NCI were excellent. The supplier

responded very quickly to every query we made, both by e-mail and by telephone. Communication within NCI proved more difficult. Various departments were involved in the project. As mentioned above, there were difficulties obtaining the information required for preloading onto the USB key. Some departments did not respond to e-mails or return phone calls. The same problem occurred when trying to confirm the breakdown of costs relevant to each department.

Time Frame:

At each stage of the process various delays occurred. As we had a deadline (we wanted the USB keys for the 1st week of September and the supplier had indicated a time frame of six weeks from the placement of the order to the delivery of the goods) and did not start the process until the beginning of July, each delay led to our 4 timeframe becoming tighter. Although the USB keys were delivered ahead of schedule, when the order was placed (4th August) there was no time left to facilitate any potential delays.

1st contact with suppliers: 07.07.06
1st meeting with staff: 12.07.06
Order placed: 04.08.06
USB keys delivered: 31.08.06

The entire process was very time consuming as so many people were involved and communication problems were plentiful. However, the end result is a very impressive USB key for every student that should be useful to them for their entire time at NCI and afterwards.

Perhaps, in future, the entire process could commence much earlier to accommodate the various delays that are bound to occur.

Advantages of the USB Key Produced for the Students of NCI:

- Reduction in amount of printing NCI has to do.
- Learners can access information anytime and anywhere provided they have access to a computer (this also caters to our off-campus learners).
- It encourages learners to use new technologies, computers and the web.

With the simple instructions provided even the most computer illiterate learner should be able to use the USB key successfully.

- Inclusive: every learner will receive a USB key irrespective of the course/year they are attending.
- Learners can access information on how best to make us of the library facilities and services therefore, furthering their learning.

The USB as a Learning Concept

The Learner key is more of an information resource than a learning concept/blended learning method. The preloaded data is mostly made up of information sheets/fact sheets and forms.

The USB also provides links to the NCI website and to on-line library resources, perhaps encouraging people who wouldn't usually use those resources to do so.

The library information on the USB key is perhaps the closest to blended learning as it informs users how to avail of and make the most use of the library resources.

Likewise the off-campus material, it provides module outlines along with introductory material to the subject matter.

Consider users' business need and technical requirements, the course content and cultural appropriateness, and the enjoyment and ease of use of the course in order to make any learning experience meaningful and memorable for the participants.

What are the characteristics of the audience? How much time will they have access to the content? What connectivity issues do they have? What are the learning styles and education level of the employees? How motivated are the learners?

What are the characteristics of the content? How long before the information is out of date? Where is the content located? Are learning activities intended to inform people, develop skills, or build competencies?

It is essential to secure client / user participation during the development stage to address the direct needs of the stakeholders.

The key to blended learning seems to be selecting the right combination of media that will drive the highest business impact for the lowest possible cost. But how does and organization decide on the mix?

What combination of tools and media will make the biggest impact for the lowest investment?

Future Development:

Blended learning and the concept of information literacy, to be effective blended learning needs to marry the concept of virtual information and face to face interaction.

Learner profiles and the virtual library, (aspects of lifelong learning), due to the dynamic nature of learning and teaching, and the drive for lifelong learning, as information providers, we need to respond to the needs of our diverse learner profiles.

VLE's and the human dimension, it is vital at all times to keep the human dimension to the fore, when developing or delivering information using virtual learning environments.

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Towards a Good Mix in Blended Learning for Small and Medium-sized Enterprises – Outline of a Delphi Study

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Abstract. The mix that is suitable to target the specific learning needs and is likely to be accepted by SMEs has yet to be clarified. Recommendations for a good mix of blended learning in SMEs will be developed using a Delphi study design, implemented as a so-called e-Delphi. The sample will be SMEs from Germany and Ireland, international providers of e-learning, blended learning and lifelong learning as well as researchers in these fields. Recent experience with contacting selected participants for the Delphi study did show big differences for Germany and Ireland. First conclusions can be expected after the first round of the Delphi study has been analyzed in October 2006.

1 Learning in SMEs

SMEs are often innovative, but under high economic pressure. This economic pressure is a threat to ongoing learning activities although continuous training and learning is necessary to stay competitive. Learning in the form of e-Learning is not in high demand with SMEs although one could expect that it is highly suitable to the learning demand at short notice (Wood & Watson 2002) which is typical for SME learning.

Blended Learning can combine the positive aspects of the two learning environments, classroom-based learning and e-Learning (Bonk & Graham, 2006).

A mix of learning styles and a mix of the different dimensions of learning at the course level can increase the usage of blended learning opportunities as a suitable way to learn in SMEs and thus increase or keep up competitiveness of the companies.

A blend of classroom-based with on-line learning seems to be the most efficient approach in many settings. The aim of this study is to explore: What is a good mix in blended learning for SMEs?

This leads to the following secondary questions

- Is there a good mix for SMEs from the IT sector in blended learning?
- Does this vary depending on the industry?
- Can an optimum definition be obtained for blended learning for SMEs?
- Can recommendations be given on how to adapt blended learning to SME learners' needs?

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- What are the constraints in SMEs for not using blended learning?

A good mix in blended learning is characterized by satisfying particular preferences of the learner as well as meeting the learning targets.

e-Learning is "learning that is delivered, enabled or mediated by electronic technology for the explicit purpose of training in organizations. It does not include stand-alone technology such as the use of CD-ROMs". The use of e-Learning depends strongly on the size of the company. Small and medium-sized enterprises use it considerably less than large companies (CIPD, 2006). A number of obstacles to e-learning have been identified in the SMEs organizational structure, the total lack of training culture within the companies and the attitude of individual managers. This leads to a lack of effective analysis of the competence needs and hampers contacting sources of competence (McCullough 2005; European Commission 2003).

E-learning is often perceived as ineffective and lacking in structure and lacking a means of learner guidance which leads to the overall impression of too high costs. The negative cost factor is further strengthened due to the payment structure of a number of e-learning systems which demand a high investment upfront. Many SMEs are not willing to take the risk of making that investment without certainty about the return on investment (Mc Cullough, 2005; Wood & Watson 2002).

Many modern e-Learning systems have very restrictive requirements. They will often run only on one specific operating system. Whereas web-browser based systems avoid this problem, they comprise of other challenges such as the need for a number of plug-ins and supplementary applications.

The diversity in applications intensifies fear of the systems, rooted in a general computer anxiety which can be addressed with including some human teaching intervention for basic tasks like using a mouse, opening a program etc. (Wood & Watson 2002).

2 Blended Learning

Blended learning describes a learning environment that either combines teaching methods, delivery methods, media formats or a mixture of all these.

In the literature the term is used to describe the integrated combination of traditional offline methods of learning with intranet web-based, extranet web-based or internet-based online approaches (Garavan & O'Donnell, 2003). To accentuate the fact that the concept is learner centered, blended learning can be described as a mix of delivery methods that have been selected and fashioned to accommodate the various learning needs of a diverse audience in a variety of subjects (Mc Sporran & King 2002).

Blended learning combines classroom-based learning with computer-mediated instruction (Graham 2006; eLearning Guild 2006), but it also describes learning that mixes various event-based activities, including face-to-face classrooms, live e-learning, and self-paced learning (Valiathan 2002).

To describe the variety of interaction Graham (2006) introduced the four dimensions of interaction in face-to-face and distributed learning environments. The four dimensions are space, time, fidelity and humanness. Space can go from live to face-to-

face to mixed reality to virtual reality. The time dimension develops from live synchronous with a very short lag time to asynchronous, which has a long lag time. Fidelity reaches from a high level that is rich in senses, which means it can incorporate sound, pictures, text and even fragrances, and the other end of the dimension is using only one of the senses, e.g. text only. The humanness dimension addresses the ratio of human interaction and machine interaction.

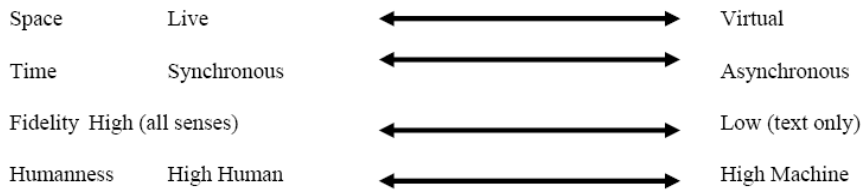

Fig. 1. Four dimensions of interaction in face-to-face and distributed learning environments (Graham 2006)

3 Frameworks in Blended Learning

Poor design of blended learning material can lead to much poorer learning results in a blended environment compared with a single method delivery. Several authors developed frameworks to react to this challenge.

Wenger and Ferguson (2006) describe how their company has come up with a framework to guide the design and deployment of their trainings and courses. It reflects the idea that most learning environments are blended already, considering that even a classroom-only course incorporates a variety of different learning modalities.

Their approach consists of three steps:

In a first step the learning ecology matrix was developed. The x-axis illustrates the focus on the delivery of instruction that varies from “content delivery focus” to “experience and practice focus” and the y-axis illustrates who controls the navigation of the learning process which varies from “guided navigation” to “learner self-navigation”.

In a second step four general learning modalities are included, studying, practicing, teaching and coaching. These modalities do not refer especially to either classroom or e-learning, but are rather applicable to both.

In a last step the matrix is completed with distinct instructional, learning and knowledge elements.

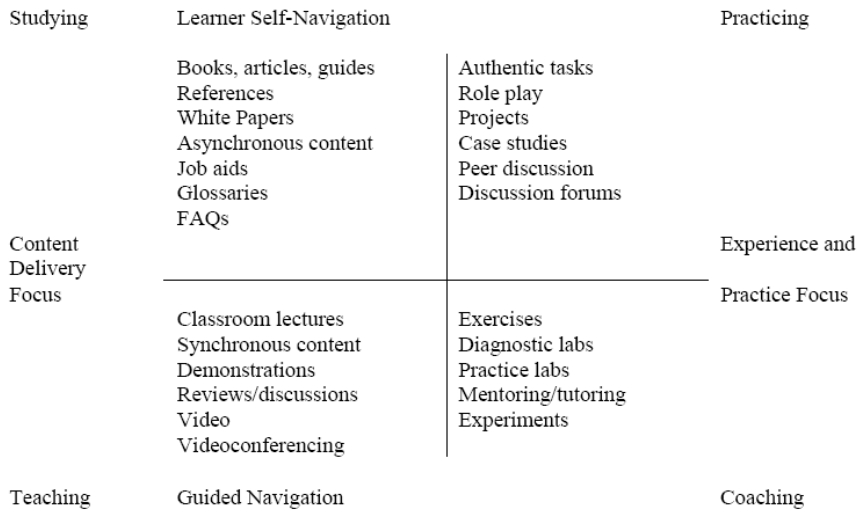

Fig. 2. Sun Learning Ecology Matrix (Wenger & Ferguson 2006)

The learning ecology matrix aims at delivering a high quality learning experience and to provide control over the learning experience for both, the learner and the instructor. It strives at combining formal and informal learning rather than positioning them as opponents. The social nature of learning has to be considered in all learning elements. The aspect of cost-effectiveness is recognized, but merely in the sense that any project aims at a combination of learning outcomes at a total minimum cost.

It is intended to be used to provide guidance for the selection of delivery methods, considering the learning needs as well as available resources. Benefits, difficulties, constraints, but also complementary methods are listed to provide the information necessary to develop the right blend. The generic framework is then applied to specific learning needs.

4 Obstacles in Blended Learning

As mentioned before SMEs use blended learning and e-learning significantly less than bigger companies. Every blend will be a trade-off from an economic perspective between cost of development, cost of delivery, time and effort and the available budget (eLearning Guild 2006). The biggest obstacles in implementing blended learning are lack of budget, choosing the right strategy and a lack of senior management buy-in. (eLearning Guild) The above mentioned methods and frameworks to design and deploy can be very helpful to find a satisfying solution.

5 Success Factors for Blended Learning

There is a variety of teaching methods, but also a variety of different learners with different preferences and needs. A well designed blend of teaching methods will provide the right learning experience for most learners. The characteristics of the audience have to be considered. This includes recognition of the amount of time they will have to access the content, which includes connectivity issues (Bersin 2003; Mc Sporran & King 2005; Saunders & Werner 2004).

The flexibility in scheduling and format is critical to success. Students have to have access to most components of a system 24 hours to make it available when they are ready to study. The flexibility in media formats provides optimum learning experiences based on personal preference. To select the right methods and formats the learning styles and the education level of employees has to be considered as well as the motivation of the learners (Bersin 2003; Serveau 2004).

Response from tutors, subject matter experts as well as technical or logistical support staff needs to be posted within 24 hours, which corresponds to a rule of thumb for effective e-communication in general. The positive effect of a timely response can be intensified by additional phone calls and face-to-face conversations and will provide a sense that there are real people behind the online environment (Serveau 2004).

Blended learning needs executive support for the introduction just as any other major change in a business environment (Bersin 2003). The decision to change to a blended solution from the system that was in use before cannot be left to individuals who are not in charge.

The content naturally will be a success factor. Apart from choosing the appropriate kind of content and making the decision whether learning activities are intended to inform people, develop skills, or build competencies, the consideration of the time before information will be out-of-date is of high importance (Bersin 2003).

6 The Delphi Study

Expert opinion on the various aspects of blended learning is required from all knowledgeable parties involved in this discussion: SMEs, providers of e-learning, blended learning and lifelong learning, experienced users of blended learning as well as researchers in these fields. The study has to involve participants from different geographical areas, different areas of expertise and aims at combining these into a common result. This is accommodated by a Delphi study. Each round of questioning is followed with the feedback on the preceding round of replies. Thus the participants are encouraged to revise their earlier answers in light of the replies of other members of the group. The evaluation of these expert opinions aims at finding a common recommendation for future learning systems for the target group, learners in SMEs. A Delphi Study is the most suitable method to accommodate all these requirements (Turoff & Linstone 2002). To already apply a first selection criteria, easy access to the internet, web-based tools are used. This demands in return to focus on establishing a credible and trustworthy communication with the participants (Anderson & Kanuka 2003).

A Delphi process using web-based and email questionnaires as well as an online discussion will provide the data. Expert opinion on the various aspects of blended learning is required from all knowledgeable parties involved in this discussion: SMEs, providers, experienced users of blended learning as well as researchers in these fields. The study will therefore involve representatives of providers, such as developers, authors, trainers involved in blended learning or e-learning, as well as representatives of small and medium-sized enterprises (SMEs) as future users of the proposed systems, researchers involved in research related to e-learning, blended learning and lifelong learning and representatives from large companies as established users of the proposed systems and as control group. To

Panelists from the four panels of experts have a leadership role in the participant's professional setting, a credible performance record and good professional reputation, such as peer recognition, market success or scholastic contribution in their field. This structure should be applied for Delphi studies which include significantly different subgroups (Kennedy 2002).

Panelists will have varied perspectives, experiences, skills and expertise; all four panels may be influential in changing the mix in blended learning or the use of the educational products. These voices from four different professional areas such as SMEs, large companies, providers and researchers will speak from different yet powerful vantage points.

Expert opinion on a wide range of topics, from the view points of four differing areas of expertise may lead to a broad consensus on issues, but in others to a divergence of opinion. The study will investigate the intersection of ideas from the four groups of experts. The investigation will result in a thorough and realistic analysis of the issues around a good mix in blended learning.

The web based open-ended questionnaire in round 1 (September ‘06) has an estimated time of 30 minutes to two hours; however this will depend on the individual participant. Round 2 (October ‘06), again a web based questionnaire, has an estimated time of one hour to 90 minutes. Round 3 (May ‘07), a web conference will take approximately 45 minutes to one hour. These time estimates do not include time spent reviewing and responding to comments from other panelists.

The evaluation of these expert opinions aims at finding a common recommendation for future learning systems. The study will focus on SMEs in Germany and Ireland, involving international experts and will run from August 2006 to July 2007.

7 Expected Results

We expect to find an answer to the question whether there is a specific mix or blend suitable for learners in small and medium-sized enterprises and whether there are any differences for learners from different industries or from different functions within the same company. If there are strong commonalities it will be interesting to see what they tell us. We expect to gain some information on ways to transfer existing concepts to SMEs and to identify research gaps and opportunities. In summary we will identify

concepts and data for Blended Learning in SME that will inform and encourage further research.

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Who Needs "Blended Learning"? Some Thoughts on a Political Concept.

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Abstract. The paper covers the topic from an e-learning provider's perspective on the basis of practical experience and discussions with corporate and SME partners. In this paper the author argues that blended learning is superfluous as a pedagogical concept. Its true context is company politics and the conflict between different factions involved in human resource development. Blended learning is a political term describing a non-explicit compromise between those responsible for the costs involved in the implementation of a particular type of e-learning and those interested in a ROI for the costs incurred and control over the learners activities.

1 How do People Learn?

People learn in a lot of different ways: by example, by trial and error, by listening, by reading, by writing, by talking, by experimenting. People learn visually, through their bodies, with their senses, while dreaming, driving and while on the job – in almost any thinkable combination. The longer you look at the concept of learning, the longer the list of possible learning methods, learning media and learning spaces gets. Nobody I have met or have heard about learns in only one way with only one method or only one type of media. (This does not mean that they may not feel more comfortable and accustomed to one or the other learning method, media or space.) As far I know learning has never been accomplished otherwise. I do not think that one needs to read a lot of academic material to come to this conclusion. But after spending some time reading well documented work on the subject, I find it hard to come to any other conclusion.

People are indiscriminate, as far as learning is concerned. They use almost anything they can get their hands on to figure out how to solve their problems or meet their learning needs – and they combine different methods constantly. If this is true, then all learning is "blended". Seen in this light, the concept "blended learning" is superfluous.

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2 Learning or Teaching?

"Blended learning" is not really about learning, it is about teaching or instruction. One of the main dichotomies conjured up in the discussion is that between "e-learning" on the on hand and "classroom" or "traditional learning" or "face to face learning" on the other hand. That seems plausible. But when you take a harder closer look at each of the terms mentioned, they are so ambiguous that it is hard to find the dividing line.

E-learning for example is often viewed as "technology driven" or "self-paced learning" and is contrasted with classroom based, communicative, teacher driven learning. This is only true for a particular e-learning scenario and is not at all specific to e-learning. E-learning obviously does depend on technology, but it is not necessarily self-paced. E-learning (teaching and learning) can be done for example over the internet with an instructor commenting and motivating individuals or a group. This group can discuss things among themselves and/or with their teacher/instructor. They may use internet and other technologies, e.g. discussion forums, chats, voice over ip, e-mail, and the plain old telephone, just to mention some possibilities. There is nothing inherently self-paced about e-learning. And to be frank, having people placed in a classroom does not mean anything communicative is happening. Maybe they are doing self-paced work while sitting together. And sitting in a classroom with a teacher in it does not necessarily mean that the instructional scenario is teacher driven.

If indeed "blended teaching" is the combination of different *teaching/instructional* methods, media and spaces then that only makes sense if the terms one juggles delineate relevant points of reference. I do not think the points most often mentioned do this. And to be frank I do not really see the value of the effort. Good (and bad) teachers combine methods and media. Depending on their scope they use textbooks, newspapers, individual talks, group discussions, motivate self-paced work and many more. Good teachers lecture, converse, comment, coax and cry. A good teacher blends anything she can get her hands on to keep the learning process moving. From this point of view, "blended teaching" is not anything new or actually anything special.

3 E-Learning, ROI and Total Control

In my view the term "blended learning" or "hybrid learning" or whatever variation will soon certainly be coined only makes sense when viewed within the context of company training. Several years ago e-learning seemed to be the answer to human resource development's training problems: it promised to be flexible (time and place), re-usable (technical modules that could be combined and used again and again) and relatively inexpensive (when the costs saved for instructors, hotels and travel were considered). Please note: the e-learning scenario considered consisted of CBTs or WBTs (computer or web-based training). People were talking about technology based instruction or "training" (practice) programs without personal interaction or instructor intervention.

One of the most important arguments in inner-company discussions was that e-learning would be more "effective", i.e. more "pin-pointed" due to the fact that anything "irrelevant" was omitted. The learner (employee) could target the information needed and only review that exact particle of knowledge necessary for the skill building at hand. No time would be wasted on "browsing on the internet" for example and the company would be in complete control of the information placed at the employees' disposal. This knowledge could be tested, the "progress" of the employee could be monitored. This was considered the ultimate ROI (return on investment). I remember many of my discussions with the human resource departments in corporations bogging down at this point. The idea of online e-learning scenarios where the employees/students could browse the internet freely and discuss topics online with other students and the instructor were completely unacceptable. My discussion partners were aghast at the thought of their employees going anywhere on their own on the internet. The idea that employees from other companies might be in the same discussion forum lead to something akin to panic attacks.

Unfortunately much of the e-learning modules, programs and learning management systems developed and purchased by companies were notoriously ineffective. After some initial excitement due to the new media involved apathy set in. Nobody wanted to use the media. The human resource department had a problem: they had spent a lot of money and it was not working well. At the same time the "traditionalists" in the company were pawing the ground, waiting to prove that they had been right in being skeptical of the whole e-learning "fad". Nobody could afford to lose – a political compromise was necessary.

"Blended learning" has very little to do with academic or pedagogical concepts. It is about corporate politics and the context and economics of human resource development. In fact the concept of "blended learning" was the human resource department's answer to probing questions on the budgets spent indiscriminately on e-learning products that were ineffective and were not accepted by personnel. In order to justify these investments it was proposed that these products would be more effective and would bring a return on investment if they were combined with instructor based, "traditional" teaching scenarios. Academia seems naively to have taken these justification arguments at face value and has tried to incorporate these lines of "reasoning" in pedagogical concepts. One may argue that somewhere along the line someone has missed the boat.

The challenges of human resource development have not as yet really been met. Companies still have major problems finding the employees they need or finding ways to build the "new" skills (especially so-called soft skills) necessary for their business development. Neither e-learning, or blended learning, workplace learning or whatever can really help. The implicit dichotomy between private learning (at home and without constraint) and company learning (at the workplace and under control) must be overcome and a more holistic view of learning and its value within the business context become the basis for new educational projects.

Applying Blended Learning in an Industrial Context – an Experience Report

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Abstract. This paper, describes the experience made with coaching enriched blended learning in the context of industrial technology transfer projects. Based on numerous applications of our modular blended learning approach for teaching object-oriented software development with UML, an attempt has been made to improve the design, the organization and the execution of the blended learning arrangement. Therefore, we collected data on the learning environment, the learners´ behavior and preferences. The results from the questioning in an industrial setting, although far from being representative because of the small number of respondents, give some interesting insights in the needs and expectations of learners and the usage of different elements of blended learning arrangements which could serve as hypotheses for later in depth studies

Introduction

Model-driven development, using UML, has become the most dominant development paradigm, in software industry. To be correctly and efficiently applied, systematic teaching and learning are key prerequisites for benefiting from new technologies. However, the question of what is the best strategy for planning and conducting training and education activities is still open:

Experience shows that typical classroom education is not as effective and efficient as it should be. Reasons might be shortened education budgets, tight project schedules, or short development cycles. This is especially true for an industrial setting since companies, especially small and medium-sized enterprises, which often have tight development schedules and short re-lease rates, often cannot afford such trainings. Furthermore, trainers often have the problem on how to prepare compact but interesting course material, how to motivate trainees or students, or how to encourage active participation.

Therefore, e-learning approaches are becoming more and more popular due to their promise to enable learning at “any time and any place”. However, as any other technology, e-learning is not a silver-bullet. Typical e-learning problems are a lack of

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social communication or the problem of checking learning progress which, ironically, are strengths in classic classroom education. Furthermore, e-Learning courses require cost-intensive and effort-consuming development projects.

In general, “traditional” and e-learning have both their strengths and weaknesses [4]. An important factor in choosing a specific approach is its effectiveness (i.e., what are success factors?) [5]. Based on various observations and experiences with both “traditional” and e-Learning, we propose a blended learning approach, which mixes traditional classes and e-Learning: E-Learning is used to leverage knowledge and skills in the very beginning, followed by in-depth seminars for teaching advanced concepts as well as for performing group work, and practical exercises. Experiences with applying this strategy to teach object-oriented development with UML, has shown positive results in academia as well as in industry [1]. This leads us to the hypothesis that blended learning will improve the efficiency and effectiveness of education in general and especially in the area of software engineering.

The Blended Learning Approach

Blended Learning proposes a mixture of learning activities consisting of self-steered learning activities, cooperative and collaborative learning activities, learning activities supported by online tutors, social learning activities, and traditional classroom teaching activities [3]. According to this definition, a modular blended learning approach for software engineering education, especially for teaching object oriented software development with UML, was defined and implemented (see Figure 1 for the product levels and phases of the program).

The approach establishes four modular learning product levels. Each level integrates the respective lower level and supplements them with new activities, in the teaching process. This modularity provides a maximum of flexibility for the design of educational programs and assures an optimal appropriateness for the learners in specific programs.

Every educational program that is designed, organized, and performed according to the blended learning approach described in the previous section follows a specific phase schema (see Figure 1, right part). This phase schema transports the various contents of the product levels to the learners. In the first phase, the educational program is designed and organized, integrating a detailed analysis of the learners skills, educational needs, and learning environment. The method used to analyze these fields is the skill profiling and analysis method ”QUALISEM-People“ [3] assuring content and instructional strategy of the program are defined based on objective information. This aims at increasing the acceptance level and thus the effectiveness of the learning program by satisfying objectively identified training needs. In the second phase, the educational program is launched. It starts with a kick-off workshop, which aims at learners as well as tutors getting to know each other, and explaining the organization of the program to the learners. To this the online phase follows in which the learners work with a web-based training of *UML Basis or UML Personal*. The goal of the online learning phase is to reach an equal level of knowledge about the UML notation. This is a prerequisite for efficient teaching sessions in the subsequent

classroom trainings, because the trainer can then concentrate on providing detailed advanced knowledge, such as object-oriented analysis, design, and programming from the product level *OO Practitioner (UML)*. In the third phase, the knowledge acquired is transferred into practice. That is, the learners perform an object-oriented software development project. The tutors, now acting as coaches, support them in their efforts following the principles of scaffolding und fading [2]. Eventually, the acquired knowledge is certified reaching the highest product and thus education level *OO Designer (UML)*.

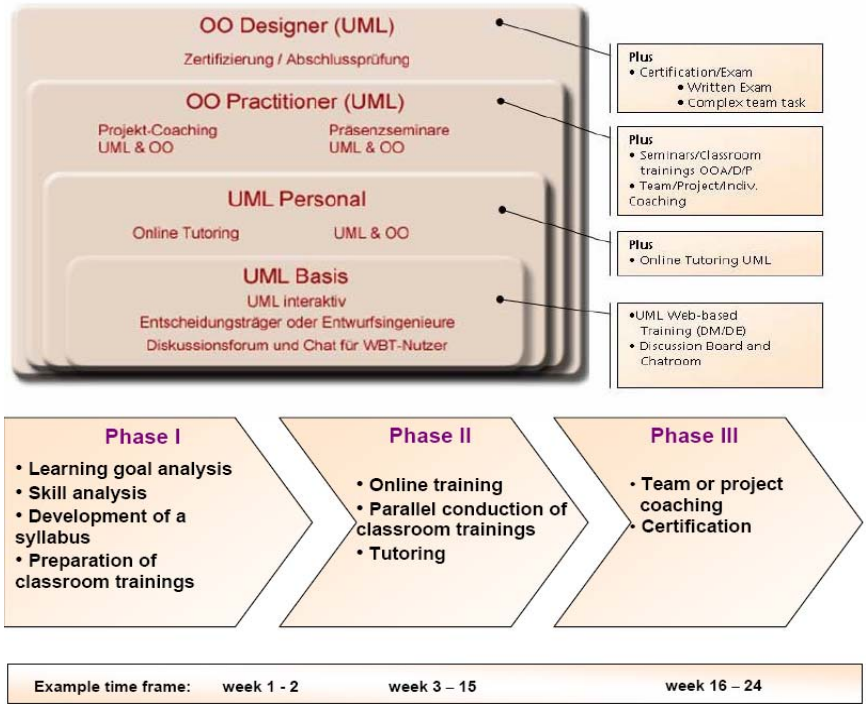

Fig.1. The product levels and phases of the blended learning program

Observations and Experiences in an Industrial Setting

The presented blended learning approach has been successfully tested both in academia and in industry [1]. With the intention to improve the blended learning arrangements and to match the industrial training programs with needs of the participants, continuously evaluation was established. Accompanying to these evaluation activities, participants were questioned about their individual learning needs, their learning behavior and their learning, preferences. The questioning was divided into a pre-questionnaire (before the Online-Learning in Phase II started) and a post-questionnaire at the end of Phase III.

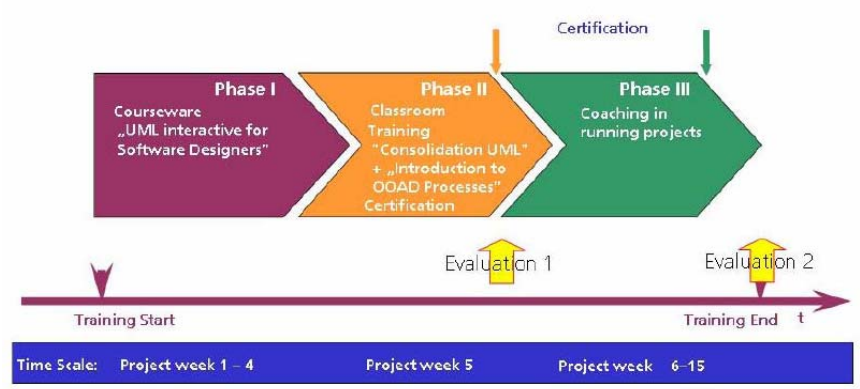

Fig. 2. Phases of the evaluated training program

The results from the questioning in an industrial setting, although far from being representative because of the small number of respondents, give some interesting insights in the needs and expectations of learners and the usage of different elements of blended learning which could serve as hypotheses for later in depth studies. One of these hypotheses states that coaching may serve very well the explored needs and preferences. The presented results were gained during a training program in a large concern (automotive branch) in Germany. A total of 42 employees (software developer, manager, persons in charge) at the age of 20-49 years attended the training program. Most of them were male (~86 percent). All participants were invited to fill out an online questionnaire at the beginning of phase I (pre) and another printout-questionnaire at the end of phase II (post). The reflux of questionnaires (23 pre/14 post) was quite satisfying, although the quantity of data and the group line-up do not allow empirical generalization.

The training program intended to provide the employees with sufficient UML knowledge for the application of an object-oriented approach.

The training program started with an online learning phase, in which the participants worked self-directed with the courseware “UML interactive for Software Designers”. This phase aimed at leveraging the knowledge and skills of the participants in applying the UML, which is a prerequisite for the classroom trainings of the second phase [8]. These classroom trainings cover topics to consolidate UML knowledge and skills of the participants and to introduce OOAD processes. To match the specific needs of the domain and the experiences of the participants, the training materials are based on realistic stuff (documentations, source code, etc.), delivered by the customer. Phase II was concluded by a certification day, where a complex, domain-specific exercise had to be solved by the participants in two-person teams. All participants were still granted access to the online course after finishing phase II. After the classroom trainings and the certification, a several weeks long project coaching phase concluded the training program. In this phase, the coach consulted the participants about how to apply UML in their day-to-day-work. The first questionnaire preceded the training program and aimed at the collection of the learning needs, their preferences and their expectations. The second questionnaire was provided to the

learners at the end of the certification day. The aim of this questionnaire was to check, if their expectations were fulfilled sufficiently and if their learning behaviour was influenced by the methodical setting of the training program.

Pre-Questioning: Prerequisites and Learning Needs

- Asked about the importance of an training program on object-oriented software development with UML for their future project work, more than a third of the participants replied that it is urgent to learn more about UML Furthermore, asked for their individual goals and expectations concerning the training program, the vast majority of answers provided (80 percent) could be summarized as 'be able to apply UML in future projects actively'.
- Apart from one person, none of the participants had any experiences with any kind of eLearning resp. online training.
- The participants were asked which element of the blended learning approach they would expect most of, they referred to classroom training, coaching and the WBT in the given descending order.

Asked, which learning mode is most effective in their point of view, the participants decided in favor of more or less informal communication with their peers. Nearly at the same high level they considered classroom training involving a tutor who is also available after the training as a project coach (see Figure 3).

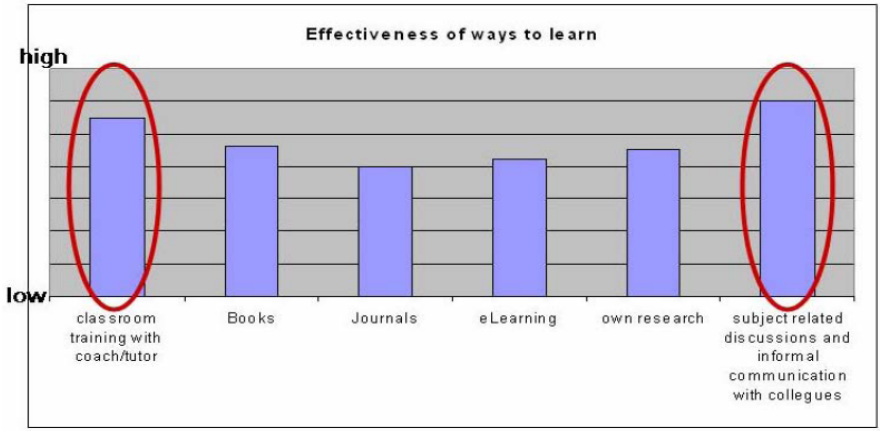

Fig. 3: Estimated effectiveness of ways to learn

Post-Questioning: Assessment of Satisfaction and Learning Behavior

- In the second questionnaire the participants regarded project coaching after classroom training the most important learning mode in the program. Therefore,

providing means for communication between learners and between learners and tutors/ coaches as well as providing a tutor / coach during a specified period after the training at all should be essential parts of an training program.

- Asked, which element of the training program did support their individual learning process most effectively, the participants named classroom teaching and coaching, the illustrations of the courseware and the informal discussions with their colleagues.
- After the training, most of the participants (~ 85 percent) did not consider any of the parts dispensable. Therefore, all elements of the blended learning approach should be present in a training program.

Summary and Conclusions

With the rapid rate of innovation in object-technology, teaching/learning of that technology has become the most challenging issue. Classroom training and online-courses both have their strengths but are often cost-intensive or not specifically adapted to the needs of a specific organization. However, the synergy effects when used in combination clearly outweigh the isolated benefits of the approaches. This paper has briefly outlined a blended learning approach, in the context of teaching the UML, which promises highly effective and efficient training of software professionals in object-technology.

Recently blended learning approaches (i.e., a combination of e-learning and classroom-oriented learning) have become quite popular, since they promise to allow for learning anywhere and anytime. Thus, they make training affordable especially for small and medium size enterprises (SMEs). Although, this is a step into the right direction it still bears one major question: How can the effect of such a training be made sustainable or in other words how can it be ensured that trainees can practically apply their new knowledge in their daily work. Ironically, this problem is neither new nor specific for blended learning approaches. Thus, solutions from other areas of education might apply here as well. One such means is ‘coaching’, a technique for observing, the current functioning, assessing the strengths and weaknesses, and developing measures for addressing needed changes. Thus, in the context of technology transfer projects coaching has to be integrated into the daily work of the trainees (i.e., workflow-oriented) in order to obtain significant improvements.

From our experience in conducting blended learning programs, every educational program needs several factors to be fulfilled in order to be successful. The first and most importance issues is a full management commitment. That means that the supervisors of the personnel being trained set incentives for successfully participating in the learning program. This could be as simple as reserving an adequate amount of time for the learners to prepare for and participate in the trainings. Secondly, a “champion” whom people trust at the company and who can explain the benefits of knew knowledge for the upcoming daily work is beneficial for motivated learners. Finally, in all blended learning projects on OO & UML conducted so far, regardless of being at academic or industrial level,the upcoming certification makes people take the online and classroom trainings serious from the beginning and prepare for

seminars and the certification. We currently plan empirical studies to investigate the return on investment of the suggested strategy. Moreover, we are looking for tools to support it. Both are necessary ingredients to drive the adoption of the approach in practical situations.

Acknowledgements

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Blended Learning Concepts – a Short Overview

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Abstract. This paper presents a short overview of blended learning, showing arguments for and against these concepts. Potential blended learning scenarios are described that vary depending on the degree of instructor involvement, learner self-organisation and on-line moderation or coaching. The paper ends with an example of successful application of a blended learning concept in industry.

Definition of Blended Learning

Blended learning can be defined as the combination of multiple approaches to pedagogy or teaching, e .g. self-paced, collaborative, tutor-supported learning or traditional classroom teaching. Blended learning often refers specifically to the provision or use of resources which combine e-learning with other educational resources.

Some authors talk about "hybrid learning" [6, 7], "mixed learning" or "multi-method-learning". However, all of these concepts broadly refer to the integration (the "blending") of e-learning tools and techniques with traditional methods. Computer-based learning is no longer regarded as an alternative to traditional forms of learning/teaching. It is integrated into a learning arrangement which combines those methods that have been selected for a specific learning purpose or environment.

Blended learning is not really a new concept. Teachers have always been using 'combined resources'. Basically, blended learning is just a combination of teaching or facilitation methods, learning styles, resource formats, a range of technologies and a range of expertise.

Blended learning is actually a sort of a return to traditional learning concepts. Traditional training also relies on phases of self-directed learning. In classical classroom training, the didactical strategy is based on the

- presentation of content by a teacher / trainer
- interaction between teacher and students and among students
- follow up of content presentation and exercises (homework), to be done individually or in groups /pairs.

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In this respect, blended learning is also a return to teacher-centered learning scenarios, as the main responsibility over

- content structuring and didactical presentation of content
- learner support and control
- organisation of social learning

remains on the teacher's side.

Blended-Learning Concepts

Blended Learning concerns not only different methods, but also different theories of learning and applies these theories by using traditional and new media. It affects different levels:

- the **theoretical** level (combining different theories of learning, like constructivism, cognitivism, behaviorism)
- the **methodical** level (combining self-directed with instructor-led learning, individual with cooperative learning, receptive with explorative learning, etc.)
- the level of the **media** (combining face-to-face with on-line elements; using different media, like books, video, CBT, etc.)

A formal classification of learning scenarios based on the criteria of form, function and method, may help to structure different potential blended learning concepts (as described in [12]).

„**Form**" describes the organisational form of e-learning and its integration into institutions. Organisational forms can be traditional classroom sessions or pure e-learning.

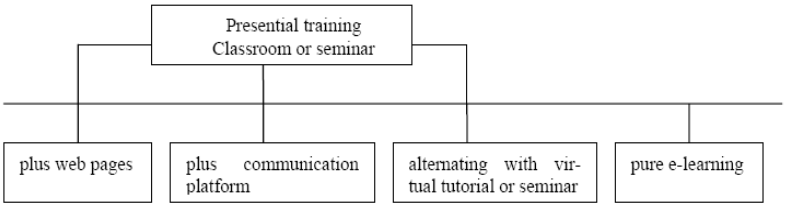

Fig. 1. Organisational forms of e-learning

„**Function**" might be mere information, direct communication or synchronous co-operation.

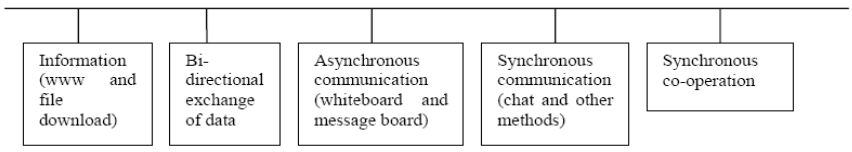

Fig. 2. Functions of learning

„**Method**“ refers to the different theories of learning and comprises instructor-led training, interactive courses or self-directed learning.

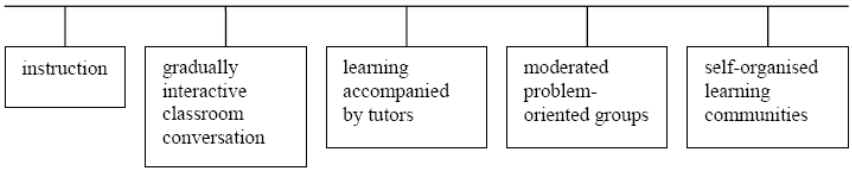

Fig. 2. Methods of learning

Combining these three levels leads to four different learning scenarios:

Table 1. Classroom training accompanied by web components (priority given to classroom training) **(Scenario I)**

	Presential component	**virtual component**
Form	Priority given to classroom training	Web components additionally used
Function	Varying	Information
Method	Varying	Instruction

Table 2. Equal importance of classroom training and web components **(Scenario II)**

	Presential component	**virtual component**
Form	Classroom training equally important	Website & platform equally important
Function	varying	Information & communication
Method	varying	Instruction, tutor support

Table 3. Integration of presential and virtual component **(Scenario III)**

	Presential component	**virtual component**
Form	Classroom training integrated	Website & Platform integrated
Function	varying	Information & co-operation
Method	varying	Moderated groups

Table 4. Virtual seminars and learning communities (no presential activities) **(Scenario IV)**

	Presential component	**virtual component**
Form	No classroom training	platform, cooperative tools
Function	Not applicable	communication & co-operation
Method	Not applicable	Groups and learning communities

Blended Learning Enriches E-Learning

Blended learning does not make the learning process easier than traditional classroom training. E-learning costs still as much effort as any other kind of learning. Every kind of self-directed learning is difficult and uncertain, because the individual learner has no opportunity to find out about his own progress. With blended learning, the comparison of individual learning progress with that of other learners is being facilitated.

Blended learning means more effective and more sustainable learning. This is especially true if the learners are accompanied by e-moderators [11] or e-tutors [8] or by project coaches.

If blended learning is only e-learning with additional classroom training, it does not make the most of technology-enhanced learning. Experienced distance learning institutes (like, e.g., the Open University www.open.ac.uk/, the Tele-Akademie www.tele-ak.de) have always been working withing on-line tutors or on-line moderators. If excellent e-moderation services are offered, there is almost no more need for classroom sessions. A face-to-face meeting would then be organized only for creating a personal/social relationship between learners and moderators/tutors and/or trainers at the beginning of the training session. But in many cases there will be no physical meeting at all. E-moderation services can offer

- motivational support (to prevent high dropout rates in distance learning)
- support with learner problems
- support with content problems
- support with technical problems
- moderated virtual learning groups
- collaborative work on the same project.

Especially with geographically distributed individual learners, e-moderation services are essential for learner satisfaction and learner success.

Is Blended Learning the Best Possible Method?

Blended learning intends to take the best of both worlds. From classical classroom training, it takes the

- teacher driven presentation and selection of relevant content
- social interaction
- the dialogue between student and teacher.

Concerning e-learning, it benefits from the advantages of self-paced learning, i.e.

- Learning anytime everywhere.
- Students can work through a specific task or problem as often as they want, until they reach their learning goal. In classroom training this would be impossible. This is why e-learning is said to be more effective and sustainable.
- The possibilty to form virtual groups for specific topics or specific levels of competence.

It is doubtful, however, whether blended learning is the ideal concept for work-based learning, for the integration of learning into work processes. Dividing the learning process into presential learning and on-line learning may result in too much teacher-centered structuring and thus prevent the learner from taking over more responsibility for her/himself. It appeals more to those learners who prefer to lean back and listen, not to the active learner required by problem-, project- or work-based learning.

Successful and effective learning is always related to the degree of implication of the learner in the learning process. With problem-oriented and explorative learning methods, learners are directly implied. However, very few web-based trainings have been built on problem orientation and exploration – they mostly reflect (hierarchical) coursebook structures with fixed scope and sequence that cannot be changed.

Moreover, studies [3, 10] have shown that people do not learn during their working hours. At least when it comes to working through on-line courses and exercises. On-line learning happens mostly at the end of working time, after work and during leisure time, and is thus not integrated at all into normal work processes.

Another interesting aspect of a recent study [3] was that on-line students largely prefer the print version of a course and spend much less time on-line than expected. Reasons for this are the preferential learning styles of the students and the fact that the print-out is more flexible and better available for mobile use. This can be interpreted as a sort of set-back for web-based training courses which do not seem to provide any added value compared to textbooks.

This leads to the conclusion that the design of web-based trainings has to be at least as good as good that of good textbooks. Browsing and scrolling through web pages instead of skimming through printed pages does not have any pedagogical added value and seems to be more cumbersome than reading a textbook.

Blended learning is definitely a good method in this period of transition, where e-learning still lacks of wide-spread acceptance. Practitioners of e-learning agree that blended learning helps learners to gradually get used to technology-enhanced learning offers, and to make them understand the advantages for their own personal progress.

Blended Learning and Change Management

There are several reasons why the introduction of e-learning in companies was often regarded as a failure in the past [5]:

- lack of internal marketing and insufficient information on e-learning offers
- lack of support from management level
- high level of self-motivation and self-learning skills required from learners
- no explicit rules for learning at the workplace
- no rules for acknowledgement of qualifications acquired by E-Learning
- lack of social exchange and direct feedback
- high initial investments and low return on the investment.

The introduction of e-learning or blended learning is a change process that has to be explicitly designed and directed. In companies with successful introduction of e-

learning, changes concerning the training method were welcomed and actively supported by the managers. Habitual work processes have to be arranged in a different way if they are to be combined with learning processes. To create an atmosphere conducive to learning at the workplace is not an easy endeavour and presupposes a fundamental change in thinking. The organisational culture must reach a state in which individual knowledge and competence is integrated into daily work processes [4]. If agreements on objectives and incentives for learning are set up between managers and employees, the latter will find out for themselves when and where to learn. There is already a strong tendency of shifting training phases into people's leisure time.

Applying blended-learning concepts does not mean a radical change, as elements of traditional training are still present. This is positive because in change management it is important to find a balance between things that have to be changed and those that are worth keeping [5].

E-learning or blended learning can only be a success if it receives the same amount of attention as any other kind of training. Self-directed e-learning should be acknowledged in the same way as attending classrom training sessions. The e-learning process has to be accompanied, analysed and constantly improved.

There will be a win-win effect for both employers and employees if the concept and organisation of blended learning programmes is based on a work process perspective. Only then will operating efficiency and productivity of the company rise, and employability will be strengthened [9].

Successful application of a blended learning concept at Fraunhofer IESE

In [1] and [2] experience reports are given on blended-learning programmes performed with customers from industry and academia. Based on various observations and experiences with both “traditional” and e-learning, a blended learning approach was proposed with the following structure:

1. Kick-off meeting of all participants, their teachers, and tutors.
2. On-line learning phase to provide knowledge and skills.
3. Traditional course.
4. Final project work.

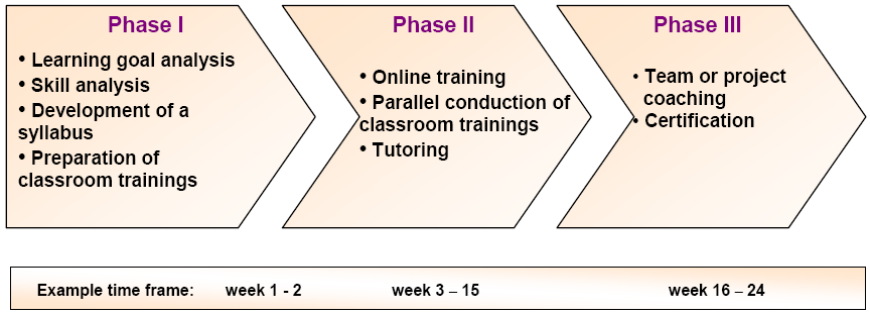

Fig. 3. Blended Learning in three phases [1]

The kick-off meeting serves as a get-together for students, tutors and trainers, with an introduction to syllabus and schedule. The on-line learning phase is supposed to leverage the knowledge and skills of the participants, which is a prerequisite for the following traditional class. The online-course comprises about 25 on-line learning hours and 10 practical exercise hours, which are normally dispensed over four weeks. It provides several navigational strategies and different entrance points in order to meet the requirements of a heterogeneous group of participants (e.g., inexperienced participants can follow a guided tour). Furthermore, participants can select one out of four modules according to their already acquired knowledge as starting point for dealing with a particular topic.

The modules are defined as parts of a virtual project where participants are part of the project team and have to support their virtual "supervisor". The "supervisor" supports participants through expert knowledge or through self-control questions and exercises (e.g., every participant has to solve a modeling task and has to submit his solution for feedback). The results of practical exercises are then regarded as a pre-test for the following class.

The following classroom training is organized as a mix of both presentations and group work. Finally, participants are asked to perform, alone or in a small group, a specific project work as final exam. The results are evaluated by the same tutors/ trainers who have been playing the role of guides and experts [2].

Informal interviews with participants, and more general feedback from the company, indicate that blended learning is efficient in terms of changing learner behavior, especially when it is enriched with additional transfer supporting activities, such as individual coaching.

There is a great demand for examples and course material that makes use of information that can easily be integrated with routine work tasks and is not solely based on theory or from existing textbooks. In building and extending the course we have come to appreciate the need to enrich self-paced learning with specific transfer supporting actions that can be adapted to a specific domain and individualized to the learners day-to-day work. Based on our experience, such transfer-oriented efforts help the participants to apply the new knowledge more easily.

In self-paced scenarios special attention has to be paid to learner's motivation. It is very important to provide further support in the application of the new knowledge and

encourage learners to try out their knowledge in new situations (i.e., encourage them to transfer their knowledge). Furthermore, motivation is increased when the results of completing the course are acknowledged and recognized within the company by some form of certification [13].

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