Blended Learning: Towards a Mix for SMEs - Stakeholders and their Priorities

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Abstract. While blended learning seems to be quite suitable for small and medium sized enterprises (SMEs), current uptake of this learning method is low. In this paper we propose a research design to examine the requirements for blended learning in SMEs. It is based on a three-round ranking-type Delphi study. Participants for the panels were carefully selected. Our method takes into account that the area and the term of blended learning are discussed in very different, partially contradicting connotations. For this purpose, we first provide the background of the initial research question and describe our research design. Next, we present preliminary results of the Delphi study and the steps in preparation of round 2. Participants were selected for the online-Delphi and grouped into panels of SME learners, trainers and providers of e-learning as well as learners from large companies as a control group for the SME learners.

Keywords: Blended Learning, SME, Delphi study, Requirements

1 Introduction

Originating in the corporate training sector the term blended learning refers to the provision or use of resources which combine e-Learning with more traditional educational resources [1]. Our research combines an exploration of blended learning and methods of learning operation in small and medium-sized enterprises (SMEs).
Blended Learning is often used as a buzz word with vague and varying meanings. It has often been described as a way to get the best out of the two worlds of technology enhanced learning and traditional classroom-based learning, benefiting from the advantages of technology enhanced learning while compensating for its disadvantages through additional in-class sessions [2, 3] and vice versa.. Blended learning is a combination of any form of technology enhanced learning with face-to-face instructor-led learning [3]. Blended learning has been proposed as a solution for training needs in SMEs [4].

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 [5] which is typical for SME learning. Research suggests that blended learning can significantly improve learning satisfaction,

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improve accessibility and increase participation [6]. It therefore has the potential to alleviate a number of issues that arise in SMEs and act as constraints to the use of blended learning, namely lack of social interaction during learning programs and exchange of ideas. Customized in-house solutions used by multinational companies (e.g., corporate LCMS or learning portal, content tailored to specific needs of company) are usually not feasible for smaller organizations. Therefore SMEs rely on what providers offer, i.e., instructor led training or off-the-shelf solutions. This is one of the reasons why learners in SMEs are reluctant to use blended learning for their learning and training needs [4].

2 Aspects of 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 off-line methods of learning with intranet, extranet web-based or internet-based online approaches [7]. 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 [8]. Blended learning aspects are covered in a variety of research papers as well as in very practical instructions for blended learning. The most prominent are briefly outlined here.

2.1 Dimensions of Blended Learning

To describe the variety of interaction Graham [9] introduced the so-called four dimensions of interaction in face-to-face and distributed learning environments. The four dimensions are space, time, fidelity and humanness. Space can range from live or physical and face-to-face over 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.

2.2 Frameworks in blended learning

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

Wenger and Ferguson [10] describe a framework to guide the design and deployment of company trainings and courses. The framework 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 is 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 varying 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 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.

The learning ecology matrix aims at delivering a high quality learning experience and at providing 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.

2.3 Success factors for blended learning

A variety of teaching methods, as well as a variety of different learners with different preferences and needs determine success of blended learning. Several success factors have been identified in the literature:

Design of the blend: A well designed blend of teaching methods can provide an appropriate 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 [8, 11, 12].

Time flexibility: The flexibility in scheduling and format is critical to success. Availability of the system enables them to study when they are ready to do so.

Mix of media and learning styles: 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 [11, 13].

Student support: 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 [13].

Executive support: Blended learning needs executive support for the introduction just as any other major change in a business environment. 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.

Content: The kind and quality of learning content is critical for success. Apart from choosing the appropriate kind of content and the decision whether learning activities are intended to inform people, develop skills, or build competencies, the consideration of the time before information is out-of-date is of high importance [11].

2.4 Blended Learning in SMEs

The mix of ICT based training in combination with face-to-face interaction has been identified as a success factor for blended learning in SMEs. A second success factor is trust in the safety of the training environment, online as well as face-to-face. SME learners prefer an informal and ad-hoc approach to learning which suits their busy schedule. Lack of confidence in ICT on the other hand is an obstacle for taking on blended learning by learners in SMEs as well as the lack of an immediate payback of the training. Activity-based learning is clearly preferred over knowledge-based learning. The size of the company has a strong impact on any kind of learning and training activities which leads to small firms often lacking a lifelong learning culture [14, 15]. A study of e-learning in continuing vocational training with emphasis on SMEs came to the conclusion that there is not much information available on e-learning in SMEs [16].

3 Statement of Purpose of Research

Blended Learning can combine the positive aspects of the two learning environments, classroom based learning and e-Learning [2]. While blended learning seems to be quite suitable for small and medium sized enterprises (SMEs), current uptake of this learning method is low [4].

An on-line Delphi study and several in-depth interviews are used for data collection. The study involves main stakeholders in blended learning in SMEs: trainers, providers and researchers from the area of e-learning, blended learning and lifelong learning, learners in SMEs will be compared with a control group of learners from large companies.

This study will explore what is a good mix in blended learning - a mix of online and face-to-face teaching - for learners in small and medium-sized enterprises (SMEs).

4 Delphi Study

There are different types of Delphi studies out of which a ranking-type Delphi is most suitable for the research question. A pre-Delphi study provides a method to determine the required type of study and other characteristics of the study. The quality of the study is highly dependent on the selection of the participants and the analysis of the data from the first round.

4.1 Pre-Delphi-Study

To determine whether a Delphi study would be a suitable approach and which type would be most appropriate, we conducted a pre-Delphi [17] study. Initially we extracted a set of questions from a literature review of the two areas blended learning

and learning in small and medium-sized enterprises as well as recommendations from the Delphi technique [18].

In the pre-study we included a small group of potential study participants: a representative from an SME, a provider, a trainer and a researcher.

At first we considered asking for feedback eventually leading to consensus on different topic areas such as learning styles, different dimensions of interaction, delivery modes and learning modalities. The pre-test showed that the research as planned would not provide input from panelists about their priorities, but rather about agreement or disagreement with the researchers' perspective or previous research. It became obvious that the study has to be open to the stakeholders' selection of important topics; otherwise we might run into the problem of simply confirming our own ideas rather than eliciting the opinion of the panelists [18].

Moreover, we excluded the idea of using a mind map to collect initial input in the first round, because it seemed likely that a number of participants might not be familiar with the technology and therefore be distracted or even turned off from the study topic itself. Instead we decided to develop an online form with a clear navigation, a good usability that takes as much work from the participants as possible and which is at best self-explaining how to use.

The pre-Delphi study provided us with a decision to conduct a ranking type Delphi study and set the limit for the amount of issues to be asked from the panelists as an input as well as the number of rounds that seem to be feasible without strongly increasing drop-out rates from the participants.

4.2 Participants of the Delphi Study

The Delphi study involves a total of 50 participants with the sub-panels small and medium sized enterprises (SMEs) from the IT industry, and from the tourism industry, large companies, as well as trainers, providers and researchers from the areas blended learning, e-learning and lifelong learning. SMEs were selected following the current SME definition of the EU [19].

SME panels: Selection for the SME panels followed a general pattern for all SME participants and an additional industry specific pattern. All SME participants were selected following the pattern being employee of an SME, an interest in or experience with blended learning or e-learning, internet access, management responsibility (team leader, project manager, department head) and the number of years of experience in the industry.

The participants from the IT SME panel have an average of 7.6 years experience in the industry. They are managing directors, owners, manager, network technical staff and software developers.

The tourism SME panel includes the following areas: hotels, B&B, tourism information, travel agent and tourist guide or instructor (ski, snowboard, sailing, etc.). The participants from the tourism SME panel have an average of 18.8 years experience in the industry. They are owners, managing directors and project managers and work for B&Bs, hotels, an outdoor events provider, travel agencies and tourism information.

Large company panel: The large company panel participants were selected following the pattern being an employee of a large company with more than 249 employees, experienced with blended learning or e-learning and having internet access. Again we looked for team leaders, project managers and department heads for this panel.

Trainer panel: The participants for the trainer panel were selected according to a pattern [20] that required several years' experience in blended learning, experience with learners in SMEs and unrestricted internet access. The trainer panelists have an average experience of 11.1 years in blended learning; the median is 8 years and years of experience ranges from 5 to 22 years. The panelists are mainly trainers in the IT sector, some in general education.

Provider panel: The participants for the provider panel were selected for their experience in blended learning and the positions in e-learning companies. The provider panelists have an average of 9.9 yrs experience in blended learning; the median is 4 years and years of experience ranges from 4 to 16 years. The panelists' positions are head of product development or education management, learning design manager, technical staff, project manager and managing director.

Research panel: The participants in the research panel were selected for their research area, work and publications in the areas of e-learning, blended learning and lifelong learning. The research panelists have an average of 11.6 yrs experience; the median is 10 years and years of experience ranges from 9 to 16 years. The research topics are for instance evaluation of TEL, access to learning, digital learning styles, social media, open educational research, business models in e-learning and e-learning standards.

4.3 Ranking-Type-Delphi Study

To select a suitable Delphi application we turned to a taxonomy proposed by Day and Bobeva [21]. Our Delphi study design can be described using their taxonomy. There will be three rounds, one for discovery of issues and the two following rounds to determine the most important issues and to rank them. The participants will be heterogeneous since there will be five sub panels of participants with different expertise, researchers and providers of e-learning, online and face-to-face trainers, learners in SMEs and learners in big companies. Within the sub panels we aim at a best possible homogeneity. The study will be conducted as an on-line survey and all communication will be conducted electronically using e-mail, website and VoIP. We aim at single-blind anonymity of the panelists while conducting the study. In addition to these criteria we decided on a ranking type survey. The ranking-type Delphi aims at finding an agreement between groups through a ranking of self-selected issues. The ranking type Delphi study requires that the researcher focuses on three initial decisions:

1. when to stop polling
2. how many issues to carry over to the next round
3. use of statistical techniques to support their conclusions.

Literature suggests that these answers have to be decided individually, depending on the study design, number of participants, area of interest, etc. We follow Schmidt's [22] and Couger's [23] examples and considered the results of the pre-Delphi.

The polling will stop after round 3. Initially the panelists are asked to list the 5-10 important aspects of blended learning. Participants have to add a description and a rationale for putting the item on the list.

The total input from round 1 is consolidated into a list size short enough to be accepted by the participants in the next round. The full list of all aspects, including duplicated and synonyms can easily overstrain the participants and might result in high drop-out rates. A too short list on the other hand can result in loss of information. Where panelists use different terms for the same issue the researchers have to provide a summary matching the different terms and one common description of the issue. In the study an initial list of 225 items from round 1 was condensed to a list of 59 items as input for round 2.

In the second round the panelists rank their "Top 20" issues, ties not allowed, out of the consolidated list of round 1. The second round is aggregated into a list of "Top 20" items for each sub panel.

This 20-item panel specific list is presented in the third round as a list of the "Top 10" with ranks from ten to one. All other items on the list (11-20) are equally ranked "0". The panelists now rank their "Top 10" issues from the 20-item list.

The rank is calculated by combining the percentage of selection and relative rankings by the individual participants. An approximation of the mean ranks has been produced by multiplying each percentage of mention by its first-round rank. A combined measure of the ranks in the second and third round provide a value for each item and provide the final evaluation of each item on the 20 item list.

4.4 Results of Round 1 of the Delphi-Study

Round 1 collects a minimum of five and a maximum of ten aspects (items) of blended learning considered most important for the topic from each participant. A consolidated list with all the items from all participants will be given to the participants in round 2.

In round 1 a list of approximately 200 unsorted items were collected. The following list highlights the aspects that were mentioned by five participants or more. The items are briefly described, reflecting the variety of meanings.

Accessibility: 24-hour accessibility of online parts, the option to work from home or while traveling were mentioned was mentioned. Materials, tutor, IT and classrooms have to be convenient as possible for the learner to encourage maximum participation. The learner has to be able to decide, where and when to learn.

Time Flexibility: Trainers and participants should have the time to get to know the system and the combination of online and face-to-face teaching and learning. Online learning should enable to learn when it suits the learner and moreover enable completely independent learning. It should enable participants to decide on suitable learning times suitable to other activities and to use times in between normal work. Online learning should support the learner to make best use of their own time.

Cost Efficiency: Blended learning as an option to keep the price of the training solution as low as possible was mentioned. Participants also see a potential to find a good mix by emphasizing the lower-cost elements of the blend (e.g. off-the-shelf e-learning entities, on-line books, etc.). Some participants believe that blended learning often means lower costs. The option to use course materials on a regional level is expected to reduce travel costs. In general participants expressed the opinion that online learning is more cost-efficient immediately as well as in the long-term.

Student Interaction: The ability to interact at different levels and through different media should allow a more adaptive approach to learning. Participatory opportunities for students to have a voice e.g. using VoIP was mentioned several times, but also taking the student through a number of learning routes rather than a given sequencing of learning materials.

Support Mechanisms: Personal support for every participant by mail, phone or chat or mentoring is considered important. Collaboration tools are seen as possibilities to greatly improve the team work that can be allocated and performed. The ability to work in teams or virtual teams is perceived as a supporting function. To provide ample opportunities for students to obtain help with specific problems was mentioned as well as the need to explore topics that might be a little off the curriculum. The online assessment is considered helpful for motivating the learner, because it gives immediate feedback, but the social interaction in the classroom is also required.

Mix of methods and media: The use of different media, different learning media, face-to-face and online are the characteristics mentioned most often. A selection of media for specific parts of a course, e.g. test or interactive content that is read to the learner or includes images and text as well as the classical reading of books, is mentioned several times. The user should have printed/offline media supplementing the online learning content. Learning with the suitable media and to make the right choice seems crucial for this area. Online modules allow flexibility, but can be very generic. Face-to-face phases in contrast can be very intensive and don't allow for distraction. They are considered more restrictive.

Mix of learning styles: A mix of learning styles is expected to support learning success. A basic mix of online and offline activities are expected as well as a mix of different ways to present and teach. This mix is also expected to increase motivation.

Workplace-related learning: Learning must be relevant and useful to the learner, otherwise it is just an exercise soon to be forgotten. The course needs to be relevant to the skills / information gap that the organization has. Learning content has to be up-to-date and important to the user.

Individuality: Instruction should be designed to adapt to the individual learner and it should provide different kinds of learning experiences. The e-learning enables learners to set an individual focus. Trainers or facilitators need to be able to deal with different personalities and heterogeneous groups.

Knowledge Base Internet: The internet provides the most recent knowledge to everybody in forums and there is no way to beat the internet as an easy to use dictionary for any topic. Accessibility and easy search functions make the internet a vast source of teaching materials and enables trainers to provide access to lots of related material to build student enthusiasm. It provides a number of elements that we can add into a blend, like blogs, wikis, mobile, podcasts etc.

Recognition of traditional learning: Formal class room training which follows a specific training guideline tends to cover the topic in question in greater detail. From experience this is suited to the more committed. Formal classroom/college is ideal also for employee networking.

Self-Paced Learning: One needs to learn self-paced learning. Nowadays everything is presented to students rather than letting them figure it out themselves. Provide learning and practice experiences that are available over a continuum of time, versus all within a short timeframe. Spaced learning and practice helps cement new knowledge into long term memory, and provides additional cues for retrieving the knowledge and skills under different circumstances. Course enables participants to select order of topics and modules. The pacing of the learning process is placed to a certain extent with the student and can suit their time needs and commitment. Self-paced learning is suitable for shift workers and those on time constraints who may not be able to attend a conventional timetable class or course. Blended Learning's main benefit for students and employers is the flexibility to do the course at your own time and pace.

Technology: Keep technology simple - If and when technology driven solutions are part of blended programs, keep it as simple as possible. The switching between mask/pages should be kept at a minimum. The learning environment has to be kept simple. Many LMS have lots of different functions and features that an average learner in an SME does not need. It is better to reduce the number of functions so that learning of content plays the main role, not learning to use the system. Offer tools of Social Software for more experienced learners. Make it easy to access and operate any technology components of the blended solution (web page, on-demand course, pod-cast, virtual classroom, etc.).

4.5 Getting from Round 1 to Round 2 of the Delphi Study

We used techniques of the coding phase in grounded theory [24] to analyze the results of round one of the Delphi study. Constant comparison of the aspects collected eventually revealed common properties, categories and eventually identified core categories. We continually checked whether new categories or concise concepts emerged.

Table 1. Consolidation of List Items from Round 1 to Round 2

	R 1	→		→		→	**Round 2**
Activity		Merge doubles		Merge synonyms & word radicals		Join similar context	
No. Items	225		176		145		59

The results were analyzed in three steps. First an alphabetical list of all items revealed doubles. If the descriptions of the items actually described the same aspect they were merged. In the next step the reduced list was checked for synonyms and

word radicals. In case they revealed more doubles in the descriptions, one of the aspects was kept on the list. In the third step similar contexts or differently named aspects with an identical or similar description were summarized and designated umbrella terms.

4.6 Next Steps

A ranked, consolidated list is prepared from the results of the first round. In the second round the panelists rank their "Top 20" issues, ties not allowed, out of the consolidated list of round 1. The second round is aggregated into a list of 20 items for each sub panel for the final round.

This 20-item list is presented in the third round as a list with the "Top 10" with ranks from 10 to 1. All other items on the list (11-20) are equally ranked "0". The panelists now rank their "top 10 issues" from the 20-item list. The rank is calculated by combining the percentage of selection and relative rankings by the individual participants. An approximation of the mean ranks has been produced by multiplying each percentage of mention by its first-round rank. A combined measure of the ranks in the second and third round provide a value for each item and provide the final evaluation of each item on the 20 item list. To visualize the results of round two and three, concept maps [25] are provided to enable the participants to get a quick overview of the results, although we are not using the complete process of concept mapping. The statement maps, concept maps which locate the statements in a coordinate plane of highest rank and percentage of agreement, will be prepared for each of the sub panels.

5 Expected findings

This paper highlights the results from the first round of the ranking-type Delphi study. The final results are expected to show which of the characteristics from the total list of characteristics of blended learning from the first round are the most important for the Delphi panel in total. It will also provide results for the individual panels, how the selection process within the panel evolved and how the panel results differ. The final results of the study will give an indication which topics to explore towards a mix in blended learning for SMEs.

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