Supporting Facilitators of Blended Learning with Guidebooks

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Abstract. Blended learning is a combination of any form of technology enhanced learning with face-to-face instructor-led training. So called guidebooks describe how self-paced learning activities can be blended with collaborative activities. This paper describes the requirements for such a guidebook based on results from a Delphi study. A draft of a possible structure for such a guidebook is suggested.

1 Introduction

This paper describes the requirements for a guidebook that supports facilitators of blended learning in delivering the course. A draft of a possible structure for such a guidebook is suggested.
The guidebook and the Delphi study described here have been developed as part of Up2UML. Up2UML is a European project funded by the European Commission under the Leonardo da Vinci programme. It aims to develop new content and training material for UML2, develop syllabi for different target groups and develop innovative training concepts. Project partners include researchers from Bulgaria, France, Germany, Romania and the National College of Ireland.
UML, the Unified Modelling Language, is a non-proprietary modelling and specification language often used by software developers to describe the functionality, the structure and internal behaviour of software systems.

2 Reasons for Guidebooks

Guidebooks are a formalized way of describing blended activities. They provide instructions for course facilitators (lecturers/tutors) on how to conduct a course using the available course material. Guidebooks may contain different syllabi based on the same material. In particular the proportion of self-paced and blended activities may vary as well as the pedagogical approach [1].
By prescribing the setting and possible usage of the material, guidebooks aim to guarantee a certain standard for the course across facilitators.

3 Requirements

3.1 The Delphi Study

The online-Delphi [2] study explores important aspects of Blended Learning from its stakeholders' perspectives. Participants from Austria, Belgium, Canada, England, Germany, Ireland, and the US signed up for the three rounds of the study. The Delphi study involves a total of 50 participants with the sub-panels Small and Medium 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 [3]. 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.

The strengths of the Delphi method are that it is flexible and it is multidisciplinary. The study uses a ranking type Delphi [4]. In the first round the participants provided five to ten major aspects which the participants consider important for blended learning. The online-form asked for the aspect with a brief definition and an explanation why the participants consider these aspects important. The next two rounds of the study will provide a ranking of the aspects selected as the most important issues.

The participants for the trainer panel were selected according to a pattern [5] that required several years' experience in blended learning, experience with learners in SMEs and unrestricted internet access.

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 IT SME panel includes the following positions: managing director, software architect, product developer and software developer. 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 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.

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.

All SME participants are from SMEs and have internet access. In interviews their interest or experience with blended learning was confirmed.

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 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.

3.2 Requirements from the Delphi Study

To extract requirements for the design of the guidebook we focused on the input from the trainer panel, but also considered input from the panels' "large companies" and both SME panels.
The characteristics considered important for blended learning from the SME and the trainer panels with relevance to the tutor activity are listed in the Table 1.

4 Structure of the Guidebook

A blended setting comprises of starting activities, one or more course execution activities and course ending activities. A set of general considerations could be derived from the 1st round of the Delphi study.

Aspects from the 1st round of the Delphi study:
SME panel: c, d, e, m, o; Trainer panel: -

4.1 Course Start

The course start section describes the purpose and aims of the course. Moreover, it lists the required learning resources and the communication tools that facilitators have to introduce in the beginning of the course.

Aspects from the 1st round of the Delphi study:
SME panel: b, h, i; k, h; Trainer panel: E, H, I, M, N, O

4.2 Course Execution

Each guidebook will contain at least one execution phase. Most syllabi would comprise several execution phases, e.g., one per session.
In Up2UML we suggest two types of execution phases, namely training and problem-based learning. However, the structure can easily be extended with other pedagogical approaches.

Table 1: Important characteristics of blended learning according to two panels in the Delphi study

SMEs from Tourism and IT		Trainers in Blended Learning	
a)	Assessment of learning progress Feedback to tutor enables him/her to assess knowledge level of learner	**A.**	Applicable to the workplace Aligned with the workplace needs
b)	Direct contact with the tutor Easy access and communication with tutor	**B.**	Beneficial All Content needs to be tailored and designed with learner's benefits and outcomes in mind.
c)	Method mix A mix of learning styles supports learning success	**C.**	Customizable structure Ability to create a program of topics that are exactly matched to the requirements of the company.
d)	Social Binding Moderation can support the development of a social structure	**D.**	Inter student interaction Using the internet as the delivery method enables integrated use of collaboration tools
e)	Variety of media, multimedia Use of different media, interactive content that is read to the learner or includes images and text as well as the classical reading of books	**E.**	Interaction Ability to interact at different levels and through different media which should allow a more adaptive approach to learning
f)	Efficiency Learning has to be done in a short time-span so results can be used for productive work immediately.	**F.**	Interactive Taking the student through a number of learning routes
g)	Labs Learn by solving problems.	**G.**	Meaningful for the learner some learning is abstract therefore contextualization is critical
h)	Answer to questions Raised questions and answers should be accessible to everybody.	**H.**	Mixing of Styles A mix of different ways to present and teach
i)	Self-paced learning requires knowing where and how I can learn or where I can get support and where I can find e-learning material.	**I.**	New Skills acquisition Ability to learn new skills alongside enhancing old skills.
j)	Study groups Learning in groups	**J.**	Practice Provide an opportunity to reinforce concepts by giving participants a chance to practice what they have been taught.
k)	Accessible	**K.**	Real World Examples

SMEs from Tourism and IT		Trainers in Blended Learning	
	Materials, tutor, IT and classrooms should be as convenient as possible for the learner to encourage maximum participation.		With each topic, it is helpful to solidify the concept if it is followed or prefaced with an example most likely familiar to SMEs.
l)	Group dynamics Lively face-to-face situation enables a chance for group dynamics.	**L.**	Scalable Should provide access to lots of related material to build student enthusiasm.
m)	Multimedia Motivation increases through mix of on-line and face-to-face teaching, since online assessment gives immediate feedback, but social interaction in classroom also needed.	**M.**	Support Mechanisms Provide ample opportunities for students to obtain help with specific problems, and to explore topics that might be a little off the curriculum.
n)	Mentoring Transparency and communication.	**N.**	Team collaboration These same collaboration tools will greatly improve the team work that can be allocated and performed
o)	Fun The success of learning depends a lot on how intensely the learner gets involved with the learning. Getting involved is easier if the learning is fun.	**O.**	Teamwork The ability to work in teams or virtual teams

4.2.1 Training

A training session is a combination of self-paced preparation, a number of collaborative activities, either synchronous or asynchronous, followed by a project. The rational of this structure is based on Bloom's classic taxonomy of learning objectives [6].

While the web-based training would mainly address the knowledge and comprehension level, the collaborative activities would reinforce learning on the analysis and synthesis level. Completing a project requires the ability to make judgements about the value of ideas and materials (evaluation).

For discussion topics, facilitators receive suggestions for suitable topics. A number of different exercises that facilitate analysis (e.g., "find the mistakes in the diagram") and synthesis (e.g., "create a use case diagram for …") are planned. Exercises can be conducted in different modes such as individually or in groups, through self-assessment or group-assessment. Facilitators are advised about the correct solution to exercises and the type of feedback they should provide.

Projects are similar to exercises but cover a number of skills or competencies. Learners need to structure the given problem or task and produce a document or

artefact. Example project topics are provided, accompanied by appropriate solutions and marking schemes.

Aspects from the 1st round of the Delphi study:
SME panel: j, l, g; Trainer panel: D, F, J, L

4.2.2 Problem-based Learning

A second pedagogical scenario covered in the Up2UML guidebooks is a variant of problem-based learning. In contrast to the training scenario, a problem is introduced and the learners use the available resources to solve the problem. Each problem is described in detail in terms of the background, task, available resources, anticipated solution and feedback to be provided.

Aspects from the 1st round of the Delphi study:
SME panel: f; Trainer panel: A, B, C, F, G, J, K, L

4.3 Course End

Course end activities include a summary as well as different types of assessment such as quizzes and projects.

Aspects from the 1st round of the Delphi study:
SME panel: a; Trainer panel: -

4.4 The Guidebook Structure in XML

The structure of these guidebooks can be described formally in XML. This enables more varied use of the guidebook. The XML description can be used to check the completeness of definitions in the guidebook, but its main function would be to provide a convenient way to read out the guidebook in different formats (print, web, audio, screen reader, localization).
The main elements of this specification are listed below.

```
<!ELEMENT blend (coursestart, courseexecute+, courseend)>
<!ELEMENT coursestart (purpose, learningtool,
communicationtool*)>
<!ELEMENT courseexecute (training | pblproject)>
<!ELEMENT training (wbt+, (discussion | exercise)*,
project)>
<!ELEMENT discussion (#PCDATA)>
<!ATTLIST discussion
            topic CDATA #REQUIRED
            prerequisite CDATA #REQUIRED
            duration CDATA #REQUIRED>
```

```
<!ELEMENT exercise (exercisebackground, exercisescenario,
exercisetask, exercisematerial?, exercisesolution,
exercisefeedback)>
<!ATTLIST exercise
            topic CDATA #REQUIRED
            prerequisite CDATA #REQUIRED
            duration CDATA #REQUIRED
            maxgroupsize CDATA #IMPLIED
            mingroupsize CDATA #IMPLIED
            mode
            (groupexercise|individualexercise|classexerci
            se)
            "classexercise"
            assessmentmode
            (selfassessment|peerassessment)
            "selfassessment"
            type (analysis|interpretation|construction)
            "analysis">
```

5 Conclusion

The guidebook reflects aspects raised by either the SME sub-panels or the trainer sub-panel of the Delphi study. The input varies between the sub-panels and the parts of the guidebook they relate to.

General aspects were exclusively considered by the SME sub-panels.

All sub-panels provided more or less equal input for the course start and topics related to the training sessions.

The development of the problem-based learning part is almost exclusively supported by input from the trainer sub-panel, whereas course end activities are only supported by one aspect from the SME sub-panels.

The demonstration of communication tools ensures that learners can enjoy the course, rather than being frustrated and overwhelmed by technology. Suitable and manageable tools can increase the engagement of the learners with the topics, but they also enable online collaboration and teamwork. In this part of the course the assessment of the learning process has to be explained to the learner, explanations on how to contact the tutor directly can be given.

The self-paced learning is an important part of the overall structure. An appropriate level of difficulty makes the course enjoyable; the exercises need to provide a variety of modes and activities to keep learners motivated.

The exercises and discussions provide information on how to ensure applicability to the workplace of the learned concepts. The project can be customized to the learners' needs. All guided activities can be seen as support mechanisms for the learner if exercises and projects are accompanied with the matching feedback. Exercises can provide different levels of difficulty and ask for different depth of knowledge and thus make it suitable to the learners' needs. Exercises that require teamwork or online participation in a discussion cater for inter-student interaction, interactivity and group

dynamics through study groups. The final project can ensure that learning is meaningful to the learner and provides a follow-up to content learned earlier in the course.
The basic structure of self-paced and guided activities caters for the request of group dynamics and study groups.

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