MANAGING BLENDED LEARNING SCENARIOS BY USING AGILE E-LEARNING DEVELOPMENT

Michael Tesar
Department of Computer Science
University of Applied Science Technikum Wien, Austria

Stefanie Sieber
Media Informatics Group
University of Bamberg, Germany

ABSTRACT

Adapting traditional learning scenarios to the claims of modern learners is for most of us no longer optional – existing scenarios have to be adjusted in order to stay in demand. However, it has to be kept in mind that integrating e-learning – regardless of which extent – also brings with it lots of new aspects to be considered. Moreover, this conversion also requests more flexibility which, in turn, leads to a possibly increased effort for managing and maintaining blended learning scenarios. Therefore, this paper suggests the utilisation of agile e-learning development for an efficient management of high quality blended learning scenarios. Four key aspects, that can be applied and need to be taken care of, have been derived and are outlined. Hence, this paper delivers a guideline – worth to be considered – for everybody implementing blended learning scenarios.

KEYWORDS

Blended Learning, E-Learning, Agile E-Learning Development, Quality Management Issues, Agile Project Management

1. INTRODUCTION

The constant change of roles from teachers to trainers or – even better – mentors also brings with it a transition of learning and teaching cultures. New technologies and methods – or basically new media – are supposed and often already demanded to be adopted. Of course, there are different scenarios to employ these new technologies. To our understanding, the most common ones are those using traditional face-to-face teaching supplemented with e-learning tools and elements – so called *blended learning scenarios*.

The idea presented in this paper is to employ agile methods – originally arising from software development – to integrate e-learning elements into classical teaching scenarios in order to efficiently design, create, and maintain interactive and dynamic blended learning scenarios. Acting on the assumption that face-to-face lectures will typically deliver basic content on the one hand and are – at least if desired and fostered by the lecturer – more dynamic per se, a possible focus is on designing suitable e-learning elements. Hence, a guideline for *agile e-learning development* is deduced from agile software development principles. However, to do so, our understanding of modern learning and one possible way to define good teaching need to be described first.

2. TEACHING AND LEARNING IN BLENDED LEARNING SCENARIOS

There are some determining factors that everyone planning to adopt and apply a blended learning scenario should be aware of. First of all, an application of new technologies builds on qualifications of teachers and learners that should not always be taken for granted. Just as well, competences for online tutoring like communication, presentation, and motivation are demanded to guide learners through the entire learning process. The role of a teacher shifts from being a tutor to being an online coach (Busch and Mayer, 2002,

p.116). The disregard of these prerequisites often results in the failure of whole concepts. *Media literacy* needs to be acquired just like expertise in communication in order to be able to work as well as communicate appropriate and efficiently in virtual environments.

Communication is an important – or maybe even the most important – success factor in e-learning scenarios and particularly in blended learning scenarios where face-to-face phases and virtual stages need to be linked. The only way to prevent misunderstandings and a lack of information is intensive and bidirectional communication. More and more, this change insists on self-dependent trainers capable of the required skills as well as being able to pass them along to their students (Bermejo and Díaz de Junguitu, 2010). Like O'Sullivan and McGlynn (2010, p.150) states "a key role of the higher education instructor is to communicate enthusiasm to their students. […] teaching has changed from the traditional didactic lecture to use of active learning strategies."

2.1 Ways of Learning

Apart from being supported by new technologies or not, teaching also needs to consider some insights on learning that have been gained in order to be successful. Ex-cathedra teaching – pure lectures without any interaction and simply unidirectional communication – is not only unattractive but also limits learners to be recipients of information avoiding reflection and discussion (Haslinger et al., 2009, p.2). To overcome these limitations, the concept of "*activating teaching*" – as e.g. described by Haslinger et al. (2009) – has been developed. Alongside with didactical aspects this concept also reveals how technology can easily be employed to encourage students to actively participate in courses. Therefore, it is one of the natural next steps to integrate designs like that into blended learning scenarios enabling the desired interaction. As a consequence, *modern learning* is not expressed by ex-cathedra teaching supported with web-based technologies but implies the proposition of added value to the learners – including capabilities for collaboration and discussion that have not been available in the past such as lecture recordings, discussion forums, wikis, blogs, or others.

2.2 Quality of Teaching

To be successful it is crucial to ensure quality of learning scenarios. Specific quality management models, such as EFQM[1] and Kirkpatrick (Schreurs, 2006) or PAS 1032[2], demonstrate the complexity of e-learning. However, these models are often accompanied by a multitude of processes and theoretical considerations. For that reason, and due to the effort for implementation, their suitability for daily use needs to be questioned.

Trying to find manageable ways to ensure quality of learning offers, Henrich and Sieber (2009, pp. 144) defines five crucial success factors for blended learning scenarios: *concept*, *creation*, *maintenance*, *utilisation*, and *participation*. As from now, we enhance this concept by adding the key factor developed in this paper – *communication*. Similar thoughts and approaches can, for instance, be found in Gurba (2010).

3. AGILE E-LEARNING DEVELOPMENT

Interactive and dynamic learning offers at a high quality level, such as E-tivities by Salmon (2002), require increasing flexibility of tutors in designing learning scenarios. Looking at other domains, the change from process- and phase-oriented procedures to agile approaches in order to foster dynamics has proven itself, especially in information technology (Meyer et al., 2008, p. 306). On account of this, an application of agile development to the field of teaching and learning should be considered. Among others, due to the fact that agile approaches are particularly suitable for maintaining a high quality level and quickly adjusting to new demands, e.g. by applying continuous bidirectional feedback.

[1] European Foundation for Quality Management Excellence Model – http://ww1.efqm.org/en/Home/aboutEFQM/Ourmodels/TheEFQMExcellenceModel/tabid/170/Default.aspx

2 German Institute for Standardization, standard DIN PAS 1032 – Learning, education and training focusing on e-learning

"[…] the teaching process is, in many ways, very similar to the software development process. It involves multiple parties with different objectives (sometimes conflicting), a very tight schedule to get things done, a fixed deadline, limited resources und a lot of expected/unexpected changes along the way." Chun (2004, p.12)

Analogies to the software development process can be found easily. Therefore, based on the *Manifesto of Agile Software Development*, we defined a likewise guideline for the agile development of e-learning scenarios. A comparison of traditional project management, agile software development and the deduced principles for agile e-learning development is shown in table 1. The four depicted – and very closely related – aspects of agile e-learning development are going to be looked at closer in the following.

Table 1. Traditional Project Management, Agile Methods for Software Development, Agile E-Learning Development.

Traditional Project Management (Agile Manifesto, 2010)	Manifesto for Agile Software Development (Agile Manifesto, 2010)	Agile E-Learning Development
Processes and Tools	Individuals and Interactions	Personalised Learning Processes
Comprehensive Documentation	Working Software	Usability of Learning Utilities
Contract Negotiation	Customer Collaboration	Learner Centred Design
Following a Plan	Responding to Change	Flexible Course Concepts

3.1 Personalised Learning Processes

To allow a smooth and legally immaculate processing of blended learning courses, a *transparent environment* is needed. Ensuring that every participating actor knows what is expected of him is an indispensable prerequisite for a successful experience. Hence, these general conditions should be made available at a spot easy of access like an online course website. They need to be employed to put down the rules for the course, which should – amongst others – at least deal with the subjects organisation, assessment and exam modalities, copy right, communication, and collaboration (Haslinger et al., 2008).

However, it has to be kept in mind that learning is an *individual process*. Therefore the defined environment needs to be binding and flexible at the same time. Besides following strict and official rules, each learner needs to be allowed to derive his own personalised learning process from these guidelines. Personalisation can e.g. take place by incorporating individual applications for learning, enabling the choice among several equivalent learning assets, or by allowing unique activities to get a grade.

3.2 Usability of Learning Utilities

Creating plausible and attractive multimedia course materials is not always simple. In addition to experience and a high degree of media literacy, plenty of creativity is needed. It is not always possible to prepare multimedia learning content with justifiable effort. Moreover, some aspects – most of them simple and intuitive – have to be taken into account to foster successful learning with multimedia learning material.

Nielsen (1993) – who is considered to be one of the originators of software usability – defined several guidelines and lots of these can also be applied to digital learning material. Alongside with learnability, rememberability, efficiency, and reliability (Feichtinger et al., 2010, p. 1867), the experience – or, put in other words, the satisfaction of being able to handle and apply something – is one of the most important aspects for a high usability (Nielsen, 1993, p. 26).

However, the best prepared content is of no use for learners, if it is available in unusual formats, not transferable to other devices, or even obsolete. For that reason – in addition to an appealing design – constant maintenance and adaption to new circumstances have to be utilised in order to keep a permanent motivation to actually use the content. A regular control of access rates can be of evidence concerning usage and acceptance. To accomplish a high acceptance, an informal survey of demand among learners on technologies and media they prefer for learning is suggestive as well.

Considering the fact that mobile devices – such as smart phones or tablet PCs – are gaining in importance, numerous additional factors need to be incorporated into designing learning material. To mention just two of them, context and the design principle "less is more" have to be kept in mind. Ideally, applications and learning material should be able to adjust to a *learner's context*, e.g. regarding previous knowledge on the interface or the content itself. In doing so, intuitive and fault-tolerant interfaces are of advantage to draw a

learner's attention to the content – and not being distracted by handling learning material or the surrounding application (Moe, 2004, pp. 1187). Finally, "*less is more*" should be the basic idea behind every learning material. A concentration on content helps to design learning material and – most important – it also helps learners to focus on essential aspects and avoids distraction. Following this principle, additional information as well as unnecessary design elements should be removed and treated separately. (Uther, 2002, p.1)

3.3 Learner Centred Design

Defining good teaching is hard and often impossible. Undoubtedly, lots of experience in teaching is helpful when it comes to creating blended learning scenarios. Enthusiasm for the subject and enjoyment of work with students are also aspects fostering motivation on both sides (O'Sullivan and MyGlynn, 2010, p. 151). Though, *intrinsic motivation* is maybe most important for achieving the desired learning goals. As argued by Pucher et al. "the most important thing teachers can do is to allow them to study in an easy, pleasant way" (2010, p.5).

A consequentially close collaboration of both groups – tutors and learners – allows a target group specific design and the successful realisation of blended learning courses where students are highly motivated and the results live up to expectations for everybody. Moreover, tutors need to be able to take criticism and be open to suggestions for improvement from learners. Learners should be in the *centre* of every course *design*.

3.4 Flexible Course Concepts

Flexible course concepts allow a quick reaction to unexpected occasions which are being likely to appear in a blended learning course. Examples of such trouble are easy to find – non-functioning servers for delivering assignments, virtual troublemakers (e.g. impertinent forum posts) or delays of the schedule that are beyond the sphere of influence of a single tutor. A rapid and unbureaucratic reaction allows a still timely finish of the course and also contributes to a positive attitude amongst learners.

A *target group specific design* asks for a continuous feedback-loop involving tutors and learners (Schaumburg, 2004). Often, suchlike communication can be implemented using tools provided by learning management systems or using individual developments (Tripp et al., 2010). Regular feedback is the only way to perceive and solve occurring problems. To be able to recognise these as soon as possible and beforehand at best, it is indispensable for tutors to actively attend the online parts of their courses. Presence and active participation are important and crucial success factors (Henrich and Sieber, 2009, p. 145 and Haslinger et al., 2009, p. 5).

4. CONCLUSION

To use a mix of traditional teaching and e-learning units as blended learning scenario has, by now, often become part of daily routine in teaching. Nevertheless, these best practices still need to be transferred to solutions suitable for everyday life and inherent parts of modern curricula.

In our opinion, the development of blended learning scenarios and the adaption of e-learning scenarios can benefit from using agile concepts. Adjusting fixed methods of instruction to changing circumstances or varying target groups will be mandatory in the near future. Different learners – which are expected to have no identical needs at all, maybe similar profiles at best – are attending the same course within the series of semesters. Hence, a rapid adaption of teaching material and – most important – teaching concepts is required to successfully work with motivated students. In order to be able to manage the creation and maintenance of such blended learning scenarios we determined four key aspects to be taken care of – *personalised learning processes*, *usability of learning utilities*, *learner centred design*, and *flexible course concepts*.

First experiences have shown that agile approaches – combined with three crucial soft skills *communication*, *creativity*, and *enthusiasm* evolved above – can be of significant help to overcome parts of everyday difficulties in teaching. An exemplary detailed description of our experiences can be found in Haslinger et al. (2009) and Henrich and Sieber (2009). Medium- and long-term suitability needs to be subject to further research.

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REFERENCES

Agile Manifesto, 2010. *Manifesto for Agile Software Development*, http://www.agilemanifesto.org/, (visited 12 April 2010)

Bermejo M. and Díaz de Junguitu A., 2010. Using Blended Learning to Develop Collaboration and Communication Skills in Higher Education. *Proceedings of INTED2010 Conference*. Valencia, Spain. pp. 5606 – 5613. ISBN: 978-84-613-5538-9

Busch F. and Mayer T., 2002. Der Online Coach – Wie Trainer virtuelles Lernen optimal fördern können. Beltz Verlag, Weinheim und Basel. ISBN 3-407-36395-8

Chun, A., 2004. The Agile Teaching/Learning Methodology and Its e-Learning Platform. *Proceedings of International Conference on Web-Based Learning – ICWL*. Beijing, China, pp. 11 – 18

Gurba K., 2010. Seven cardinal sins of distance learning. *Proceedings of the International Workshop GUIDE2010.* Universita degli Stui Guglielmo Marconi, Roma, Italia

Feichtinger R,, Tesar, M., Salzbrunn, B, and Pucher, R., 2010. Critical usability-evaluation of mobile device applications for m-learning purposes. *Proceedings of INTED2010 Conference.* Valencia, Spain. pp. 1864 – 1875. ISBN: 978-84-613-5538-9

Haslinger M., Kirchweger A., and Tesar M., 2008. E-Learning-Logistik für Großlehrveranstaltungen: Lehrveranstaltungsordnung und Qualitätsmanagement. *13. Jahrestagung der Gesellschaft für Medien in der Wissenschaft*, Krems, Österreich. In: Zaucher S., Baumgartner P., Blaschitz E., Weissenbäck A. (Hrsg.). Offener Bildungsraum Hochschule; Freiheiten und Notwendigkeiten. Waxmann Verlag. Münster. p. 329

Haslinger M., Tesar M., and Kirchweger A., 2009. *Recht für Techniker/innen: „Aktivierendes E-Learning 2.0“*. Fachportal Pädagogik, http://www.pedocs.de/frontdoor.php?source_opus=729&la=de

Henrich A. and Sieber S., 2009. Blended learning and pure e-learning concepts for information retrieval: experiences and future directions. *In Information Retrieval*, Vol. 12, No. 2, pp. 117 – 174.

Meyer K., Schubert M., and Böttcher M., 2008. Agile Ansätze für die Entwicklung IT-basierter Dienstleistungen. In: *Entwicklung IT-basierter Dienstleistungen.* Physica-Verlag, Heidelberg, ISBN: 978-3-7908-1943-4, p. 305 – 318

Moe, K.H., 2004. Designing a Usable Mobile Application for Field Data Collection. *Proceedings of IEEE Africon 2004. pp.* 1187 – 1192

Nielsen, J., 1993. *Usability Engineering.* Academic Press, San Diego, ISBN: 978-0-12-518406-9

O’Sullivan S. and McGlynn H., 2010. What we can learn from our students? Use of student reflections as tools to improve teaching strategies. *Proceedings of INTED 2010 Conference.* Valencia, Spain, pp. 149 – 157. ISBN: 978-84-613-5538-9

PAS 1032-1, 2004. *Aus- und Weiterbildung unter besonderer Berücksichtigung von e-Learning;* Teil 1: Referenzmodell für Qualitätsmanagement und Qualitätssicherung, Planung, Entwicklung, Durchführung und Evaluation von Bildungsprozessen und Bildungsangeboten. Publicity Available Specification PAS 1032-1, Beuth Verlag GmbH, Berlin.

Pucher R., Tesar M., Feichtinger R., Salzbrunn B., and Schmöllebeck F., 2010. The QUADRO-Project – Integrating E-Learning Elements with Social Networks to Simplify the Daily Life of IT-Students. *Proceedings of the International Workshop GUIDE2010.* Universita degli Stui Guglielmo Marconi, Roma, Italia

Salmon G., 2002. *E-Tivities: The Key to Active Online Learning.* Taylor & Francis. ISBN 978-0749436865

Schaumburg H., 2004. *Die fünf Ws der Evaluation von E-Learning*. Humboldt Universität zu Berlin.

Schreurs J., 2006. EFQM and Kirkpatrick in a Framework for Evaluation of E-learning. *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education.* Chesapeake, VA. pp. 1780-1785

Tripp T., Mallory T., Johnson C., Keith J., and Olsen D., 2010. Tools for Improving Teaching and Learning. *Proceedings of the International Workshop GUIDE2010.* Universita degli Stui Guglielmo Marconi, Roma, Italia

Uther, M. 2002. Mobile Internet usability: What can ”Mobile Learning“ learn from the past? *Proceedings of the IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE’02)*. pp. 174