Factors Guiding Your Way to Success in Hybrid Learning

Christine Bauer
(University of Vienna, Austria
christinebauer@gmx.at)

Michael Kovacs
(Vienna University of Technology / University of Vienna, Austria
kovacs@ibab.tuwien.ac.at)

Abstract: In this paper we provide a record of relevant factors for the reasonable selection of learning settings. Our work aims to help teachers, instructors, facilitators, etc. in creating a convenient blend of learning settings for their specific and unique hybrid learning environments. Research is in progress, for which this paper's work forms the basis in order to create a matrix framework for systematically balancing learning environments.

Keywords: Hybrid Learning, Blended Learning, Balancing Learning Environments, Media Selection, Factors Influencing Learning Environments
Categories: K.3.1 Computers and Education (Computer Uses In Education)

1 Introduction

Blending traditional classroom teaching with learning approaches making use of information and communication technologies (ICT) is a major concern in current e-learning research. Although initial experiences have been made with hybrid learning concepts, the question how one can assess to which degree a course should consist of traditional learning and e-learning elements is still to be answered.

Previous work [see e.g., Baumgartner, Laske, Welte (1999), Bremer (2001), Filk (2002), Kerres, de Witt, Stratmann (2002)] could identify a wide scope of relevant factors influencing an optimal mix. Yet, general rules for balancing could not be revealed.

By now, the mix in hybrid learning is mainly based on teachers'[1] personal experiences and/or empirical studies and experiments in very specific settings. Obviously, there is a need for an appropriate methodical framework. We aim to support teachers in their decisions how to organise hybrid learning courses.

This paper outlines our framework on a conceptual basis, giving an overview of relevant factors influencing the optimal mix in hybrid learning. It builds the basis of our further research for creating a matrix framework, which will give support in finding an appropriate learning setting for a corresponding specific learning scenario.

The next section reviews the characteristics of media considered in our approach. In section 3, we discuss factors affecting media's appropriateness for certain educational settings. In section 4 we draw some general conclusions and give an outlook on further research.

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[1] The term *teacher* is used throughout this paper synonymously for teachers, instructors, facilitators, etc.

2   Characteristics of Media

Learning, whether or not enhanced by e-learning elements, holds a wide range of characteristics. Since there is the need to differentiate more precisely, we consider characteristics as presented below. These characteristics may or may not fulfil a certain purpose in the learning process. (Note that every way of communicating something to be learned, we refer to as medium; e.g., oral lecture, discussion forum, book, etc.)

Synchronous – Asynchronous
Media can basically be divided in synchronous and asynchronous media. While in synchronous settings people interact simultaneously (in real-time), using asynchronous applications they interact at different points in time.

Same Place (Presence) – Distributed (Distance)
Learning can take place in presence phases (participants meet) or people learn distributed (e.g., collaboration via the Internet, self-paced learning at home).

Push System – Pull System
From the learner's perspective, in push systems information is delivered or retrieved automatically. Pull systems demand the learner to get the information actively.

Written – Oral
The oral medium is the most traditional communication system of the human evolution. People retain what they are communicated orally only in their individual memories, not in the communication medium that links them; speech evaporates [see Lipnack, Stamps (1997)].

The invention of writing gave new directions in communication. Though written interaction is more slowly and cognitively more demanding than oral communication, it offers the ability to capture communications and make messages explicit, public, and permanent [see Bauer (2002), Lipnack, Stamps (1997)].

Interaction at Physical Presence – Interaction by Means of CMC
While people can interact at physical presence, in distributed settings they mainly communicate by means of computer-mediated communication (CMC). This characteristic is not to be confused with *same place – distributed*, since e.g., when using the medium book, neither CMC is deployed nor is there a need for physical presence.

Self-Paced – Collaboration
Media may or may not support self-paced learning (e.g., book, CD-ROM) or collaboration with co-learners (e.g., expert discussion via chat).

Communication Channels
Communication channels describe if the communication flow is one-way or two-way, and how many people can communicate with each other (e.g., one-to-one (1:1), one-to-many (1:n), many-to-one (n:1), many-to-many (n:m)).

Potential for Interactivity
According to media synchronicity theory [see e.g., Schwabe (2001)], a medium's potential for interactivity is the higher the more it makes an immediate response

possible. We speak of *potential* instead of degree because it depends on the communicators if they make use of a medium's possibilities (since there is a gap between what people make out of a medium and what is technically possible).

Permanence

Permanence is the degree to which a medium is capable of creating and/or keeping a record of messages/information [see Duarte, Snyder (2001)]. E.g., a book or a discussion by e-mail have permanence because inputs are saved and are available at later points of time, whereas an oral lecture often does not have permanence, unless the lecture is recorded or someone takes detailed notes.

Permanence is of prime importance for reusable learning objects (RLOs).

3 Factors Affecting Media's Appropriateness for Certain Educational Settings

Optimally balancing the manifold opportunities for communication and learning in education seems to be a challenge, which has to be met *for each specific setting separately*. Though hints and tips are to be abundantly found, practitioners face ambiguity since they still lack a convenient framework guiding them to find a reasonable mix.

Most authors focus on some of the influencing factors going into detail. Indeed, acquiring knowledge, experience, and a sense of which media are suitable for what kind of learning activities is complex and impossible to achieve within one or two application cycles [Derntl, Motschnig-Pitrik (2004)]. However, the practitioner is overburdened with what to consider for his specific needs.

This section gives an overview of relevant factors influencing the mix in hybrid learning. These factors *have* an impact on the didactical decision what kind of media to use for a certain learning scenario (situation). However, several factors are inherent in a certain scenario, which may lead to demands on media that seem contradictory. In such a case, media shall be chosen that best suit the scenario; therefore it is not enough just to consider one of these inherent factors in order to make an appropriate decision what kind of media to apply.

In the following, we present factors to be considered. Yet, at the current stage of research, the list of factors is not exhaustive and will be amended according to future findings.

3.1 Learning Factors

The term *learning factors* subsumes relevant factors concerning learning and the learning process themselves. Learning is, whether explicitly or implicitly, based on a learning model, a learning paradigm, learning objectives, and learning content.

For reaching an adequate decision what kind of media to use for a certain scenario, all these factors have to be considered.

3.1.1 Learning Theory

In any case, learning and teaching is based on a learning paradigm, whether implicitly or explicitly stated by the teacher [Baumgartner (1997)]. Major learning paradigms

are *behaviourism*, *cognitivism*, and *constructivism* [see e.g., Baumgartner, Laske, Welte (1999), Mathes (2002)]. The inherent learning paradigm directly or indirectly influences the choice of media since e.g., behaviouristic learning models demand the instructor to keep control over the learning process and, thus, require instruction-oriented elements. However, instruction-oriented elements do not necessarily build on behaviourism. They may include cognitivistic elements [Mathes (2002)].

3.1.2 Learning Objectives

Learning objectives express what the whole learning process or a specific setting should result in. Objectives may or may not be precisely set in advance. While the instructor appears to keep control over objectives in behaviourist settings, objectives in pure constructivist settings are dynamic since adapted by participants [see Filk (2002), Bremer (2001)].

A learning objective is tightly linked to the specific *subject of the learning content* and outlines what a learner will be able to do differently, resulting in different *domains of learning objectives*.

Subject of the Learning Content
Learning content is viewed here as of *what* has to be learned (from a conceptual perspective) rather than a *physical representation* of content (e.g., a textbook).

A very general way to categorise content is with regard to its corresponding (scientific) discipline and additionally how sophisticated it is. Another completely different approach is to differentiate between *knowing what*, *knowing how*, *knowing where*, and *to be able to* [Baumgartner (2002)].

Domain of Learning Objectives
Basically, we can distinguish between cognitive, affective, and psychomotoric objectives [see Bremer (2001)], though, due to interdependences, it is sometimes difficult to strictly separate these from each other. The dependency of media selection and learning objective is evident: e.g., it seems obvious that learning theoretically how to swim (*intellect*) demands other media than learning how to swim in practice (*skill*).

Furthermore, domains can be subdivided into *levels of objectives*. For instance, for the cognitive domain, Bloom's "Taxonomy of cognitive complexity" is widely accepted; from the simplest to the most complex: knowledge (remembering), comprehension (understanding), application (transferring), analysis (relating), synthesis (creating), and evaluation (judging) [see e.g., Berge, Muilenburg (2002)].

3.1.3 Learning Phase

Every learning scenario serves a certain purpose within the learning process. Media have to enable and support the following purposes depending on the phase in the process [see e.g., Bremer (2001)]: representing knowledge (presentation of learning content), motivating and activating the learner, enabling and supporting communication (between teachers and learners or learners among each other), supporting the learner in processing the learned content and organising his own learning process, supporting reproduction and application of the learned content, as well as assessing the learning progress (for learners themselves and by teachers).

Dependent on the specific learning scenario, appropriate media are to be chosen in order to provide adequate support of the respective learning phase (e.g., a book will not enable communication between learners).

3.2 Human Factors

Learning is all about humans. People involved in learning are the learner and the teacher which both affect the conditions for media selection. First, variables valid for both learners and teachers are outlined. Subsequently, additional variables for learners and teachers are dealt with separately.

3.2.1 Variables of Both Learners and Teachers

Experience With Media
The more experience an individual could acquire with a certain technology, the better he will be able to make use of it [see e.g., Foulger (1990), Limayem, Hirt (2000)].

Learning settings have to be chosen in accordance with their participants' e-learning competencies and must not exceed these. The degree of e-learning elements in a hybrid learning setting shall therefore be determined by participants' experiences [see Albrecht (2002), Bremer (2003)].

Media Acceptance
E-learning is not for everyone. Some individuals are simply not willing to learn or teach in settings other than presence courses; they seem to be convinced to need personal contact and interaction at physical presence [see Duarte, Snyder (2001)]. Any attempt to get them working with other media will run against resistance.

As [Hollingshead, MacGrath (1995)] point it out, "Users may or may not like using the computer. Their attitudes may depend on their expectations before using the system […] and/or their own experience with the system. This reaction may or may not get more favourable over time." Media acceptance should clearly influence one's media selection.

Media Preferences
Though interrelated, media preference is not equal to media acceptance. One may accept a medium but prefer a different one, thus yielding way better results with the latter.

Media preference is also affected by a learner's habitual learning place [see Bremer (2001)], since one might prefer different media for learning at home alone or in a crowded lobby when on a business trip.

In order to best support learners and increase their learning outcomes, we suggest that learners' preferences should dominate teachers' preferences in this respect.

3.2.2 Learner Specific Variables

Learning Style (Learning Habits)
Learning styles are heavily discussed, which gives evidence to this factor's importance. A very helpful overview of the many models used to describe learning styles can be found in [O'Connor (1997)].

Learning style research aims to find clusters of people who use similar patterns for perceiving and interpreting situations. Media differently support styles. Based on this information, we should adjust educational environments to make them more effective.

Motive for Learning
The issue how to stimulate learner's motivation is widely discussed [see e.g., Salmon (2001), Ludwig (2002)]. We agree that media choice has a high impact on motivation. Beyond, we suggest that a learner's initial motive for learning (e.g., participating in a course) is a relevant factor for the didactical decision on media choice. We hypothesise that a highly motivated person who is extremely interested in a topic will keep motivation for learning at a high level with any kind of media, while for someone who is little or not at all motivated to learn (e.g., someone who attends a course because he is required to do so due to the curriculum), media has to be carefully selected in order to increase motivation.

3.2.3 Teacher Specific Variables

Beyond competencies that both, teachers and learners, need for the appropriate use (application) of media, teachers need competencies for preparing and producing learning material. These include practical design and implementation competencies [see Albrecht (2002)].

Didactical Competencies
It is crucial that the teacher is able to put the didactical objectives into operation [see Albrecht (2002)] with the media chosen. Appropriate media selection is dependent on the teacher's ability to conceptualise didactical issues by using a specific medium.

Production Competencies
Regardless if the teacher has to do it himself or has some assistance, learning material has to be prepared and produced. E.g., implementing a flash video simulation is only an option if there is someone available, who is able to program it.

3.3 Learning Environment Factors

Learning and teaching need, in any case, some media, whether technically enhanced or not, to communicate what is to be learned. Consequently, *learning environment factors*, like resources and infrastructure, affect the conditions for media selection in a certain scenario.

Resources and Media Available
Availability of resources rigorously restricts the possibilities for learning and teaching. For instance, in many areas broadband Internet access is not available (yet); consequently, if learners live in such areas, it would not be a wise choice to stress on high-quality video streaming, which simply overextends connections with little or limited bandwidth.

Principally, we differentiate between resources on the part of the institution – for which we can further distinguish between human (personnel) resources, technical (material) resources, and budget –, and on the part of the learners.

Institution's resources: Personnel available results in a specific ratio of learners to teachers, i.e. how many teachers support how many learners (1:1, 1:n, m:n). Depending on this ratio, certain media can be used and others cannot (e.g., web-based trainings may be favoured when a great number of students have to be reached by a small number of teachers in order to ease the burden on the latter). Technical resources and infrastructure [see Kovacs (2004)] are not only necessary for delivering e-learning elements but also for developing and deploying learning material. It depends on the availability of resources whether a specific medium may be deployed or not. Moreover, budget constraints need to be considered.

Learners' resources: Especially in cases of technology-enhanced learning, the learner's technical resources (e.g., broadband Internet access, multimedia PC) are to be considered for the design of a hybrid learning setting. If learners are perceived not to have the necessary resources available, the institution has to provide adequate infrastructure or consider other media.

Furthermore, it seems important to consider *when*, *how long*, and *where* resources are available and how easily learners and teachers have access to them. For instance, if learners have access to the Internet for very limited time only, or learn in different time zones, the extensive use of synchronous online conferencing is a poor option.

Reuse of Existing Learning Material

Learning material (as a special kind of resource) is treated here separately due to its importance. Reusability of content is a primary concern of e-learning standardisation [see e.g., ADL Initiative (2001)].

If there is already learning material available for a specific subject in a way that fits the specific hybrid learning setting, it can be easily reused. Thus, this influences media selection insofar as it might be better to use existing material that is good enough in practice than spending much budget for developing material that provides only marginal additional benefits.

So far, we identified following aspects to differentiate:

- First, a written presentation can be used as it is.
- Second, electronically available content can, moreover, be easily used. (Attention has to be paid to legal issues like intellectual property rights, etc.)
- Third, you might invite e.g., an expert for a certain topic; otherwise you have to prepare the topic on your own.

Consequently, reusability does not only refer to material sources but also to human sources, which increasingly gains recognition.

4   Conclusions and Outlook on Future Work

Based on a combination of e-learning research, communication research, and our own research and practice, we aim to set up a framework, which will give support in finding an appropriate learning setting for a corresponding specific learning scenario. To meet this goal, we discussed characteristics of media and relevant factors influencing the optimal mix in hybrid learning settings [see Figure 1] in this paper. Based on various sources, we tried to point out these factors' significance for the reasonable selection of media. As *research is in progress*, subsequent work is going to relate these factors to the characteristics.
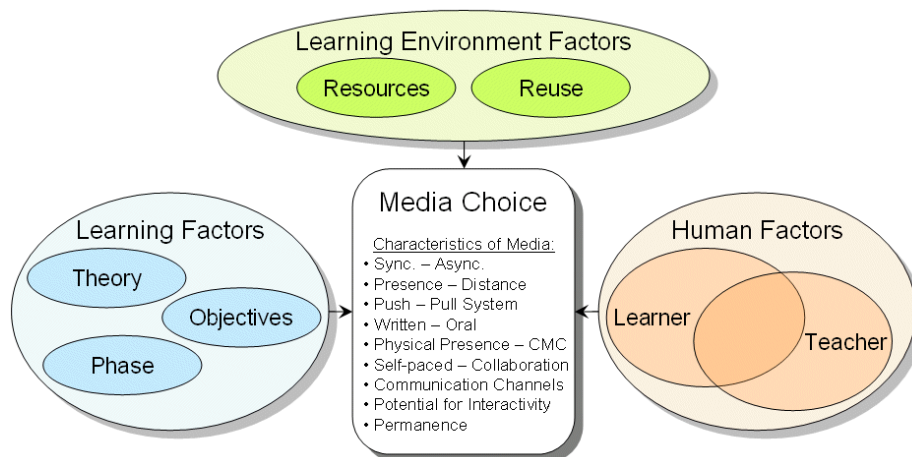
Figure 1: Factors for Balancing Hybrid Learning Environments

In order to test the relevance of the described factors in practice, as a next step we plan to use courses at the University of Vienna as case studies, for which the mapping between the media characteristics and the factors should be observed and recorded. If case studies support the appropriateness of our approach, we intend to validate the framework empirically. If both dimensions (factors and characteristics) of the matrix prove useful, we will assist and support teachers in applying the framework for planning and delivering new hybrid learning solutions for their courses, using results for our iterative, empirical investigation.

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