CHAPTER 1.1

BLENDED LEARNING SYSTEMS:

DEFINITION, CURRENT TRENDS, AND FUTURE DIRECTIONS

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The term "blended learning" is being used with increased frequency in both academic and corporate circles. In 2003, the American Society for Training and Development identified blended learning as one of the top ten trends to emerge in the knowledge delivery industry (cited by Rooney, 2003). In 2002, *The Chronicle of Higher Education* quoted the president of Pennsylvania State University as saying that the convergence between online and residential instruction was "the single-greatest unrecognized trend in higher education today" (Young, 2002, p. A33). Also quoted in that article was the editor of *The Journal of Asynchronous Learning Networks* who predicted a dramatic increase in the number of hybrid (i.e., blended) courses in higher education, possibly to include as many as 80-90% of all courses (Young, 2002).

So what is this "blended learning" that everyone is talking about?   This chapter will provide a basic introduction to blended learning systems and share some trends and issues that are highly relevant to those who are implementing such systems. To accomplish these goals, the chapter will address five important questions related to blended learning systems such as: What is blended learning?, Why blend?, What current

blended learning models exist?, What issues and challenges are faced when blending?, and What are the future directions of blended learning systems?

BACKGROUND AND DEFINITIONS

The first question asked by most people when hearing about blended learning, of course, is just "What is blended learning?" Even though blended learning has become somewhat of a buzzword in corporate and higher education settings, there is still quite a bit of ambiguity about what is meant when the term is used (see Jones, this volume). How is blended learning different that other terms in our vernacular such as distributed learning, e-learning, open and flexible learning, and hybrid courses? Some define the term so broadly that one would be hard pressed to find any learning system that was not "blended" (Masie, this volume; Ross & Gage, this volume). Others challenge the very assumptions behind blending as holding onto relics of an old paradigm of learning (Offerman & Tassava, this volume). In the first section of this chapter, I will articulate a practical working definition for the term blended learning and provide a historical context for its emergence.

What is being blended?

One frequent question asked when one hears about blended learning (BL) is "What is being blended?" While there are a wide variety of responses to this question (Driscoll, 2002), most of the definitions are just variations of a few common themes. The three most commonly mentioned definitions documented by Graham, Allen, and Ure (2003) are:

1) BL = combining instructional modalities (or delivery media) (Bersin & Associates, 2003; Orey, 2002a, 2002b; Singh & Reed, 2001; Thomson, 2002)

2) BL = combining instructional methods (Driscoll, 2002; House, 2002; Rossett, 2002)

3) BL = combining online and face-to-face instruction (Reay, 2001; Rooney, 2003; Sands, 2002; Ward & LaBranche, 2003; Young, 2002)

The first two positions above reflect the debate on the influences of media versus method on learning (Clark, 1983, 1994a, 1994b; Kozma, 1991, 1994). Both of these positions suffer from the problem that they define BL so broadly that there encompass virtually all learning systems. One would be hard pressed to find any learning system that did not involve multiple instructional methods and multiple delivery media. So defining BL in either of these two ways waters down the definition and really does not get at the essence of what blended learning is and why the concept of blended learning is exciting to so many people. The third position more accurately reflects the historical emergence of blended learning systems and is the foundation of the author's working definition (see Figure 1).

Insert Figure 1 approximately here

The working definition in Figure 1 reflects the idea that BL is the combination of instruction from two historically separate models of teaching and learning: traditional F2F learning systems and distributed learning systems. It also emphasizes the central role of computer-based technologies in blended learning.

Past, Present, and Future

BL is part of the ongoing convergence of two archetypal learning environments.
On the one hand, we have the traditional F2F learning environment that has been around
for centuries. On the other hand, we have distributed learning environments that have
begun to grow and expand in exponential ways as new technologies have expanded the
possibilities for distributed communication and interaction.

In the past, these two archetypal learning environments have remained largely
separate because they have used different media/method combinations and have
addressed the needs of different audiences (see Figure 2). For example, traditional F2F
learning typically occurred in a teacher-directed environment with person-to-person
interaction in a live synchronous, high fidelity environment. On the other hand, distance
learning systems emphasized self-paced learning and learning-materials interactions that
typically occurred in an asynchronous, low fidelity (text only) environment.

Insert Figure 2 approximately here

Figure 3 shows the continuum for four critical dimensions of interactions that
occur in both of these environments. Historically, F2F learning has operated at the left-
hand side of each of these dimensions while distributed learning has operated at the right
of each of these dimensions. To a large degree, the media available placed constraints on
the nature of the instructional methods that could be used in each environment. For
example, it was not possible to have synchronous or high fidelity interactions in the
distributed environment. Because of these constraints, distributed learning environments

placed emphasis on learner-material interactions, while F2F learning environments tended to place priority on the human-human interaction.

Insert Figure 3 approximately here

The rapid emergence of technological innovations over the last half century (particularly digital technologies) has had a huge impact on the possibilities for learning in the distributed environment. In fact, if you look at the four dimensions, distributed learning environments are increasingly encroaching on instructional territory that was once only possible in F2F environments. For example, in the time and fidelity dimensions, communication technologies now allow us to have synchronous distributed interactions that occur in real-time with close to the same levels of fidelity as in the F2F environment.   In the humanness dimension, there is an increasing focus on facilitating human interaction in the form of computer-supported collaboration, virtual communities, instant messaging, blogging, etc. Additionally there is ongoing research investigating how to make machines and computer interfaces more social and human (i.e., see work with automated agents, virtual worlds, etc.).   Even in the space dimension, there are some interesting things happening with mixed reality environments (see Kirkley & Kirkley, this volume) and environments that simultaneously facilitate both distributed and F2F interactions (see Wisher, this volume).

The widespread adoption and availability of digital learning technologies has led to increased levels of integration of computer-mediated instructional elements into the traditional F2F learning experience. From the distributed learning perspective, we see

evidence of the convergence in F2F residency requirements (Offerman & Tassava, this volume; Pease, this volume) and limited F2F events (such as orientations and/or final presentations) (Lindquist, this volume), In addition, there is greater emphasis on person-to-person interaction, and increasing use of synchronous and high-fidelity technologies to mediate those interactions.   Figure 2 depicts the rapid growth of distributed learning environments and its convergence with F2F learning environments.   The intersection of the two archetypes depicts where blended learning systems are emerging.

While it is impossible to see entirely what the future holds, we can be pretty certain that the trend towards blended learning systems will increase. It may even become so ubiquitous that we will eventually drop the word "blended" and just call it learning as both Masie and Massy (this volume) predict. But regardless of what we decide to call blended learning in the future, it is clear that the phenomenon of blended learning is here to stay. Therefore, it is imperative that we understand how to create effective blended learning experiences that incorporate both F2F and computer-mediated (CM) elements.

CURRENT TRENDS AND ISSUES

This section of the paper is dedicated to looking at current trends and issues that are relevant to blended learning systems. I begin with a brief review of what the research says about why people choose blended learning. Next, I share some of what we have learned about current models of blended learning including similarities and differences between higher education and corporate models. Finally, this section will end with a peek into several important issues and challenges that are being faced in the design and implementation of blended learning systems.

Why blend?

There are many reasons why an instructor, trainer, or learner might pick blended learning over other learning options. Osguthorpe and Graham (2003) identified six reasons why one might chose to design or use a blended learning system: (1) pedagogical richness, (2) access to knowledge, (3) social interaction, (4) personal agency, (5) cost effectiveness, and (6) ease of revision.   In the BL literature, the most common reason provided is that BL combines "the best of both worlds" (refs). While there is some truth to this, it is rarely acknowledged that a blended learning environment can also mix the least effective elements of both worlds if it is not designed well. Beyond this general statement, Graham et al. (Graham, Allen, & Ure, 2003, in press) found that overwhelmingly people chose BL for three reasons: (1) improved pedagogy, (2) increased access/flexibility, and (3) increased cost effectiveness.

Improved Pedagogy. As indicated above, one of the most commonly cited reasons for blending is more effective pedagogical practices. It is no secret that most current teaching and learning practice in both higher education and corporate training settings is still focused on *transmissive* rather than *interactive* strategies. In higher education, 83% of instructors use the lecture as the predominant teaching strategy (U.S. Department of Education, 2001). Similarly, distance education often suffers from making large amounts of information available for students to absorb independently (Waddoups & Howell, 2002). Some have seen blended learning approaches increase the level of active learning strategies, peer-to-peer learning strategies, and learner centered strategies used (Collis, 2003; Hartman, Dziuban, & Moskal, 1999; Morgan, 2002; Smelser, 2002). There are many examples of this in this handbook including the model

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used by IBM (Lewis & Orton, this volume) where learners go through three phases

(Phase 1) online self-paced learning to acquire background information, (Phase 2) F2F

learning lab focused on active learning and application experiences instead of lecture, and

(Phase 3) online learning and support for transferring the learning to the workplace

environment. Using a similar strategy, a BYU accounting professor uses online modules

to help students acquire the tool skills and technical information and then uses precious

F2F class time to focus on application, case studies, and develop decision making skills

(Cottrell & Robison, 2003). It is interesting to note such overlaps in blended learning

models between the corporate training world and higher education.

A few other ideas for using BL to improve pedagogy included in this handbook

are: Oliver, Herrington, and Reeves (this volume) who provide insights into how

computer-mediated environments can bring a level of authenticity to the traditional

classroom experience. Collis (this volume) shares a model for how BL can be used to

integrate formal classroom learning and informal workplace learning. Wisher (this

volume) and Kirkley and Kirkley (this volume) who share ideas for collaborative learning

and problem solving in environments that mix live F2F elements with virtual reality.

Increased Access/Flexibility. Access to learning is one of the key factors

influencing the growth of distributed learning environments (Bonk, Olson, Wisher, &

Orvis, 2002). Many chapters in this volume emphasize programs that would not be

possible if students were not able to have a majority of their learning experiences at a

distance from instructors and/or other students (for examples, see Kaur & Ahmed; Lee &

Im; Reynolds & Greiner, this volume). Learner flexibility and convenience is also of

growing importance as more mature learners with outside commitments (such as work

and family) seek additional education. Many learners want the convenience offered by a distributed environment, and, at the same time, do not want to sacrifice the social interaction and human touch they are used to in a F2F classroom. There are numerous examples in this handbook of how blending is used to provide a balance between flexible learning options and the high touch human interactive experience. WebCT executives, Barbara Ross and Karen Gage (this volume), for example, have seen an expansion of reduced seat time courses that allow for increased flexibility but retain some traditional F2F contact. University of Central Florida's M courses (Dziuban, Hartmann, Juge, Moskal, & Sorg, this volume) are also good examples of this. As a third example, the University of Phoenix model allows for F2F socializing in orientations as well as presentation experiences at the beginning and ending of a course with online learning experiences in between.

Increased Cost Effectiveness. Cost effectiveness is a third major goal for BL systems in both higher education and corporate institutions. Blended learning systems provide an opportunity for reaching a large, globally dispersed audience in a short period of time with consistent, semi-personal content delivery. Bersin and Associates (2003) have done an exemplary job of documenting corporate cases that have effectively used blended learning to provide a large return on investment (ROI). Similarly, in this handbook, the IBM chapter from Lewis and Orton (this volume) reports ROI figures as high as 47 to 1 for their implementation of BL. In adding to these results, the Avaya chapter (Chute, Williams, & Handcock, this volume) and Microsoft chapter (Lutz this volume) both provide cases in which BL solutions have resulted in a significant ROI.

In higher education there is also interest in finding solutions that are cost effective. The Center for Academic Transformation with support from the PEW Charitable Trust recently completed a three year grant program designed to help universities explore ways of using technology to simultaneously achieve quality enhancements and cost savings. More detailed information for each of the thirty grant redesign projects that PEW funded can be found at the grant web site (PEW, 2003). A summary of the significant role blended learning played in the various Pew projects can be found in Graham and Allen (Graham & Allen, in press; Graham et al., 2003).

The second section of this handbook on for-profit universities has several chapters that address this issue (Pease, this volume). The University of Central Florida, for example, has predicted cost savings due to cost reductions in physical infrastructure and improved scheduling efficiencies, which have yet to materialize (Dziuban et al., this volume).

What models of blending exist?

One of the goals of this handbook is to look broadly across many sectors (corporate, higher education, for-profit higher education, military, etc.) to see what the current state of blended learning is and what we can learn from innovative people and organizations in this arena. The 39 chapters of this volume provide a wide range of perspectives and flavors of blended learning to learn from. While there is a wide variance in the blended learning practices that are occurring, there are also some strategic similarities that will be articulated in following section.

Blending at many different levels

One of the first things that we notice as we look at the different models of blending in the cases in this handbook is that they occur at a variety of different organizational levels. This section will articulate the four levels at which we identified blends occurring. Several chapters (Ross & Gage, this volume; Wright, Dewstow, Tappendin, & Topping, this volume) specifically address different levels of blending that are occurring. All of the BL examples in this handbook occur at one of the following four different levels:

- Activity level

- Course level

- Program level

- Institutional level

Across all four levels, the nature of the blends is either determined by the learner or the designer/instructor. Blending at the institutional and program levels is often left to the discretion of the learner, while designers/instructors are more likely to take a role in prescribing the blend at the course and activity levels.

Activity Level Blending. Blending at the activity level occurs when a learning activity contains both F2F and CM elements. For example, Wisher (this volume) outlines large scale military training events that incorporate both F2F and virtual elements. Kirkley and Kirkely (this volume) also discuss how mixed reality technologies blend the virtual and the real together during learning activities. In higher education, Oliver et al. (this volume) talk about strategies for using technological tools to make learning activities more authentic, while examples like Jung and Suzuki (this volume) share how

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technology is used to bring experts at a distance into the classroom creating a

simultaneous F2F and CM experience.

Course Level Blending. Course level blending is one of the most common ways

to blend. A course level blend entails a combination of distinct F2F and CM activities

used as part of a course. Some blended approaches engage learners in different but

supporting F2F and CM activities that overlap in time while other approaches separate

the time blocks so that they are sequenced chronologically but not overlapping (see

examples in Huang & Zhou and Jagannathan, this volume). Owston, Garrison, and Cook

(this volume) describe eight different cases of blending at the course level across

universities in Canada. Collis (this volume) describes an approach to course level

blending for a suite of courses used by Shell EP.

Program Level Blending. Ross and Gage (this volume) observes that blends in

higher education are often occurring at the degree program level. Blending at a program

level often entails one of two models - a model in which the participants choose a mix

between F2F courses and online courses or one in which the combination between the

two is prescribed by the program. Jung and Suzuki (this volume) talks about a program

level blend in the Japan context in which there are certain F2F courses that are required

for a program and the rest can be taken at a distance. Salmon and Lawless (this volume)

describes a business Management Certificate program which allows students the choice

of completing the program completely online or online with F2F tutoring session and/or

participation in an extended on-campus Management Challenge. The New Zealand Law

Diploma program is conducted mostly online with about 15 percent of the learning time

in a F2F setting. Reynolds and Greiner (this volume) and Wright et al. (this volume) both

describe teacher education programs that blend F2F and CM experiences at the program level.

In the corporate arena BL is often applied to a particular training program as was the case with Oracle's Leader Track training (Hanson & Clem, this volume), Avaya's Executive Solutions Selling Business Acumen program (Chute et al., this volume) and cases of three training programs provided by Microsoft (Ziob & Mosher, this volume).

Institutional Level Blending. Some institutions have made an organizational commitment to blending F2F and CM instruction. Many corporations as well as institutions of higher education are creating models for blending at an institutional level. IBM (Lewis & Orton, this volume) and Sun Microsystems (Wenger & Ferguson, this volume) are corporate examples of organizations with institutional models of blended learning. The University of Phoenix (Lindquist, this volume) also has an institutional model for blending where students have F2F classes at the beginning and end of the course with online activities in between. At a university level, the University of Central Florida (Dziuban et al., this volume) has created the "M course" designation for blended courses that have some reduction in F2F seat-time. Other institutions such as BYU Idaho have a general education requirement that students must have one online learning course experience to graduate (BYU-I, 2004). Brigham Young University (Provo campus) has experimented with "semester online" courses where on-campus students could enroll for a distributed course along with other campus-based courses (Waddoups & Howell, 2002). Similarly, at the University of Illinois, traditional on-campus economics students have been allowed to take a required course online while they were off-campus for the summer (Wang, Kanfer, Hinn, & Arvan, 2001). (It is important to note that "dual mode"

institutions (Rumble, 1992) that support both F2F and computer mediated instruction are not necessarily in the business of blending learning. For the institution to be engaged in blended learning, there must be a concerted effort to enable the learner to take advantage of both ends of the spectrum. It is not sufficient for the institution to have a distance learning division that is largely separate from the on-campus operations.)

General Categories of Blends

One of the reasons that we are interested in models of blended learning is that we are interested in the practical question of "How to blend?" Each model provides ideas about how to blend with examples implemented in specific contexts and with real constraints. Table 1 provides three categories for blended learning systems found in this handbook based on the primary purpose of the blend. Some blends in this handbook would fit into multiple categories; however, usually a blend most closely matches the focus of one category. It is also important to note that none of these blends are necessarily bad – they just have different foci.

Insert Table 1 approximately here

We see the greatest focus on *enabling blends* in programs that come out of a distance learning tradition. A good example is the University of Phoenix (Lindquist, this volume) that attempts to provide an "equivalent" learning experience through its F2F residential programs, entirely online programs, and blended learning programs. In this system, learners pick the option that best meets their cost and time constraints.

There is an enormous focus on *enhancing blends* in traditional university settings. With the widespread adoption of learning management systems (LMS) and technology equipped classrooms, it is becoming increasingly commonplace for instructors to enhance their courses with some level of technology. Both Jones (this volume) and Wright et al. (this volume) provide models that span the spectrum from a minimum level of integration to a high level of integration. The hope of some is that enhancing blends are the first steps towards more transformative blends.

It is interesting to point out that there seem to be a greater abundance of examples of *transforming blends* in the corporate environment than there are in the university environment. Examples like the Live-Virtual-Constructive simulations (Wisher, this volume), mixed-reality and problem-based embedded training (Kirkley & Kirkley, this volume) show how high-end technologies can transform the learning experience. Other examples include the increased use of knowledge management, electronic performance support systems, and mobile devices to situate learning in the context of workflow (see Chute et al., Collis, DeViney & Lewis, Singh, and Wagner, this volume).   In higher education environments constraints such as class duration, size, location, and availability of technology can provide a formidable barrier to making transformative changes. Oliver et al. (this volume), for instance, point to several ways that technology can support the development of authentic learning environments. There are a growing number of faculty experimenting with innovative technology-mediated approaches to teaching (such as the use of tools for simulations, visualization, communication, and feedback) that are transforming the ways that their students learn (West & Graham, in press)..

What issues or challenges are faced when blending?

This section briefly outlines six major issues that are relevant to designing blended learning systems. The issues are: (1) the role of live interaction, (2) the role of learner choice and self-regulation, (3) models for support and training, (4) finding balance between innovation and production, (5) cultural adaptation, and (6) dealing with the digital divide.

The Role of Live Interaction. Under what conditions is human interaction important to the learning process and to learner satisfaction with the process? Hanson and Clem, Hoffmann, Owston et al., and others (this volume) observed a preference among many learners for the live (or F2F) components of a blended experience. When CM and F2F elements were combined, learners often placed a greater value or emphasis on the F2F aspects of the experience. Juxtaposed to this Offerman and Tassava (this volume) makes the claim that the F2F components are really unnecessary and primarily used for socialization reasons. Similarly, the University of Phoenix (Lindquist, this volume) takes the position that the live, completely online, and blended options to their courses are "equivalent" experiences to be selected based on learner preference.   When and why should we be considering human interaction such as collaboration and learning communities? How does live interaction versus low fidelity, asynchronous interaction affect the learning experience?

Role of Learner Choice/Self Regulation. How are learners making choices about the kinds of blends that they participate in? Many of the chapters of this book as well as other blended learning publications make it seem like learners are primarily selecting blended learning based on the issues of convenience and access. But this begs

questions about the type and amount of guidance that should be provided to learners in making their choices about how different blends might impact their learning experience. Online learning components often require a large amount of self-discipline on the part of the learners (Collis, 2003). Huang and Zhou (this volume) mention the challenge that many of their Chinese students have in regulating their own learning without the close guidance of an instructor. How can blended learning environments be designed to support increasing learner maturity and capabilities for self-regulation?

Models for Support and Training.   There are many issues related to support and training in blended environments including: (1) increased demand on instructor time (Hartman et al., 1999; Lee, this volume), (2) providing learners with technological skills to succeed in both F2F and CM environments (Levine & Wake, 2000; Morgan, 2002), and (3) changing organizational culture to accept blended approaches (Hartman et al., 1999). There is also a need to provide professional development for instructors that will be teaching online and F2F (Lee this volume, Lindquist this volume). It is important to see more successful models of how to support a blended approach to learning from the technological infrastructure perspective as well as from the organizational (human) perspective.

Digital Divide. The divide between the information and communication technologies available to individuals and societies at different ends of the socio-economic spectrum can be great (see chapters by Massy, Jagannathan, and Kaur this volume). Massy (this volume) raises the issue that e-learning is often perceived as being an approach that favors the advantaged. Yet, e-learning is a strategy that might be considered for educating the masses because of its low cost and ability to be distributed

widely. But the jury is still out on whether blended learning models can be developed

that are affordable and still address the needs of different populations with different

socio-economic conditions around the world.

Cultural Adaptation. What role can and should blended approaches play in

adapting materials to local audiences. One strength of e-learning is the ability to rapidly

distribute uniform learning materials. Yet, there is often a need for customizing the

materials to the local audience to make them culturally relevant.   Jagannathan (this

volume) and Selinger (this volume) both address the need to find balance between global

and local interests. Selinger suggests that a F2F instructor plays an important role in

helping to make globally distributed materials culturally relevant and meaningful.

Balance Between Innovation and Production. In design, there is a constant

tension between innovation and production. On the one hand, there is a need to look

forward to the possibilities that new technological innovations provide, and, on the other

hand, there is a need to be able to produce cost effective solutions. However, due to the

constantly changing nature of technology, finding an appropriate balance between

innovation and production will be a constant challenge for those designing blended

learning systems.

DIRECTIONS FOR THE FUTURE

We live in a world in which technological innovation is occurring at break-neck

speed and digital technologies are increasingly becoming an integral part of our day-to-

day lives. Technological innovation is also expanding the range of possible solutions

that can be brought to bear on teaching and learning.   Whether we are primarily

interested in creating more effective learning experiences, increasing access and

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flexibility, or reducing the cost of learning, it is likely that our learning systems will provide a blend of both F2F and CM experiences.

Ross and Gage (this volume) make the statement that future learning systems will be differentiated not based on ***whether*** they blend but rather by ***how*** they blend. This question of *how to blend* F2F and CM instruction effectively is one of the most important we can consider as we move into the future. Like any design problem this challenge is highly context dependent with a practically infinite number of possible solutions. So in this handbook we do not present any one solution as ***the solution,*** rather we share examples of successful blends across many contexts*.* We hope that the wide range of global perspectives and specific local examples available in this handbook will help readers to gain a better understanding of options for meeting instructional design challenges in varied contexts. Our charge is to try and best understand the strengths and weaknesses of both F2F and CM environments so that when we are faced with tradeoffs, we can make appropriate decisions. Figure 4 is a simplified representation of this complex challenge. From a pedagogical standpoint, the designers of blending learning systems should be seeking out best practices for how to combine instructional strategies in F2F and CM environments that take advantages of the strengths of each environment and avoid their weaknesses (Osguthorpe & Graham, 2003; Martyn, 2003).

Insert Figure 4 approximately here

To illustrate the importance of understanding the strengths and weaknesses afforded by a F2F or CM learning environment, consider the following example of an

activity level blend. Class discussions are one of the most ubiquitous instructional methods used in education. Unlike the lecture, the instructional method of class discussion focuses on learner interaction rather than knowledge transmission. Typically, the goal of class discussion is to have the learners negotiate and co-construct an understanding of the discussion topic. The F2F and CM environments have many complimentary strengths and weaknesses that impact class discussion. Table 2 lists some of the strengths and weaknesses of conducting discussions in each of these environments.

Insert Table 2 approximately here

Although Table 2 certainly does not contain all of the possible strengths and weaknesses of conducting discussions in the F2F and CM environments, instructors might use this understanding to make decisions about whether to use one or the other or both learning environments to meet instructional goals. For example, by understanding the affordances of F2F and CM environments, an instructor of a large enrollment class might choose to use the CM environment so that everyone in the class can contribute to the discussion. Another instructor concerned about unmotivated students and procrastination might choose to use a F2F discussion where social presence and excitement for the topic can be communicated through voice as well as gesture. A third instructor might choose to blend the two learning environments, starting with a brief exploratory F2F discussion to generate excitement for the topic and set the stage for a more in-depth follow-up discussion online in a CM environment.

As we move into the future it is important that we continue to identify successful

models of blended learning at the institutional, program, course, and activity levels that

can be adapted to work in contexts. This will involve understanding and capitalizing on

the unique affordances available in both F2F and computer-mediated or distributed

learning environments.

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Figures

Definition:

Blended learning systems combine face-to-face instruction with computer-mediated instruction.

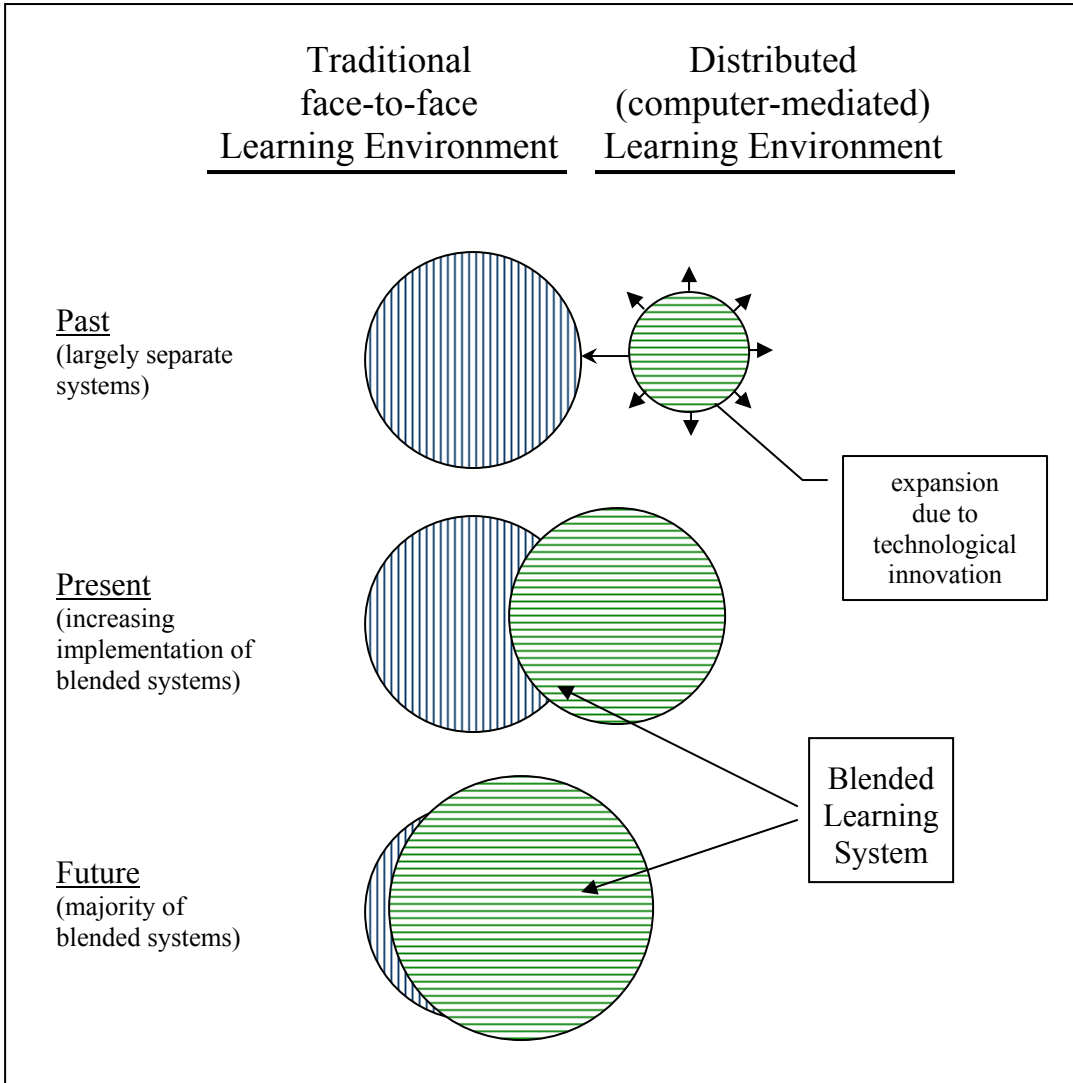Figure 1: Definition of blended learning systems

Figure 2: Progressive convergence of traditional F2F and distributed environments allowing development of blended learning systems
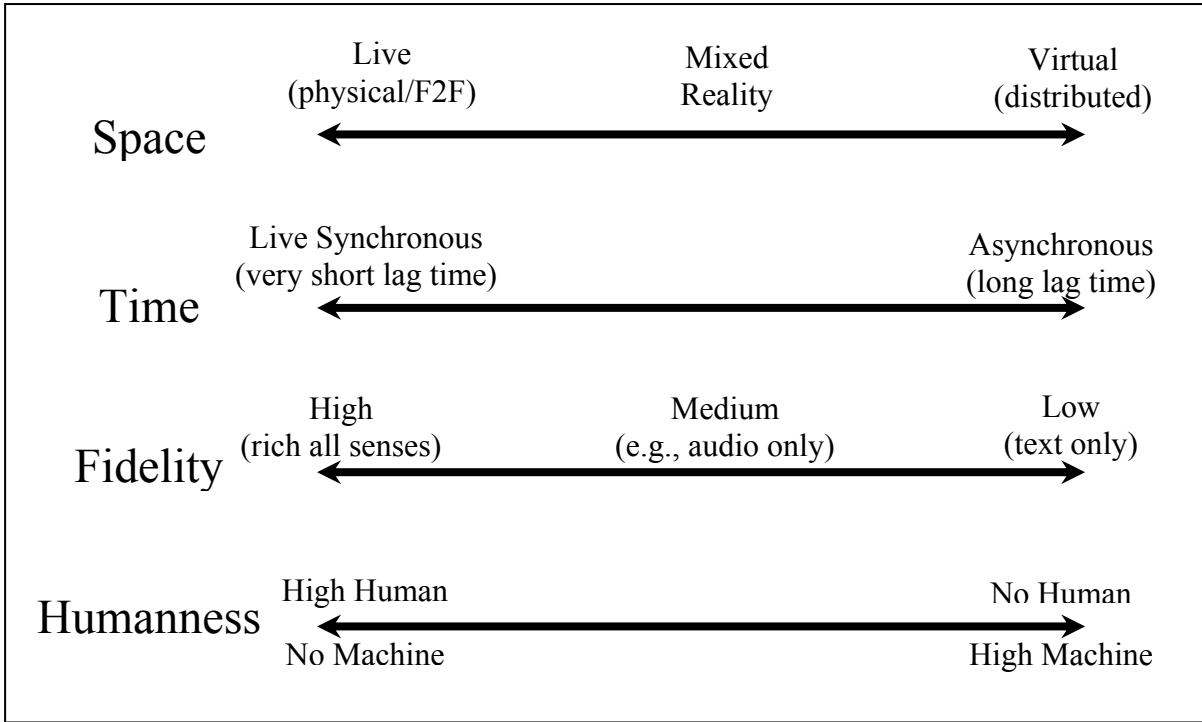
Space	Live (physical/F2F)	Mixed Reality	Virtual (distributed)
	← →		
Time	Live Synchronous (very short lag time)		Asynchronous (long lag time)
	← →		
Fidelity	High (rich all senses)	Medium (e.g., audio only)	Low (text only)
	← →		
Humanness	High Human / No Machine		No Human / High Machine
	← →		

Figure 3: Four dimensions of interaction in F2F and distributed learning environments

Strengths of Environment

Desirable

Face-to-Face
Learning
Environment

Blending
Technology-mediated and F2F

Technology-
mediated
Learning
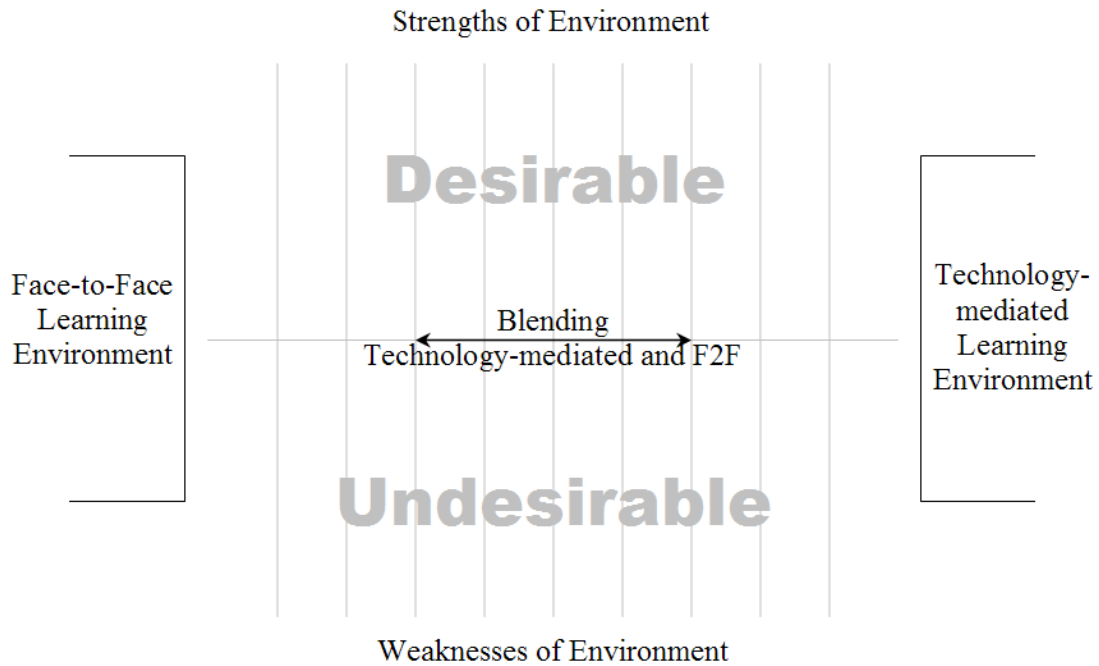Environment

Undesirable

Weaknesses of Environment

Figure 4: The challenge of finding blends that take advantage of the strengths of each environment and avoid the weaknesses.

Tables

Table 1: Different categories of blended learning systems

Enabling Blends	Enabling blends primarily focus on addressing issues of access and convenience. For example, blends that are intended to provide additional flexibility to the learners or blends that attempt to provide the same opportunities or learning experience but through a different modality.
Enhancing Blends	Enhancing blends allow for incremental changes to the pedagogy but do not radically change the way teaching and learning occurs. This can occur at both ends of the spectrum. For example, in a traditional F2F learning environment, additional resources and perhaps some supplementary materials may be included online.
Transforming Blends	Transforming blends are blends that allow for a radical transformation of the pedagogy. For example, a change from a model where learners are just receivers of information to a model where learners actively construct knowledge through dynamic interactions. These types of blends enable intellectual activity that was not practically possible without the technology.

Table 2: Strengths and weaknesses of conducting discussions in F2F and computer-mediated

learning environments

	Computer-mediated environment (Asynchronous text-based discussion)	**F2F environment** (In-class discussion)
Strengths	*Flexibility:* Students can contribute to the discussion at the time and place that is most convenient to them. *Participation:* 100% students can participate because time and place constraints are removed. *Depth of Reflection:* Learners have time to more carefully consider and provide evidence for their claims and provide deeper more thoughtful reflections. (Mikulecky, 1998; Benbunan-Fich & Hiltz, 1999)	*Human Connection:* it is easier to bond and develop a social presence in a F2F environment. This makes it easier to develop trust etc. *Spontaneity:* Allows for the generation of rapid chains of associated ideas and serendipitous discoveries (Mikulecky, 1998).
Weaknesses	*Spontaneity:* Doesn't encourage the generation of rapid chains of associated ideas and serendipitous discoveries (Mikulecky, 1998) *Procrastination:* There may be a tendency towards procrastination (Benbunan-Fich & Hiltz, 1999) *Human Connection:* The medium is considered to be impersonal by many (Benbunan-Fich & Hiltz, 1999) –this may cause a lower satisfaction level with the process (Haytko, 2001).	*Participation:* Can't always have everyone participate, especially if there are dominating personalities. *Flexibility:* Limited time, which means that you may not be able to reach the discussion depth that you would like.