BLENDED LEARNING DESIGN:
FIVE KEY INGREDIENTS

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"People are not single-method learners!" says e-learning guru Elliott Masie (cited in Rossett, 2002). Indeed, while specific "blended" offerings differ, industry consensus continues to point to the use of multiple modalities for learning. Masie puts it simply: "We are, as a species, blended learners."

"We are, as a species, blended learners."
- Elliot Masie

If this is true–that people perform better when they have a mix of modalities and methods of learning–what defines the most effective mix? Will any combination of modalities do, or is there an "optimum blend," a "sweet spot" to blended learning? In short, what is the most effective blended learning design? This paper suggests the need for five critical ingredients for blended learning, and uses both traditional and modern instructional design to back it up.

The Business Case

Before we dive into the instructional design, we need to ask the question: what is the business case for blended learning? In a 2001 IDC study, Julian and Boone found, "The importance of a blended approach to learning is that it ensures the widest possible impact of a learning experience and thus ensures…that the organization optimizes productivity and delivers value to its customers" (Julian and Boone 2001).

A Blend of Theories, Not Just One

Having established that blended learning is good for business, let's take a look blended learning design in practice. Instructional design can be a volatile topic, often characterized by competing theories and differing philosophies. But in practice, value can be drawn from many instructional theories, and in the case of blended learning, different theories apply to different situations. In fact, this author would argue that some of the best-designed learning experiences draw on a blend of learning theories and philosophies.

"Learning theories aren't like religion."
- Allison Rossett

Allison Rossett, professor of educational technology at San Diego State University, supports this "blended theory" approach. "Learning theories aren't like religion," says Rossett. "You don't have to pick Catholic or Baptist or Muslim, and shun the others. The goal is to have the right theory for the right situation." (cited in Zemke 2002).

Zemke states that the situation is dependant upon "the people you serve, the nature of the skills they must master and the context in which they are to perform."

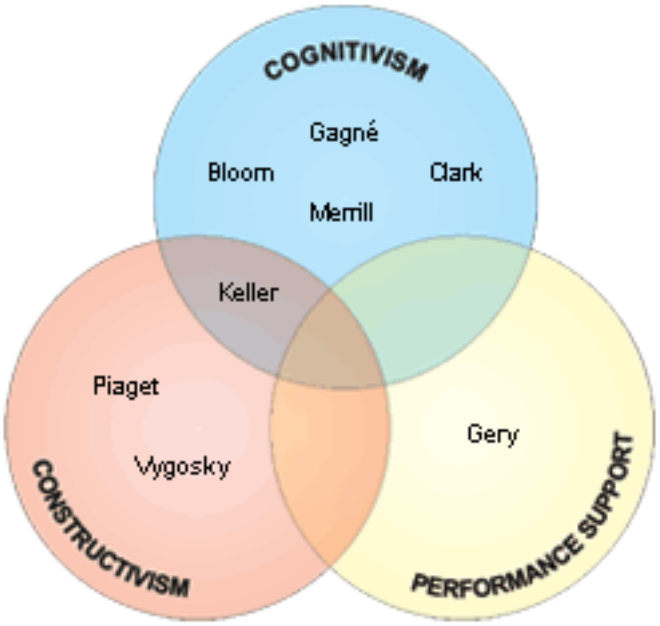

Figure 1: A Blend of Learning Theories

Such a "situational" instructional design model fits well with the concept of blended learning. By applying learning theories of Keller, Gagné, Bloom, Merrill, Clark and Gery, (see Figure 1) five key ingredients emerge as important elements of a blended learning process (see Figure 2):

1. **Live Events:** Synchronous, instructor-led learning events in which all learners participate at the same time, such as in a live "virtual classroom."

2. **Online Content:** Learning experiences that the learner completes individually, at his own speed and on his own time, such as interactive, Internet-based or CD-ROM training.

3. **Collaboration:** Environments in which learners communicate with others, for example, e-mail, threaded discussions and online chat.

4. **Assessment:** A measure of learners' knowledge. Pre-assessments can come before live or self-paced events, to determine prior knowledge, and post-assessments can occur following scheduled or online learning events, to measure learning transfer.

5. **Reference Materials:** On-the-job reference materials that enhance learning retention and transfer, including PDA downloads, and PDFs.
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INGREDIENT 1: LIVE EVENTS

Live, synchronous events are a main "ingredient" of blended learning. For many learners, nothing can replace the ability to tap the expertise of a live instructor. But what drives an effective live event? For theorist John Keller, it comes down to the four elements in his ARCS Model of Motivation: Attention, Relevance, Confidence, and Satisfaction. In this section we'll show how each element of Keller's model can be used to create an engaging, effective live learning experience.

Attention: The first aspect of the ARCS model is gaining and keeping the learner's attention. For example, an experienced virtual classroom instructor may begin his class by telling a joke, or by polling the learners with a thought-provoking question. This engages online learners and prepares them for learning.

Relevance: Learners stay focused when they believe the training is relevant to their specific situation. To show relevance a virtual instructor may use examples or analogies familiar to her audience. She may also show how learners can use course information to solve real problems.

Confidence: Learners must have confidence in their skills and abilities in order to remain motivated. To instill confidence in learners, an expert virtual instructor will make classroom expectations clear, then give learners ample time to practice their new skills. As they experience success, learners gain confidence.

Satisfaction: Finally, learners must be satisfied with the results of their learning experiences in order to remain motivated. A good virtual instructor will do this by providing learners with opportunities to use new skills, such as having them perform hands-on exercises that simulate their work environment.

While other theories may also be applied, careful application of Keller's principles creates a road map for success in one of the most critical elements of blended learning–the live instructor experience.

INGREDIENT 2: SELF-PACED LEARNING

Self-paced, asynchronous learning events add significant value to the blended learning equation. In order to get maximum value–real business results–from a self-paced learning offering, it must be based on effective implementation of instructional design principles.

Most self-paced learning products claim an instructional design foundation. Actual *implementation* of instructional design principles varies widely, with equally diverse results. For example, two products may both be "based on" Gagné's Nine Events of Instruction. The first product contains stated objectives, scrolling text, and a few multiple-choice questions. The second learning product also contains learning objectives and text, but adds photo-realistic technical animations, MP3 quality audio, and search capability to the mix. Same foundation, widely differing implementation and results.

Truly Reusable Learning Objects

Today's self-paced learning products are often sold as "reusable learning objects" (RLOs). Once again, the term is common, but actual quality in implementation varies dramatically. Merrill (2002) advises caution when working with learning objects. In order to achieve desired results, he says, you can't just "chop things up and expect them to make sense." To deliver on the promise of e-learning, learning objects must be founded on strong instructional design, such as Merrill's Component Display Theory (Merrill, 1994).

> You can't just "chop things up and expect them to make sense."
>
> - M. David Merrill

Component Display Theory can be classified as "situational" design theory. Its stated assumption is that for every learning *situation*, (e.g., facts, concepts, procedures, principals, processes), there are corresponding instructional *treatments* that should be used. Effective treatments may include the appropriate use of examples, non-examples, instructional animations, "try it" interactions, drill and practice "flash card" exercises and hands-on labs.

Multimedia and Modern Design Theory

Modern instructional design theory also supports the use of multimedia as a tool to promote knowledge transfer. Three principles from Ruth Clark (2002) deserve special attention:

1) **The Multimedia Principle: Adding Graphics to Text Can Improve Learning**
   Research has shown that graphics can improve learning. The key is to ensure that graphics relate directly to the instructional message, that is, they "educate, not decorate."

2) **The Contiguity Principle: Placing Text Near Graphics Improves Learning**
   In five out of five studies, multimedia researcher Richard Mayer (cited in Clark, 2002) found that learning from screens that integrated words near the visuals yielded an average improvement of 68%.

3) **The Modality Principle: Explaining Graphics with Audio Improves Learning**

> Audio should be used in situations where overload is likely. For example, if you are watching an animated five or six-step software demonstration, you need to focus on the visual–the animation. If you have to read text and at the same time watch the animation, overload is more likely than when you can hear the animation being read to you.

While many self-paced learning products claim to be "instructionally correct," only effective implementation of ID principles delivers consistent business results

Asynchronous learning products that blend traditional theory, such as Gagné's Nine Events of Instruction, with modern instructional design principles, such as those advanced by Merrill and Clark, consistently yield a more effective, higher-quality learning product. And while many self-paced learning products claim to be "instructionally correct," only effective *implementation* of ID principles delivers consistent business results.

INGREDIENT 3: COLLABORATION

The power of a live event or self-paced learning experience is augmented when opportunities for meaningful collaboration exist. Brown (1998) states: "Humans are social beings, and, as posited by the constructivist theory of learning, they develop new understandings and knowledge through their social interactions with a community of others." Further, Tinzmann argues that "Collaborative learning affords students enormous advantages not available from more traditional instruction because a group can accomplish meaningful learning and solve problems better than any individual can alone." (Tinzmann et. al., 1990).

When creating a blended learning offering, designers should create environments where learners and instructors can collaborate synchronously in chat rooms, or asynchronously using e-mail and threaded discussions. Two types of collaboration produce effective results: peer-to-peer and peer-to-mentor.

Peer-to-Peer: Peer-to-Peer collaboration allows learners to discuss critical issues with other learners, and sometimes, even teach it to them.

Peer-to-Mentor: Peer-to-Mentor collaboration makes it possible for mentors to coach learners one-on-one, field questions, and tailor responses to the needs of each individual learner. Expert mentors will also "push" additional guidance to learners in the form of e-mailed tips, reminders, and suggested practice items.

INGREDIENT 4: ASSESSMENT

Assessment is one of the most critical ingredients of blended learning, for two reasons: 1) It enables learners to "test out" of content they already know, fine-tuning their own blended learning experience, and 2) It measures the effectiveness of all other learning modalities and events.

Benjamin Bloom (1956) provides a framework for designing and building assessments. He is most often identified by his six levels of cognitive learning: Knowledge, Comprehension, Application, Analysis, and Synthesis (see Figure 3).

LEVEL	DESCRIPTION	EXAMPLE
1. Knowledge	Remembering previously-learned material, e.g., definitions, concepts, principles, formulas.	Which networking topology is shown in the graphic?
2. Comprehension	Understanding the meaning of remembered material, usually demonstrated by explaining in one's own words or citing examples.	Give an example of a Class C network address.
3. Application	Using information in a new context to solve a problem, to answer a question, or to perform another task. The information used may be rules, principles, formulas, theories, concepts, or procedures.	What steps should be taken to prepare for the closing of the Houston office and perform the transfer of users and computers to the Dallas office once the Houston office is closed?
4. Analysis	Breaking a piece of material into its parts and explaining the relationship between the parts.	Your client needs your help in selecting a routing protocol for use in their internetwork. Their primary concern is scalability. They also would like to ensure the protocol adheres to open standards. Which protocol would you recommend?
5. Synthesis	Putting parts together to form a new whole, pattern or structure.	David needs read access to a share located on the Financial server in your Windows 2000/XP network. You add his account to the Accountants global group. This global group is a member of the ReadAccInfo domain local group. This group has the Allow Read permission for the share. David logs off and then logs back on and attempts to access the ReadAccInfo share and is unable to access the share. What is most likely the problem?
6. Evaluation	Using a set of criteria, established by the student or specified by the instructor, to arrive at a reasoned judgment.	Bob uses a Windows XP Pro laptop for work when he is on the road, and he uses a Windows XP Pro desktop when he is at the office. When he goes on the road, he wants to have access to the same My Documents folder that he has at the office. He connects his laptop using wireless access and a VPN to the corporate network. What is the best way to allow access to the same documents from both PCs?

Figure 3: 6 Levels of Assessment

These "levels of cognitive learning" make it clear that meaningful assessment is more than just text-based multiple-choice test items. Examples of "higher level" assessment items include the use of real-world scenarios, and technical graphics and animations, as appropriate.

INGREDIENT 5: PERFORMANCE SUPPORT MATERIALS

Performance support material is, arguably, the most important ingredient of blending learning. In Gagné's terms, it promotes "learning retention and transfer" to the work environment.

Performance support champion Gloria Gery agrees. "The goal is to generate immediate work performance by people with little or no experience in what they're doing." (Cited in The Editors, 2000) Today's most effective performance support materials come in several flavors: printable references, job aids, and PDA downloads.

Learners can now download multimedia learning objects to their PDA, taking "Just-In-Time Support" to a new level.

Printable References:
Printable downloads are a popular form of reference tool, due to their portability and ease of replication.

Job Aids:
Job aids include charts, graphs, summaries and checklists that can be used on the job to enhance job performance. Job aids are often used for information that is impractical to memorize and can be easily looked up.

PDA Downloads:
With the increasing availability and popularity of personal digital assistants (PDAs), learners can now take multimedia learning objects with them wherever they go. Self-paced learning objects–complete with 3-D animations and MP3 audio–can be downloaded to learners' PDAs, taking the term "just-in-time" support to a new level.

CONCLUSION

"Not long ago, there were battling 'isms', theories and schools of thought over the 'one best theory' to adhere to in training" says Zemke (2002). Today, there is growing agreement that "there is not, and probably never will be, one great unified General Theory of Adult Learning that will solve all our problems." Rather, blended learning offerings should be based on an appropriate blend of learning theories, such as those put forward by Keller, Gagné, Merrill, Bloom, Clark, and Gery.

"The question is not if we should blend. Rather the question is what are the ingredients"?
- Marc Rosenberg

Blended learning offerings are gaining momentum, and with good reason. Says Tom Kelly, Vice President of Worldwide Training at Cisco Systems: "E-learning is versatile. You have a range of choices. Instructors can use e-learning tools and technology in a classroom setting. Students and instructors interact live and on-line over the Web–no physical classroom involved. Self-paced learning is another option that makes content accessible on a 7X24 basis. We've found that e-learning is most effective when it uses a blend of all these delivery options." (cited in INNOVATIONS@CISCO, 2002).

What will the learning blend look like in the future? As new and better learning modalities continue to be developed, we are sure to add additional examples to our mix. But, as Marc Rosenberg (cited in Barbian 2002) puts it, "The question is not if we should blend. Rather the question is what are the ingredients?" We know the question. Business results depend upon the answers.

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