A complete and effective learning strategy for many organizations must include delivery of instruction through several modalities. E-Learning is an important modality in this mix, but it is not the only one. Content domain analysis and content level analysis are two keys to selecting the optimum combination of methods and technology use, matched to the desired outcome. This week’s article and case study, written by two experts in blended learning, will give you an excellent process for producing content fine-tuned to your organization!

Content Design for Performance-oriented Reusable Blended Learning

By Seung Youn (Yonnie) Chyung and Armi Stephanie Trenas

Recently hired as training manager at a manufacturing company, Jane manages instructional designers and trainers in several branches in different cities across the region. Among many training programs that she inherited was an instructor-led safety training program for all employees of the company. After reviewing the current status of the training, and speaking with some of the instructional designers and trainers in different branches, she discovered a lack of consistency in the design and delivery of the program across branches. Also, some of the existing content shared by multiple branches involved a series of PowerPoint slides which were designed for the trainers to literally flip through and read.

Jane felt that it would be more efficient if this portion of the content were delivered instead via self-paced e-Learning. She also thought it an opportune time to transform the overall design of the safety training program from a mere information dump to a more performance-oriented product and one that was consistent across branches. Jane wants to look for more information that would guide her through this blended learning project.

Many of you may find yourself in a situation similar to Jane’s. Whether you are working in the manufacturing industry, the healthcare industry, the banking
industry, or the military as a learning and performance improvement professional, you need to pay attention to performance-oriented instructional design principles. You may also agree that adoption of e-Learning can improve overall cost-effectiveness and consistency in instruction. However, e-Learning is not a panacea; learning and performance improvement practitioners need to know when and how to blend e-Learning with conventional methods.

In this article, we intend to offer several important instructional design principles for blended learning to help practitioners who are situated similarly to Jane. However, regardless of whether the designer creates the content for face-to-face learning, e-Learning, or blended learning, there exist different structural levels of content; for example, curriculum-level, course-level, lesson-level, and topic-level. The duration and type of instruction may also vary from several days of an industry training program to a semester-long academic course. In our discussions, we shall focus on the training context with course-level content as the highest level. Also, although e-Learning can be synchronously or asynchronously delivered, we will focus on asynchronously-delivered, self-paced e-Learning programs.

**E-Learning or blended learning**

The fact that there are many definitions of e-Learning out there can cause some confusion as to exactly what e-Learning is. A quick review of the history of advances in computer and Internet technology may help explain the evolution of e-Learning.

When computers, and especially personal computers, became available as a learning tool, the term used was computer-based training (CBT). Then, when Internet-based systems became available, learning materials could be delivered through the Internet, and training delivered through the World Wide Web came to be known as Web-based training (WBT). This Web-based *online learning* also made it possible for instructors and learners to communicate with each other synchronously or asynchronously, thereby leading to the creation of online communities of learning. But, given that there are many other delivery technologies used in instruction, a more inclusive term, *e-Learning*, emerged to refer to “instruction delivered on a computer by way of CD-ROM, Internet, or intranet” (Clark and Mayer 2003, 13), or more broadly to “the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance” (Rosenberg 2000, 28).

Regardless of the scope of the definition of e-Learning, it is about using technology-based solutions for learning and performance improvement. A concern regarding this type of media-focused practice, however, is that not all learning situations require the use of technology. Most learning and performance improvement practitioners would agree that using e-Learning

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alone is not as effective as integrating it into other approaches. Focusing only on e-Learning is analogous to limiting instructional design to the use of one particular instructional method all the time. Realization of this limitation, and concern about this type of media-focused practice, thereby brought forth a new term, *blended learning*. It seems commonsensical to think that for instruction to be effective, it should provide learners with an environment where a collection of appropriate methods and media are used. This idea takes us back to what we learned in Instructional Design Principles 101.

**Content analysis for performance-oriented blended learning**

Optimally, designers should analyze the instructional content before determining which media ought to be used to deliver the content. During content analysis, you would analyze the type (domain) and level (sequence) of the content. A *content domain analysis*, in particular, identifies whether the main purpose of instructional content is to change the learners’ cognitive, emotional, or physical status. Such content domain analysis is necessary up front during the instructional design process, as different types of content will likely require different strategies. Among the popular models of content taxonomy are the Taxonomy of Educational Objectives that Benjamin Bloom and his colleagues developed in the 1950s, Robert Gagne’s five domains of learning which he developed in the 1970s, and David Merrill’s content categories presented in his Performance-Content Matrix in the 1980s. These models have commonalities as shown in Table 1. However, Bloom’s three domains and Gagne’s five domains of learning are better used for determining the type of course or lesson, while Merrill’s four categories are appropriate for analyzing topic-level content.

A content domain analysis on course-level content will help state the overall domain and goal of instruction clearly. For example, the main domain for the course in Jane’s scenario would be the cognitive domain.

### Table 1 Different taxonomies of learning content

<table>
<thead>
<tr>
<th>Theorists</th>
<th>Type of Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>(suggested level to be used)</td>
<td></td>
</tr>
<tr>
<td>Bloom et al. (course or lesson-level)</td>
<td>Cognitive domain</td>
</tr>
<tr>
<td>Gagne (course or lesson-level)</td>
<td>Verbal information</td>
</tr>
<tr>
<td>Merrill (topic-level)</td>
<td>Motor skills</td>
</tr>
</tbody>
</table>

Verbal information

- Fact
- Concept
- Procedure
- Principle

Intellectual skills

- Cognitive strategies

Cognitive domain

- Cognitive strategies

Affective domain

- Attitudes

Psychomotor domain

- Motor skills

Optimally, designers should analyze the instructional content before determining which media ought to be used to deliver the content.
domain, while the statement of the instructional goal could be: “Employees will be able to comply with the company safety policy, 100 percent of the time.”

In addition to determining the main domain of the content, the designer needs to conduct a content level analysis to determine the optimal range of the sequence of learning required for achieving the instructional goal. When Bloom and his colleagues developed the Taxonomy of Educational Objectives in the 1950s, they focused on the cognitive domain among the three domains and developed six levels of the cognitive learning sequence, from simple to complex, as the cognitive domain would be the area most emphasized in education. (In this article, we will focus on the cognitive domain as well.) Nearly a half century later, a group of scholars revised the cognitive domain of the taxonomy (Anderson and Krathwohl 2001). The cognitive dimension of the revised taxonomy still includes the original six hierarchical levels, but the sequence of the last two levels is reversed as shown in Table 2 (from synthesis to evaluation vs. from evaluation to creation).

Either version of Bloom’s taxonomy of the cognitive domain helps identify content levels for inclusion in instruction. From a content level analysis, instructional designers are able to state specific lesson objectives, instructional strategies, and assessment methods for use in the instructional steps required in the course. The levels of content are closely associated with the usual progression of sequences in acquiring different types of knowledge, from declarative knowledge to procedural knowledge, on to situated knowledge. The concept of declarative vs. procedural knowledge is derived from cognitive psychology; declarative knowledge is “knowledge of facts about the world,” and procedural knowledge is “knowledge about how to do something” (Anderson 1976, 78). Declarative knowledge (memory) is explicit and easy to codify, whereas procedural knowledge (memory) can be tacit and difficult to articulate. As described by a group of educational psychologists (e.g., Brown, Collins, and Duguid 1989), situated knowledge or situated cognition re-

Table 2 Content level analysis for blended learning

<table>
<thead>
<tr>
<th>Model</th>
<th>Level of Cognitive Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxonomy</td>
<td></td>
</tr>
<tr>
<td>Examples of Action</td>
<td>define, describe, identify, list, match compare, execute, explain, operate, use assign, determine, judge, plan, prioritize</td>
</tr>
<tr>
<td>Verbs for Objectives</td>
<td></td>
</tr>
<tr>
<td>Common Instruction</td>
<td>Drill and practice Simulated problem solving Scenario- or project-based performance</td>
</tr>
<tr>
<td>Methods</td>
<td></td>
</tr>
<tr>
<td>Blended Learning</td>
<td>[Self-paced e-Learning] [Face-to-face learning]</td>
</tr>
<tr>
<td>Knowledge Type</td>
<td>Declarative knowledge Procedural knowledge Situated knowledge</td>
</tr>
<tr>
<td>Orientation to</td>
<td>Lower Higher</td>
</tr>
<tr>
<td>Performance</td>
<td></td>
</tr>
</tbody>
</table>
fers to the ability to use one’s knowledge appropriately in a specific context; therefore, it is better learned by engaging in authentic activities and often through collaboration. Learners usually need to acquire a “knowing what” type of declarative knowledge (for example, what each insurance claim code means) before being ready for a “knowing how” type of procedural knowledge (for example, how to fill out an insurance claim) and a “knowing when and why” type of situated knowledge (such as how to investigate fraudulent claims). In this sense, these three types of knowledge are comparable to levels (sequence) of learning. Declarative knowledge, which covers the lower levels of Bloom’s taxonomy of the cognitive domain, often serves as foundational knowledge for more performance-oriented procedural and situated learning.

This framework on the three types of knowledge (declarative, procedural, and situated) is useful for determining how to blend self-paced e-Learning and face-to-face learning in a course. As a rule of thumb, it would be cost-effective to use self-paced e-Learning for delivering declarative knowledge and some of procedural knowledge that can be codified fairly easily. On the other hand, it may prove rather difficult, although not impossible, to facilitate the development of situated knowledge via e-Learning alone. Face-to-face learning may be a better method for handling situated knowledge, and some of procedural knowledge which requires immediate and frequent interactions between the instructor and the learners.

**Blended learning content as learning objects**

As the designer analyzes course content, a blueprint of the course emerges, outlining the overall structure and sequence of learning. Another instructional design principle that helps incorporate blended learning is the learning-object-based design. Generally speaking, a course is a collection of content, which can be organized in a ring binder or a folder in a computer. Whether it is for face-to-face learning, e-Learning, or blended learning, the course content is often organized in some sort of hierarchical structure, dividing the course into modules. Each module in turn contains a series of lessons, each of which has several topics. The raw materials of the content are thereafter stored in the binder.

The aforementioned folder analogy of content organization works well for the design of blended learning. Once a blueprint of the content is defined and organized in a folder, it is time to determine appropriate ways to deliver the content; should it be via face-to-face learning or e-Learning, or both (blended)? In face-to-face learning, these materials would appear in the form of reading materials, handouts, worksheets, presentation media, and testing materials. In self-paced e-Learning, raw media elements would contain multimedia, including audio, animation, and videos as well as text and images. Also, assessments in self-paced e-Learning are designed such that an instructor’s presence is not required. Regardless, when each chunk of content is well defined and distinct from the rest, as illustrated using the folder analogy (see Figure 1), the replacement or reuse of individual chunks of the content becomes easy.

The granularity and reusability principles help to improve flexibility of the design of blended learning. Small chunks of learning content are often referred to as learning objects (LOs). Rosenberg (2000) defines a learning object as “the smallest chunk of instruction or information that can stand alone and still have meaning to a learner” (p.170). According to Hodgins (2002), any group of information therein that addresses a learning objective is an LO. Based on these definitions, learning objects can be either lesson-level or topic-level learning content. However, a lesson is usually designed with a learning objective for a specific performance task, and its individual topics are selected to complete the task. Therefore, the term “learning objects” is often used in the generic sense to refer to lesson-level learning content. To illustrate, let us revisit Jane’s scenario involving a workplace safety training course.

Skipping the module level, the training course may contain three lessons, each possibly consisting of several topics, as shown in Table 3 on page 6. The objective for the first lesson on “Why prevent accidents?” may be stated thus: “Employees will recognize the benefits of preventing accidents and consequences of failing to prevent accidents on both personal and organizational levels.” In order for the trainees to be able to complete this lesson, they would need to study several specific topics. As the course progresses through lessons 2 and 3, its orientation shifts from the acquisition of declarative knowledge to that of more performance-oriented, procedural, and situated knowledge.

As explained previously, a blueprint of the overall
design of course content will help instructional designers determine how to blend e-Learning with conventional face-to-face learning methods. In Jane’s case, transforming the declarative type of content in all three lessons and some of the procedural type of content in lessons 2 and 3 (demonstrating the procedures of conducting safety risk assessments and incident investigations) to e-Learning is possible. The actual conduct of risk assessments and investigations, and the discussions on high-safety-risk areas and prevention strategies in lessons 2 and 3, would be better learned and practiced in a face-to-face environment. The e-Learning component may also be used as a pre-instructional strategy to prepare learners with foundational knowledge before they engage in instructor-led learning activities.

Reusable blended learning (case study)

Adoption of learning objects in blended learning design increases reusability of the content, while possibly reducing future development costs. To maximize this potential benefit, the Bangko Sentral ng Pilipinas (BSP), which is the Philippine Central Bank, initiated a blended learning project.

Background

The BSP, the Philippines’ central authority responsible for promoting and maintaining monetary stability in the country, has over 4,600 employees in its headquarters and offices throughout the archipelago. Its decision to proceed with the implementation of e-Learning is considered a major milestone. As a result of such major factors as accessibility and cost, the question no longer has to do with whether to take part in this global development or not, but is on how to do it. Presently, all of the Bank’s training programs consist of instructor-led classroom sessions. Offering training to three regional offices and eighteen provincial branch offices requires efficient planning and resource utilization. In the past, programs had to be scheduled back-to-back so as to optimize travel expenses. This practice translated to trade-offs between on-time delivery of training and cost-optimization. With e-Learning, it is hoped that some of the training will become more accessible to those who need it, when they need it, at a lower cost, and with the same or, better still, increased effectiveness.

Notwithstanding the promise held by this exciting prospect, a few concerns have been brought up by various stakeholders. They fear that e-Learning may erode the personal connection among the Bank’s employees which the face-to-face training programs have been partly instrumental in forging and preserving. There is also anxiety over how this unfamiliar online environment will affect Subject Matter Experts (SMEs) who have been conducting training ever since. Another issue that has surfaced is: should the Bank rely on off-the-shelf third-party software or should it develop its own? Further, how can the Bank get its e-Learning act together amidst these concerns while achieving the very purpose for which it was intended in the first place? Answers to these questions have yet to be found.

Assessing the fit of a reusable blended learning initiative

During its initial foray into the blended learning initiative, the BSP Institute (the training department of the BSP) conducted a program-level content analysis on its over 130 in-house training programs using the model of three knowledge types: declarative (“knowing what”), procedural (“knowing how”), and situated (“knowing when and why”) (Chyung 2007). As shown in Figure 2, the analysis revealed that the BSP Institute’s in-house training courses address different

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### Table 3 Overall design of workplace safety training course (simplified)

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Topic</th>
<th>Declarative</th>
<th>Procedural</th>
<th>Situated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Why prevent accidents?</td>
<td>Workplace safety facts</td>
<td>Causes for accidents</td>
<td>Consequences of accidents</td>
<td>Workplace safety policy and legal requirements</td>
</tr>
<tr>
<td>2. How to conduct a safety risk assessment</td>
<td>Risk assessment form</td>
<td>Risk assessment procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. How to investigate accidents</td>
<td>Safety violation report form</td>
<td>Incident investigation procedure</td>
<td>Complete reports</td>
<td>High-safety-risk areas and prevention strategies</td>
</tr>
</tbody>
</table>

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![Figure 2 Result of the BSP Institute's content analysis on in-house training programs.](image)
Design Techniques

The Bank’s current concept of reusing content

The concept of using learning objects, and reusing them, is not altogether unfamiliar to the Bank’s current training practice that involves designing, preparing, and delivering training. The Design and Delivery process in Figure 4 generates a syllabus describing the overall content structure of the Fundamentals of Central Banking Course (FCBC). An excerpt of the content structure is provided in Figure 5 on page 8.

Three SME-Trainers, including the Module Director, handle the three lessons in the module. As instructors, they prepare the delivery (lecture) plan and the materials, such as, but not limited to, PowerPoint slides, corporate video clips, and handouts. These are later “filed away” by either the SME or the BSP Institute in their respective hard drives. The transition from this current practice into reusable blended learning would be easier for SME-Trainers because of the similarity of the approach to how they currently develop and reuse their classroom materials.

When the new programs being offered require content similar to those already existing (or filed), the content is retrieved and reused. The SME-Trainer either makes some revisions to customize it to the new target audience, or uses the material as is, adding content through the explanations and examples he or she shares in class. As a result, development time and associated costs are considerably minimized. Examples of how the FCBC module and lessons are reused are shown in Figure 6 on page 9. Since each of the FCBC lessons can be independently delivered as a component of another program, they can be classified as reusable learning objects.

Efforts toward blended learning

While a probable fit exists between the BSP’s needs and the blended learning approach, and benefits may be gained from it, there are other conditions necessary to making the Bank’s adoption of a blended learning strategy successful. Instructional design skills are important as new considerations brought about by the challenges and promises of the e-Learning environment have to be factored in. Unlike classroom training which is accommodative of adjustments via the instructors’ intervention, e-Learning instruction must be well-planned from the onset. A practical tagging system (metadata) paired with a robust database that will make e-Learning content easily accessible to designers and trainers will also be essential. An enhanced system of filing has yet to be devised to sup-
port the reusability of e-Learning content. Finally, in order to track the employees’ use of the content and their learning progress, the content produced should be compatible with the learning management system used by the Bank.

Summary

Content analysis has to be undertaken before a decision is made with regard to the use of face-to-face learning, e-Learning, or blended learning. In this article, we presented several instructional design principles that you may find useful during the analysis. Identify the structural level of the content that you need to design (course, lesson, or topic). If it is at the course or lesson level, determine the main domain of the content (cognitive, affective, or psychomotor). For the cognitive domain, determine the level of content (six levels in Bloom’s cognitive domain; or three types of knowledge – declarative, procedural, and situated). Lower levels of content serve as foundational knowledge for the higher levels of content that facilitate changes in performance. Compare the advantages and disadvantages of face-to-face learning and e-Learning. Apply an appropriate mix of face-to-face learning and e-Learning so as to maximize learning and performance improvement. Designing content with learning objects can help increase reusability and cost-effectiveness of your blended learning project.

References


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Figure 6

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