# Instructional Design Model for Courseware*

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## EXECUTIVE SUMMARY

This paper describes the instructional design model and principles at the core of Skillsoft Courseware. The paper also discusses a variety of learning theories and instructional strategies that are used flexibly and creatively within our content design model to meet a broad range of learning requirements.

## INTRODUCTION

Skillsoft's model of instructional design is based primarily on the concepts of performance-oriented instruction, mastery, and the sequencing of instructional activities and strategies. The model draws heavily from adult learning principles that emphasize learner initiative, self-management, learning transfer, and experiential learning.

The design of Skillsoft courses starts with the definition of learner-focused performance objectives and then proceeds to the selection and implementation of instructional strategies and learning activities appropriate for those objectives. Frequent practice questions or exercises, along with assessments, measure learners' achievement against those objectives. The self-paced environment and unlimited access to instruction and assessment provide all learners with the opportunity to reach their desired level of mastery within the course. This robust, yet flexible, design methodology creates an instructionally sound model for the design and development of highly interactive, engaging, and instructionally effective courses—regardless of the content focus or level of learning.

The design, development, process and quality assurance standards behind our courseware are all geared toward ensuring each of its key components meets Skillsoft's expectations for the best instruction possible, including:

- Learning outcomes specified by performance goals and objectives

- Content aligned with course objectives

- Assessments that can be used before and after instruction to evaluate mastery of the knowledge and skills specified in the objectives

- Instructional strategies, learning activities and multimedia elements appropriate for the specific course content area

- Levels of learning appropriate for the content and the target audience

**EFFECTIVE INSTRUCTION**



Objectives
Content
Assessment
Instructional Strategies

Adult Learning
Performance-oriented Instruction
Mastery Learning
Observation and Modeling
Social Learning Theory
Learning Styles and Preferences

The theories and principles embedded within the Skillsoft ID model are actualized via:

- Intuitive, user-friendly graphical user interface

- Course structure and interface that supports self-paced, learner-controlled instruction

- Unlimited access to instruction and assessments

- Presentation and practice templates designed for unified and predictable functionality

- Rich variety of presentation, practice, and assessment templates supporting high levels of learner interactivity and engagement

- Standardized, yet flexible, flow of instruction

## SKILLSOFT INSTRUCTIONAL DESIGN MODEL

Instructional design is often described as an application of theory, rather than theory itself. Restricting application to a single theory or approach is not realistic; different learning theories, principles or concepts may apply, depending on the learners, the content, and the learning situation. Understanding the strengths and weakness of different learning theories is essential in designing appropriate instruction for varying conditions. The best design decisions are influenced by knowledge of not one, but multiple, learning theories. This is why Skillsoft's approach to instructional design is deliberately flexible and eclectic.

## THE CORNERSTONES

Skillsoft's Instructional Design Model consists of four cornerstones supported by multiple learning theories and instructional design principles.

## OBJECTIVES

Objectives are statements of intended learning outcomes. They describe the performance learners will exhibit in order to be considered competent. Objectives describe the result of instruction, rather than the process of instruction. Objectives, along with content, are the starting point for the design and development of all Skillsoft courses. Objectives must be written in performance-oriented language. In other words, objectives must clearly describe the behavior or activity the learner will perform to demonstrate learning. Those behaviors must be measurable and "doable" within an eLearning environment.

Objectives must also reflect or strongly suggest the desired level of learning—whether it's lower level comprehension and knowledge, or higher level application and analysis. Skillsoft strives to include as many high-level objectives as possible—or as appropriate to the purpose and goals of a specific course.

## CONTENT

Content is the information or subject matter treated in a specific work. Within the training industry, the term "content" refers to broad curriculum areas as well as the subject matter treated in specific, individual courses. In the context of instructional design, content usually refers to the information included in a planned instructional product or collection of products. Content, then, from a course design perspective, is the specific information needed to support presentation, practice and assessment of one or more instructional objectives. Content and learning objectives are the starting point for designing and developing eLearning courses, or any type of instructional product.

## CONTENT DOMAINS

Content domains are broad areas of knowledge, influence, or activity. Skillsoft's course offerings include content from five high-level domains—Business Skills, Leadership, Information Technology (IT), Compliance (which includes Environmental, Safety, Health and Legal), and Productivity and Collaboration Tools. Each of these content domains is subdivided into sub-categories, which form the basis for Curriculum areas in Skillsoft's Overall Content Portfolio.

Each sub-category is easily divided into even smaller areas, further delineated and defined by content specifics and/or target audience. It's this more restrictive, less inclusive focus that drives the identification and selection of content for specific series, courses, and ultimately the course-level lessons and topics.

**LEARNING DOMAINS**

Just as there are broad areas of content, there are also broad areas of learning outcomes called Learning Domains. These three domains provide an additional structure for categorizing instructional outcomes and content.

*   **Cognitive Domain:** The cognitive domain of learning refers to the intellectual skills and behaviors involving mental processing. These skills range from rote memorization to the ability to think and solve complex problems.

*   **Affective Domain:** The effective domain refers to attitudes, feelings, and values-all of which are critical to learner motivation. From a learner's perspective, content in this area answers the question, "What's in it for me?"

*   **Psychomotor Domain:** The psychomotor domain involves behaviors requiring motor as well as cognitive skills. Physical activities fall into this domain, as do many technical skill areas, such as machine operation.

Learning outcomes are often described as changes in behaviors, skills, and/or attitudes. Those changes are the same changes defined in the performance-oriented objectives. Under Skillsoft's Instructional Design Model, categorizing objectives and their related content by Learning Domain is the first and most fundamental step in achieving instructional excellence and effectiveness.

**CONTENT/INFORMATION TYPES**

Several learning theorists and instructional designers have devised methods of categorizing or classifying content into types. Skillsoft works with five types of content and bases the definitions of those types on Robert Horn's theories of Structured Writing and Information Mapping.

*   **Facts:** Facts are statements asserted with or without supporting evidence. Facts include names, dates, events, specifications, symbols, measurements, and experimental results and observations.

*   **Concepts:** A concept is a class or group of items that share a unique combination of critical attributes or characteristics. These unique attributes are not shared by other groups and are referred to by the same generic name or symbol. Concepts can be physical objects, conditions, responses, events, and ideas.

- **Principles:** A principle is a statement of what should or should not be done, what seems to be true in light of evidence, or what is unproven, but implied by other statements. Principles include laws, policies, guidelines, generalizations, hypotheses, rules, assumptions, and axioms.

- **Procedures:** A procedure is a set of steps a person performs in order to obtain a specified outcome.

- **Processes:** A process is a series of events or phases that takes place over time and usually has an identifiable purpose or result. A process, like a procedure, usually involves sequential events or time intervals. However, a process usually lacks the specificity required for the reader to perform the tasks described.

Content can involve several or all five of the content types. Breaking the content into smaller component parts based on content type is often a beneficial process—both for the person structuring the content as well as for the person attempting to understand or learn the content.

Content types are invisible to Skillsoft's target audience (the learner), but play an important role in the organization and development of content for presentation to the learner.

### INSTRUCTIONAL STRATEGIES

Instructional strategies deal with the selection and arrangement of content elements and instructional activities in a manner that facilitates learning. Skillsoft defines "instructional strategies" as the methods used to present, practice, and sequence instructional content. Instructional strategies are tools for implementing instruction, regardless of the media and delivery options. They represent a key component in any instructional design process and provide a high degree of flexibility and adaptation when considering media and/or platform delivery alternatives. Instructional strategies provide the greatest opportunity for flexibility, engagement, and interaction.

As the explanations of objectives and content cornerstones have already implied, no single instructional strategy, or specific arrangement or sequence of instructional activities, can be applied across the board to meet all learning requirements in all content domains. Therefore a wide range of instructional strategies must be available, regardless of the media or delivery requirements.

Instructional strategies include, but are not limited to:

- Practical Application Examples
- Active Demonstrations
- Visual representation of content, including 2- and 3-D animations, iconography and motion iconography
- Audio representation of content (voiced narration, sound effects, background music)
- Advance organizers
- Attention gaining strategies
- Reflection Activities / Questions
- Debriefs
- Progressive disclosure

- Exploratory and discovery learning
- Job aids
- Learning aids
- Follow-on activities
- Simulated dialogues
- Guided practice, discussions
- Practice exercises
- Embedded questions with feedback
- Scenarios
- Role-plays
- Repetition

Obviously, not all instructional strategies are used in all instructional circumstances. For example, scenarios are used heavily in soft skills content, while active demonstrations are used heavily in productivity and collaboration tool content. But these kinds of presentations, explanations and activities, combined with content organization and sequencing strategies, provide the means by which the instructional designers and course developers at Skillsoft design engaging, interactive, and successful learning activities and instruction.

## ASSESSMENTS

Assessments are deliberate attempts by people to acquire information about themselves or others. The information is then compared to a specific standard or desired result. Within instructional and learning environments, tests are used to measure what people know and how well they can apply what they know. Assessments strategies are closely related to the instructional strategies used to practice content. No single practice strategy, or sequence of practice strategies, can be applied across the board to meet all learning requirements in all content domains. Therefore, a wide range of

strategies must be available, regardless of the media or delivery requirements. The same holds true for the range of strategies that are appropriate for use in assessment or testing. Effective assessments allow learners to exhibit the behaviors specified in the objectives and provide meaningful feedback about those behaviors.

- **Pre-test:** When tests occur prior to instruction they are called pre-test or pre-assessments. Used in this manner, test identify content the learner has not already mastered, set expectations for upcoming instructional experience, and establish a baseline measurement against which future learning gains can be charted. Pre-assessment results can also be used to focus learner attention on unknown content.

- **Post-test:** When tests occur after instruction, they are called post-tests or mastery tests. The primary purpose of post-testing is to evaluate learner mastery of content after instruction. The score produced in post-testing is often compared against the pre-test score to evaluate whether learning gain has occurred, and if so, its extent. The post-test score is also the score most often compared to established standards or expected levels of proficiency—as in certification or achievement testing.

## UNDERLYING LEARNING THEORIES AND INSTRUCTIONAL DESIGN PRINCIPLES

### ADULT LEARNING

The term "Adult Learning" is associated with a body of attempts to develop theories of learning specifically for adults. Theories of adult learning vary in their origins and degree of development, but all emphasize the importance of building upon the learner's experience.

### EXPERIENTIAL LEARNING

Carl Rogers was a psychologist who became interested in learning theory as part of the humanistic education movement. Rogers distinguished two types of learning: cognitive (meaningless) and experiential (significant). The former corresponds to academic knowledge such as learning vocabulary or multiplication tables, and the latter refers to applied knowledge such as learning about engines in order to repair a car. The key to the distinction is that experiential learning addresses the needs and wants of the learner.

Characteristics of Experiential Learning:

- **Personal involvement:** The learner participates completely in the learning process and takes control over its nature and direction.

- **Self-initiation:** The learning or sense of discovery comes from within and is based primarily on involvement with the practical, social, personal, or research problems.

- **Pervasive effect:** Learning makes a difference in the learner's behavior, attitude, or even personality.

- **Self-evaluation:** The learner determines whether the experience meets a need and self-evaluates progress or success.

Per Rogers, experiential learning is equivalent to personal change and growth. Rogers believed that all human beings have a natural propensity to learn and that the role of the instructor is to facilitate such learning. He also emphasizes the importance of "learning to learn" and an openness to change.

Rogers' approach to learning evolved as part of the humanistic education movement and was based on his views about psychotherapy and a humanistic approach to psychology. It applies primarily to adult learners and significantly influenced other adult learning theorist such as Knowles and Cross.

## ANDRAGOGY

Although psychologists and educators have been concerned for many years with the best way to teach adults, Malcolm Knowles is often credited with having pioneered the field of adult learning. He played a significant role in the spread of adult learning theory awareness, knowledge, and popularity, and continued to refine his model over time based on input from peers. His original list of four basic assumptions about adult learners (number 2 to 5 below) expanded to six. The newest additions are motivation (number 6) and "need-to-know" (number 1).
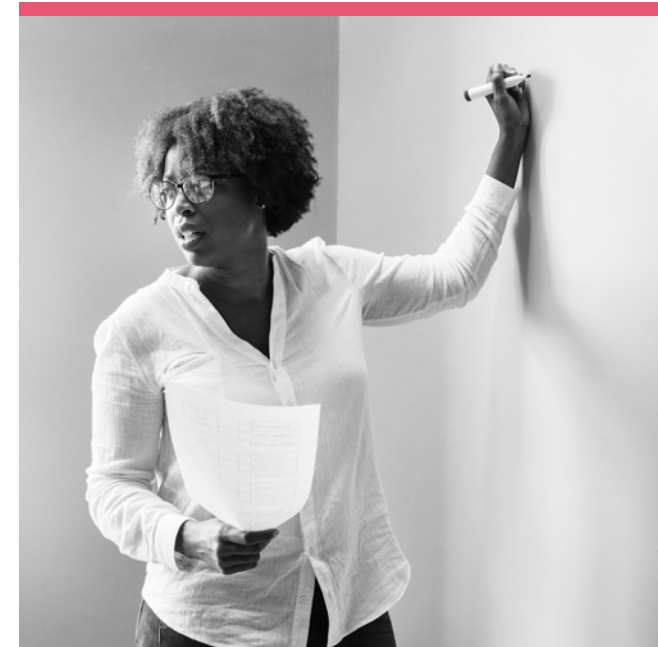
1. **Need-to-Know:** Adults need to know why they need to learn something before undertaking to learn it. This includes the benefits they will gain as well as the negative consequences of not learning it. At the very least, educators can make an intellectual case for the value of the learning in improving the effectiveness of the learners' performance or the quality of their lives. Tools that can raise the level of self-awareness via real or simulated experiences can help learners discover for themselves the gaps between where they are now and where they want to be. Personnel appraisal systems, job rotation, exposure to role models, and diagnostic performance assessments are examples of such tools.

2. **Self-Concept:** Adults have a self-concept of being responsible for their own decisions, for their own lives. They have a need to be seen by others and treated by others as capable of self-direction.

3. **Experience:** Adults enter educational activities with an accumulated reservoir of experiences that provide both beneficial and negative learning effects. Life experiences can be a resource for learning, as well as a strong foundation for or connection to new learning. But as adults accumulate experience, they also develop mental habits, biases, and presuppositions that can cause resistance to new ideas, fresh perceptions, or different ways of doing things.

4. **Readiness to Learn:** Adults become ready to learn new behaviors and skills in order to cope with real-life situations. They learn best when the achievement of new skills has immediate value in their professional or personal lives.

5. **Orientation to learning:** In contrast to children who are subject-centered (at least in school), adults are life-centered (or task-centered or problem-centered) in their orientation to learning. Adults are motivated to devote energy to learn something to the extent they perceive it will help them perform tasks or deal with problems that they confront in their life situations. Furthermore, adults learn new knowledge, skills, values, and attitudes most effectively in the context of application to real-life situations.

6. **Motivation:** While adults are responsive to some external motivators, such as better jobs, promotions, and pay raises, the most potent motivators are internal pressures such as a desire for increased job satisfaction, self-esteem, or better quality of life.

Knowles used his assumptions about adult learners to develop an associated set of assumptions about the design of adult learning:

1.  Prepare adults for learning. Tell them in advance why they need to learn something and what they can expect to learn as a result of their efforts. If possible, also involve them in the planning and evaluation of the instruction.

2.  Provide adults with learning activities based on experiential techniques vs. transmittal techniques (doing vs. being told about). Treat mistakes as opportunities for more learning.

3.  Learning for adults should be problem-centered rather than content or theoretically oriented. Adults need opportunities to apply and try out learning as quickly as possible.

4.  Adults learn best when the topic is of immediate value. Make instruction available when needed, and present it within the context of learner needs and experience.

In practical terms, instruction for adults should focus both on the process and on the content being taught. Strategies such as scenarios, role-playing, simulations, and self-evaluation are most useful.

## CRITERION REFERENCE INSTRUCTION (CRI)

Criterion Reference Instruction refers to a set of methods developed by Roger Mager and Peter Pipe for the design and delivery of instruction. The critical aspects of CRI include:

•   Identification of what needs to be learned via goal and task analysis

•   Exact specification of the outcomes to be accomplished and how they are to be evaluated (performance objectives).

•   Evaluation of learning in terms of knowledge and skills specified in the objectives (criterion referenced testing)

•   Development of instructional unites tied to specific objectives

CRI is based on the ideas of Mastery Learning and performance-oriented instruction, both endorsed by Benjamin Bloom and John Carroll. It incorporates many of the ideas found in Gagné's Conditions of Learning Theory (types and levels of learning, task hierarchies, objectives) and is compatible with most theories of adult learning because of its emphasis on learner initiative and self-management. The methods are particularly applicable to self-paced courses in which students learn at their own pace and take assessments to determine if they've mastered a module.

**Principles**

- Instructional objectives are derived from job performance and reflect the competencies that need to be learned.

- Students study and practice only those skills not yet mastered to the level required by the objectives.

- Students are given opportunities to practice each objective and obtain feedback about the quality of their performance.

- Students should receive repeated practice in skills that are used often or are difficult to learn.

- Students are free to sequence their own instruction within the constraints imposed by the pre-requisites, and progress should be controlled by their own competence (mastery of objectives).

- Students' attainment of desired levels of mastery is evaluated via test items that evaluate master in terms of the knowledge and competency specified in the objectives.

Skillsoft's Instructional Design Model, particularly the four cornerstones of objectives, content, strategies, and assessment, draw heavily on the criterion-referenced methods. The approach is well known throughout educational and training communities, but is particularly valued by corporate learning and training and development organizations.

## LEVELS OF LEARNING

Benjamin Bloom's Taxonomy of Learning Objectives is one of the most well-known approaches to classifying learning outcomes by level. This taxonomy, or classification system, identifies three domains of learning, each organized as

a series of levels of prerequisites. The taxonomy suggest that learning cannot effectively progress through lower to higher levels until the levels directly below have been covered and mastered.

The original concept applied to all three learning domains (cognitive, psychomotor, and affective), as part of their original work, Bloom and his associated established classifications for the cognitive and affective domains. Others later developed the taxonomy of learning levels and objectives for the psychomotor domain.

**Taxonomy of Cognitive Learning Objectives**

The learning levels identified within the Cognitive domain have received the most attention in workplace instruction, and are worthy of a brief review. Cognitive learning consists of six levels. Specific learning behaviors can be identified for each level, along with appropriate descriptive verbs that can be used for writing instructional objectives:

1. **Knowledge:** arrange, define, duplicate, label, list, memorize, name, order, recognize, reproduce state

2. **Comprehension:** classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate

3. **Application:** apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, write.

4. **Analysis:** analyze, appraise, calculate, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.

5. **Synthesis:** arrange, assemble, collect, compose, construct, create, design, develop, formulate, manage, organize, plan, prepare, propose, setup, write.

6. **Evaluation:** appraise, argue, assess, attach, choose, compare, defend, estimate, judge, predict, rate, core, select, support, value, evaluate.

**Taxonomy of Affective Learning Objectives**

The affective domain deals with feelings, emotions, attitudes and valuing. The cognitive and affective domains are related. As learners cognitively learn subject content they form judgments of its worth and value to them as a person or business professional. The affective domain consists of five levels, each requiring more involvement and commitment to the subject content and its underlying principles.

1. **Receiving:** Learners merely tolerate the subject content. They pay attention and can recognize facts or information associated with the affective content

2. **Responding:** Learners become sufficiently involved with the subject that they will seek it out and gain satisfaction in learning it. The learners actively attend and have a preference for the subject.

3. **Valuing:** When learners value subject matter, they are committed to it. They see it as being critically important to them.

4. **Organization:** As learners internalize values, they 1) organize the values in systems, 2) determine the relationships amongst the systems, and 3) establish the dominant and pervasive values.

5. **Characterization:** Values at this level now consistently guide learner behaviors. Values guide behavior without conscious forethought.

The work of Bloom and other taxonomies of learning outcomes is significant because it represents the first attempt to classify learning behaviors and provide concrete measures for identifying different levels of learning. The organization of levels and prerequisites suggests a basic sequential model for designing instruction, and provides a method of categorizing expected learning level maximums for specific instructional programs. For instance, instruction for technicians working within the cognitive domain may cover knowledge, comprehension and application, but not analysis or above. Conversely, training for full professional mastery might include all the technician-focused training, as well as analysis, synthesis and evaluation.

Bloom's taxonomy is an integral part of Skillsoft's design process. Each learning objective is classified first by domain and then by level. In the Business Skills content library, for example, a small percentage of the objectives (20% or less)

in every course must be based on the affective domain. Although the learning level is low (receiving), it represents an important learning focus. Receiving is a prerequisite to paying attention and ultimately putting the cognitive content into practice. Skillsoft courses do not typically include objectives from the psychomotor domain, although courses may touch on related content, such as mouse movements, keyboard strokes, or facial expressions and body movements.

Since the majority of content in Skillsoft courses is drawn from the Cognitive Domain, most of the course objectives are classified according to Bloom's Taxonomy of Cognitive Learning Outcomes. Skillsoft's instructional design standards also emphasize the importance of higher-level objectives. Learners want to be able to "do" as well as "know" which requires solid instruction covering lower level, as well as application and analysis level, content and objectives.

## MASTERY LEARNING

Mastery Learning is based on John Carroll's idea that most, if not all, students can achieve the same or similar levels of mastery given varying amounts of time and instructional strategies. This is in sharp contrast to the more traditional model that assumes differences in learning outcomes are based on differences in aptitude rather that instruction. This approach aligns nicely with corporate and business goals for training and professional development.

The theory depends heavily on developing measurable objectives against which learner achievements can be assessed. The key elements are:

- Clearly specifying what is to be learned and how it will be evaluated

- Allowing students to learn at their own pace

- Assessing student progress and providing appropriate feedback or remediation

- Testing for achievement of the final learning criterion

The Mastery Learning model is closely aligned with the use of instructional objectives and the systematic design of instructional programs. In fact, Mager's Criterion Reference Instructional model is an attempt to implement the

Mastery Learning Model. The concepts of individualized learning and the importance of feedback and reinforcement are also relevant to the model.

The challenge in mastery learning environments is providing enough time and employing instructional strategies so that all students can achieve the same level of learning. It calls for an organized plan and procedure for developing instructional materials or programs. Programs that closely adhere to its concepts and key elements, especially with regard to multiple learning paths, tend to require considerable time to develop and implement. Its practical shortcoming relates to the fact that people do differ in ability and tend to reach different ultimate levels of achievement.

Mastery Learning is evidenced in Skillsoft's courseware largely through course navigational features and interface design. No limits are placed on learning time or mastery attempts, and learners are allowed to repeat instruction as often as they choose.

## SOCIAL LEARNING THEORY/OBSERVATIONAL LEARNING

Social Learning Theory is associated with the work of Albert Bandura. It emphasizes the importance of learning through observing and modeling the behaviors, attitudes, and emotional reactions of others. Social Learning Theory explains human behavior in terms of continuous, reciprocal interactions between cognitive, behavioral, and environmental influences. Learning occurs by forming ideas about how new behaviors are performed after observing others, and then later using that information as a guide for action.

The underlying process include:

- Attention (degree of distinctiveness, attractiveness, and usefulness an individual, activity, or object possesses as a behavioral goal)

- Retention (coding, cognitive, organization, symbolic and motor rehearsal)

- Motor reproduction (physical reproduction, self-observation of reproduction, feedback)

- Motivation (external, vicarious, self-reinforcement)

**Principles**

- Organizing and rehearsing the modeled behavior symbolically and then enacting it overtly achieve the highest level of observational learning. Coding modeled behavior into words, labels, or images enhances retention.

- Individuals are more likely to adopt a modeled behavior if they value the resulting outcomes.

- Individuals are more likely to adopt a modeled behavior if the model is similar to the observer, has admired status, and if the behavior has functional value.

Social Learning Theory is the theoretical basis for the behavior modeling widely used in soft skills training, particularly for management and leadership skills training. Bandura showed modeling to be an effective shortcut to tedious and hazardous trial and error learning attempts. Simple mimicry augmented by extracting the rules underlying the modeled behaviors successfully generated new patterns. This aspect of Bandura's theory play a significant role in the design of the behavioral skills training in the Business Skills and Leadership Solutions area. It provides the theoretical basis behind the design of a new scenario-based leadership development program.

## COGNITIVE LEARNING STYLES AND PREFERENCES

Cognitive learning styles refer to the preferred way an individual receives and processes information. Not to be confused with individual differences in abilities described by Gardner and Guilford, learning styles describe typical

modes of thinking, remembering, or problem solving. Cognitive styles indicate an individual's tendency to behave in certain ways and are associated with personality rather than inherent abilities or intelligence. The assumption is that optimal learning occurs when learning activities and information design are aligned with the preferred style of the individual learner.

The field of research literature on learning styles is filled with discussion of concepts that are often similar, but described with varying terminology and descriptors. Kolb's Learning Styles are an outgrowth of his original work on what he calls the experiential learning cycle. In an experiential learning cycle, learners first have experience, reflect on them in small groups, complete readings and conceptualize, and then do active projects. Kolb formalized this theory and expanded it to include learning styles and characterized by types of learners aligned with two stages in the cycle. The stages–concrete experience, reflective observation, abstract conceptualization, and active experimentation–align with the North, East, South, and West points on a compass. The four learning styles–accommodating, diverging, assimilating and converging–fall into the quadrants between two of the stages in the cycle and are linked with learning preferences identified with those two stages of experiential learning. For example, an accommodator prefers concrete experiences and active experimentation.

Kolb continues to refine his original thinking on learning styles, and recently moved to a nine-style model with a tic-tac-toe grid instead of the four-quadrant grid. The more complex grid places more emphasis on balance and adaptation; individuals with more balanced styles are more flexible and adaptable to meet the needs of specific tasks or learning challenges.

The Learning Style Questionnaire (LSQ) developed by Honey and Mumford identifies a similar set of four styles— activist, reflector, theorist, and pragmatist. This model infers a person's learning style preference from the way the person solves problems or behaves in meetings.

The 4MAT framework, based on the work of Bernice McCarthy, suggests yet another four learning modes (analytic, imaginative, common sense, and dynamic), and has been widely applied in education.

Simpler approaches to learning style definition also flourish. For instance, Pask described a style called serialist versus holist. Serialists prefer to learn sequentially, and holists prefer to learn in a hierarchial or top-down manner.

**EFFECTIVE INSTRUCTION**
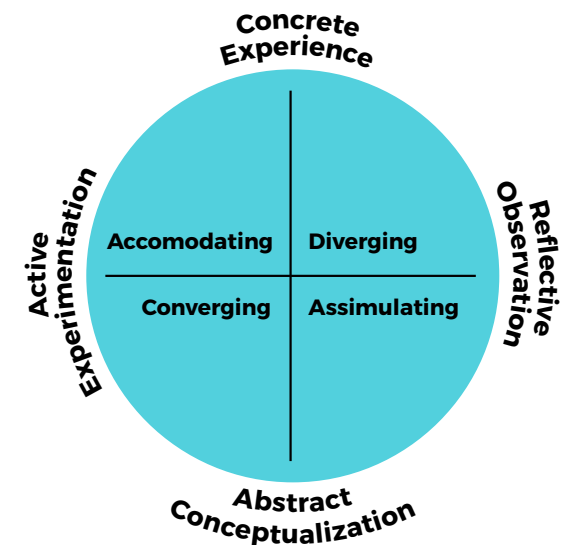
Media-based instruction has also popularized the notion of learning styles based on input modes, or the way individuals perceive and receive information. One such style includes four categories—auditory, kinesthetic, visual/verbal, or visual/nonverbal components. Another style describes three modes—auditory, visual, and kinesthetic.

Wading through the literature and terminology is only one challenge associated with learning styles. Ever since Kolb introduced learning styles to education in the mid-60s, educators have debated a series of unanswered questions:

- Is the theory predictable enough to be of use to educators and instructional designers?

- Is an individual's style constant, or does it adapt based on varying factors and conditions?

- Should learning be focused exclusively on an individual's preferred style?

- Is there empirical data to support correlating learning style with learning effectiveness? (This has recently been called into question.)

- Can instruction be designed to effectively adapt to more than one learning style across multiple learners?

These and other questions are targets of periodic interest in the trade journals and eLearning communities, but without any new clarification or resolution. The debate continues and has become more active of late, and with polarized views and opinions. The trade press energy underscores the appeal of learning styles and adaptive learning—not only to educators and designers who want to develop effective learning solutions, but also to learners, who are attracted to the idea of individualized learning.

Skillsoft continuously monitors the research and associated advancements in technology. In the meantime, the course design and development process continues implementing instructional strategies and course features in a manner that is palatable to and effective with as many learners and learning styles as possible.

## MICROLEARNING

Perhaps the newest instructional design principle underlying Skillsoft's latest courseware is microlearning. Microlearning is an instructional design strategy focused on providing learners with just-in-time performance

support as part of corporate training. It represents a training approach that is well-aligned to the way people work today. Microlearning breaks lessons into smaller chunks of information that employees can absorb on the job. In Skillsoft's courseware, microlearning often takes the form of 3 to 5-minute videos that can be accessed on demand. Microlearning modules can be shorter (as short as ninety seconds) or longer (up to ten minutes) depending on the training objective. It depends on the learner audience, the content, and the learning objectives of the course. In a typical Skillsoft "soft skill" business course, microlearning is enabled by structuring the full length course's (15-20 minutes of video instruction) as follows:

- A 30-second course overview

- 4-6 Topics in which the overall content of the course is divided into logical, cohesive 2.5 to 3 minute chunks
    - Topics, while part of the overarching course, must be able to stand alone per their individual content
      and focus

- Final "Let's Review" 30 second summary topic

The microlearning approach breaks down the longer learning curriculum into more easily consumable pieces of information by dividing it up into core instructional components that are brief and targeted. The goal is to deconstruct a course or module to form the essential building blocks of information that can be personalized according to the needs of the learner. Each microlearning topic addresses just one learning objective so that the learner focusses on that "one" highlighted objective of the module in order to ensure that the knowledge is effectively transferred.

Microlearning gives instructional designers the ability to design more personalized courses by providing learners with the flexibility to only access the parts of the course that are relevant to them, while skipping those they do not require. Personalized microlearning enables "continuous learning" and knowledge acquisition to meet an extended learning goal. Using microlearning content, learners can set their own goals, learn at their own pace, and access the information from the device of their choice. This flexibility to learn on the go, anytime and anywhere, leads to greater absorption of the learning materials and hence consequently provides better outcomes. Also, microlearning is well suited for distributed practice and spaced repetition. It enables opportunities for "metacognition", which is the experience of stepping back and contemplating what has just been learned.

The instructional design principles reviewed in this paper need not be abandoned in the development of courseware using a microlearning approach. For example,  Skillsoft's microlearning courseware includes a 30-second "Course Overview" as a standard opening for all feature levels, a "Knowledge Check" topic containing at least one practice question per tested objective (in alignment with the associated test strategy,) an overall course assessment (aligned to the topic objectives and with two questions per tested objective,) a job aid comprised of key information useful as a course takeaway and a final "Let's Review" 30-second summary topic for Scenario-based and Panel-discussion formats.

There are also design elements that we incorporate into our courseware that make the microlearning content as impactful as possible. The most critical of these is that we match the course's instructional strategy to the learning objectives. For example, for soft skill competencies in our business and leadership content we use scenario video to demonstrate behaviors in relatable business situations and we reinforce that with onscreen subject matter experts providing insight and expertise related to the instructional concepts. For business technical content we may use 3D animations, iconography, and onscreen text to reinforce key instructional messages and deconstruct the concepts so they are more accessible to the learner.

Also, every course is designed to minimize cognitive load. We accomplish this by:

- Using an ideal balance of narration, visuals and text by eliminating extraneous visuals, text and audio

- Using diagrams (where appropriate) to help learners build deeper understanding or using specific graphic mock-ups for any charts, tables, or concepts that must be conveyed in a particular way to properly align with instruction

- Incorporating cues and signals to focus attention on important visual and textual content

- Integrating explanatory text close to related visuals on screens to avoid split attention

- Displaying onscreen graphic text that reinforces all tested attributes

- Minimizing friction and distraction in the background

We also make every effort to incorporate pragmatic issues, problems and situations to accelerate the route to application and provide performance aids as external memory supplements. One of the approaches that Skillsoft also deploys in our microlearning content is "interleaving." Psychologists have found that people learn better when different types of information are "interleaved" or mixed up in unexpected ways in a course, instead of always being presented in an orderly, predictable fashion. Finally, the focus in content experience design is on conveying meaning, not rote information transfer. In doing so we use a conversational tone rather than an overly authoritative tone.

## FUTURE RESEARCH TO INFORM SKILLSOFT'S INSTRUCTIONAL DESIGN MODEL

Skillsoft is constantly seeking ways to improve the effectiveness of its instructional design model. This is why we partnered with the Massachusetts Institute of Technology's Office of Digital Learning and Accenture to embark on an extensive research initiative that will delve into the science of learning. We want to better understand the instructional strategies that best stimulate learner engagement and interest.

Some of the planned experiments for the research study include:

• Assessing the impact of scenario-based versus instructor-led video content on recall.

• Analyzing the impact of presenting material to the learner in advance of the video, such as a preview or outline of the content, or a pre-assessment so the learner understands the gap in their knowledge.

• Reviewing the impact of interpolated testing or quizzes within the videos to see how it influences interest and retention.

• We also plan to look at the impact of having the learner author their own "relevance statement" before watching the video, to determine if this association with their everyday life has a meaningful influence on retention. Some studies suggest that the mere act of writing this paragraph increases a learner's intrinsic interest in the course content and improves learning outcomes. Again, we seek to validate this through our research.

- Finally, we want to assess the learner's mindset (growth/grit) to understand whether people with a growth mindset and more "grit" learn regardless of the course video quality or if more interesting videos are truly the deciding factor.

Phase one of our research involves a virtual pilot and phase two involves a simultaneous fMRI-EEG experiment. We plan to run fMRI-EEG readings within a laboratory setting at MIT to visibly monitor and measure the activity within the brain under each experiment. As background, the bulk of learning research is done using fMRI technology which identifies where cognitive processes are taking place in the brain and how different brain parts are connected, whereas EEG sees the overall state of regions of the brain with precise timing. These state-of-the-art technologies will provide definitive insight on how our brains process information in Skillsoft courseware.

In other words, through the project we will determine whether good learners have a fundamentally different neural network as seen in fMRI and if so, whether that translates to different neural states as seen in EEG. Once fMRI learning research is translated into EEG in the laboratory setting, we will then be able to apply EEG to real employees and assess learning in a real work environment.

Some of the questions that we hope to answer in the fMRI and EEG phase of the project include the following:

- Do people who learn better from videos have fundamentally different neural network connectivity?

- Do people with growth mindset have a different neural network than those with fixed mindset?

- Do the interest factors in video-based courses improve employees' focus and decrease mind wandering as measured by fMRI & EEG?

- Are there age differences in focus/mind wandering based on the interest factor in the video course as measured by fMRI & EEG?

This kind of research to better understand the effectiveness of different instructional strategies in courseware design has not previously been performed using scientifically rigorous research methods, so there is tremendous potential to produce vital research in the field of brain science as it relates to the use of courseware for corporate learning. The results of this research will provide the basis for the development of a future white paper.

## SUMMARY

Learning design is a core foundation of Skillsoft's eLearning solutions. Teamed with enabling technologies and professional services, we design and develop the highest quality courseware possible. We continue to evolve our instructional design model based on practical needs (microlearning) and the latest research in brain science. Skillsoft has established a distinguished track record of continuous improvement and industry recognition and we are committed to maintaining that reputation and to the continued application of learning theory and instructional design principle to the development of highly effective, interactive, and engaging learning experiences.

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## ABOUT THE AUTHOR

Heide is Senior Vice President of Skillsoft's training and development content and is also responsible for its Leadership & Business Skills content portfolios. She joined Skillsoft in 2016 and is responsible for driving innovation across all content areas.

Heide has extensive experience in the publishing, media, educational technology & corporate training sectors. Prior to joining Skillsoft, she spent almost a decade working at Harvard Business Publishing, where she developed award-winning eLearning products in the leadership and business skills content areas, including interactive simulations, video-based courses, case studies and experiential learning solutions. Prior to that, she held several roles at the global publishing and media
giant, Bertelsmann.

Heide is passionate about leveraging technology to improve the practice of management. She is also a thought leader in the areas of training and development and management and leadership. She has been quoted in numerous publications including  Forbes, The Economist, CLO Magazine, HR Drive, Business Insider, INC., Deal Crunch and Learning Solutions, to name a few. She is also a frequent participant in panel discussions and presenter at leading industry conferences. Because Heide has also held leadership roles in product development, innovation and product management at Fortune 100 companies, she truly has her finger on the pulse of what organizations need to train and develop today's workforce, especially in a digital economy.

Heide holds an MBA with distinction from Harvard Business School and is on the faculty of the Management and Organization Department of Boston College's Carroll School of Business.

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## ABOUT SKILLSOFT

Skillsoft is the global leader in corporate learning, delivering beautiful technology and engaging content that drives business impact for modern enterprises. Skillsoft comprises three award-winning solutions that support learning, performance and success: Skillsoft learning content, the Percipio intelligent learning platform and the SumTotal suite for Human Capital Management.

Skillsoft provides the most comprehensive selection of cloud-based corporate learning content, including courses, videos, books and other resources on Business and Management Skills, Leadership Development, Digital Transformation, IT Skills and Certification Training, Productivity and Collaboration Tools and Compliance. Percipio's intuitive design engages modern learners and its consumer-led experience accelerates learning. The SumTotal suite features four key components built on a unified platform: Learning Management, Talent Management, Talent Acquisition and Workforce Management.

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