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Two-Dimensional Versus Three- Dimensional Curriculum Models

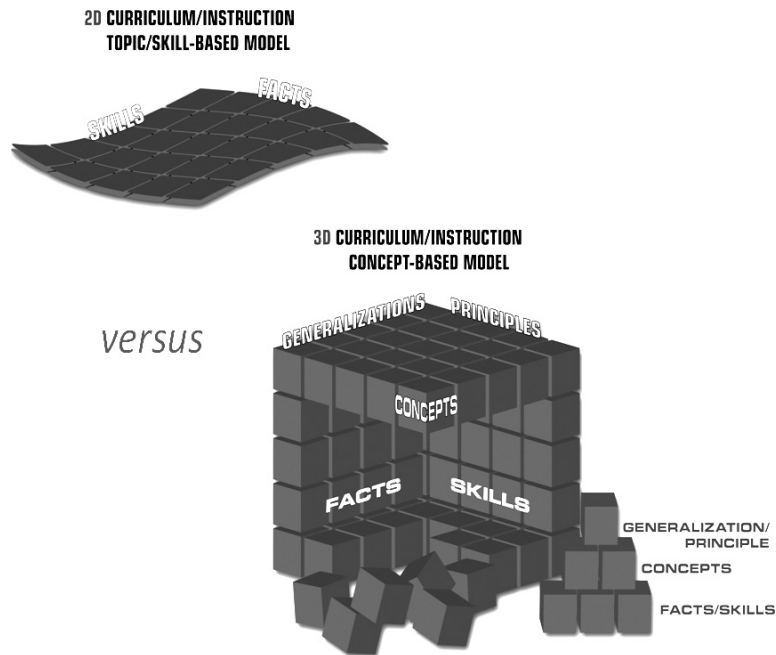
CONTRASTING THE TWO-DIMENSIONAL AND THREE-DIMENSIONAL MODELS

There is a significant difference between the traditional model of curriculum design based on verb-driven objectives (List . . . , Analyze . . . , Identify), and the concept-based models of curriculum design. We can characterize this difference as a two-dimensional design versus a three-dimensional design as illustrated in Figure 2.1. The two-dimensional model driving traditional curriculum design focuses on facts and skills and generally *assumes* deeper, conceptual understanding. This model can produce the often quoted “inch-deep, mile-wide” approach to curriculum design. The three-dimensional, concept-based model however, recognizes the critical importance of the conceptual level to create deep knowledge, transferable understanding, and higher-order thinking. The three-dimensional

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In the three-dimensional model, topics, facts, and skills remain important components of the model, but the third dimension of concepts, principles, and generalizations

Figure 2.1 Two-Dimensional Versus Three-Dimensional Curriculum Models

Source: Copyright 2012 by H. Lynn Erickson.

ensures that conceptual thinking and understanding are prominent in the design of curriculum and instruction. The topics, facts, and skills support conceptual thinking and understanding. The three-dimensional model shows the important components that must be included when designing curriculum; but does so in a visual that creates a sharp contrast with the traditional and simplistic two-dimensional coverage model. This is not to say that a two-dimensional model contains no conceptual focus, but rather that conceptual understandings are not clearly distinguished from factual and skill expectations. All disciplines have a conceptual dimension. Deep understanding and the transfer of knowledge and skills require that teachers understand the relationship between the factual/skill level and the conceptual level, and use this relationship effectively in instruction. Teaching for deeper conceptual understanding differs dramatically from teaching for memorized factual knowledge. The curriculum must address these two levels explicitly to support teachers in their planning.

The purpose of contrasting the two-dimensional and three-dimensional models is to graphically illustrate where curriculum and instruction have been historically—and how they need to be adapted if we are to meet the intellectual challenges we will continue to face locally and globally. In the next section we share the Structures of Knowledge and Process as three-dimensional, concept-based models.

INTRODUCING THE STRUCTURES OF KNOWLEDGE AND PROCESS

In 1995 Lynn Erickson put a model for the Structure of Knowledge in her first book, *Stirring the Head, Heart and Soul: Redefining Curriculum and Instruction*. The Structure of Knowledge shows the relationship between the Topics and Facts taught in classrooms with related concepts, generalizations, principles, and theories.

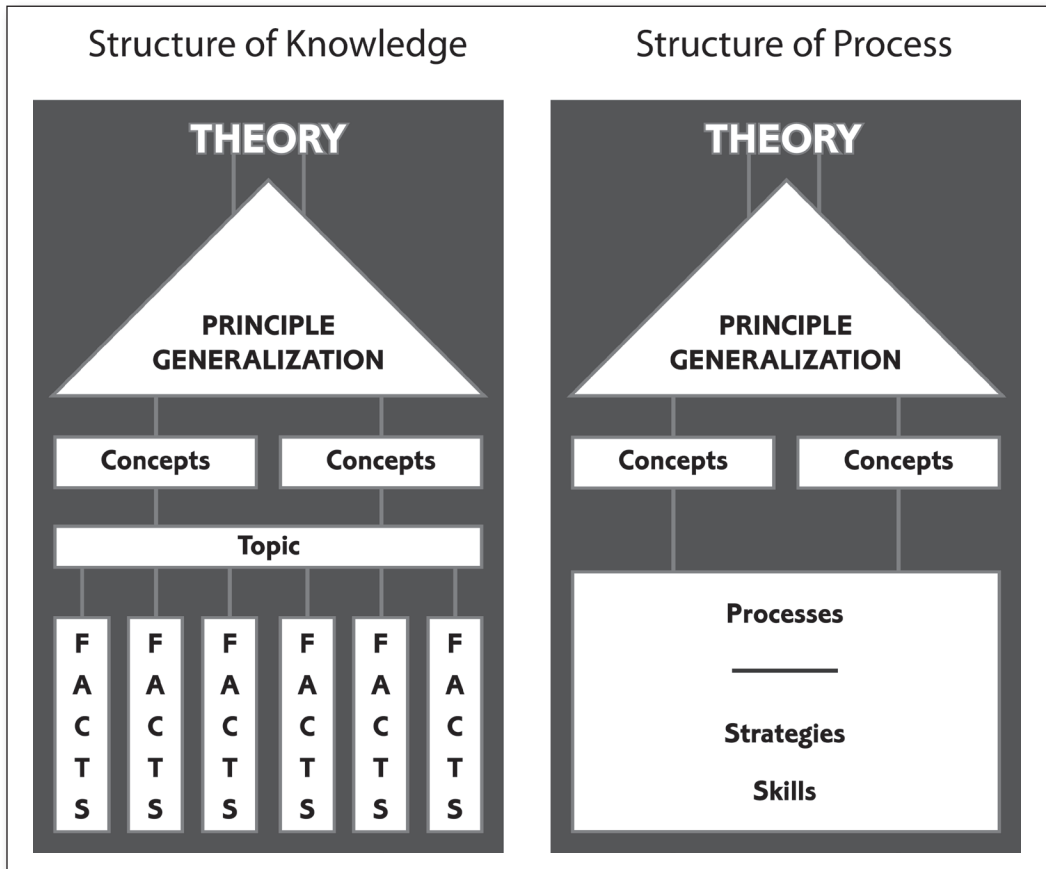
The Structures of Knowledge and Process are complementary models with a symbiotic relationship.

In 2013, Lois Lanning shared her work with the Structure of Process in a book titled *Designing a Concept-Based Curriculum for English Language Arts: Meeting the Common Core With Intellectual Integrity, K–12* (Lanning, 2013).

After working with Lynn Erickson for 18 years as a colleague on concept-based curriculum and instruction she brought her expertise in the English language arts area into a curriculum design model that addresses process subjects like English language arts, world languages, and the arts. The Structure of Process illustrates that the content of English language arts (Processes, Strategies, and Skills) does indeed suggest critical concepts that are combined to craft Generalizations and Principles. These generalizations and principles are the deeper conceptual understandings that give relevance to the processes, skills, and strategies. This understanding is essential to prevent perfunctory application of skills, and to support the appropriate transfer of complex skills across multiple contexts and situations. When understood, appropriate processes, skills, and strategies are applied to outside content to create meaning (Lanning, 2013). Both the Structure of Knowledge and the Structure of Process are complementary three-dimensional, concept-based models. It is helpful at this point to share an example of a process-based performance expectation and a generalization drawn from the concepts embedded or implied within the skill performance to show the difference in sentence construction:

Expected Process-Based Performance: Report on a topic, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace (Source: U.S. Common Core State Standards for English Language Arts 4.SL.4)

Generalization (Conceptual Understanding): To be clearly understood, effective presenters adapt their message and presentation style according to purpose and audience.

Figure 2.2 The Structures of Knowledge and Process

Source: Copyright 1995 by H. Lynn Erickson

Source: Copyright 2012 by Lois A. Lanning

The generalization clearly informs the teacher of the important, transferable idea to teach toward. The Standard alone could easily be considered as discrete skills to be covered in an activity.

Figure 2.2 shows the complementary nature of the two structures. The Structure of Process fills a void that has existed in understanding concept-based curriculum and instruction for process-driven subjects like English Language Arts, World Languages, and the Visual and Performing Arts. The Structure of Knowledge works well when the driver of the subject area is factual or conceptual content (e.g., history, mathematics). But other subjects, such as English language arts, are framed by processes, strategies, and skills that are then applied to content drawn from a variety of sources (Lanning, 2013).

THE INTERPLAY OF PROCESS AND KNOWLEDGE

Process and knowledge are the duo of dance. Neither can perform without the other.

Imagine trying to—

Read a book _____ with blank pages.

Fly an airplane _____ with no knowledge or understanding of instruments and concepts like *lift*, *airspeed*, and *direction*.

Solve a problem _____ with no problem.

Process and knowledge are complementary and have a symbiotic relationship. Knowledge by itself is quite inert and of little use until it is put into action through a process that includes strategies and skills. And processes like reading, writing, thinking, analyzing, producing, or creating cannot operate meaningfully without content. But the relationship is flexible. Any number of processes, strategies, and skills can be applied to particular content. For example, if I am working on the topic of “Climate Change,” I may choose to apply any of the following processes, strategies, or skills when learning about the topic:

- Analyze scientific data using multiple sources of text including verbal, visual, and electronic
- Create mathematical models to represent statistical data
- Develop economic predictions based on the analysis of statistical data
- Write a position paper for a specific audience that addresses a problem and supports a position with reasoned argument

It is for this reason—that any number of skills can be applied to the study of content—that we should allow teachers to choose which skill to apply to specific topics or content as they design learning experiences for their students. But this means that teachers have a responsibility to internalize the *skill sets* as required in state academic standards or national curricula for their subjects and grade level; and to draw from the full complement of skills in designing the learning experiences and assessments

throughout the year. Teachers also need to be cognizant of the appropriate developmental sequence for skills in subjects like language arts, world languages, or mathematics.

Traditionally, mathematics has been viewed as a distinct set of procedures to be memorized and carried out. However, most ideas in mathematics that can be solved procedurally also lend themselves to exploration, reasoning, and pattern-seeking. In fact, the U.S. Common Core State Standards for Mathematics (CCSSM) highlight the importance of connecting content standards with the Standards for Mathematical Practice (Common Core State Standards Initiative, 2010b, pp. 6–8), which include:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Mathematics is a different way of thinking and processing information. It was developed to gain a deeper understanding of phenomena in our world. Therefore, it needs to be applied across subject areas.

Mathematics, science, and the other subject areas are three-dimensional constructs of factual knowledge, conceptual understandings, and skills. In the next section we will consider classroom descriptions of curriculum documents to determine fidelity to concept-based design principles.

CONTRASTING INSTRUCTIONAL DESCRIPTIONS

Three-dimensional, concept-based classrooms exhibit certain characteristics that place them in sharp contrast to traditional two-dimensional classrooms. One of the instructional unit overviews below exemplifies concept-based characteristics, and one does not. Can you identify which overview indicates a concept-based unit plan? What characteristics led you to this conclusion?