

An excerpt from: What is concept-based curriculum and instruction?

Erickson, H.L. (2012). *Concept-based teaching and learning*. Paris: International Baccalaureate Organization.

Concept-based curriculum and instruction is a three-dimensional design model that frames factual content and skills with disciplinary concepts, generalizations and principles. Concept-based curriculum is contrasted with the traditional two-dimensional model of topic-based curriculum, which focuses on factual content and skills with **assumed** rather than deliberate attention to the development of conceptual understanding and the transfer of knowledge (see Figure 1).

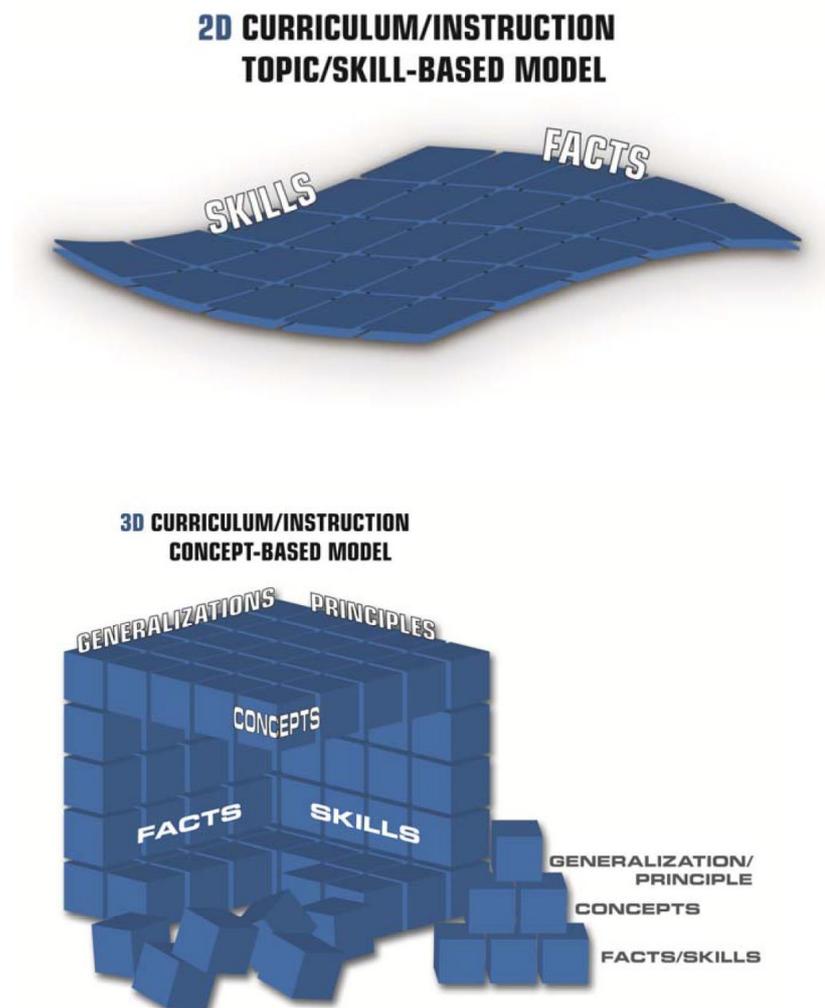


Figure 1. Two-dimensional and three-dimensional curriculum and instruction (taken from Erickson 2008).

Two-dimensional curriculum models focus on facts and skills with the goals of content coverage, analysis and the memorization of information. Three-dimensional models focus on concepts, principles and generalizations, using related facts and skills as **tools** to gain deeper understanding of disciplinary content, transdisciplinary themes and interdisciplinary issues, and to facilitate conceptual transfer through time, across cultures and across situations. Three-dimensional models value a solid base of **critical** factual knowledge across the disciplines, but they raise the bar for curriculum and instruction by shifting the design focus to the conceptual level of understanding. This focus necessarily requires a supporting role for factual knowledge.

A corollary goal of concept-based instruction that is seldom stated overtly is development of the intellect. In a concept-based instruction model teachers use the facts in concert with concepts and generalizations to effect higher order, synergistic thinking. Facts provide the foundation and support for deeper, conceptual thinking and understanding. Three-dimensional concept-based curriculum models value student inquiry and constructivist learning to support personal meaning-making.

The research and agreement on the importance of conceptual understanding is undeniable. From the National Council of Teachers of Mathematics (NCTM) (2009) we hear the call:

Any national mathematics curriculum must emphasize depth over breadth and must focus on the essential ideas and processes of mathematics (p 1).

...research on the learning of complex subjects such as mathematics has solidly established the important role of *conceptual understanding* in the knowledge and activity of persons who are proficient (p 2).

One of the strongest research summaries supporting the importance of conceptual understanding can be found in *How People Learn: Brain, Mind, Experience and School* (Bransford et al 2000), published by the National Academy of Sciences and the National Research Council.

Experts' knowledge is connected and organized around important *concepts* (eg, Newton's second law of motion) (p 9).

To develop competence in an area of inquiry, students must: a) have a deep foundation of factual knowledge, b) understand facts and ideas in the *context of a conceptual framework*, and c) organize knowledge in ways that facilitate retrieval and application (p 16).

... organizing information into a *conceptual framework* allows for greater *transfer*; that is, it allows the student to apply what was learned in new situations and to learn related information more quickly (p 17).

Anderson and Krathwohl's book (2001) updated Benjamin Bloom's *Taxonomy of Educational Objectives* (1956), and further supports the need to teach for deeper conceptual understanding.

By separating factual knowledge from conceptual knowledge, we highlight the need for educators to teach for *deep understanding of conceptual knowledge*, not just for remembering isolated and small bits of factual knowledge (p 42).

Students *understand* when they build connections between the "new" knowledge to be gained and their prior knowledge. More specifically, the incoming knowledge is integrated with existing schemas and cognitive frameworks. Since concepts are the building blocks for these schemas and frameworks, *conceptual knowledge* provides a basis for understanding (p 70).

Beyond the research, the importance of conceptual structures for disciplinary content just makes logical sense.

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There are many benefits to a concept-based model.

- Thinking—It requires thinking students who draw on critical, creative, reflective and conceptual thinking abilities.
 - Facilitates "synergistic thinking"—the cognitive interplay between the factual and conceptual levels of thinking.
 - Requires deeper intellectual processing as students relate the facts to key concepts and principles.
 - Develops conceptual structures in the brain (brain schemata) to relate new knowledge to prior knowledge, and to illuminate the patterns and connections of knowledge.
 - Facilitates the transfer of knowledge at the conceptual level.
 - Provides opportunities for personal meaning-making through processes of thinking, creating and reflecting.
- Intercultural understanding—It develops intercultural understanding and international-mindedness through conceptual transfer.
 - Facilitates the transfer of learning across global contexts as students engage with concepts and conceptual understandings as reflected across unique and varied cultures.
 - Encourages inquiry into global issues of concern that draw out the multiple perspectives and situations of different cultures and nations.
- Motivation for learning—It recognizes that intellectual and emotional engagement are essential to the motivation for learning.
 - Increases motivation for learning by inviting students to think about the facts through a relevant and personally engaging key concept. The unit topic and the key concept have an iterative relationship—each reinforces the other, for example, considering the facts about "Global conflicts in the 21st century" through the conceptual lens of perspectives, or considering facts about "Our land and people" through the lens of identity.