Theory and Research Supporting the Montana Guide to Curriculum Development

Delineating the underpinnings for a theory of a Montana guide to curriculum development is a challenging task. First, the theory needs to refer to the giants—the writers and thinkers in the field whose work helps to define our task. The theory should explain how the structure of knowledge is related to a model for curriculum. It should also reference what research tells us about how people learn best. Finally, the theory should provide users of the curriculum guide with enough direction to help ensure that materials, tasks, and products exemplify the principles around which the theory has been developed—in a user friendly format.

Referring to the Giants

In looking to the leading thinkers in the field to find out what is known about the hallmarks of good curriculum these heroes surfaced:

- William James
- Alfred North Whitehead
- John Dewey
- Hilda Taba
- Ralph Tyler
- Benjamin Bloom
- Jerome Bruner
- Carol Ann Tomlinson
- Sandra Kaplan
- Jann Leppien
- Jean Purcell
- H. Lynn Erickson
- Grant Wiggins
- Jay McTighe

A synthesis of their thinking suggests that good curriculum should:

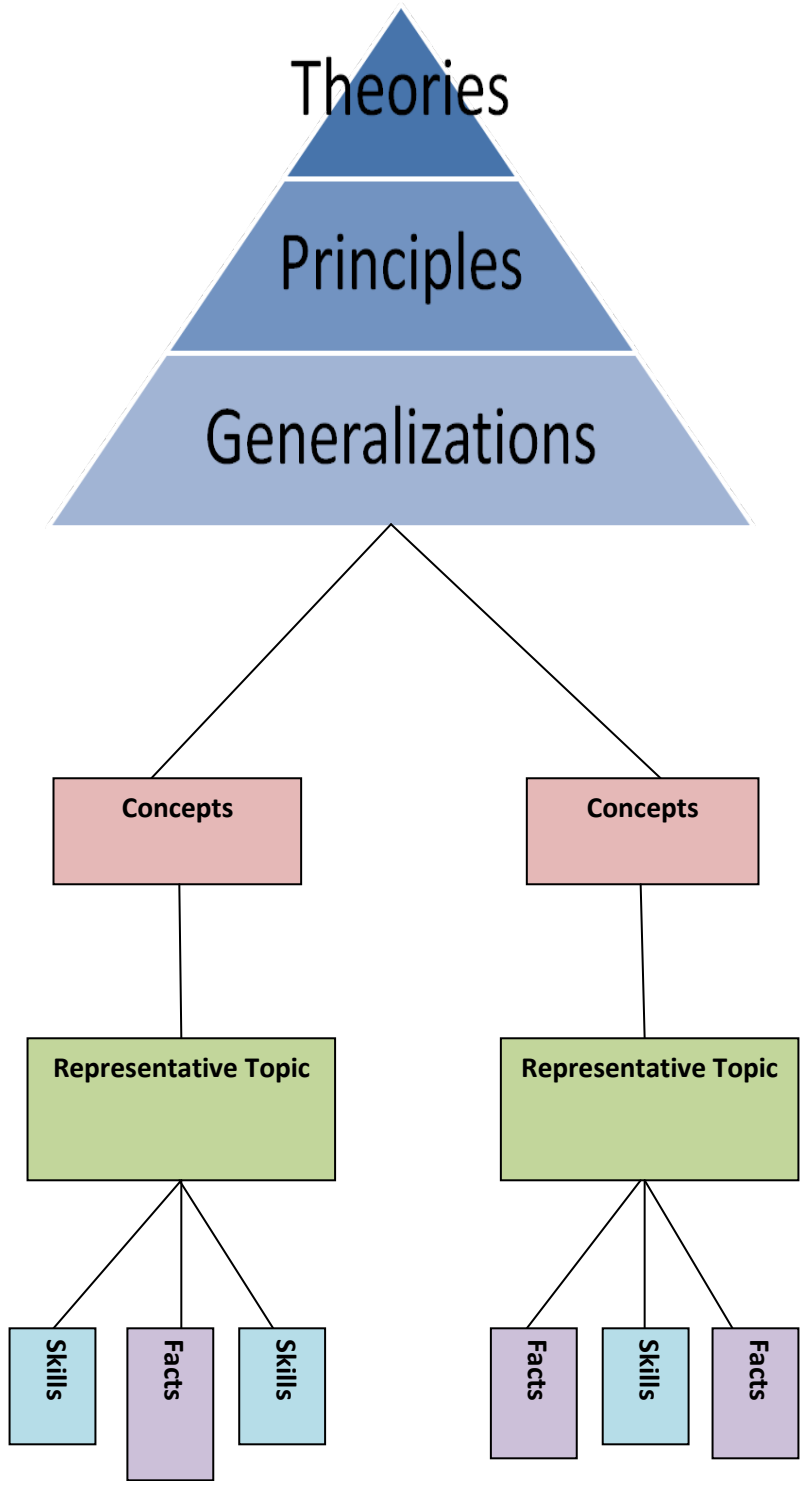
- Be organized around the structure of knowledge
- Reflect content selection and procedures (student tasks) that will help maximize the in-depth understanding and transfer of knowledge, understanding and skills

- Have a clear focus on the essential facts, understandings and skills that professionals in the disciplines value most (delineated in the state standards) and select content (representative topics) that best represent the essential structure of the disciplines
- Respect the unique characteristics of the learner
  - ❑ Recognize and support the need of each learner to make sense of ideas and information, reconstructing older understandings with new ones.
  - ❑ Address interest and readiness levels
- Place a premium on the development of process skills (including skills of inquiry, thinking skills and 21st century skills) as well as the appropriate use of methodology within content fields
- Be aligned
  - ❑ all component parts
  - ❑ with the goal of in-depth understanding (Tomlinson)

Structure of Knowledge

The content teachers and students wrestle with in the classroom--history, science, mathematics, the study of language--all comes from the disciplines. "The disciplines have evolved as discrete entities over centuries as the result of the different kinds of questions researchers have asked and the different research methodologies they have developed to answer them." (Renzulli) Knowing that in order to design effective curriculum it is necessary to better understand how knowledge within a discipline is constructed, Hilda Taba, a powerful and insightful educator in the 1950s and 60s became a primary source. She advocated teaching to the deeper understanding of concepts and main ideas (transferrable, conceptual understandings) rather than focusing on superficial coverage of the factual information (Taba).

Referencing Taba's work, as well as H. Lynne Erickson's *Concept-based Curriculum and Instruction for the Thinking Classroom*, the following graphic was developed to describe the structure of knowledge:


Theories
Principles
Generalizations
Concepts
Concepts
Representative Topic
Representative Topic
Skills
Facts
Skills
Facts
Skills
Facts

(Erickson)

Theories: Explanations of the nature or behavior of a specified set of phenomena based on the best evidence available. “The big bang theory of the universe.” “The land bridge of early human migration.”

Principles: Two or more concepts stated in a relationship. Usually considered to be the foundational truths of a discipline. “The supply and demand of goods and services affect cost.” “Any straight line can be extended indefinitely in a straight line.”

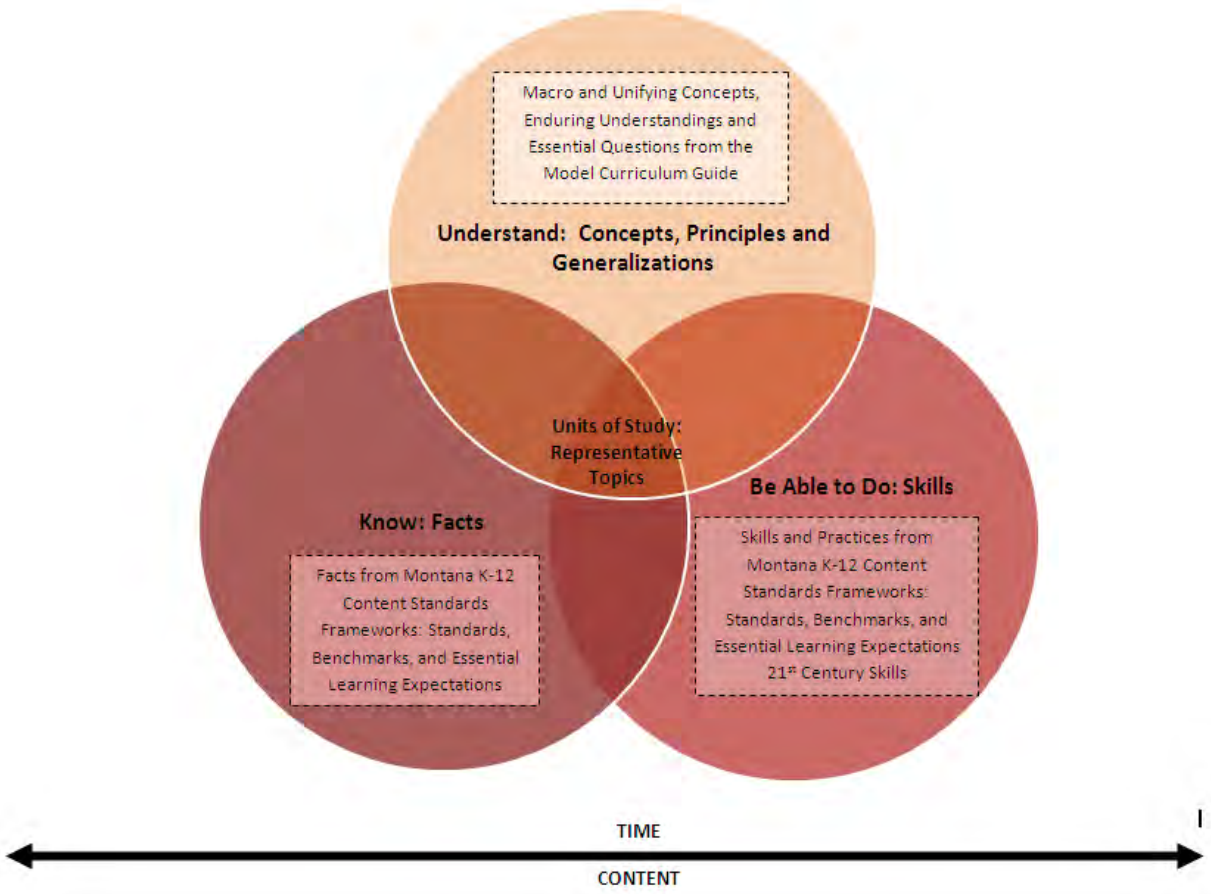
Generalizations: Two or more concepts stated as a relationship – essential learnings or understandings; the "big ideas" related to the critical concepts and topics of a study (e.g., “Organisms adapt to changing environments in order to survive.” “Numbers can be added together in different ways to reach a common sum.”)

Concepts: One- or two-word concepts are abstract, timeless, transferable and universal. Concepts may be very broad macro-concepts, such as “change,” “system,” or “interdependence”; or they may be more topic specific, such as “organism,” “habitat,” or “culture.”

Topics: The lens through which content is explored such as “Causes of the Revolution, “Rocks and Minerals,” or “Geometry.”

Facts: Defined in the Montana Content Standards

Skills: Defined in the Montana Content Standards (Erickson)


Macro and Unifying Concepts, Enduring Understandings and Essential Questions from the Model Curriculum Guide
Understand: Concepts, Principles and Generalizations
Units of Study: Representative Topics
Know: Facts
Facts from Montana K-12 Content Standards Frameworks: Standards, Benchmarks, and Essential Learning Expectations
Be Able to Do: Skills
Skills and Practices from Montana K-12 Content Standards Frameworks: Standards, Benchmarks, and Essential Learning Expectations
21st Century Skills
TIME
CONTENT

How People Learn

In creating a conceptualization about how people learn best, sources such as *How People Learn* (Bransford)*, How Students Learn History, Science and Mathematics in the Classroom* (Donovan), curriculum models of Understanding by Design and the Parallel Curriculum Model provided research and insight. All of them support the notion that helping students organize their learning around big ideas and transferable concepts is essential.

The 2005 publication, *How People Learn: Brain, Mind, Experience, and School* delves into scientific findings from studies of people who have developed expertise in a variety of areas. Of course, not all school children are expected to become experts, but the study of expertise does show what the results of successful learning look like. “The studies found that experts’ knowledge is not simply a list of facts and formulas that are relevant to their domain; instead, their knowledge is organized around core concepts or "big ideas" that guide their thinking about their domains.” (Bransford)

“The idea that experts recognize features and patterns that are not noticed by novices is potentially important for improving instruction. Research on expertise suggests the importance of providing students with learning experiences that specifically enhance their abilities to recognize meaningful patterns of information.” (Bransford)

“The fact that experts' knowledge is organized around important ideas or concepts suggests that curricula should also be organized in ways that lead to conceptual understanding. Many approaches to curriculum design make it difficult for students to organize knowledge meaningfully. Often there is only superficial coverage of facts before moving on to the next topic; there is little time to develop important, organizing ideas.” (Bransford)

In an effort to apply this important research to what actually happens in classrooms the National Academies Press published *How Students Learn: History, Mathematics, and Science in the Classroom*. The authors make the following points:

1. Students come to the classroom with preconceptions about how the world works. If their initial understanding is not engaged, they may fail to grasp the new concepts and information, or they may learn them for purposes of a test but revert to their preconceptions outside the classroom.
2. 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.

3. A "metacognitive" approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them. (Donovan)

What do Teachers Need from Curriculum Guides?

The last consideration in developing the theoretical underpinnings of the guide is that all component parts be aligned, lead to in-depth understanding and be responsive to teacher needs.

From a timely September 2010 article in *Educational Leadership* "Among Colleagues: What do Teachers need from Curriculum Guides," the following comments informed development of this guide:

> "Begin with the end in mind. What do I want students to understand when teachers have finished instruction?"
>
> "My advice is to err on the side of less. Give teachers a guide, not an 'everything' bagel."
>
> "The staff development that supports the new curriculum is as important as the new curriculum itself." (Among colleagues: what do teachers need from curriculum guides?)

The Third International Mathematics and Science Survey (TIMSS) criticized curricula that were "a mile wide and an inch deep" and argued that this is much more of a problem in America than in most other countries. Research on expertise suggests that a superficial coverage of many topics in the domain may be a poor way to help students develop the competencies that will prepare them for future learning and work. This guide to curriculum development seeks to help address this fundamental issue of American schools. (Wang)

Works Cited

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