Next Level Differentiation: Infusing Creative and Critical Thinking into Learning Design

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Texas approved a statewide goal for gifted education 30 years ago, and not one word of it has changed.

Do your best to state or summarize the goal with those near you.
Texas Goal for Gifted Education

Students who participate in services designed for gifted/talented students will demonstrate skills in self-directed learning, thinking, research, and communication as evidenced by the development of innovative products and performances that reflect individuality and creativity and are advanced in relation to students of similar age, experience, or environment.

High school graduates who have participated in services for gifted/talented students will have produced products and performances of professional quality as part of their program services.
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Differentiation in Texas

Districts meet the needs of gifted/talented students by modifying the depth, complexity, and pacing of the curriculum and instruction ordinarily provided by the school.
Next Level Differentiation

Pre-Planned and Written
Systematic and Aligned

Integrated with Content Outcomes
Assessment Connection

Differentiation
Next Level Differentiation

Infusion

Creative Thinking

Critical Thinking
Why Creativity?
Creativity and Gifted Education

Where creativity goes—and, by extension, wherever talent goes—innovation and economic growth are sure to follow.

Creativity in Gifted Education (Renzulli, 1978)
Creativity in Gifted Education

Schoolhouse Giftedness and Talent

• Refers to test-taking, lesson-learning, or academic giftedness or talents. Individuals who fall into this category generally score well on more traditional intellectual or cognitive assessments and perform well in school.

Creative/Productive Giftedness and Talent

• Reflected in individuals who tend to be or have the potential to become producers (rather than consumers) of original knowledge, materials, or products and who employ thought processes that tend to be inductive, integrated, and problem oriented.

- Renzulli (1986)
Importance of Creativity

The development of creative thinking, creative production, and creative dispositions ought to be a priority in gifted education.

• Skills of creativity are expected more than ever in the current knowledge-based economy.

• Demands of the creative class workforce:
  a) Deep domain expertise
  b) Well-developed creative capacity
  c) Problem-solving, design, and innovation skills
Cognitive Creativity
Creative Pedagogy in Gifted Education Learning Designs
Cognitive Versus Ornamental Creativity

**Cognitive Creativity**

Creativity Involves

a) Generating Ideas
b) Finding and Solving Problems
c) Developing authentic products
d) Identifying trends and making predictions
e) Combining ideas and concepts
f) Making original interpretations and critiques

**Ornamental Creativity**

Creativity Involves

a) Enhancing products and performances with design elements to increase aesthetic appeal.

b) May include audio, visual, and/or digital enhancements which contribute to originality and elaboration.
Cognitive vs. Ornamental Creativity

**Cognitive Creativity**

**Examples**

a) Designing and testing a solution to an erosion problem

b) Constructing a mathematical model to make an informed decision.

c) Describing 21st Century examples of the *Macbeth* narrative.

**Ornamental Creativity**

**Examples**

a) Earning extra-credit points for adding design elements to a presentation (e.g. poster)

b) Designing a cover for a book, story, or other narrative.

c) Adding color to a project.

d) Designing a costume for an oral presentation.
Cognitive Versus Ornamental Creativity

**Cognitive Creativity**

**Examples**

d) Forecasting trends in biology and corresponding medical innovations.

e) Applying Thomas Paine’s *Common Sense* ideas with an interpretation of contemporary politics.

**Ornamental Creativity**

**Examples**

e) Building a sugar-cube model of a historical structure.

f) Making illustrations and photo collages to represent vocabulary terms.
Cognitive Versus Ornamental Creativity

**Cognitive Creativity**

**Educational Impact**
- Supports deep learning of content and concepts
- Develops innovation thinking across domains
- Increases capacity to transfer or apply knowledge and skills
- Prepares students for information-rich work environments.

**Ornamental Creativity**

**Educational Impact**
- Supports aesthetic design skills associated with presentation
- Little or no connection between content and presentation
- Reinforces creativity as an enhancement element in the final stages of production
Why Critical Thinking?
The ability to exert purposeful, and self-regulatory judgment has become an expected foundation for building professional expertise given the demands of ubiquitous information and intellectual work in both global and micro knowledge economies.

(Ahuna, Tinnesz, & Kiener, 2014; Nold, 2017)
Why Critical Thinking?

Work in most professions involves constantly expanding access to data with expectations that those data are to be used to make sound decisions and solve complex problems.

(Chan, 2013; Peters, Zitko, & Schmude, 2016; Young, 2006)
Why Critical Thinking?

High-stakes decisions and non-heuristic problem solving are standard features of leadership and innovation; therefore, preparing students for those opportunities is a task for all educators.

(Kettler & Brown, in press)
Critical Thinking is...

• Reflective thinking using principles of reason, logic, and evidence to analyze, evaluate, and construct consistent and coherent arguments, understandings, and judgments.
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Critical Thinking is...

• Reflective thinking using principles of reason, logic, and evidence to analyze, evaluate, and construct consistent and coherent arguments, understandings, and judgments.

• Purposeful, self-regulatory judgment including interpretation, analysis, and evaluation of the context in which the judgment is based.

• Skillful, responsible thinking that facilitates good judgment because it 1) relies upon criteria, 2) is self-correcting, and 3) is sensitive to context.
How We Teaching Thinking Skills
Teachers ever since Socrates have aspired to show students how to think intelligently and apply what they have learned.

D.N Perkins, *Thinking Frames: An Integrative Perspective on Teaching Cognitive Skills*
Learning to think is less a matter of instruction than of experience and opportunity.

Frank Smith, *To Think*
Four Approaches to Teaching Thinking

- **Direct Instruction**
  - Teaching the specific skills and heuristics of thinking
  - May be a curriculum within the curriculum

- **Infusion**
  - Specific objectives for thinking skills infused in learning
  - Thinking objectives combined with content objectives

- **Immersion**
  - Immersion in rich curriculum develops thinking skills
  - No specific thinking objectives but complex content

- **Mixed Method**
  - Combine direct instruction with infusion/immersion
  - DI combined with infusion yields most robust results
Infusing Creative Thinking
Using the Taxonomy of Creative Thinking

Creativity objectives / student expectations can be combined with your curriculum standards (TEKS).

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Creativity 4.1: Students will recognize and describe problems that could be solved.
Using the Taxonomy of Creative Thinking

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Creativity 4.1: Students will recognize and describe problems that could be solved.

Students will recognize and describe problems that could be solved with alternative energy resources such as wind, solar, hydroelectric, geothermal, and biofuels.
Using the Taxonomy of Creative Thinking

The student understands the factors of production in a society's economy. The student is expected to:

(A) describe ways in which the factors of production (natural resources, labor, capital, and entrepreneurs) influence the economies of various contemporary societies; (Grade 6 Social Studies)

Creativity 1.2: Students will effectively use a wide range of idea creation techniques (e.g. brainstorming) to think of original ways in which factors of production influence the economies of the U.S. and Mexico.
Your Turn to Infuse Creative Thinking

I will provide the TEKS student expectations, and you combine them with one or more skills from the creative thinking taxonomy.
Your Turn to Infuse Creative Thinking

Grade 6 Science

The student knows that natural events and human activity can impact Earth systems. The student is expected to:

(A) predict and describe how catastrophic events such as floods, hurricanes, or tornadoes impact ecosystems;
(B) analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas; and
(C) model the effects of human activity on groundwater and surface water in a watershed.
Grade 5 English Language Arts

The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:

(A) infer multiple themes within a text using text evidence;
(B) analyze the relationships of and conflicts among the characters;
(C) analyze plot elements, including rising action, climax, falling action, and resolution; and
(D) analyze the influence of the setting, including historical and cultural settings, on the plot.
Infusing Critical Thinking
Teaching to Emphasize Critical Thinking Skills

Economics (6th). The student understands factors of production in a society’s economy. The student is expected to:

• Identify problems and issues that may arise when one or more of the factors of production is in relatively short supply.

Critical Thinking Objective:

• 4.1.3 Students use evidence to support inferences and reasonable conclusions, opinions, and interpretations (Inference: Using Evidence)
Teaching to Emphasize Critical Thinking Skills

Economics (6th). The student understands factors of production in a society’s economy. The student is expected to:

• Identify problems and issues that may arise when one or more of the factors of production is in relatively short supply.

Critical Thinking Objective:

• Students use evidence to support inferences and reasonable conclusions, opinions, and interpretations (Inference: Using Evidence)

Students uses evidence to support their description of problem/issues that may arise when one or more factors of production is in relatively short supply.
Teaching to Emphasize Critical Thinking Skills

The student is expected to (grade 4 math):

(B) use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories;

Critical Thinking Objective:

- 1.1.1 Students establish categories or frameworks and describe distinctions between them.

Students establish categories to describe and distinguish attributes of rhombuses, parallelograms, trapezoids, rectangles, and squares.
Your Turn to Infuse Critical Thinking

Grade 7 Social Studies

The student understands how individuals, events, and issues shaped the history of Texas during the late 19th, 20th, and early 21st centuries. The student is expected to:

(A) explain how the oil industry led to the industrialization of Texas;
(B) define and trace the impact of "boom-and-bust" cycles of leading Texas industries throughout the 20th and early 21st centuries such as farming, oil and gas production, cotton, ranching, real estate, banking, and computer technology;
Your Turn to Infuse Critical Thinking

Grade 8 Language Arts

The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:

(A) analyze how themes are developed through the interaction of characters and events;
(B) analyze how characters' motivations and behaviors influence events and resolution of the conflict;
(C) analyze non-linear plot development such as flashbacks, foreshadowing, subplots, and parallel plot structures and compare it to linear plot development.
Next Level Differentiation

Next level differentiation is specifically related to the Texas State Goal for gifted education.

- Thinking, research, communication, and self-directed learning
- No more random acts of differentiation
Next Level Differentiation

Next level differentiation is specifically and systematically woven into the fabric of the domain-specific curriculum.

- Taxonomies of thinking skills should guide differentiated learning designs.

- Ideally, thinking skills objectives are infused in the curriculum across multiple domains and grade levels.
Next Level Differentiation

Next level differentiation involves formative and summative assessment of complex thinking skills.

- What we measure we treasure.

- The taxonomies of creative and critical thinking describe student expectations that can be assessed formally and informally.