What Works in Curriculum for the Gifted: 25 Years of Research

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How People Learn

- New knowledge is constructed based on existing conceptions and beliefs.
- Usable knowledge is connected and organized around important concepts that support transfer of learning.
- The use of deliberate learning strategies to scaffold instruction.

---National Research Council, 2000
Theoretical Frameworks for William & Mary Curriculum

- Cognitive learning (e.g. Sternberg)
- Social reconstruction (e.g. Banks)
- Zone of proximal development (flow)
  - (e.g. Vgotsky, Csikszentmihalyi)
- Academic rationalism (e.g. Adler)
- Constructivism (e.g. Vgotsky)
Central Research Questions

• What differentiated interventions in curriculum, instruction and assessment work with gifted learners at key stages of development in the core domains of learning?

• How effective is gifted curriculum with promising low income and minority students?

• How do teachers change instructional practices based on using a differentiated curriculum and receiving targeted professional development?

• What are the factors that impact successful innovation in schools?
Methodology

• Quasi-experimental designs

• Experimental designs
  • (Project Athena & Clarion)

• Qualitative (case studies of schools)
Learner Characteristics and Corresponding Emphases in the Curriculum

THE LEARNER

Precocity
Intensity
Complexity

THE CURRICULUM

Advanced Content
Process/product depth considerations
Issues/concepts/themes/ideas across domains of learning
The Integrated Curriculum Model

Issues/Themes Dimension

Advanced Content Dimension

Process-Product Dimension

VanTassell-Baska, 1986
Advanced Content Dimension

- Teaching subject matter earlier to gifted students
- Pre-testing for proficiency and aptitude
- Teaching the curriculum at an accelerated pace

Application: Accelerated Learning

Talent Search Model research:

- Testing elementary and middle school students on a verbal aptitude measure and offering follow-up fast-paced classes in selected languages.

- Assessment results suggest that younger students score at the mean or higher than older students taking the same curriculum at a regular pace.

- Online and independent learning opportunities available for self-pacing of curriculum through various media.

Process-Product Dimension

- Curriculum differentiation requires higher-order skills of analysis, synthesis and evaluation.
- Learning must engage the learner in problem-finding and problem-solving behaviors.
- Engaging students in constructing and designing artifacts representative of a chosen language’s culture(s) deepens interest and motivation.
Application: Higher Level Processes

- Use of scaffolds to elevate thinking
- Models for problem solving
- Questioning
What literary allusions does Shakespeare use and why?

Synthesize the Hamlet “To be or not to be” speech in your own words.

Evaluate the impact of Shakespeare’s writing on our society today?
The use of concepts and themes elevates learning for the gifted to more abstract levels for making easy interdisciplinary connections.

Real-world issues and problems provide a level of complexity that challenges gifted learners to think in creative and innovative ways.

Concepts, themes and issues cut across social-cultural boundaries, providing universal ways for students to appreciate the connectivity of learning as a window to humanity.
Application: Concepts for Interdisciplinary Study

- **Systems** – study of systems in all areas of learning—scientific, social, mathematical, language
- **Change** – allows for study of the world in respect to how change impacts our understanding
- **Models** – representations of reality in abstract form
MAKE CONNECTIONS
Assessment

- Product-based, using specific rubrics.
- Concept-based, asking students to participate in discussions and write essays on the concept of time.
- Content-based, vocabulary and oral proficiency assessments.
Create an arch, using mathematical and engineering skills and specifications provided.

What is the significance of the arch as a design structure? Why?
Language Arts Curriculum Framework

The Literature

Concept

Understanding Change

Process

Using the Reasoning Process

Content

Learning Language Arts Content and Skills

Literary Analysis and Interpretation

Persuasive Writing

Linguistic Competency

Oral Communication
Major Research Findings from Quasi-Experimental Studies in Language Arts

- Significant and important treatment effects for literary analysis and interpretation and for persuasive writing
- No significant gender effects
- Student performance showed that additional attention was needed to enhance higher-level thinking and elaboration skills.
- Students were able to improve significantly after unit instruction regardless of the grouping model employed.
- Students enhanced their learning each time they were exposed to the units and maintained their level of achievement between interventions across the years.

Feng, VanTassel-Baska, Quek, Bai, & O’Neill, 2004; VanTassel-Baska, Zuo, Avery, & Little, 2002; VanTassel-Baska, Johnson, Hughes, & Boyce, 1996
Instrumentation for Project Athena

• **Student Gains**
  • Test of Critical Thinking (TCT) \( (r = .89) \)
  • Iowa Test of Basic Skills (Reading Comprehension)
  • Performance-based Unit Assessments

• **Teacher Gains**
  • Classroom Observation Scales- Revised (COS-R)
    • \( r = .91-.93 \)
    • Inter-rater reliability
      • .87-.89
Project Athena (Language Arts)  
Longitudinal Experimental Findings in Title I Schools: Year 1 - 3

- Project Athena students showed significant learning gains in critical thinking and reading comprehension and outperformed control students in critical thinking. (p<.04) d = .31-.56
- Project Athena students showed consistent growth patterns in literary analysis and interpretation and persuasive writing at a level of significance and educational importance. P<.000 d=1.0-1.75
- Sub-analyses suggest that student growth in critical thinking may be bounded by the characteristics of the learner, teacher skills in critical thinking, and fidelity of curriculum implementation.
- Gender, ethnic, and ability differences were evident.
- Teacher observation data suggest that two years of training and implementation significantly enhances teacher behaviors in differentiation practices.

VanTassel-Baska & Bracken, 2005
Student Longitudinal Gains in Critical Thinking Skills

Student Longitudinal Gains on TCT by Condition

Within subjects growth: $F(5, 112) = 2.7$, $p = .02$, $d = 1.7$

Between subjects effect: $F(1, 112) = 5.3$, $p = .04$, $d = .31 - .56$
Experimental students’ longitudinal gains on persuasive writing

$F (5, 46) = 15.6, p=.000, d = 1.75$
A comparison between experimental and control teachers’ instructional practice on the COS-R scale across three years
A comparison between experimental and control teachers on the use of critical thinking strategies

A comparison between experimental and control teachers' instructional behaviors on the CRI

<table>
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<tr>
<th>y1_1st</th>
<th>y1_2nd</th>
<th>y2_1st</th>
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Experimental (N=9)

Control (N=3)
Science Curriculum Framework

The Problem

Concept
Understanding “Systems”

Process
Using Scientific Research

Content
Learning Science
Major Research Findings from Quasi-experimental Studies in Science

- Significant and important treatment effects were found for students’ ability to plan an experiment based on use of the units.
- A similar pattern of effects was seen across units, grade levels, and grouping patterns.
- Responses to the units indicated high levels of engagement for both teachers and students.
- Repeated exposure to units over 2-3 year periods demonstrated increasing competence in the use of scientific experimentation.

Feng, VanTassel-Baska, Quek, Bai, & O’Neill, 2004
VanTassel-Baska, Avery, Little, & Hughes, 2000
VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998
Social Studies Curriculum Framework

The Social/Historical Context

- Concept
  - Understanding Systems, Cause and Effect
- Process
  - Using Social Science Processes

Learning Social Studies Content and Habits of Mind

- Reasoning
- Research
- Document Analysis
- History
- Geography

Government
Economics
Major Research Findings from a Quasi-Experimental Study in Social Studies

- Students engaged in the units showed significant treatment effects on measures of conceptual thinking and content learning. Significant gains were also shown on measures of critical thinking.
- Treatment effect was evident for the whole sample and for nongifted students. Gifted students showed significant gains in content learning.
- Treatment effect was consistent for males and females.
- Subanalyses by school and by unit demonstrated significant treatment effect in content knowledge and critical thinking.
- Teachers who participated in the project over multiple years demonstrated increased use of strategies for accommodating individual differences, general teaching strategies, critical thinking, metacognition, and classroom extensions.

Little, Feng, VanTassel-Baska, Rogers, & Avery, 2002
Models of Research-based Practice

- Using concept maps
- Articulation of thinking
- Promoting higher level thinking
- Making connections
- Using metacognition
William & Mary Models for Teaching and Learning

- Concept Development Model
- Reasoning Model
- Research Model
- Problem-Based Learning
- Literature Web

- Hamburger Model
- Dagwood Model
- Vocabulary Web
- Analyzing Primary Sources
- Reasoning about a Situation or Event
A system is a collection of items or processes that interact with each other to constitute a meaningful whole.

All systems have

1. Elements
2. Boundaries
3. Interactions among elements to generate system behavior
4. Many systems receive input and produce output
Analyzing a System

Boundaries

Elements

Interactions

Inputs

Outputs
Standards of Reasoning

- Are there enough reasons to make a convincing argument?
- Is the evidence correct or right?
- Are the reasons clear?
- Are specific reasons or examples included rather than vague generalizations?
- Are the arguments and reasons strong and important?
- Is the thinking logical?
Literature Web

- Key Words
- Feelings
- Images/Symbols
- Ideas
- Structure
Constructing Meaning Through Literature

- Use concept mapping techniques to explore meaning individually
- Construct whole group discussion to build more complete understanding
- Develop specific follow-up questions to probe issues
- Use direct textual passages to focus on meaning
- Employ comparison techniques to ensure transfer of literary elements
Reasoning about a Situation or Event

What is the situation?

Who are the stakeholders?

What is the point of view for each stakeholder?

What are the assumptions of each group?

What are the implications of these views?
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<tr>
<th>Memory/Cognition Level</th>
<th>When did the election take place?</th>
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<td>Convergence Level</td>
<td>What were the causes of the Trump win? Of the Clinton loss?</td>
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<td>Divergence Level</td>
<td>What would have happened if Clinton had won? How would life be different today?</td>
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<tr>
<td>Evaluative Level</td>
<td>How successful was the Trump victory for conservatives, based on the criteria of economics and politics?</td>
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Encouraging Thinking in the Classroom

• Ask authentic questions (I wonder why that occurred? What do you think?)
• Treat all knowledge as tentative. (Why do you think that is true?)
• Model thinking
• Use the 4-step model
4-Step Model to Enhance Thinking

- Read
- Discuss
- Write
- Reflect
Metacognitive Tools

• Questions for reflection
• Journal prompts
• Problem logs
• Need to know boards
Implications of the use of the ICM

- Provides an organizational structure for the differentiation of content, process, product, and concept dimensions of curriculum.
- Provides a design template for high level integration of curriculum dimensions.
- Provides a pathway for interdisciplinary connections.
What Have We Learned?

- Coherence in design is necessary (blueprint).
- Tryouts and pilots are critical.
- Providing training directly on materials helps implementation.
- Use of cognitive learning models helps students internalize higher level thinking (e.g., concept mapping).
- Fidelity of implementation is essential to assess an innovation.
- Differentiated curriculum and instruction matter!
We shall not cease from exploration, and the end of all our exploring will be to arrive where we started and know the place for the first time.

- T.S. Eliot