The NRCCTE Curriculum Integration Studies

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Disclaimer:

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NRCCTE Partners
Four Main Activities

- Research (Scientifically-based)
- Dissemination
- Technical Assistance
- Professional Development

www.nrccte.org
Three Foci

- **Engagement** – Completing high school, completing programs
- **Achievement** – technical and academic
- **Transition** – to continued formal learning without the need for remediation; and to the workplace
Curriculum Integration Research

- Math-in-CTE: study complete
  - Math-in-CTE Technical Assistance—five years
- Authentic Literacy: complete
- Science-in-CTE: underway
The Math-in-CTE Study

A study to test the possibility that enhancing the embedded mathematics in Technical Education coursework will build skills in this critical academic area without reducing technical skill development.
Math Study Questions

- Does enhancing the CTE curriculum with math increase math skills of CTE students?
- Can we infuse enough math into CTE curricula to meaningfully enhance the academic skills of CTE participants (Perkins III Core Indicator)
  - . . . Without reducing technical skill development
- What works?
Math-in-CTE Findings

All CTEx vs. All CTEc
Post test % correct controlling for pre-test

![Bar chart showing post test % correct for TerraNova, AccuPlacer, and WorkKeys tests.](chart图)

- **TerraNova**
  - Experimental Classes: 50 (p = 0.02)
  - Control Classes: 40

- **AccuPlacer**
  - Experimental Classes: 50 (p = 0.03)
  - Control Classes: 40

- **WorkKeys**
  - Experimental Classes: 60
  - Control Classes: 60 (p = ns)

Legend:
- Blue: Experimental Classes
- Yellow: Control Classes
Math-in-CTE Information

www.nrccte.org
The Science-in-CTE Study

A replication of Math-in-CTE

A study to test the possibility that enhancing the embedded science in Technical Education coursework will build skills in this critical academic area.
Science-in-CTE
Pilot Study Questions

- Does enhancing the CTE curriculum with science increase science skills of CTE students?
- What works?
Science-in-CTE Pilot Study

- Brent Young, NDSU, State Project Director
- Support from ND Department of CTE
- Plant science teachers paired with science teachers
- RCT design: experimental and control classrooms
- Spring semester pilot concluded 2010
- Preliminary findings in late summer 2010
- Ahead: full year study 2010-2011
- Sites in health sciences and environmental studies
Emergent Core Principles

- Develop and sustain a community of practice
- Begin with the CTE curriculum and not the math/science/reading curriculum
- Understand that m/s/r is an essential workplace skill
- Maximize m/s/r in the CTE curriculum
- Recognize that CTE teachers are teachers of m/s/r-in-CTE, and not m/s/r teachers
Literacy in CTE
**Purpose:** determine impact of reading strategies on comprehension and motivation to read for students enrolled in CTE

**Objective:** Compare the effects of reading strategy instruction under a control condition and two models of content-area reading interventions: a CTE Framework and MAX Teaching
Treatment Fidelity

- Teachers receive sample lesson plans
- Weekly journaling of teaching practices
- Interviews with teachers post-intervention
~2,677 students

- 35.3% Juniors and 29.7% Seniors
- 60.7% female
- 65.4% white, 23.5% black
- 51.8% FRPL
- 40.6% of mothers’ education level ≥ HS
- 50.6% of fathers’ education level ≥ HS
- Reading aloud, study guides, asking questions
Literacy-in-CTE

- 101 teachers in 3 groups
- 15 returning teachers funded out of another pool of funds
- Professional Development: July - August 2009
  - 2.5+ days
- Treatment period: September 17 – April 9
- Weekly teacher reports of reading activities
# Teachers

<table>
<thead>
<tr>
<th>State</th>
<th>CTRL</th>
<th>ALS/ASH</th>
<th>MAX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY</td>
<td>12</td>
<td>15</td>
<td>16</td>
<td>43</td>
</tr>
<tr>
<td>SC</td>
<td>19</td>
<td>21</td>
<td>18</td>
<td>58</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>31</strong></td>
<td><strong>36</strong></td>
<td><strong>34</strong></td>
<td><strong>101</strong></td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
<td></td>
<td>15</td>
<td><strong>15</strong></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td></td>
<td>49</td>
<td><strong>116</strong></td>
</tr>
</tbody>
</table>
Experimental design

- Random Assignment
- Pretest only
  - Demographic survey
- Pretest and posttest
  - Gates-MacGinitie Reading Test (untimed ~50 min)
    - Grade level 7-9
    - Forms S & T
  - Motivations for Reading Questionnaire (15 min)
Micro-Periods of Reading

- Pre-Reading
- During Reading
- Post-Reading
# Coop Learning & Skills Acquisition

<table>
<thead>
<tr>
<th></th>
<th>MAX</th>
<th>SAM</th>
<th>Coop Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before Reading</strong></td>
<td><strong>M</strong>otivation</td>
<td>Introduction and modeling of the skill</td>
<td>Written commitment and small-group discussion</td>
</tr>
<tr>
<td></td>
<td>Reducing the anxiety and improving the probability of success in reading</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>During Reading</strong></td>
<td><strong>A</strong>cquisition</td>
<td>Guided practice in learning skill</td>
<td>Individual gathering of data for discussion</td>
</tr>
<tr>
<td></td>
<td>Individual silent reading for personal interpretation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>After Reading</strong></td>
<td><strong>E</strong>xtension</td>
<td>Reflection on how the skill worked</td>
<td>Attempt to achieve small group and class consensus</td>
</tr>
<tr>
<td></td>
<td>Cooperative construction of meaning through discussion, writing, etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6 Essential Elements for Adolescent Literacy Instruction

1.) Guided Reading of Text
2.) Direct Instruction
3.) Peer-Led Discussion of Text
4.) Word Study
5.) Purposeful Oral Reading and Text Production
6.) Inquiry Learning
# Pilot Test Analysis

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>ANCOVA</th>
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</thead>
<tbody>
<tr>
<td>$H_{1a}^0$: NSD total GMRT gain score of MAX v. CTRL</td>
<td>reject</td>
</tr>
<tr>
<td>$H_{1b}^0$: NSD total GMRT gain score of CTE v. CTRL</td>
<td>reject</td>
</tr>
<tr>
<td>$H_{2a}^0$: NSD GMRT vocab gain score of MAX v. CTRL</td>
<td>reject</td>
</tr>
<tr>
<td>$H_{2b}^0$: NSD GMRT vocab gain score of CTE v. CTRL</td>
<td>retain</td>
</tr>
<tr>
<td>$H_{3a}^0$: NSD GMRT compr gain score of MAX v. CTRL</td>
<td>reject</td>
</tr>
<tr>
<td>$H_{3b}^0$: NSD GMRT compr gain score of CTE v. CTRL</td>
<td>reject</td>
</tr>
<tr>
<td>$H_{4a}^0$: NSD MRQ gain score of MAX v. CTRL</td>
<td>retain</td>
</tr>
<tr>
<td>$H_{4b}^0$: NSD MRQ gain score of CTE v. CTRL</td>
<td>reject</td>
</tr>
</tbody>
</table>
Which strategies did teachers use?

<table>
<thead>
<tr>
<th>MAX</th>
<th>ALS/ Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cornell notes</td>
<td>1. Anticipation guide</td>
</tr>
<tr>
<td>2. Hunt for main ideas</td>
<td>2. Directed Reading-Thinking Activity</td>
</tr>
<tr>
<td>3. Previewing nonfiction text</td>
<td>3. Inquiry Charts</td>
</tr>
<tr>
<td>4. Pre/Post learning concepts checks</td>
<td>4. Vocabulary from context</td>
</tr>
<tr>
<td>5. Focused free writes</td>
<td>5. List-Group-Label</td>
</tr>
<tr>
<td>6. Paired reading</td>
<td>6. GIST</td>
</tr>
<tr>
<td>7. Guided reading procedure</td>
<td></td>
</tr>
<tr>
<td>8. Anticipation guide</td>
<td></td>
</tr>
<tr>
<td>How?</td>
<td>Why?</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Used strategies more early in week</td>
<td>Selected strategies that were easy to implement</td>
</tr>
<tr>
<td>Asked students for feedback about which strategies worked best</td>
<td>Strategies helped students learn</td>
</tr>
<tr>
<td>↑ assigned reading: student engagement in reading</td>
<td>Transitioned learning to students</td>
</tr>
<tr>
<td>Adult learning approach</td>
<td>Teachers actually “taught” less</td>
</tr>
<tr>
<td>• Learner feedback</td>
<td></td>
</tr>
<tr>
<td>• Utility value</td>
<td></td>
</tr>
</tbody>
</table>
Teacher Reflections
Teacher interviews

1. Foster teacher confidence,
2. Develop communities of practice,
3. Utilize authentic texts,
4. Commit to professional development,
5. Adjust strategies for use in CTE,
6. Adopt the framework where texts are used,
7. Encourage student receptiveness.
Student focus groups

1. Students desired a utility value,
2. Understood importance of reading to their career,
3. Engaged if they could apply information,
4. Social aspect from reading to foster motivation.
Post-Research Teacher Meeting

- Teachers
  - did not ask students to read more: but students read more productively
  - Want additional support
  - Required additional preparation time
  - Used 4-7 strategies regularly
  - Text ≈ content ≈ strategy
  - Try strategies ~3 times before “comfortable”
Post-Research Teacher Meeting

- Students
  - Mix of strategies is important
  - Treat CTE learners more like adult learners – check w/ students to see how strategies are working, give choices
  - Know reading is important, they just don’t want to read
Challenges of Implementing Literacy
Thinking about integration on 3 levels

- Systems/holistic
- Curricular/programmatic
- Instructional/pedagogic

*What happens when the door closes, and the teacher begins to teach?*
Common findings/themes

- CTE teacher fear of integration
  - feeling incompetent in front of students
  - lesson planning
- Challenge of changing teaching practice
- Time issues
- The “tipping point”
Common findings/themes

- Implementation → internalization
  - Space for innovation
- Concepts → Principles → Relevant ROI
- Repeat volunteers – what’s next?
- Teachers have to think about “how” and “what” they’re teaching
- Teacher-driven reform – value teacher’s voice
Jump-Start Workshop: ACTE 2-day pre-session

- Choice of Math-in-CTE or Literacy-in-CTE
- In-depth intro to curriculum integration models
- Info on TA for on-site implementations
- For select leadership teams from states and districts
  - Teacher teams
  - Administrators (break-out/s)
- Interested? Leave your card for info mailing
For more information

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NRCCTE Website
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