THE POWER OF INTEGRATED ACADEMICS IN CTE

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GROWING CTE TOGETHER
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What is Your Definition of Integrate Academics?

Write it down and add meaningful points for you as the presentation and discussion go forward
What does it Look Like?

• Richer, better sequenced curricula

• Facilitative instruction

• Increased collaboration and coordination among academic and CTE teachers

• Transition effectively from school to work and college.
Let's Get this Straight?

CTE Teachers are Teachers of Math, Literacy and Science in CTE not Math, Literacy and Science teachers
First Things First - NYS Approved Programs

- Curricular design with rigorous content
- Aligned to state and national learning standards
  - CSLS and Current Science and Social Studies Standards
  - Career Development and Occupational Studies
  - Common Career Technical Core
  - Program of Study B & I standards
- CTE Teachers and Academic teachers when credit is offered
- Benchmarks for student performance and assessment
- Two academics from two component districts awarding credit for BOCES services

What did we learn from approved Program Reviews?

• Start from the CTE curriculum/standards
• Utilize a combination of consultation, co-teaching and direct instruction
• Have common planning time
• Collaborate on the students employability profile
• Invest in CTE teachers to work on literacy and math pedagogies
• Invest in academic teachers to work on workplace understanding and expectations
• There is variability in the success of integrated learning
• Academic credit is under utilized and misunderstood
Organizing for Success

What Doesn’t Work

• Everyone does their own thing
• Only those comfortable work together
• No defined responsibility for the delivery of content or support
• No common rubrics
• The program is vocational

What Works

• Common planning time
• Agreed upon delivery protocol
• Participation in student assessment
• Calibration to grade student work with the same rubrics
• Structured assignments and schedule for academic support for students
Working together is everything and a must do!

This is a 21st Century Skill we want our students to learn and master but it starts with the school leader.
Instructional Delivery Models

- **Consulting** - Academic/CTE teacher advises and provides information, guidance and strategies

- **Co-Taught** - the CTE and academic teacher tag team this in the CTE or academic class

- **Direct instruction** - the CTE teacher and Academic have common goals but work with students independently
ACHIEVE/ 2010
Integrated Models

A. Coordinated courses
   - Programs of Study
   - Interdisciplinary Assignments and activities

B. Coordinated Pedagogy
   - Cross walk of CTE and Academic Standards to identify and increase overlap in content/expectations
   - Curriculum mapping

C. Partial integration
   - Double courses
   - Blended instruction
   - Team teaching
   - Transcribed elective credit

D. Full integration
   - Double courses
   - Blended instruction
   - Team teaching
   - Transcribed academic Credit
This is about organizing for Teaching and Learning

• You need an agreed upon framework for learning
  – The curriculum is the base and your work
  – You have to build or review and understand it together
  – Who is going to do what so it is non-duplicative?

• Building a partnership
  – Presence and listening
  – Respecting your differences
  – Knowing the content
  – Kindness

• Models of Co-Teaching
  – Team Teaching—both work together
  – One Teaching, One Drifting
  – Parallel Teaching—each teaches a portion of the classroom
  – Station Teaching
  – Alternative Teaching—large group small group
What we can learn from our Special Education Colleagues

Co-teaching is the hardest thing to do

- **Parallel Teaching**
  - divide the class, content the same, methods differ

- **One Teaching, One Drifting**
  - Support and assistance

- **Station Teaching**
  - Rotating groups, every teacher teaches every student

- **Alternative Teaching**
  - Most students in large group, others work with small groups for pre-teaching, enrichment, re-teaching or other individualized instruction

Curriculum and Instructional Design

Begin with CTE

• Have an instructional frame
  - Rigor, Relevance & Relationships
  - Depth of Knowledge
  - Danielson
  - Other (Learner Focus Schools)

• Backward Design
  - Goals and outcomes
  - Curriculum building and cross walks
  - Unit construction
  - Lessons and anchor activities
  - Formative assessment
  - Pacing chart
DOK Level 1 and RR quad A are necessary but insufficient for college and career readiness.
Alignment of the Assessment to Curricular Goals

- Pre assessment
- Formative assessments
  - Unit
  - End of Lesson
  - Embedded in instruction
- End of Program of Study national certification or recognized examination
  - Written,
  - performance and
  - Presentation/product

Oh my god!!!

Jeezzz!

Bearing Down!
A TAC Resource

Next Generation Assessments
http://www.nyctecenter.org/spn/alignmentSearch.php
Resistance is the opposition to the flow of electrical current. An electrician wants to replace an electrical wire used in a simple circuit with a wire that has less resistance to current flow. The diagram shows the simple circuit the electrician is working on. The wire that the electrician is replacing is between points X and Y. The old wire was 15 feet long and made of copper. Previously, when one volt was applied, 60 amps of current flowed through the circuit. The electrician plans to install another copper wire in the circuit but is not sure if he should use a longer or shorter wire to decrease resistance.

Ohm’s law can be used to determine the relationship between voltage, current, and resistance: \( V = IR \), where \( V \) is the current in volts, \( I \) is the current in amps, and \( R \) is the resistance in ohms.

1. How can the electrician manipulate Ohm’s law to determine the resistance of the previous wire?
2. How can you use a graph to illustrate the relationship between wire length and resistance? Construct a graph using at least three data points.
3. How can you use your graph to help the electrician decide between a cooper wire that is longer or shorter than 15 feet?
4. Explain your reasoning.
5. Write a memo to the electrician with your findings and recommendations. Justify your findings.

**Scoring Guide**

1. \( R = \frac{V}{I} \)
2. The graph should show that as wire length increases, resistance increase
Standards of Mathematical Practice

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Are these universal skills for all content mastery and understanding?
A Contextual Approach to Mathematics

1. Introduce the CTE lesson
2. Assess students’ math awareness
   - Bridge CTE content and Math vocabulary.
   - Introduce math vocabulary through the math embedded in the CTE content.
   - Assess the whole class.
3. Work through the embedded math in the CTE lesson
   - Work through the steps/processes of the math example that is embedded in the CTE content.
   - Continue to bridge the CTE and math vocabulary.
4. Work through RELATED, CONTEXTUAL math-in-CTE examples: Using the same embedded math concept:
   - Work through similar problems in the same occupational context.
   - Use examples of varying levels of difficulty; from basic to advanced.
   - Continue to bridge CTE and math vocabulary.
   - Check for understanding.

Transfer of Learning: The application of skills and knowledge learned in one context being applied in another context. (Cormier & Hagman, 1987)
A Contextual Approach to Mathematics

5. Work through TRADITIONAL MATH examples: Using the same embedded math concept:
   - Work from applied to abstract problems.
   - Work through examples as they may appear on standardized or state tests.
   - Move from basic to advanced problems.
   - Continue to bridge CTE and math vocabulary.
   - Check for understanding.

6. Students demonstrate understanding
   - Provide opportunities to demonstrate understanding of math concepts embedded in the content.
   - Connect the math back to CTE context.
   - Conclude the lesson with CTE content
   - Allow students to demonstrate their understanding of both the math and the CTE lesson.

7. Formal Assessment: Include math questions in formal assessments.
   - CTE unit exams
   - CTE project assessments

The Big Inch: ACTE Literacy Resources
http://www.acteonline.org/general.aspx?id=903#.V26hMmM-G-8
• The most difficult texts in high school are CTE texts
  □ They are non fiction
  □ They are technical
  □ They relate to work with your mind, hands, and materials

• Don’t Dismiss Literature
  □ Informs our soul and the things that make us human
  □ There is good literature out there that relates to careers
  □ TAC Library of books (fiction and non fiction)

http://www.nyctecenter.org/spn/article/lrsearch
(sign in required at not cost)
Literacy Strategies—Observed in Program Reviews

- Have students read a designated # of books and articles across the curriculum per year.
- Have students in all classes write weekly, completing 24 writing prompts each year. This may be related to the first point.
- Have students read and write in all classes to enhance learning.
- Have students develop research products/projects in all classes, yielding a paper, demonstration, or project. (Precursor to their final assessment)
Literacy Strategies—Observed in Program Reviews

- **Classroom Libraries**
  - Students do leisure reading related to the content
  - Access to books, articles and other materials in their classroom library.
  - Books, articles and other materials at a variety of reading levels
  - Teachers share what they are reading with students.
  - Writing assignments based on the reading are designed to allow reflection

- **Literacy journals**
  - Used as formative assessments in each program
  - Journaling completed every week in every program.
  - Have content-related questions and prompts
  - Rubric for grading the work.
  - Student literacy activities/projects are reviewed by a certified English teacher
ACTE Resources

- Generating Interactions between schemata and text
- Word Walls for CTE Vocabulary
- Previewing Text
- Writing on the Walls

Literacy strategies
http://www.acteonline.org/literacy/#.V216fGM-G-8
Most professional work requires listening to the client and evaluating and proposing actions on the work presented. Usually the proposal is in writing and made orally.
Types of Speaking and Listening

**Speaking**
- Imitative
- Intensive
- Responsive
- Transactional
- Interpersonal
- Extensive

**Listening**
- Reactive
- Responsive
- Intensive
- Interactive
- Selective
- Extensive

Talking to oneself
Integrated Strategy with Power

Getting New Equipment

- Research Options for New Equipment
- Students developed the budget and specifications,
- Conducted internet research
- Submitted their recommendations to the teacher, principal and school business official.
- The teacher is on the lookout for ways to empower students and shifts the operation of the program into their hands.
- Another example is the structure in place to have students run and maintain the small animal laboratory.

What are the academics in this activity?
- Research Skills
- Budgeting
- Developing the specification (Technical writing)
- Evaluating options and writing recommendations
- Presenting the proposal (Speaking and Listening)
“All of the leaders in the programs reviewed were strong proponents of CTE. However, in the higher performing programs, there was a consistent and persistent focus on integrated academics, with literacy a particular focus. This was not lost on students who were often clear about how the CTE program provided a context and the need to master academic skills and dispositions.”
Thanks for Hearing me Out

Go back to the question and your thoughts
What are your thoughts now?
How did this effect your definition?

Questions

Go Integrate!