California Mathematics Project – Career Technical Education Connections (C3)

Initial Pilot (Sept 2011 – Feb 2012)

Briefing document (April 2012):

Background: A group of California Mathematics Project (CMP) site directors attended the May 1-4, 2011 UCCI Institute at Lake Arrowhead. CMP collaborated with the Sonoma County Office of Education (SCOE) to host a pilot workshop inspired by the UCCI goals.

Understanding that the UCCI had different goals, we nonetheless felt the following concerns:

- Unrealistic to create a year-long integrated curriculum in four days.
- No specific support or plans for implementation.
- Not enough facilitators with subject matter expertise.
- No follow-up.

Our planning team addressed these concerns to create a different model that we felt could augment and support the overarching UCCI (and Linked Learning) goals.

C3 Design features:

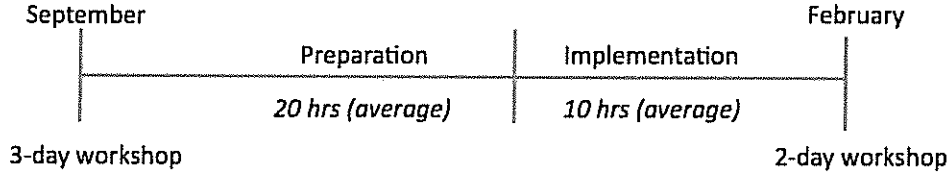
- Pairs of teachers expected to implement an integrated project with students
- Workshop time provided experts from CMP and CTE to facilitate and support the teachers' development of their integrated projects.
- Teachers expected to document evidence of students' accomplishments in both specific Common Core Mathematics Standards and California CTE Standards.
- Follow-up meeting to showcase and analyze student outcomes and discuss challenges of implementation.

The workshop was framed as a reverse-engineering approach: starting with an idea for a student project that necessitated both the mathematics and CTE standards, what is needed to actually implement the project with students in a set time period? The face-to-face work sessions with CMP and CTE experts and feedback from fellow teachers was critical to prepare for implementation. [See Exhibits A, B, and C to get a sense of the teachers initial planning and follow-up expectations]

Format: Pairs of teachers (one mathematics, one CTE) applied. They attended a three-day workshop, designed and implemented an integrated project, then brought back student work and shared and analyzed the outcomes in a 2-day follow-up meeting.

Summary of Outcomes: We had 11 pairs of teachers from 10 districts and 8 CTE Industry Sectors complete the five days. They implemented their projects with over 550 students. Attached are some sample presentations made by the teachers highlighting some key aspects of their project (See Exhibit C for the expectations and guidelines). Exhibit D contains a sample of feedback comments from the participants.

TIMELINE



11 Schools, 22 Teachers, 550 Students

THEORY OF ACTION

Students need to be able to make meaningful connections between what they are learning in school and how it applies to their future to be college and career ready.

Educators need to provide students with opportunities to work on relevant projects, involving real products and real consequences, promoting the authentic application of both academic content and relevant occupational practice.

Instruction needs to develop students' mathematical content knowledge and develop mathematical character as described in the Common Core State Standards; students *know* the mathematics and can *use and apply* the mathematics in the context of 21st century skills.

INSTITUTE GOALS

- Increase student engagement
- Provide successful pathways for students to be college and career ready

OUTCOME AND EXPECTATIONS FOR PARTICIPATING TEAMS

- Develop cognitively demanding mathematical tasks that are connected to CTE Industry Sectors
- Develop units that infuse *CaCCSS-M* (Common Core Standards) in math and CTE courses
- Increase the relevance of the mathematics in college and career readiness
- Increase student perseverance
- Implement units developed

EXHIBIT A:
The template used to organize and document the teachers' initial planning and work:

C3 Project Title:_____

Team _____

Industry Sector:_____ Pathway:_____ CCSS Math Unit:_____

GROUP WORK SESSION 1:

Description of Final Student Product:

How does the student demonstrate or document evidence of:

CCSS (Content)
Standard:.
Evidence:

Standard:
Evidence:

Add standards as needed.

CCSS (Practices)
Standard:
Evidence:

Standard:
Evidence:

Add standards as needed.

CTE
Standard:
Evidence:

Standard:
Evidence:

Add standards as needed.

EXHIBIT B:
Template used for the third work session:

GROUP WORK SESSION 3

Project Outline Part II- More Detail

Intro

Lessons/Activities:
Roles/Responsibilities:

Benchmark 1:

Lessons/Activities:
Roles/Responsibilities:

Benchmark 2:

Lessons/Activities:
Roles/Responsibilities:

Benchmark 3:

Lessons/Activities:
Roles/Responsibilities:

Add Benchmarks as needed

Final Product:

Lessons/Activities:
Roles/Responsibilities:

EXHIBIT C:
What participants were told to bring to the follow-up meeting:

Each team will be expected to bring the following to the C3 institute on Friday February 3, 2012.

1) **A 10 minute PowerPoint presentation (see details below)**
2) **Some examples of student work or posters, pictures or other media for the break out room**

Prepare at most <u>10 power point slides</u> that address the following key points:

- C3 project title, team names, industry sector, pathway
- Brief description of the final student project
- ***A specific CTE standard*** and evidence (e.g. photo's of student work) of how this standard was necessitated in the project.
- ***A specific CCSS mathematics standard*** and evidence (e.g. photo's of student work) of how this standard was necessitated in the project.
- Some examples of successes and challenges and lessons learned.

NOTE: If your team would like feedback from any of the C3 facilitators feel free to email your presentation (and any specific questions) to Tsai-Tsai before Wednesday February 1, 2012.

EXHIBIT D:
Sample participant feedback comments from the follow-up session:

- *There is an abundance of math ideas and standards that connect with CTE.*
- *Motivation of students based on realization that math is used to solve real world problems.*
- *Samples and evidence to go back and share...to inspire and engage others.*
- *We have found a process to engage CTE and Core teachers*
- *Value of commitment to "context" as center of math*
- *Getting a chance t see examples of integrated curriculum implemented in diverse educational settings.*
- *Choose projects that necessitate the mathematics.*
- *The work forced students to be precise and model with math in a natural way.*
- *The format of the conference helped me to flush out my thoughts about how this could/will work.*
- *I will try to make this grow organically both at my site by sharing the successes I heard about here.*
- *A new great project that connects CTE & Geometry.*
- *Math is not as scary as I thought it would.*
- *Conceptual Eng. Class that relates to Geometry next year.*
- *Implementing a project can be done even if you have no common time or students.*
- *Collaboration requires relationships.*
- *Big impact project has been implemented and there are plans to revise and implement again in the coming year.*
- *Pulling the math from authentic content.*
- *It has provided a new way to look at collaboration and trans disciplinary instruction.*
- *I better understand the importance of contextual learning.*
- *How to see math in mu CTE Curriculum.*
- *Changed the dynamic and created a professional real life learning opportunity.*