Co-teaching and the PrimeD framework: Radicals and Rational Exponents

Christopher Rakes
University of Maryland Baltimore County

Rebecca Kirvan
Ashley Witkowsi
Old Mill High School

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Professional Development: Research, Implementation, & Evaluation (PrimeD)

Phase I: Design and Development Challenge Space
- Common Vision and Design
- Community Goals
- Distributed Leadership
- Targets
- Context

Phase II: Implementation
PD to Support Networked Improvement Communities
- Whole Group Engagement
  - PD Effective Elements
  - Participant Leadership
- Classroom Implementation
  - PDSA Cycles
  - Classroom Studies

Phase III: Evaluation
- Judgment of value and merit
- Fidelity of program components
- Oversight of context, cycles & connections
- Measures & outcomes implementation
- Was it successful?

Phase IV: Research
- Generation of Knowledge
- Attends to context as a set of factors
- Effect of program components on outcomes
- Relationships among program components
- Measures & outcomes validity & reliability
- What happened and why?
Co-teaching in PrimeD

**Challenge Space Considerations:**
- Curriculum map
- Testing windows
- Target classes
- Research/theory application
- Co-teacher roles
- PD Connections

**Classroom Implementation:**
- Group planning for unit
- Co-teaching for key lessons in unit
- Invite school and district admin

**Research**
- Which characteristics of co-teaching were most/least helpful?
- Were there differences in success by class type?
- Which approaches to co-teaching were most helpful and why?
- Which aspects of the unit helped students learn deeply?

**Evaluation**
- Student feedback
- Student participation & leadership
- Benchmark quizzes
- Teacher assessment of student learning
Research Questions

1. How can the application of a co-teaching model to the PrimeD framework support the professional growth of teachers?
2. How can the application of a co-teaching model to the PrimeD framework enhance the professional growth of teacher educators?
The Innovation

- Growing mold on bread
- Phenomena-first approach:
  - Introduce mold project at beginning of unit
  - Frame lessons during unit within the mold project context
  - Model scientific inquiry: Predict-Observe Explain, Peer discussion and critique (within and between groups, whole class)
- Student leadership throughout unit
  - Sharing ideas during exploration activities
  - Creativity and developing/sharing expertise
Dynamic Modeling

Basic form for Radical Functions: \( y = a^n\sqrt{(bx - h)^p} + k \) or \( y = a(bx - h)^{\frac{p}{n}} + k \)

Open “Radical Function Transformations.ggb” - [https://ggbm.at/E76D4ExR](https://ggbm.at/E76D4ExR)

a) Explain how you think a, b, h, and k change the graph of \( y = \sqrt{x} \) and \( y = \sqrt[3]{x} \) (what are n and p for square root functions? for cube root functions?)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>( y = \sqrt{x} )</th>
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<tbody>
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<td>a</td>
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b) Do a, b, h, and k have a similar or different effect on the two functions? Explain your reasoning.
Student Showcase

Gallery Walk/Science Fair set up.
Teacher Reflections

- CSA sequence of instruction
- Wait time
- Productive struggle
Ripple Effect

- District leadership observed during unit and during the final showcase.
- This year, refining mold project for algebra 1.
  - Real mold or non-mold simulation (e.g., spread of disease simulator)
  - Linear-Exponential-Maybe Quadratic, not including rational exponents/radical functions.
- All algebra 1 students at IB schools in the district will be doing the mold project next year.
Teacher Educator Reflections

- Importance of planning collaboratively with teachers
- Expanded focus of plans
- Sharpened/Refreshed Classroom Teaching Skills
- Multiple contexts for trials
- Extended mentoring opportunities for program graduates
  - Better tracking after graduation
  - Detailed conversations about particular issues
- Extended feedback on preparation program
Questions?

Chris Rakes: rakes@umbc.edu
Rebecca Kirvan: rkirvan@aacps.org
Ashley Witkowski: awitkowski@aacps.org