Implementing what Works from Conversations with Students and Faculty: The Good, the Mixed, and the Uncertain.

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In the Beginning, there was Nothing

- Higher Education Act of 1965 allowed community colleges to grow exponentially.
- Community Colleges opened at an average of one per week between 1965 and 1972.
- The goal was to serve the previously underserved.
- Community college math faculty had a lot to learn.
- They could not teach the way they had been taught.
What has worked overwhelmingly well for community college math students?
Student Engagement

- Group discussions
- Pair-share
- Academic controversy
- Small-group tutorials
- Team-problem solving
- Much more!
Contextualization

- Where am I ever going to use this in real life?
- Surveying student interests at the beginning of the term to determine their interests and how we can relate best relate the content.
- The Quantitative Reasoning class.
- Math in the Industry
- Robotics - Sinclair Community College
- Jay Martin - Wake Technical Community College
(-40)(-3) Forty dollars was taken out of a person’s bank account for 3 months. However, it was a mistake as the person had moved away and attempted to cancel. Therefore, the payments for the 3 months were negated. The person gets $120 on her account.

50÷0. If I have 50 cupcakes, and there are 10 students in a room, how many cupcakes does each student receive? Yes, 5. How about 5 students? Yes, 10. How about 1 student? Yes, all 50. If I have 0 cupcakes and 50 students, each student gets 0 cupcakes. However, if there are 0 students in the room, and I have 50 cupcakes, no one can receive any cupcakes. It’s impossible to give an answer.
Adapting to Technology

- Calculators
- Computer Programs
- Internet- online learning
- Interactive math programs
- Remind App
- Zoom
- Robotics and artificial intelligence.
Thorough and Matter of Fact Instruction

- Students appreciate thorough and complete instruction, “the whole story.”
- “Ambiguity is not a four-letter word, but ambiguity, SHOULD be a four-letter word”.
Alternative Math Pathways

- Shorter pathways for non-STEM students.
- QR or introduction to statistics for non-STEM students instead of college algebra.
- In 2020, Carnegie conveyed that students who enrolled in either the statistics or QR pathways were more than three times as likely to complete their college-level math requirement than those who enrolled in a developmental math sequence. Additionally, students completed their college-level math credits in less than a quarter of the time (compared to attempting to complete an entire developmental math sequence).
Quantitative Reasoning (QR) and Introduction to Statistics with a corequisite.

We can get non-STEM students (and possibly STEM) through their math requirements within one year.

We are placing students more appropriately. Real-life applicable.

School Funding has increased.
Mixed Results

- What infinitives have received mixed results? That is not necessarily bad, but we need to look at how to make these better.

- Then again, some modalities or teaching strategies cannot be extrapolated to all students.
Emporium Model- The Good

- The National Center for Academic Transition reported that implementing the emporium model improved success rates in developmental math classes.

- Furthermore, this model allows students to obtain more individualized assistance and focus more on troublesome topics. It also spends more time on tasks such as drill and practice, as opposed to listening to lectures (Twigg, 2011).
The Emporium Model- The Good

- Student awareness is the key.
- Structure and some uniformity is imperative.
- Students appreciate being able to focus on their difficult areas.
- Better for lower-level classes (e.g., introduction to algebra).
Emporium Model - The Bad

- Some studies noted that students who attempted the emporium model were less successful than those who took math in a traditional setting and were even less likely to persist in college (Childers & Lu, 2017; Kozakowski, 2019).

- Other drawbacks to the emporium model include a lack of depth: students can get the correct answers by guessing and checking rather than by truly understanding the content (Ariovich & Walker, 2014; Beamer, 2020).

- Other studies have found little evidence that the emporium model is superior to the traditional approach (Weiss & Headlam, 2018).
Emporium Model- The Bad

- Can be problematic for non-traditional students unfamiliar with the technology.
- Can create bad organizational habits.
- Can be difficult for courses such as intermediate algebra.
- Some students need guided practice.
Inquiry- Group-based Instruction

- Data showed that students who make connections with their peers and faculty were more likely to stay in college.
- Students were having difficulty applying mathematical content.
- Advocates of this reform asserted that students who learned through their peers and through more of an inquiry-based approach retained the information.
- Traditional, lecture-based approach was not working.
- Inquiry was employed in developmental math, learning communities, quantitative reasoning classes.
It seems like every few years, or at least once a decade, the push for more inquiry-based instruction (group-based learning) makes a comeback.

We seem to run in circles.

We hear all the positives regarding inquiry-based instruction; however, the modality never seems to stick.

Then, a few years later there is another push more inquiry-based instruction.
Feedback

- Many students became frustrated. They were unable to learn in their groups and went off track. The students did not understand why they simply could not “get answers” from their instructors. Their math anxiety worsened.

- While students enjoyed the QR class, many became frustrated with the inquiry-based instruction.

- Many students entered the QR class lacking an understanding in topics such as probability and struggled to learn in groups.

- They became frustrated when their instructors simply switched the groups.
Faculty felt micro-managed.

Some students dropped their QR classes and searched for a QR class that utilized less of an inquiry-based approach.

Students would sit in groups simply unaware of what they were supposed to accomplish. Math anxiety worsened.

The Fermi problems confused students.

Several faculty members began to lessen the inquiry-based approach.

The faculty still utilized group work and in-class projects but made a point and a priority to provide their students with thorough instruction before-hand.
The Uncertain

- What lies ahead that may be troubling?
The Potential Elimination of Standalone Developmental Math

- Some schools have experienced poor results when eliminating standalone developmental math and employing default placement into college-level classes.
- This has proven disadvantageous to the lower and middle-tiered students.
- Corequisite classes do not have the bandwidth to serve students with all incoming skill levels.
- I can share more specific data.
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