Faculty and Student Experiences Across Reformed Developmental Math Course Models in CUNY Community Colleges

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Graduate NYC (GNYC) is an initiative that aids The City University of New York (CUNY) and the New York City Department of Education (NYC DOE) in increasing college readiness and success of students in the New York City area.
Why remedial math?
CUNY context: Reforms to remediation

• 20,000 students entering community colleges annually assessed as needing remediation, usually in math

• Report of the CUNY Task Force on Developmental Education (2016)
  – Alternative math course structures (co-req, Statway, Quantway)

• CUNY Project for Relevant and Improved Mathematics Education (PRIME)
Overview of study

The goal of the research was to qualitatively explore how faculty and students experience different reformed course models including:

• A co-requisite algebra course
• A hybrid course
• A quantitative reasoning course
Research Questions

1. How do faculty members experience teaching in each reform context?
2. How do students experience learning within each of these reform contexts?
3. Do the different developmental contexts appear to be more effective for certain types of instructors and/or learners than for others?
4. What types of unanticipated consequences arise as a result of changes to remedial policy, course structure and/or pedagogy?
Methods

- Data collection in three colleges in fall of 2016
- Interviews with math departments chairs, and developmental math faculty
- Focus groups and interviews with students in each course type
- 16 classroom observations
- Administration of two surveys at the beginning and end of the course
Student sample

• 38 students
• Most from computer-mediated course
• Selection bias
Theoretical framework

• Each reform model seeks to address a specific barrier, or set of barriers, to student progress
• Reform models are designed based on assumptions about student and faculty behaviors and preferences
• If student and faculty behaviors are inconsistent with the assumptions informing course design, theorized benefits are less likely to materialize
The hybrid course

• Computer-mediated version of Elementary Algebra
• 50% lecture, 50% computer-mediated instruction
• Open to all remedial students
• Reform led by a single instructor at the college
• Not an official CUNY central reform
Theory of action: Hybrid

• Problem: Lack of individualization

• Theorized benefits:
  – Student controls pace, topics, how material is presented
  – More learning modalities used
  – Young people like computers

• Assumptions:
  – Students have the autonomy, motivation, and discipline to take advantage of the resources the software provides
Faculty Perspective: Learning on computers

“I think what the computer does...is that it makes the student an active member in the learning process. Rather than watching me teach, the student is learning the material while we are discussing it.”
Administrator Perspective: Homework

“Yes, I mean [technology] is helpful, it's another resource for [the students]. It has the potential to extract more homework from them.”
Student perspective: Learning on computers

“I would like the teacher to lecture more and forget about the [the software]. [The software] should just be a tool for you to use if you needed help understanding something more than something that it seems as if you need to use every day.”
"[The instructor] teaches fine to me. It's just that I get confused because like on [the software] I'm on like a different subject, and once she's teaching so I'm getting confused, mixing up what I'm doing on [the software] to what she's doing [in class]."
Student perspectives: Extracting homework

Interviewer: How much time would you say you spend on average doing homework for this class?

Student1: None.

Interviewer: None, okay. How about you?

Student2: Usually I'll do the [software modules] in class like while she's teaching most of the time.
Main tension in course model

- Balancing autonomy with structure
The co-requisite course

- Course combines remedial and introductory college-level content into a single semester-long course
- 7 hour, 3 credit course
- Embedded tutor, and supplemental tutoring
- Open to students in STEM pathways
- “Official” CUNY reform
Theory of action: Co-requisite course

• Problem: Pre-curricular remediation and exit points

• Theorized benefits:
  – College-level credit immediately
  – Less attrition

• Assumptions:
  – Students are capable of accelerated progress
Faculty perspective: Pacing

“Basically as far as freedom to respond to students needs when they need more time, there is some, but not a lot. Because the syllabus does have to be covered.”
Faculty perspective: Pedagogy

“A lot of [instruction] is still procedural in this course, because in my experience procedural learning takes less time. And we have a massive amount of material in this course.”
Faculty Perspective: Mismatched expectations

“So I think there’s a conflict of expectations where [the students] expect it to be something that’s seven, maybe ten hours a week. But for a lot of students to really be successful, no it’s more like a twenty hours week...“
Student perspectives: Pacing

“She definitely puts more effort into trying to help people individually. In my past classes, it was just like, ‘All right, we have six weeks to do this, every day something new, we can’t review anything.’ So it was definitely harder than what I’m going through right now’.”
Main tension in course model

• Balancing acceleration with adequate student support
The quantitative reasoning course

• Non-algebra based remedial course
• Teaches contextualized, “real world” math with an emphasis on conceptual understanding
• Inquiry based instruction and collaborative learning
• Open to non-STEM pathway students placed into the middle developmental level
• “Official” CUNY reform
Theory of action: Quantitative Reasoning

• Problem: “Traditional” pedagogic approaches and irrelevant math lead to disengagement

• Theorized benefits:
  – Greater student engagement and motivation
  – Mastery of math

• Assumptions:
  – High fidelity implementation, including strong instruction and successful use of group work, and student engagement
Faculty perspective: Student engagement

“Things that students hear, see, read, and now it’s right there in the math class. The hope is to get students interested, to engage more, relatively more than to the algebra curriculum.”
Administrator perspective: A different kind of math class

“[students] have had negative experiences in math and with some exceptions most of them don't like math...we decided why not give them a different experience, where they don't feel frustrated, where they can be more successful and where they can see the usefulness of the math they learn and hopefully apply it more directly when they take future courses.”
Student perspective: Group work

“I really like how it’s -- this math how it’s setup. I like how there are groups and there are conversations. It’s more of like working together type of thing rather than just like sitting in a class and watching the professor talk the whole time, it’s more engaging, it gives you more focus.”
"Well, I like the course so much that if I pass this course, I'm going to take the credit one [the college-level QR course], because it's really, it deals with real life situations. And that's what I want, because that's how I focus..."
Student perspective: Pedagogy

“But like in [QR] it's explained why we're doing this, so even if you're confused, you can always go back and understand like the relations between each of the steps and numbers and whatever, and why we're doing it. But and like [Intermediate Algebra] was more like oh you just gotta do this. And to me it's like very hard because it's like I don't make sense of it as well as I do in [QR]. It's a whole different teaching.”
“[QR] changed my perspective [about math] a little bit. Only because of [the instructor]. But watch me go into another class next semester and it's not him, and the teacher is just the opposite of him and I'm just going to be like - why am I here? Exactly. Zero stars.”
Student engagement

When the professor is not interacting directly with the students, they tend to fall off task, looking at their phones and not sure how to proceed.

When he calls on one student who is looking at his phone, the student says that he didn’t have his book yesterday and therefore cannot answer.
Main tension of course model

- High fidelity implementation
Limitations of Study

• Limited generalizability
Take aways

• Inform students about remedial options and consider goodness of “fit.”
• Prevent repeated failures.
• Beware of tension between accelerated progress and mastery of content.
• Better tracking and evaluation of reforms, including qualitative assessment.
Next steps

• Follow-up data collection this focused on students who failed and repeated dev courses and the role of gender in course performance

• Analysis of enrollment data to understand student enrollment patterns in dev math courses
Questions?
There is a paper!! Read it.

Thank you!!!