

# Framing the Why and How: Adopting a Hopeful Stance toward Co-Requisite Math Developmental Education

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# A Preview of Our Time Together

- ▶ A big-picture view on shifting context of higher education and where the reforms are coming from.
- ▶ A review of the scholarly literature on developmental education and multiple measures placement.
- ▶ A personal story and a plea.
- ▶ Discussion—Breakouts and large group

# The Mission of Higher Education is Changing

## ▶ Access:

- ▶ 1944 GI Bill,
- ▶ 1947 President's Commission on Higher Education (community colleges, federal financial aid),
- ▶ 1965 Kansas Community College Act
- ▶ *“The idea was to give new and diverse students new and diverse options. Early leaders and advocates of...expansion said these students had the ‘right to fail.’ Getting them in mattered most.” (Walsh & Milliron, 2019 p. 52)*

## ▶ Completion/Equity:

- ▶ National Institute of Education, 1983; 2000s: Pew Foundation, Lumina Foundation, Ford Foundation, Kresge Foundation

# Current Mission Context: KBOR

- ▶ KBOR Building a Future Strategic Plan
  - ▶ Focused on total degree completers as well as equity gaps within completion
  - ▶ Implementing strategies that support increased completion, such as driving down time to completion

# Framing the Problem

- ▶ At the community college level, open-access admissions policies have, as their name implies, increased access to higher education; however, the large number of students who leave college without achieving their educational goals has led scholars to question whether we've really improved access at all (Bahr et al., 2019).
- ▶ In terms of identifying factors that contribute to the attrition of so many students, studies suggest that students become "...mired in developmental curricula in math, reading, and/or writing" (Bahr et al., 2019), never reach gatekeeper mathematics or English courses, and fail to persist in pursuing their educational goals.

# Framing the Problem

- ▶ Educational literature suggests that over 2/3 of community college students enroll in at least one developmental course (Bahr et al., 2019).
  - ▶ An even larger percentage *place* into developmental coursework via standardized assessments (ACCUPLACER, COMPASS, locally-developed placement instruments are among the most cited assessments in the literature); however, more students than ever are electing *not to enroll* in developmental sequences - or any other college courses, for that matter.
  - ▶ Stigmatization associated with developmental courses
  - ▶ Academic momentum theory
  - ▶ Assistance-hindrane theory
- ▶ Lengthy developmental sequences do not fulfill graduation or transfer requirements and are associated with considerable investments in time and money.
  - ▶ Ultimately, they delay student progress toward a degree or credential.

# Framing the Problem

- ▶ Evidence regarding the efficacy of developmental courses is mixed at best (Bahr et al., 2019).
- ▶ Efforts to address the problem (Bahr et al., 2019)
  - ▶ Accelerated support courses
  - ▶ Co-requisite support courses
  - ▶ Differentiating curricular pathways
  - ▶ Broadening determinants of placement - single placement score vs. multiple measures of assessment looking at placement score, high school performance indicators, non-cognitive indicators, etc.
- ▶ Problems with standardized placement exams (Bahr et al., 2019)
  - ▶ Lack of research studies establishing predictive validity
  - ▶ Lack of systematic approach to determining cut scores
  - ▶ Point-in-time assessment
  - ▶ Prevalence of *under-placement* based on standardized scores
    - ▶ Multiple studies (feel free to email me for a list) relying on regression discontinuity designs have substantiated this finding

# Multiple Measures to Determine Placement

- ▶ High school GPA has been shown to be a strong predictor of performance in college-level courses in math and English (Bahr et al., 2019).
- ▶ Math achievement in high school has been identified as another indicator of success (Ngo & Kwon, 2015).
- ▶ High school measures reflect data collected over a period of time vs. a point in time.



# California Community College System Study

- ▶ n = 201,986 students who enrolled in a developmental or college-level mathematics course
- ▶ Research questions
  - ▶ What are useful predictors of performance in developmental and college-level math and English coursework? To what extent do these predictors vary across different skill levels?
  - ▶ What are the appropriate thresholds of achievement to apply when making placement determinations?
- ▶ Methodology - decision-tree analysis and data mining
- ▶ Outcome variable of interest
  - ▶ Achievement of grade of “C” or better on students’ initial attempt in their first math or English course

# California Community College System Study

## ▶ Findings

- ▶ Cumulative high school GPA is a strong predictor of passing math and English courses across all levels of skill.
- ▶ Thresholds for determining placement (see next page for table)

Course	For direct matriculation	For non-direct matriculation
Statistics	HS GPA $\geq 3.0$ <u>or</u> HS GPA $\geq 2.3$ and completed HS precalculus course with $\geq C$	HS GPA $\geq 3.0$ <u>or</u> HS GPA $\geq 2.6$ and completed HS precalculus course with $\geq C$
College Algebra	HS GPA $\geq 3.2$ <u>or</u> HS GPA $\geq 2.9$ and completed HS precalculus course with $\geq C$	HS GPA $\geq 3.2$ <u>or</u> HS GPA $\geq 3.0$ and completed HS precalculus course with $\geq C$ <u>or</u> HS GPA $\geq 3.0$ and completed HS statistics course with $\geq C$
Trigonometry	HS GPA $\geq 3.4$ <u>or</u> HS GPA $\geq 3.0$ and completed HS precalculus course with $\geq C$ <u>or</u> HS GPA $\geq 3.0$ and completed HS algebra 2 with $\geq B$	HS GPA $\geq 3.3$ <u>or</u> HS GPA $\geq 2.8$ and completed HS precalculus course with $\geq C$
Precalculus	HS GPA $\geq 3.4$ <u>or</u> HS GPA $\geq 2.6$ and HS calculus attempted/in progress in grade 12	HS GPA $\geq 3.3$ <u>or</u> HS GPA $\geq 3.0$ and completed HS calculus with $\geq C$
Calculus 1	HS GPA $\geq 3.6$ <u>or</u> HS GPA $\geq 3.2$ and completed HS precalculus with $\geq C$	HS GPA $\geq 3.5$ <u>or</u> HS GPA $\geq 3.1$ and attempted HS calculus

# Experimental Studies of Multiple Measures Placement

- ▶ Community Colleges in State University of New York System (SUNY);  $n \approx 13,000$
- ▶ Four Minnesota Community Colleges & One Wisconsin Community College
- ▶ Research question: Do multiple measures placements yield better student outcomes compared to placements based solely on standardized placement scores?
- ▶ Randomized controlled trial designs
- ▶ SUNY: multiple measures consisted of standardized test performance, high school GPA, and years since high school graduation
- ▶ Minnesota and Wisconsin: multiple measures consisted of standardized test performance, high school GPA, and noncognitive assessments used to construct decision rules

# Experimental Studies of Multiple Measures Placement

- ▶ Findings
  - ▶ *HS cumulative GPA is the best observable predictor of success* in college-level courses
  - ▶ Students “bumped up” by multiple measures are *more likely* to successfully complete college-level courses (*across all subgroups*)
- ▶ Follow-up at SUNY tracked students for an additional three years (original study followed students for 1.5 years)
- ▶ Findings from the follow-up
  - ▶ Higher rates of enrollment in college-level math coursework, although gains were not statistically significant past the first term
  - ▶ Higher rates of college-level credits attempted and earned
  - ▶ Higher rates of credential attainment and/or transfer to four-year institutions

# So, then, how do we “sustain the gains?”

- ▶ Look no further than Texas!
- ▶ Large study (n = 88,461) investigated the efficacy of an accelerated developmental course offered alongside a college-level course vs. a study skills course offered alongside a college-level course
- ▶ Findings
  - ▶ Students who completed the accelerated co-requisite were 12% more likely to pass it and 2% more likely to pass the college-level math course.
  - ▶ Students who completed the study skills co-requisite were 1% more likely to pass college level math course and **4% more likely to persist to the next college year.**

# A Personal Co-Requisite Story from a Different Field

The background of the slide features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side of the slide, creating a modern, layered effect.

# References

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