Measure Twice, Cut Once: Practical and Effective College Placement Recommendations Beyond HSGPA

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Hello MNADE Members!

- I hope you are well!
- Visit communitycollegedata.com Resources page for PDF of this PPT with links to sources; Twitter @2yrcollegedata
- As educators, please remember that you serve a very important role in society that is often unrecognized
- Keep up your crucial work even if it seems too difficult, especially after/during the pandemic; the goal today is to give you practical ideas to help you with your work

- My position: I support effective and well-supported reforms in remediation and developmental education (R/DE) (e.g., multiple "mixed" measures for placement, acceleration options, corequisites for students just beneath college-level cutoff, etc.)
- However, I also support the inclusion of traditional stand-alone prerequisite R/DE coursework as an option for students at institutions and state systems
- Holistic reform addressing income, including developmental courses as an option, is the best approach for at-risk students

- The problem is that for over a decade, R/DE have been mischaracterized as a barrier (Goudas, 2021, 2022)_{1,8}; this claim has been repeated so frequently it has become an unquestioned assumption, a widely shared narrative even among practitioners; this is a false narrative; past and recent research support R/DE
- Definitions of terminology:
 - *remediation*: coursework, typically in English or mathematics, designed to assist students in preparing for college-level courses
 - developmental education: a system of supports, including remediation, based on the principles of adult learning

- The problem with the barrier claim is that policymakers are using it to eliminate or severely restrict R/DE in institutions and state systems across the nation
- In this presentation, I will discuss how placement practices have been shaped due to this claim and what to do to improve them
- For many students, prerequisite R/DE courses have been and still are beneficial; therefore, they should still be offered as an option, and placement into or out of these courses can be improved by adding measures beyond only HSGPA

The barrier claim was founded on the repetition of statements similar to this quote by Community College Research Center (CCRC) researchers Jaggars and Stacey (2014)₂:

"Only 28 percent of community college students who take a developmental education course go on to earn a degree within eight years, and many students assigned to developmental courses drop out before completing their sequence and enrolling in college-level courses" (p. 1).

That percentage (i.e., "only 28%") is from a well-known source in higher education, which is found in an endnote in Jaggars and Stacey (2014)₂:

"4. Based on calculations using the National Educational Longitudinal Study (NELS:88). The comparison figure for nonremedial students is 43 percent (Attewell, Lavin, Domina, & Levey, 2006)" (p. 6).

However, the CCRC left out *critical* information about that percentage from Attewell et al. (2006)₃:

"The NELS:88 shows that 28% of remedial students in two-year colleges graduate within 8.5 years (compared to 43% of nonremedial students).... Our analyses were able to distinguish the effects of a poor high school academic preparation from the effects of taking remedial coursework in college, and we found that most of the gap in graduation rates has little to do with taking remedial classes in college. Instead, that gap reflects preexisting skill differences carried over from high school. In two-year colleges, we found that taking remedial classes was not associated at all with lower chances of academic success, even for students who took three or more remedial courses [emphasis added]" (p. 915).

NCES Remedial Coursetaking (Chen, 2016)_{4,5}



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Supplemental Data (Chen, 2016)₅

Table 180302. Among 2003–04 beginning postsecondary students who first enrolled in public 2year institutions, percentage distribution of students according to their postsecondary persistence and highest degree attainment as of 2009, by remedial course enrollment and completion status: 2003-09

	6-year persistence and degree attainment					
Remedial course enrollment and completion status	No degree, and not enrolled	No degree, but enrolled	Attained an associate's degree or certificate	Attained a bachelor's degree		
Total	45.2	20.2	22.9	11.8		
Enrolled in any remedial courses	44.3	23.1	22.3	10.4		
Enrolled in remedial courses and passed all	35.3	22.1	25.8	16.8		
Enrolled in remedial courses and passed some	46.7	27.0	22.2	4.2		
Enrolled in remedial courses and passed none	66.8	17.5	11.6	4.2		
Did not enroll in remedial courses	47.0	14.1	24.1	14.8		

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BPS:12/17 Data (Pretlow et al., 2020)

National Center for Education Statistics

Table 2.2-C. Among 2011–12 first-time postsecondary students who began in an associate's degree program, percentage distribution of 6-year attainment and persistence status at any institution, by selected beginning enrollment characteristics: 2012–17

Selected beginning enrollment characteristics	Undergraduate certificate	Associate's degree	Bachelor's degree	Enrolled at 4-year institution	Enrolled at less-than- 4-year institution	Not enrolled
Self-reported remedial or developmental						
coursetaking, 2011–12						
Yes	6.6	21.0	11.0	6.3	9.9	45.3
No	5.4	21.5	13.1	6.1	8.0	45.9

BPS:12/17 Data (Chen et al., 2020)

Table 4. HIGHEST POSTSECONDARY ATTAINMENT: Percentage distribution of 2011–12 beginning postsecondary students' highest postsecondary attainment, by first degree program and selected coursetaking experiences: June 2017

First degree program ¹ and selected coursetaking experiences	No credential, not currently enrolled	No credential, currently enrolled at less-than- 4-year institution	No credential, currently enrolled at 4-year institution	Attained an under- graduate certificate	Attained an associate's degree	Attained a bachelor's degree
Associate's degree program	55.6	5.9	5.7	4.8	17.4	10.6
Took any remedial courses ²						
Yes	57.4	7.8	5.0	4.9	17.1	7.8
No	52.5	2.8	6.9	4.6	17.8	15.5

Remedial-Nonremedial First-Year GPA (Goudas, 2022)⁸

Table 6

Comparison of Remedial and Nonremedial Average First-Year GPA by Income Decile (t Tests)

Income (AGI)	Remedial GPA		Nonremedial	Difference	
	M(SD)	п	M(SD)	п	_
Decile 1	2.04 (1.23)	370	2.32 (1.37)	100	+0.28
Decile 2	2.11 (1.18)	340	2.25 (1.40)	130	+0.15
Decile 3	2.15 (1.14)	350	2.57 (1.17)	120	$+0.42^{**}$
Decile 4	2.30 (1.15)	370	2.56 (1.24)	130	+0.26
Decile 5	2.28 (1.12)	330	2.71 (1.09)	130	$+0.44^{***}$
Decile 6	2.45 (1.05)	330	2.63 (1.09)	150	+0.18
Decile 7	2.32 (1.14)	320	2.77 (1.09)	170	$+0.44^{***}$
Decile 8	2.43 (1.04)	310	2.87 (0.99)	180	$+0.43^{***}$
Decile 9	2.41 (1.08)	270	2.76 (1.06)	200	$+0.35^{***}$
Decile 10	2.43 (1.03)	280	2.69 (1.11)	210	$+0.25^{*}$

Note. Remedial and nonremedial combined M = 2.398; remedial combined M = 2.28;

nonremedial combined M = 2.64. The National Center for Education Statistics requires that all descriptive statistics be rounded to the nearest 10 to protect student privacy.

p < .05. p < .01. p < .001.

Source: U.S. Department of Education, Beginning Postsecondary Students Longitudinal Study (BPS:12/17), Restricted Dataset.

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- Research has shown that R/DE never has been a barrier
- Aside from noncognitive barriers and issues that many public 2year college students face, if coursework is considered a barrier, then the first year of college is the primary "barrier" for most at-risk students, remedial or nonremedial
- Nonetheless, because of heavy promotion of these arguments, a very low cutoff for HSGPA, actual or self-reported, became the default; here is a little background about how this happened and more about HSGPA, actual and self-reported

Understanding multiple measures and HSGPA for placement

How HSGPA Became the Default Placement Measure

CCRC Scott-Clayton et al. (2014)₉:

"We find that severe mis-assignments are common using current test score-cutoff-based policies, with 'underplacement' in remediation much more common than 'overplacement' college courses. Incorporating high school transcripts into the process could significantly reduce placement errors, but adding test scores to already available high school data often provides little marginal benefit" (p. 371).

CCRC Scott-Clayton (2012)₃₂

Table 2

Relationship of College-Level Outcomes to Alternative Sets of Predictor Variables

	Sample restr	Sample restricted to students with high school background data				
				Test Scores, HS		
			Placement Test	GPA/Units, PLUS		
	Placement Test	High School	Scores PLUS	Local HS,		
	Scores Only	GPA/Units Only	HS GPA/Units	Years Since HS		
	Panel A. R-	Squared Statistics				
	(Proportion of	Variation Explained)			
Math						
Earned B or higher in CL ^a	0.121	0.102	0.165	0.183		
Earned C or higher in CL	0.069	0.077	0.109	0.121		
Passed CL (D- or higher)	0.040	0.058	0.074	0.078		
Grades in first CL^{b}	0.129	0.119	0.183	0.204		
English						
Earned B or higher in CL	0.021	0.043	0.060	0.093		
Earned C or higher in CL	0.008	0.038	0.045	0.059		
Passed CL (D- or higher)	0.004	0.034	0.038	0.047		
Grades in first CL	0.017	0.055	0.069	0.098		

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How HSGPA Became the Default Placement Measure

CCRC Scott-Clayton & Stacey Research Overview (2015)10:

"In the urban system, using high school information alone would increase the rate at which Black students are assigned to English remediation and substantially decrease their representation in college English. One way to avoid differential impacts on subgroups would be to allow students to test out of remediation based on either test scores *or* high school achievement" (p. 3).

CCRC Study (Scott-Clayton & Stacey, 2015)10

Predicted Racial/Ethnic Composition of Introductory College-Level Courses by Assessment Method (Urban Study)⁹



English



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Black student college-level placement decreased by half using HSGPA alone

Up to Half of All Community College Students Do Not Submit HS Transcripts for HSGPA

- Several studies on HSGPA for placement (e.g., Scott-Clayton, 2012)₃₂ have noted that 30 to 50% of students in the samples did not even have a HSGPA transcript submitted to institutions
- My own college's data reflect the same percentage (50%)
- This is concerning because to make up for this, colleges are asking for self-reported HSGPA instead (we will discuss this in a moment)
- Many without transcripts are not enrolling from HS immediately

NAEP Average HSGPA (Nord et al., 2011)₁₂





* Significantly different (p<.05) from 2009.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, High School Transcript Study (HSTS), various years, 1990–2009.



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Another Major Problem With HSGPA: Nontraditional Students (Age)

- Several studies on HSGPA have shown that its ability to predict placement is drastically reduced for students who enter college 1 or more years after high school graduation
- The term nontraditional is typically used for students who are age 25 or higher when starting college, but researchers use their own definitions as well (1 or 2 years after graduating high school, respectively, in the next two slides)

HSGPA, SAT/ACT, Accuplacer, and R^2 (Hodara & Lewis, 2017)₁₃

Figure 2. Among first-time University of Alaska students who enrolled directly in college-level English and math courses within a year of high school graduation between 2008/09 and 2011/12, high school grade point average explained more of the variance in grades for those courses than it did among students who delayed college entry



entry refers to students who had at least a oneyear gap between high school graduation and college

College-level English course grade

College-level math course grade

Compass Correlations (Westrick & Allen, 2014)14

Table 5

Standardized Logistic Regression Coefficients

Course type		Single-pro	ed. models	Two-pred. model		
(Compass test)	Subgroup	Compass	HSGPA	Compass	HSGPA	
English	Overall	0.34	0.64	0.22	0.61	
Composition 1	Traditional	0.36	0.76	0.25	0.72	
(Writing Skills)	Nontraditional	0.33	0.38	0.21	0.36	
Speech/ Rhetoric	Overall	0.36	0.74	0.30	0.69	
(Writing Skills)	Traditional	0.38	0.88	0.29	0.82	
	Nontraditional	0.34	0.34	0.30	0.31	
American History	Overall	0.41	0.80	0.39	0.76	
(Reading)	Traditional	0.33	0.99	0.29	0.96	
	Nontraditional	0.47	0.43	0.48	0.38	
Other History	Overall	0.53	0.72	0.51	0.69	
(Reading)	Traditional	0.54	0.92	0.52	0.89	
	Nontraditional	0.60	0.38	0.72	0.35	
Psychology	Overall	0.49	0.68	0.44	0.63	
(Reading)	Traditional	0.48	0.82	0.39	0.77	
	Nontraditional	0.52	0.36	0.47	0.32	
Sociology	Overall	0.60	0.65	0.51	0.60	
(Reading)	Traditional	0.55	0.81	0.41	0.75	
	Nontraditional	0.64	0.40	0.62	0.34	
Biology	Overall	0.59	0.88	0.52	0.81	
(Reading)	Traditional	0.64	0.94	0.50	0.86	
	Nontraditional	0.70	0.63	0.83	0.56	
Arithmetic Skills	Overall	0.60	0.38	0.54	0.30	
(Pre-Algebra)	Traditional	0.66	0.62	0.67	0.51	
	Nontraditional	0.67	0.15 ^a	0.43	0.08 ^b	
Elementary	Overall	0.42	0.68	0.38	0.64	

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What About Self-Reported HSGPA?

Self-reported data is less reliable for remedial students:

"Kuncel et al. argued that self-reported grades may be valuable and accurate reflections for academically higher-performing students but are of much less use for academically lowerperforming students" (as cited in Shaw & Mattern, 2009, p. 1)11.

What About Self-Reported HSGPA?

Self-reported data is less reliable for remedial students:

"Freeberg noted that there were only very slight differences in overreporting or underreporting by gender and by race/ethnicity when controlling for prior academic performance; however, students with a lower actual HSGPA were far more likely to overreport their HSGPA than were higher-performing students" (as cited in Shaw & Mattern, 2009, p. 2)11.

Citrus College in California, a Study on Self-Reported HSGPA (2017)₁₅

Table 4		Count	Self-reported GPA Mean	School-reported GPA Mean	Mean diff.	% within +/-0.25
School-reported	0.0-1.4	5	1.9	1.3	0.6	40%
GPA range	1.5-1.9	53	2.2	1.8	0.4	34%
	2.0-2.4	180	2.6	2.2	0.4	38%
	2.5-2.9	216	2.9	2.7	0.2	64%
	3.0-3.4	138	3.3	3.2	0.1	74%
	3.5-4.0	38	3.7	3.7	0.0	79%
	Total	630	2.877	2.642	0.235	58%

The Dunning-Kruger Effect (Novella, 2019)₁₆



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How to increase the accuracy of placement beyond HSGPA:

What instructors and institutions can do

Ideas for Both Instructors and Institutions

- I imagine an instructor in the classroom may be wondering, What can I do myself to improve placement?
- Faculty are busy teaching the students already in their classes!
- However, there are a few ideas to consider
- The key is working together as a division or discipline using a coordinated effort

Idea for Instructors:

First-Week Placement Test, Then Move Classes

- Shift students into different classes during the first week based on a placement assessment (use same test for entire division)
- Pairs of prerequisite R/DE and college-level courses could be scheduled at the same days and times
- This is a model that divisions and disciplines could decide to use in conjunction with a division-approved standardized assessment (writing or mathematics)
- Some divisions already use their own placement assessments

Idea for Institutions: Free Accuplacer Retests

- Students could be encouraged to take a retest of the Accuplacer for free up to three times a year: *The Advance Program* is a highly successful program reducing misplacement by 25% at Delta; testing center staff should recommend a free retest if student places into any R/DE
- Approximately 1/3rd of students will return for a retest, and about 75% of them will move up a level
- They will perform equally well compared to others who placed into the higher level course initially

Idea for Institutions: Utilize Transcript-Level Data

- Transcript data, e.g., especially the type of mathematics course and grade in that course that a student took and received in HS, have been shown to be highly correlated with college math placement
- If your institution has enough resources to dedicate to admissions staffing and time, student transcript data could be used to place students into math courses

HS Math GPA and Remediation (Fong et al., 2008)17

FIGURE 3

Freshman mathematics remediation rate in Nevada public colleges and universities for the Nevada study population in 2006/07 by grade 12 mathematics grade point average (GPA) and highest level of mathematics completed in grade 12 in 2005/06 (percent)

Remediation rate (%)



Idea for Institutions: Checklist for Advisors

- Noncognitives, i.e., the factors not related to knowledge or skills, have been shown to major factors interfering with student progress in college
- How should we assess those and use them for placement?
- Advisors could use an algorithm-based, computerized survey that would ask questions related to work and family obligations
- A serious discussion about what affects most students should take place, and only those items should go into the survey

- Angela Duckworth popularized grit and its use in predicting success in a paper called "Grit: Perseverance and Passion for Long-Term Goals" (2007)₁₈ in the Journal of Personality and Social Psychology
- However, she published an op-ed in the NYT (March 26, 2016)¹⁹
- Here is what she said on a related matter, using grit to grade schools

"Attributes like self-control predict children's success in school and beyond. Over the past few years, I've seen a groundswell of popular interest in character development... It seemed that the narrow focus on standardized achievement test scores from the years I taught in public schools was giving way to a broader, more enlightened perspective. These days, however, I worry I've contributed, inadvertently, to an idea I vigorously oppose: high-stakes character assessment" (paras. 2–4).

"Does character matter, and can character be developed? Science and experience unequivocally say yes. Can the practice of giving feedback to students on character be improved? Absolutely. Can scientists and educators work together to cultivate students' character? Without question. Should we turn measures of character intended for research and self-discovery into high-stakes metrics for accountability? In my view, no" (paras. 23–24).

• After reading this, I emailed Dr. Duckworth at the Character Lab housed in the University of Pennsylvania, and I asked her whether we should also apply her stance to placement in community colleges. A lab assistant emailed back immediately:

"Your assumption that the character measures should not be used in admissions decisions is correct" (Character Lab, personal communication, March 28, 2016).

Idea for Institutions: What About Guided Self-Placement (GSP)?

- Some colleges use a prefab template to insert their own questions and weight answers to arrive at a placement decision
- Embedded in many GSPs are self-reported HSGPA
- Other questions try to gauge noncognitive skills or personality traits that may indicate ability to pass higher level courses if not quite prepared
- Research on the effectiveness of these is quite limited

Idea for Institutions: Holistic Intake Process

- In 2012, I had an idea for a holistic and year-round intake process at community colleges that would address many issues: Many students, for example, do not submit HSGPA transcripts in a timely manner so that advising can use them for placement
- Community colleges have an open enrollment mission; most 2year colleges allow students to apply and enroll at any time in the year; compare this to universities where there are set processes to apply, be accepted, and start on campus (e.g., orientation week)

Idea for Institutions: Holistic Intake Process

- According to the Center for Community College Student Engagement (2018)³¹, 62% of incoming students meet with an advisor. What are the other 38% doing? Online self-advising?
- Might we improve placement for all students by requiring a process that funnels them through the most important steps?
- Imagine this scenario:

Idea for Institutions: Holistic Intake Process

- New students attend a welcome process (intake session) on any Tuesday or Friday from 9 a.m. to 1 p.m. (including free lunch!)
- Introduction, placement assessments (standardized, GSP, and/or division tests), sit-down with advisor (able to handle fully online?), advise to retest or get HSGPA (come back to a second intake session), discussion about work and family, talk to financial aid, online and in-person orientation, next steps, registration (or directions for registration later), free lunch (end of an experience changes how people view an entire experience; see *peak-end rule*)
- This would require more advisors than the average student-toadvisor ratio of 1 to 800–1,200 (Jaggars & Fletcher, 2014)₃₀

Warning: This is difficult!

An RCT of a comprehensive system for placement did not increase gateway course outcomes very much

Figure 3.1

Change in Placement Among Program Group Students



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Figure 3.2

College-Level Math Course Outcomes (Among Students in the Math Subsample)



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Figure 3.3

College-Level English Course Outcomes (Among Students in the English Subsample)



Figure 3.6

College-Level Math Course Outcomes for Cohort 1 (Among Students in the Math Subsample)



^{***}p < .01, **p < .05, *p < .10.

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Figure 3.7

College-Level English Outcomes for Cohort 1 (Among Students in the English Subsample)



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• As I have discussed before (Goudas, 2021, 2022)_{1,8}, data on remediation presents a causation-correlation problem that, in addition to biases in data selection, makes it *appear* that remediation is a barrier; however, the problem is not remediation or developmental education per se:

If remediation is a barrier,

then all courses and semesters pose similar barriers

 CCRC has acknowledged that other first-year, first-semester courses at community colleges pose equal barriers to positive outcomes for students

CCRC researchers Zeidenberg et al. (2012)²¹ have demonstrated that other courses pose equal barriers to student success:

"Our findings indicate that despite the focus on college math and English, these courses are not the only obstacles to completion for community college students. In fact, they present no greater obstacle to completion than the other gatekeeper courses that are identified in this paper" (p. 4).

Past studies have found positive results for remediation (Goudas, 2021, 2022)_{1,8}. Other peer-reviewed studies using statistical controls also have also concluded that remediation is not a barrier:

Cabrera et al. (2005)₂₂: "Those taking math remediation courses were 4% more likely to transfer than those who did not.... However, among Lowest-SES students, the effect of taking remedial reading is particularly noteworthy. For this group taking remedial reading actually increases their likelihood of transferring by 24%" (p. 23).

Fike and Fike (2008)₂₃: "Students who did not enroll in developmental mathematics had lower odds of retention than those who enrolled in developmental mathematics but did not successfully complete the course. This finding suggests the significant role that developmental mathematics plays in student retention" (p. 78).

Lesik (2006)₂₄: "Using the regression-discontinuity design and an instrumental variables strategy to model selection bias, I concluded that participating in a developmental mathematics program significantly increases the odds of successfully completing a college-level mathematics course on the first try" (p. 17).

Turk (2019)₂₅: "When two groups of statistically similar students were compared, developmental education generally improved the chances of earning an associate degree" (p. 1090).

Saw (2019)₂₆: "For 2-year college students, remediation enrollment in both mathematics and English improved the likelihood of transferring to a 4-year college and earning a bachelor's degree" (p. 298).

Sanabria et al. (2020)₂₇: "Taking remediation is associated with a nearly nine percentage-point increase in bachelor's degree completion for 2-year college students after accounting for demographic, familial, and academic background characteristics" (p. 474).

- The primary causes of low completion rates (first-year success, graduation, transfer, etc.) is not any particular set of one or two college courses; all first-year courses are equal "barriers" if viewed in this way
- Factors such as income, work, family obligations, children, daycare, transportation, race, age, parental education level, high school courses taken (HS quality), college choice, support levels in college, tutoring, disability status, mental health levels—all of these combined and more have a far larger impact on outcomes for at-risk 2-year college students

Comprehensive Reform, Including Thoughtful Mixed Measures for Placement, is Best

- The most effective reform, the City University of New York's Accelerated Study in Associate Programs (ASAP), addresses all of these issues yet does not eliminate remediation
- The original model more than doubled graduation rates (21% vs. 48% for developmental students) and was an RCT comprised of 90% students of color (Miller et al., 2021)₂₈
- Miller et al. (2020)²⁹ studied a replication of ASAP in Ohio and found that this model of true holistic *developmental education* caused a 3year graduation rate increase of 12 percentage points (49 vs. 37%) (p. 48) at a cost of \$1,840 per student per year (p. ES-7)

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• These studies included required developmental coursework first

Comprehensive Reform, Including Thoughtful Mixed Measures for Placement, is Best

- A reasonable policymaker should conclude that traditional standalone remediation should be retained as options for students
- I encourage policymakers to implement reforms such as welldesigned corequisites, i.e., just beneath the college-level cutoff, thoughtful multiple measures for placement reforms, i.e., actual mixed measures with more advisors and coordinated efforts at all levels of the institutions, and appropriate accelerated options, etc.
- It is complicated and requires money, time, staffing, effort; but the goal is extremely important in society and is very much worth it

Thank you!

Keep up the good work in the field!

References below and more reading available: communitycollegedata.com alexmgoudas (at) gmail (dot) com

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(See below for references with links)

References

- 1. Goudas, A. M. (2021). *False narratives, not data, are driving reforms.* Community College Data. <u>http://communitycollegedata.com/articles/false-narratives-not-data-drive-reforms/</u>
- 2. Jaggars, S. S., & Stacey, G. W. (2014). What we know about developmental education outcomes [Research overview]. Community College Research Center, Teachers College, Columbia University. http://ccrc.tc.columbia.edu/media/k2/attachments/what-we-know-about-developmental-education-outcomes.pdf
- 3. Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation. *The Journal of Higher Education*, 77(5), 886–924. https://doi.org/10.1080/00221546.2006.11778948
- 4. Chen, X. (2016). *Remedial coursetaking at U.S. public 2- and 4-Year institutions: Scope, experiences, and outcomes* (NCES 2016-405). U.S. Department of Education. Washington, DC: National Center for Education Statistics. <u>https://nces.ed.gov/pubs2016/2016405.pdf</u>
- National Center for Education Statistics. (n.d.). Table 180302. Among 2003–04 beginning postsecondary students who first enrolled in public 2year institutions, percentage distribution of students according to their postsecondary persistence and highest degree attainment as of 2009, by remedial course enrollment and completion status: 2003-09. U.S. Department of Education, Institute of Education Sciences. https://nces.ed.gov/Datalab/TablesLibrary/TableDetails/12658
- Pretlow, J., Jackson, D., & Bryan, M. (2020). A 2017 follow-up: Six-year persistence and attainment at any institution for 2011–12 first-time postsecondary students (NCES 2020-238). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. <u>https://nces.ed.gov/pubs2020/2020238.pdf</u>
- Chen, X., Caves, L. R., Pretlow, J., Caperton, S. A., Bryan, M., & Cooney, D. (2020). Courses taken, credits earned, and time to degree: A first look at the postsecondary transcripts of 2011–12 Beginning Postsecondary Students (NCES 2020-501). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. <u>https://nces.ed.gov/pubs2020/2020501.pdf</u>
- 8. Goudas, A.M. (2022). Focusing on community college students in the NCES BPS:12/17 dataset to examine income, remediation, first-year grade point average, and 6-year graduation rates [Unpublished doctoral dissertation]. Central Michigan University.
- 9. Scott-Clayton, J., Crosta, P. M., & Belfield, C. R. (2014). Improving the targeting of treatment: Evidence from college remediation. *Educational Evaluation and Policy Analysis*, *36*(3), 371–393. <u>https://doi.org/10.3102/0162373713517935</u>
- 10. Scott-Clayton, J., & Stacey, G. W. (2015). *Improving the accuracy of remedial placement*. New York, NY: Columbia University, Teachers College, Community College Research Center. <u>http://ccrc.tc.columbia.edu/media/k2/attachments/improving-accuracy-remedial-placement.pdf</u>
- 11. Shaw, E. J., & Mattern, K. D. (2009). *Examining the accuracy of self-reported high school grade point average* (College Board Research Report No. 2009-5). College Board. https://files.eric.ed.gov/fulltext/ED562616.pdf
- 12. Nord, C., Roey, S., Perkins, R., Lyons, M., Lemanski, N., Brown, J., & Schuknecht, J. (2011). *The nation's report card: America's high school graduates* (NCES 2011–462). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. <u>http://nces.ed.gov/nationsreportcard/pdf/studies/2011462.pdf</u>
- 13. Hodara, M., & Lewis, K. (2017). *How well does high school grade point average predict college performance by student urbanicity and timing of college entry?* (REL 2017–250). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northwest. https://files.eric.ed.gov/fulltext/ED573041.pdf
- 14. Westrick, P. A., & Allen, J. (2014). Validity evidence for ACT Compass placement tests (ACT Research Report Series). ACT. http://files.eric.ed.gov/fulltext/ED546849.pdf
- 15. Citrus College Office of Institutional Research, Planning and Effectiveness. (2017). *Accuracy of self-reported high school GPA*. <u>http://www.citruscollege.edu/admin/research/Documents/AB705/AccuracyGPA2017.pdf</u>

- 16. Novella, S. (2019, January 8). *Misunderstanding Dunning-Kruger* [Web log post]. <u>https://theness.com/neurologicablog/index.php/misunderstanding-dunning-kruger</u>]
- 17. Fong, A.B., Huang, M., & Goel, A.M. (2008). *Examining the links between grade 12 mathematics coursework and mathematics remediation in Nevada public colleges and universities* [Issues & Answers Report, REL 2008–No. 058]. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory West. https://ies.ed.gov/ncee/edlabs/regions/west/pdf/REL_2008058.pdf
- 18. Duckworth, A. L., & Peterson, C. (2007). Grit: Perseverance and passion for long-term goals. Journal of Personality and Social Psychology, 92(6), 1087–1101.
- 19. Duckworth, A. L. (March 26, 2016). Don't grade schools on grit. *The New York Times Online*. Retrieved from http://www.nytimes.com/2016/03/27/opinion/sunday/dont-grade-schools-on-grit.html
- 20. Barnett, E., Kopko, E., Cullinan, D., & Belfield, C. (2020). *Who should take college-level courses? Impact findings from an evaluation of a multiple measures assessment strategy*. Center for the Analysis of Postsecondary Readiness and MDRC. <u>https://postsecondaryreadiness.org/wp-content/uploads/2020/10/multiple-measures-assessment-impact-findings.pdf</u>
- 21. Zeidenberg, M., Jenkins, D., & Scott, M. A. (2012). Not just math and English: Courses that pose obstacles to community college completion (CCRC Working Paper No. 52). Community College Research Center, Teachers College, Columbia University. http://ccrc.tc.columbia.edu/media/k2/attachments/not-just-math-and-english.pdf
- 22. Cabrera, A. F., Burkum, K. R., & La Nasa, S. M. (2005). Pathways to a four-year degree: Determinants of transfer and degree completion. In A. Seidman (Ed.), *College student retention: A formula for success* (pp. 155–214). ACE/Praeger Series on Higher Education.
- 23. Fike, D. S., & Fike, R. (2008). Predictors of first-year student retention in the community college. *Community College Review, 36*(2), 68–88. https://journals.sagepub.com/doi/abs/10.1177/0091552108320222
- 24. Lesik, S. A. (2006). Applying the regression-discontinuity design to infer causality with non-random assignment. *The Review of Higher Education, 30*(1), 1–19. https://muse.jhu.edu/article/203468/pdf
- 25. Turk, J. M. (2019). Estimating the impact of developmental education on associate degree completion: A dose–response approach. *Research in Higher Education, 60,* 1090–1112. https://doi.org/10.1007/s11162-019-09549-9
- 26. Saw, G. K. (2019). Remedial enrollment during the 1st year of college, institutional transfer, and degree attainment. *Journal of Higher Education*, *90*(2), 298–321. https://www.tandfonline.com/doi/full/10.1080/00221546.2018.1493668
- 27. Sanabria, T., Penner, A. & Domina, T. (2020). Failing at remediation? College remedial coursetaking, failure and long-term student outcomes. *Research in Higher Education*, 61, 459–484. https://doi.org/10.1007/s11162-020-09590-z
- 28. Miller, C., & Weiss, M. (2021). Increasing community college graduation rates: A synthesis of findings on the ASAP model from six colleges across two states. MDRC. <u>https://files.eric.ed.gov/fulltext/ED611732.pdf</u>
- 29. Miller, C., Headlam, C., Manno, M., & Cullinan, D. (2020). Increasing community college graduation rates with a proven model: Three-year results from the Accelerated Study in Associate Programs (ASAP) Ohio demonstration. MDRC. https://www.mdrc.org/sites/default/files/ASAP_OH_3yr_Impact_Report_1.pdf
- 30. Jaggars, S. S., & Fletcher, J. (2014). *Redesigning the student Intake and information provision processes at a large comprehensive community college* (CCRC Working Paper No. 72). Community College Research Center, Teachers College, Columbia University. <u>https://ccrc.tc.columbia.edu/media/k2/attachments/redesigning-student-intake-information-provision-processes.pdf</u>
- 31. Center for Community College Student Engagement. (2018). *Show me the way: The power of advising in community colleges*. The University of Texas at Austin. https://www.ccsse.org/nr2018/Show Me The Way.pdf
- 32. Scott-Clayton, J. (2012). *Do high-stakes placement exams predict college success*? (CCRC Working Paper No. 41). Community College Research Center, Teachers College, Columbia University. http://ccrc.tc.columbia.edu/media/k2/attachments/high-stakes-predict-success.pdf
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