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The Importance of Institutional Data Reporting Quality for Understanding Dev-Ed Math Enrollment and Outcomes

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Abstract

Student placement test records, course enrollments, and other student-level data collected by community colleges are vital for evaluating the outcomes of students in developmental education (dev-ed) courses. Researchers and policymakers rely on this information to examine the impact of existing programs and assess ongoing reforms to dev-ed—the accuracy of state administrative data is critical to those tasks. In this study, we examine math placement records in a statewide administrative data set to understand how test records provided by colleges in the state aligned with student course enrollment patterns. We highlight systematic data reporting problems, where many students lacked test scores and test exemption records necessary for policymakers and researchers to determine if they enrolled in the appropriate coursework for their needs. We also found that a non-negligible proportion of students enrolled in dev-ed math—10%—did not require remediation due to exemption status or passing placement test scores. We conclude with a discussion of the pressing need for accuracy in data reporting, as up-to-date, high quality student-level data are essential to evaluate ongoing reforms to developmental education.

There is a pressing need for high quality data to understand how students are placed into developmental education (dev-ed) courses and how dev-ed influences students' trajectories. Test scores and other student-level data collected by institutions serve immediate administrative purposes; they also enable scholarly researchers to contribute necessary and valuable insights about education (Figlio, Karbownik, & Salvanes, 2016). Student placement test records and course enrollments are vital for evaluating the outcomes of students in dev-ed (e.g., Melguizo, Bos, Ngo, Mills, & Prather, 2016; Scott-Clayton, Crosta, & Belfield, 2014). State agencies rely on this data to assess the population's college-readiness, determine funding allocations, evaluate existing policies, and make recommendations to policymakers. Thus, the accuracy of state administrative data is crucial to assessing existing policies and practices.

In this paper, we examine math placement records in statewide administrative data collected by the Texas Higher Education Coordinating Board (THECB) to understand how test records provided to the state align with student course enrollment patterns, with an eye on whether the patterns align with dev-ed placement policies. We highlight systematic data reporting problems, where many students lack test scores and test exemption records

necessary for policymakers and researchers to determine if they enrolled in the appropriate coursework for their needs. We conclude with a discussion of implications.

Why Dev-Ed Math is a Pressing Concern at Community Colleges

Roughly 60% of two-year college entrants are deemed underprepared for college math (Bailey, Jeong, & Cho, 2010). Developmental education aims to help students achieve college-readiness and acquire the foundations to succeed in college coursework. Yet, dev-ed represents a significant hurdle for many students. Prior research illustrates that taking dev-ed coursework reduces both the number of college-level credits students take and their likelihood of earning a degree (Boatman & Long, 2018; Martorell & McFarlin, 2011). Dev-ed credits do not count toward a degree, deplete limited financial aid resources, and are often required before students can take college-level courses (Bailey et al., 2010; Melguizo, Hagedorn, & Cypers, 2008). Research suggests that many students in dev-ed could pass college-level courses, inspiring scrutiny of placement methods and extant dev-ed models (Logue, Watanabe, & Douglas, 2016; Scott-Clayton et al., 2014).

Some of the most persuasive research on the effects of dev-ed coursework on student outcomes leverages students' placement exam scores to compare students in dev-ed with those not in dev-ed, focusing on students with scores close to placement cutoffs (e.g. Boatman & Long, 2018; Martorell & McFarlin, 2011; Scott-Clayton & Rodriguez, 2015). Many other studies in the literature control for student test scores as a baseline measure of ability (Park Woods, Hu, Bertrand Jones, & Tandberg, 2018; Scott-Clayton et al., 2014; Weisburst, Daugherty, Miller, Martorell, & Cossairt, 2017). In all of these studies, researchers restricted their sample to students with a placement test score. In states with high rates of data reporting problems, restricting the sample in this way (although analytically necessary) forces researchers to focus on a sample that is no longer representative of the student population. Thus, the accuracy and completeness of placement records are crucial to examining the effectiveness of dev-ed practices and reforms.

Study Contexts

Texas is one of the largest and most diverse higher education systems in the country. Texas community colleges account for 12% of the nation's enrollment in two-year colleges (authors' calculations, 2018). Among Texas college entrants, 61% of two-year and 18% of four-year students enroll in dev-ed math (THECB, 2018a). Starting in 2013, Texas colleges were required to use the Texas Success Initiative (TSI) assessment to test college-readiness in math, reading, and writing (prior to that time, colleges selected the placement test) (Texas Success Initiative, 2011). Some students are exempt from taking the TSI, including those who meet a minimum threshold for SAT, ACT, or state exit exam scores, and are eligible to enroll immediately in college-level coursework. In math, non-exempt students must earn a score of at least 350 on the TSI to enroll directly into college math. Test scores expire after five years, at which point students who have not passed dev-ed coursework must be re-tested. In 2017, the legislature passed a new mandate requiring an increased proportion of students with placement test scores below passing to enter co-requisite coursework (enrolling in a college-level course paired with a co-requisite dev-ed support course) instead

of traditional dev-ed (THECB, 2018b). Evaluating the effectiveness of the new mandate will likely require the use of students' placement test scores, drawn from administrative data.

Methods and Results

In this study, we sought to examine the alignment of observed patterns of student placement records and dev-ed enrollment at Texas colleges with state dev-ed placement policies and understand how data quality issues may undermine the evaluation of dev-ed reforms. Using six years of THECB data (2010–2016), we determined how often Texas college students' math course enrollments were inconsistent with placement policies. The data included student demographics, college enrollments, course enrollments, and grades for the entire population of Texas college-enrollees in fall 2015 and spring 2016, along with five years of students' TSI report records, which capture placement tests and exemptions for all colleges in the state.

Table 1 shows the prevalence of issues of math course placement and record missingness in the 2015–2016 school year. Columns 1, 3, and 5 show math course enrollment and various test record statuses for the entire population of math enrollees. The first set of results in the top half of the table shows results for fall 2015 students. In highlighting results, we focus on students enrolled in dev-ed math (column 5) because placement into dev-ed math—especially when not required—has important implications for academic progress. When the full history of active test records did not support students' dev-ed course enrollment, we describe their placement as “inappropriate” based on state placement recommendations; when the full history of records lacked test scores or exemptions to support placement into dev-ed, we note that there is “insufficient data” for student placement. Inappropriate placement, where a student enrolls in dev-ed math despite meeting the requirements (a passing test score or an exemption) for college math, is the most concerning issue we identify in the data. Also concerning, however, is when students enrolled in a math course have insufficient data (no test results or exemptions in the past five years); in that case, state agencies and researchers cannot determine whether or not the students were correctly placed in their math course.

Among all enrollees (which includes both new and returning students) taking a dev-ed math course in fall 2015, 10% of students had test scores or exemptions that indicated they did not need to take dev-ed and thus were inappropriately enrolled in dev-ed (see Table 1, column 5: 1.6% passed the test, 8.4% were exempt). An additional 28% lacked proper records to support a dev-ed placement (column 5: 28.2% were “not tested”). Most students with insufficient data had TSI report records in the data but no test scores or exemptions. We refer to their status as “not tested” because we have no evidence they ever were. For these students, the exemption variable reported by their institution listed “n/a or previously reported,” but there was no prior exemption code or test score reported within the five-year validity window across all colleges in the state. Overall, the results from the fall 2015 panel in Table 1 indicate that thousands of Texas college students were inappropriately placed into dev-ed math and tens of thousands lacked sufficient data in their records for policymakers to know if they were appropriately placed. Due to missing data, it would be impossible for the

state to determine whether colleges fully complied with state placement score mandates and for researchers to comprehensively evaluate remedial education.

We hypothesized that some students might lack test records because colleges relied on older (expired) records. For that reason, we report results for first-time-in-college (FTIC) students, in addition to all enrollees, in each semester. We found similarly high rates of missing test scores and exemptions for new students, who would not have records outside of the five-year window. Columns 2, 4, and 6 display results for FTIC students. In fall 2015, 5% of FTIC students enrolled in dev-ed math had test scores or exemptions that indicated they did not need to take dev-ed (column 6: 1.0% passed the test; 3.8% were exempt), while an additional 27% lacked sufficient data to support dev-ed math enrollment.

The bottom half of Table 1 shows patterns among spring 2016 students. We present both fall and spring semester math course enrollees because it seemed feasible that colleges' reporting of placement records might differ in the spring semester, when there are fewer students entering college for the first time. However, we found similar patterns of appropriate and inappropriate dev-ed placement and insufficient data across fall and spring semesters; the primary differences across semesters is that there are substantially fewer FTIC students. Even with the substantial overlap between non-FTIC students enrolled in fall 2015 and spring 2016, the spring results serve to suggest that colleges did not rectify placement issues or missing records by the subsequent semester.

Implications of Results

Overall, the patterns presented here illuminate inconsistencies between state placement policies and dev-ed course enrollment and serve to highlight the importance of complete and accurate administrative data. For a substantial portion of students enrolled in dev-ed math in Texas, there is no evidence that they are required to be there. A non-trivial portion of students taking dev-ed math were exempt or passed their placement test (10% of all dev-ed math enrollment in fall and spring); a much larger portion enrolled in dev-ed math students lacked sufficient data to support their enrollment in the course (28–29% depending on the semester). For students who enrolled in dev-ed even though they were not required to, we cannot know why they did so without further inquiry. Recent evidence suggests that many students elect to take dev-ed even when it is optional and may be unaware of its potential consequences (Deil-Amen & Rosenbaum, 2002; Park et al., 2016).

For students with insufficient data, we assume the findings at least partially reflect data reporting problems, where colleges did not provide the most up-to-date information for each student. Anecdotal reports from advisors suggest that staff may enter additional information into their college advising system (typically in the form of notes or comments) without updating data reported to the institutional researchers. In an effort to improve data quality, the THECB recently urged institutional researchers at Texas colleges to provide as much information about student placement information as possible in data reports and to avoid using the “previously reported or n/a” response option.

The findings have implications for several audiences. For policymakers, the results highlight the importance of accountability for record-keeping. Incomplete or inaccurate data will have consequences as new policies are enacted, as it could undermine the evaluation of new policies and practices. Those relying on the data will be unable to know if students without placement information were inappropriately placed into programs targeting students in need of dev-ed. For staff who routinely perform data reporting, the most valuable takeaway is that data reporting requires scrutiny and attention to detail. In order to assess new initiatives and understand areas of weakness, states and institutions rely on the quality and accuracy of administrative data. Colleges may need to improve their internal communications (e.g. across departmental units) to ensure institutional research staff provide high quality and up-to-date data to the state. Finally, the results have implications for students, who rely on administrators and policymakers to provide an academic environment conducive to student success. We find it concerning that 10% of dev-ed math students enroll in non-mandatory dev-ed coursework, given evidence that dev-ed can stunt student success. This number likely underestimates inappropriate placement into dev-ed, given the high volume of missing test scores and exemptions.

We encourage colleges to examine their data reporting protocol and to assess the quality of the data they report. Math placement should be consistent with test score and exemption records because math placement should be consistent with students' needs (though we recognize concerns over the use of the placement test; for now, testing is the required placement procedure in this context). Proper reporting of test score and exemption records helps communicate students' baseline skills and knowledge to administrators, researchers, and policymakers. In an environment where there are legitimate concerns about placing students in dev-ed unnecessarily, this information is crucial. An additional benefit of performing a quality check between math placement and test score/exemption status is that colleges would identify how many students enroll in dev-ed unnecessarily and could enact new practices to encourage those students to enroll in gateway courses instead.

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Patterns of Missingness, Exemptions, and Placement Test Passes and Failures for Students Taking College and Developmental Math

Table 1

Semester	TSI Status	All Students		College Math		Dev-Ed Math		Conclusion About Dev-ed Students' Placement:
		All enrollees	First-Time-In-College	All enrollees	First-Time-In-College	All enrollees	First-Time-In-College	
		[1]	[2]	[3]	[4]	[5]	[6]	
Fall 2015	All Students	1,397,851	222,591	287,998	79,993	91,703	41,801	
	Tested, Failed	202,044	47,673	32,101	6,141	56,684	28,381	Appropriate
	Tested, Passed	145,846	34,215	49,423	21,447	1,434	436	Inappropriate
	Exempt	618,296	73,672	142,097	36,261	7,711	1,582	
Spring 2016	Not Tested	348,525	47,986	62,940	15,807	25,872	11,402	
	No TSI Report Records	83,140	19,045	1,437	337	2	0.0%	Insufficient Data
	All Students	1,325,973	70,910	250,862	13,432	72,456	15,961	
	Tested, Failed	184,988	21,777	31,999	2,001	44,537	12,104	Appropriate
	Tested, Passed	138,483	9,130	41,462	4,511	999	127	Inappropriate
	Exempt	574,787	17,214	116,557	4,613	6,229	578	
	Not Tested	346,692	14,394	59,379	2,118	20,677	3,151	
	No TSI Report Records	81,023	8,395	1,465	189	14	0.0%	Insufficient Data

Notes. Data obtained from Educational Research Center; we used Texas Higher Education Coordinating Board Texas Success Initiative (TSI) Report and course schedule data. Columns [1] and [2] include all students at all Texas public colleges, columns [3] and [4] include students enrolled in college-level math but not in dev-ed math, and columns [5] and [6] include students enrolled in dev-ed math. We present the count of students in various statuses based on their available TSI data. The TSI Report should contain records for all placement tests, as well as exemptions for students who are not obligated to take a placement test. The rows "Exempt", "Not Tested", "Tested, Passed", and "Tested, Failed" are mutually exclusive and use data from TSI Reports from fall 2010 to spring 2016. This encompasses the five-year TSI validity window for students enrolled in fall 2015 and spring 2016 (scores/exemptions from before this window would be expired). For the Dev-Ed Math columns (the focus of our inquiry), we also present percentage of students, out of the total number of dev-ed students, in each TSI data status in bold text. The final column describes whether, for students enrolled in dev-ed math, there is data to support their placement into dev-ed.