



The University of Texas at Austin
Charles A. Dana Center

Accelerating Mathematics Pathways in Deep East Texas

Project Final Report

June 2020







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Executive Summary

With the support of the T.L.L. Temple Foundation, the Charles A. Dana Center at The University of Texas at Austin seeks to impact systems change and policy in Deep East Texas by creating more seamless transitions at key connections among school districts and two- and four-year institutions of higher education. Aligning with the Foundation's focus on increasing postsecondary preparation, access, and success, the Accelerating Mathematics Pathways in Deep East Texas project strives for transformative change for equitable access to and opportunity for success in rigorous math pathways as a normative practice for all students.

When the Dana Center embarked on this initiative, engagement in mathematics pathways work varied across Deep East Texas, with expertise existing in pockets on different campuses. Building strong relationships and fostering conversations across the region was needed to see larger gains in math course alignment as well as implementation of continuous improvement processes to ensure high-quality effective math instruction that incorporates evidence-based curriculum and pedagogy central to improving course completion rates.

Math was a particular challenge for students in this region. According to Texas Education Agency measures, 68 percent of high school seniors were not ready for college math. An overwhelming number were referred to developmental math courses when beginning college. First college-level math course completion rates for first-time-in-college students were lower at most institutions in this region compared to Texas community colleges overall; 11 to 24 percent completed their first course within the first two semesters.

In addition, Governor Greg Abbott signed into law in June 2017 Texas House Bill 2223, mandating that all public higher education institutions in the state develop and implement co-requisite models to deliver developmental education by fall 2020. Thoughtfully designed and carefully implemented co-requisite models have been shown to result in substantial increases in student success, as measured by student completion of credit-bearing, college-level courses.

With this landscape as a backdrop, the Dana Center accelerated the Dana Center Mathematics Pathways' (DCMP's) impact in Deep East Texas through the following strands of work:

- **Leadership:** Providing professional learning experiences to campus leadership and faculty to increase institutional scaling of math pathways.
- **Policy:** Facilitating policy discussions to create conditions to scale multiple math pathways.

- **Advising:** Developing tools and resources to support advising structures that facilitate student placement in the math pathway best aligned to their program of study.
- **Faculty Capacity:** Building faculty capacity to use accelerated math courses to reduce time to completion of college credit-bearing courses.
- **K–12 Transition:** Fostering collaboration with school districts to align transition courses with math pathways in higher education.
- **Regional Infrastructure:** Building the infrastructure to lead math pathways work.

All 11 colleges and universities taking part in the Foundation-sponsored grant activities experienced substantial gains over the last two and a half years. Every institution now offers at least three mathematics pathways, which is important for gateway math course alignment with recommendations for programs of study as well as for transfer across institutions. In addition, 100 percent of the institutions offer more than one mathematics pathway course to meet the quantitative core curriculum requirement for degree completion.

Every participating institution increased its co-requisite course enrollment since the beginning of the grant. On average, implementation of co-requisite courses went from 17 percent of developmental course offerings in 2017 to 45 percent in institutions' most recent reports. Some institutions experienced more significant gains, with Lamar University increasing its percentage of co-requisite enrollment by 63 percent. Angelina College, Kilgore College, Panola College, and Stephen F. Austin State University also increased their co-requisite enrollment by more than 50 percent.

The institutions in the Deep East Texas region showed a 116-percent increase of students completing a college-level math course in two years for the fall 2016 cohort compared to the fall 2014 cohort. This means 633 additional students who were identified as needing developmental supports passed a college-level math course, putting them on the pathway to credential completion. This increase was in the early implementation stage of the grant.

Ten of 11 institutions increased college course completion for developmental students within two years. Across institutions, average college course completion for developmental education students has increased from 21 to 31 percent, surpassing the state average of 26 percent. Kilgore College, Panola College, and Texas A&M University—Texarkana more than doubled the percentage of developmental students completing a college-level math course. As a final major accomplishment, six institutions redistributed gateway math course enrollment to better reflect the math requirements of their top programs of study over the course of the grant.

Full implementation of mathematics pathways also requires regional work on transfer and applicability of math courses. Of the three universities in the Deep East Texas region, Texas A&M—Texarkana has completed the most extensive assignment of a default math course for each program of study. Importantly, requirements in the program of study may negate the opportunities provided in the multiple options of the core curriculum. A student may need to take another math course if he/she took one to satisfy the core curriculum and the course does not meet the math requirement for the program of study, pointing to critical issues to be addressed in advising as well. A major accomplishment of this initiative is the establishment of long-term relationships across institutions that leads to continued improvement on the issues of transfer and opens the dialogue to address challenges.

The Accelerating Mathematics Pathways in Deep East Texas Project Final Impact Report presents project activity highlights, project impact, challenges and obstacles, and lessons learned. In addition, Appendix A summarizes Deep East Texas mathematics pathways benchmarks, and Appendix B provides individual progress reports for the 11 colleges and universities participating in this initiative.

Project Activity Highlights

During the two-and-a-half-year project, the Dana Center used various avenues to bring together the region's stakeholders to build strong relationships and foster conversations regarding leadership, policy, advising, faculty capacity, K–12 transition, and regional infrastructure. The following are highlights of the Center's convening efforts.



Leadership Strand

Leadership Convening (June 2018): Representatives from 11 colleges and universities and 3 school districts developed action plans for full-scale implementation of mathematics pathways from the K–12 math transition course through postsecondary education, aligned to programs of study. Each campus had a leadership team consisting of the following:

- Administrator(s) with authority to support the work across the institution and with other institutions in the region (e.g., associate provost, vice president of instruction)
- Mathematics dean or departmental leadership representing gateway courses and developmental programs
- Director of advising
- Student services leader (vice president or dean) with leadership for all support services and registration processes
- Institutional research to assist with data collection and evaluation
- K–12 partner (assistant superintendent, curriculum/instruction lead) to provide information on current high school programs and lead design of agreements with higher education institutions.

During the convening, the Dana Center provided administrators with leadership development on change management.



Texas Pathways Institute Presession Workshop (November 2019): Institutional teams consisting of math and English department chairs, lead administrators, and institutional researchers energized their co-requisite work by engaging with the equity-focused data tools and strategies that campus teams can use to evaluate and improve.

Capstone Event (December 2019): The institutional leadership teams reflected on the completed work and created action plans for next steps, including working more closely with the high schools on mathematics pathways, continuous improvement of co-requisites, connecting to business and industry, and working more deeply with advisors across sectors. The event was attended by 26 representatives from all 11 institutions.



Policy Strand

Transfer Convenings (February and April 2019): Representatives from 11 institutions reviewed student mobility data, best practices, policy challenges, and action plans. The Dana Center leveraged its Texas Transfer Alliance connection to bring in Josh Wyner of The Aspen Institute to cofacilitate the discussion with Mary Hendrix and Linda Welsh, DCMF coordinators for Deep East Texas. (Note: The Center is leading the Alliance, a collaboration of Texas universities and community colleges focused on improving transfer student outcomes. The Alliance is spearheading Texas' portion of Tackling Transfer, a three-state project led by three national organizations [The Aspen Institute's College Excellence Program, HCM Strategists, Sova] that works with institutional leaders, policymakers, practitioners, and key partners in each state to codevelop a three-year plan and provide technical assistance identified by institutions.)



Advising Strand

Advising Workshop (February 2019): Attended by 48 representatives from 11 institutions, the convening built awareness of mathematics pathways through case-making discussion of math as an obstacle to degree completion and an examination of content for multiple math pathways. Tools and resources were developed to support effective advising structures that facilitate student placement in the math pathway best aligned to their program of study. This event increased participants' understanding of new strategies for collaboration, theories of advising, and the role of academic advising in the successful implementation of mathematics pathways.





Faculty Capacity Strand

Co-requisite Technical Assistance Convenings (October 2017): At two events attended by 177 math faculty, department chairs, advisors and deans from 42 East Texas institutions, the Dana Center provided structures for teams to learn from each other and create action plans. Chairs and faculty were furnished with a tool for gathering course offerings information, student placement data, and faculty information as well as a co-requisite remediation discussion guide.

Follow-up Co-requisite Convening (February 2018): The Dana Center offered a follow-up convening where the Texas Association of Community Colleges shared additional insight on interpreting HB 2223 and Complete College America shared national data on the impact of implementing co-requisites on student success. The Center made the connection between mathematics pathways, guided pathways, and co-requisites, emphasizing the need to support students as learners. The Center led the math breakout sessions, where faculty learned about plans for fall 2018 implementation. Additional case studies were shared to showcase different models of how the courses could be set up as well as team planning time.

Texas Pathways Institute Presession Workshop (April 2019): At the “Differentiated Instruction: Active Formative Assessment Strategies that Engage All Students” presession, participants actively experienced instructional techniques that by their design meet individual needs within a diverse student classroom while providing instructors with immediate formative assessment. These “low-floor, high-ceiling” strategies include all students, giving them the opportunity to deepen their understanding through discourse. The purpose, construction, and recommended facilitation strategies for each technique were discussed and examples and templates provided.

Pedagogy Workshop (August 2019): Attended by 37 representatives from 14 institutions, this event enabled math department chairs and faculty to engage each other about a variety of topics, including active learning, classroom culture, identity, and belonging.



K–12 Transition Strand

K–12 Convening (October 2018): Thirty-three representatives from seven higher education institutions and eight K–12 partners explored tools and strategies for aligning high school senior-level math transition courses to college-level multiple mathematics pathways. The event enabled department chairs and select math faculty from community colleges in Deep East Texas to explore improving articulation of high school transition math courses with postsecondary math pathways through regional partnerships.



Regional Infrastructure

Built into every convening throughout the project were sessions providing mid-level and senior managers the tools and skills to lead change through a regional approach of implementation of mathematics pathways on their campuses and within their region. Separate breakouts allowed for collaboration, where successes were shared and strategies for overcoming challenges as students move within the institution and across institutions (including the K–12 system) were discussed. Webinars provided continued support for leaders in between convenings.

Project Impact

Deep East Texas Mathematics Pathways Benchmark Summary

Appendix A summarizes the current status of the implementation of mathematics pathways as normative practice at colleges and universities participating in regional work funded by the Foundation. All participating institutions have multiple mathematics pathways in their academic curriculum offerings. They also have multiple math courses beyond College Algebra to meet the core curriculum requirement. This is true for both community colleges and universities, verifying that College Algebra is not the default course for the core curriculum.



Multiple Mathematics Pathways

Having mathematics pathways as an option is the first requirement in math pathways normative practice; however, if students are not enrolling in different pathways, the implementation of the pathways is still in its infancy. While there is not an exact percentage that represents full implementation, the percentage of students in various pathways should be proportional to the percentage of students who have chosen a particular metamajor and the default math course identified as appropriate for that metamajor.

All 11 colleges and universities participating in this initiative now offer at least the three major mathematics pathway courses. In addition, 100 percent of the institutions offer more than one mathematics pathway course to meet the quantitative core curriculum requirement for degree completion.

Since 2017, several institutions have changed the distribution of their gateway math courses to better reflect the student enrollment in programs of study. Panola College shifted student enrollment in College Algebra into Elementary Statistics so that now the latter course is the most common gateway offering with 47 percent of student enrollment. This reflects the recommendations for the courses in its top programs of study, several of which are in the health services. In 2017, Texarkana College enrolled 79 percent of gateway math students into College Algebra; only 57 percent of students enrolled in College Algebra in 2019, with more students shifting into Quantitative Reasoning courses.

Regional Work on Transfer and Applicability

Mathematics pathways normative practice also requires regional work on transfer and applicability of math courses. Of the three universities in the Deep East Texas region, Texas A&M University—Texarkana has done the most work in assigning default math courses to every program of study. Without changing the default math requirements for the most popular programs of study, outdated math requirements may prevent students from benefiting from the multiple mathematics options available in the core

curriculum. A student may need to take another math course if he/she took one to satisfy the core curriculum and the course does not meet the math requirement for the program of study. When this occurs, there may be advising problems that need to be identified and addressed to improve advising practices.

Alignment with community colleges and the transfer institutions is ascertained based on the percentage of students taking a math course at the community college aligning with the math requirements in the program of study at the primary transfer university. For example, if 80 percent of students take College Algebra at Lee College but the transfer institution is requiring another math course in at least 50 percent of its programs of study, Lee College is out of alignment with the transfer institution. This could result in students losing credits upon transfer and having to take an additional math course. These issues of alignment in transfer and applicability practices serve as another critical progress indicator toward mathematics pathways normative practice. Two four-year institutions in the region, Stephen F. Austin State University and Texas A&M University—Texarkana, had fewer than half of their gateway math course students enrolled in College Algebra. Stephen F. Austin was only enrolling 26 percent of students into College Algebra. For both institutions, the most common math requirement for their top programs of study is Statistics. The two-year institutions in the region should continue to move toward a similar course distribution.

Co-requisite Math Courses

With the passage of HB 2223, implementation of co-requisite math courses also becomes an indicator of progress, along with student outcomes in developmental, co-requisite, and entry-level college math courses. Data reported on co-requisite math course implementation serves as a baseline for progress over the funded period.

Since fall 2017, institutions have greatly increased their co-requisite course offerings. The implementation of co-requisite courses across grant institutions had increased from an average of 13 percent implementation to 45 percent implementation in fall 2019. Every institution increased its implementation. Eight of 11 institutions have at least 25 percent of developmental enrollments in co-requisite courses. Six of 11 institutions have at least 50 percent enrollment, and three institutions are at or above 75 percent enrollment. This marks tremendous progress.

Individual institutions have changed rapidly. Lamar University went from 10 percent enrollment in co-requisite courses in 2017 to 73 percent enrollment in 2019. Kilgore College enrolled 19 percent of developmental students in co-requisite courses in 2017 and 74 percent of students in 2019. Other institutions had smaller but important changes. Lamar State College—Orange implemented its first co-requisite courses in 2019.



Developmental Math and College-level Course Completion

The institutions in the Deep East Texas region showed a 116-percent increase of students completing a college-level math course in two years for the fall 2016 cohort compared to the fall 2014 cohort. This means 633 additional students who were identified as needing developmental supports passed a college-level math course, putting them on the pathway to credential completion. This increase was in the early implementation stage of the grant. Some institutions had large increases for this same population in gateway math completion. For example, Panola College had 13 percent of developmental students starting in 2014 complete a college-level course in two years, but for students who started in 2016, 28 percent completed a college-level course in the same amount of time. Kilgore College experienced a similar increase in college course completion, from 13 to 31 percent.

Institutional Progress Reports

Appendix B provides individual progress reports on the institutions that participated in the Deep East Texas regional work. These reports show where each institution was at the start of the work and its current status (based on the most recently available data) on the following outcomes:

- College-level math completion within two years for students who were enrolled in developmental education
- Co-requisite implementation as a proportion of all students enrolled in developmental mathematics
- Top programs of study
- Gateway math course distributions for each institution

These indicators are important because they reflect movement toward the outcome of having more students enroll in college-level math courses that are aligned with students' programs of study. By providing co-requisite options, students are better able to reach college-level courses quickly and no longer be held back by long developmental course sequences.

Exemplar Institutions

Kilgore College, Stephen F. Austin State University, and Panola College are exemplars in their progress toward these goals over the two and a half years of the Deep East Texas work.

While the leadership at **Kilgore College** had already begun streamlining mathematics pathways and implementing co-requisite course options for students when the grant began, it has made excellent progress over the course of the grant. Since 2017, Kilgore has increased its co-requisite enrollment from 19 percent of developmental student enrollment to 74 percent. In this time frame, the college has also continued to move toward gateway math course distribution that is well aligned with its programs of study. Kilgore has also had one of the largest groups of representatives at grant convenings, with 16 individuals in attendance. Its college math completion rates for developmental students have more than doubled since 2016, from 13 to 31 percent. These rates should continue to increase based on the work that the college's staff have done over the last three years.

The **Stephen F. Austin State University** leadership team members have been vocal at convenings and have described their work in redistributing gateway course enrollments to better match their most enrolled programs of study. Stephen F. Austin had already begun this work before the grant, and now has only 19

percent of students enrolled in College Algebra as of fall 2019. As a four-year institution, this commitment to mathematics pathways serves to reassure two-year institution leadership as they engage in this work. Over the course of the grant, the university has increased its co-requisite enrollment from 7 percent of developmental student enrollment to 66 percent. Its college math completion rates for developmental students have increased since 2016 from 25 to 32 percent and should continue to increase based on the work that its staff continue to do.

Panola College has also achieved significant gains over the course of this grant period. In 2017, 28 percent of developmental course enrollment was in co-requisite courses; in fall 2018, that percentage increased to 87 percent. Over the same time period, Panola has realigned its gateway course enrollment to better match the math requirements of its most highly enrolled programs of study. Student enrollment in College Algebra decreased from 52 to 36 percent, while enrollment in Statistics increased from 34 to 47 percent. College-level math completion for developmental students has more than doubled since 2016—from 13 to 28 percent—and should continue to increase based on the work that the college has done over the course of the grant.

Immediate and Long-term Impacts

Over the course of the project, the Dana Center observed the following immediate and long-term impacts:

- At the institutional level, changes in co-requisite implementation, distributions of math course enrollments, and student success rates across the region are occurring.
- The changes to the structure of both developmental math and gateway math distributions will continue to impact students at each institution in this region for years to come. Student success rates in the area are expected to continue improving as the impact of the availability of co-requisite instruction continues to improve student outcomes.
- With the initial leadership convening, institutions realized that the K–12 sector needs to be brought to the table with mathematics pathways. There needs to be a seamless transition from high school to college. This work prompted the need and the initial steps to have the conversations, but more support is needed around the 9–16 alignment.
- The four Lamar institutions (Lamar University, Lamar Institute of Technology, Lamar State College—Orange, Lamar State College—Port Arthur) have begun working together to address issues of mathematics pathways at the regional level. This has surfaced issues of transfer to resolve and should result in improved outcomes over time.
- Texarkana College has the highest three-year full-time student graduation rate of all 50 community colleges in Texas. The Texas Higher Education Coordinating Board's report indicates that the college's graduation rate is double what the state average is for completion of a degree or certificate within three years. Degree pathways are part of the institution's strategic plan and underscore their core values and beliefs.

Individual Impact

Project Participation

Over the course of the grant, 152 individuals attended convenings and trainings in the Deep East Texas region. Faculty, administrators, advisors, and deans from two- and four-year institutions engaged in professional development alongside representatives in K–12 districts across a variety of topics, including pedagogy, advising, transfer, leadership, and the transition to college math.

Forty-eight of the 152 participants attended more than one convening. Each institution had at least six individuals attend convenings, with some institutions engaging as many as 16 stakeholders as well as individuals from neighboring K–12 districts. At the first convening in June 2018 and the capstone in December 2019, institutions brought teams of people with diverse roles and responsibilities to engage in the work, gauge progress toward meeting goals, and plan future actions. By engaging a variety of stakeholders from each institution and from surrounding institutions, the Dana Center catalyzed institutional and regional change that does not rely on any one individual but on a collaboration amongst several individuals.

Attendees at Temple Grant Convenings

Institution	Participants
Angelina College	12
Kilgore College	16
Lamar Institute of Technology	9
Lamar State College—Orange	7
Lamar State College—Port Arthur	7
Lamar University	13
Lee College	16
Panola College	9
Stephen F. Austin State University	6
Texarkana College	12
Texas A&M University—Texarkana	8

Stakeholders participating in a variety of workshops indicated the collaborative work led to changes in their mindsets and behaviors. A quote from one capstone participant encapsulates the sentiments of some stakeholders:

“[The] Dana Center has provided a structure for us to collect and analyze our data and the professional development opportunities have been relevant and specific. The support and structure from the DCMF professionals made it possible for us to do the work on our campus. We would not have known where to start.”

Another participant said that getting key stakeholders together to discuss these “intricate issues gave us all structure to turn our conversations into actionable steps.”

In addition to stakeholders, students at each institution have been impacted by the Deep East Texas regional work. In 2018, an average of 31 percent of students who were enrolled in developmental math completed their first college-level math course in two years. This average surpassed the state average of 26 percent and is up from 21 percent at the start of the work. This is life-changing for individual students because they are now able to move forward with their college education without excess credits and accompanying debt and with increased confidence. These students are no longer held back by the traditional developmental education mathematics structures.

Institutions

Kilgore College won the Math Pathways award by the Texas Success Center in October 2019. “Kilgore College has a strong alignment between programs of study and math course enrollment and a proportional distribution of students into specific programs of study. Compared to most institutions, which enroll close to 40 percent of students in general studies or liberal arts, only 16 percent of Kilgore College students are enrolled in generalized programs. Kilgore has set math requirements for programs of study appropriately and has enrollments in college-level math courses that are aligned with those requirements. Kilgore’s one-year math completion rates are among the highest in the state.”

Panola College recognized the importance of early connections with K–12 partners. In April 2019, 8th-grade students from 11 area public schools visited the college to explore options for academic and career education opportunities.

Lamar University established mathematics as its Quality Enhancement Plan (Math to a Degree) with the chair of the math faculty as the QEP director for the university. It is making a concerted effort to address the challenges of mathematics. The university is already making changes in requirements that are better aligned with the needs of programs of study. For example, in spring 2020, all programs of study in the College of Fine Arts will have MATH 1332 as a math requirement instead of College Algebra.

The four Lamar institutions met to review and discuss the varying mathematics requirements. Opportunities for changes at the university and better alignment with the transfer institutions have been identified and will continue to be pursued.

Challenges and Obstacles

Challenges and obstacles still exist regarding advising. Many school districts want the colleges and universities to offer many dual-credit courses (as a result of Texas House Bills 3 and 5), including College Algebra. Although these courses will be accepted by four-year universities, they may not be applied to degree programs. The Dana Center began working with partner school districts on these issues, but there is still work to do regarding degree program alignment and equity issues. Many school districts do not offer college preparation courses for students who have not been successful passing the Texas Success Initiative assessment. Assisting them with this process will address equity issues and result in more clarity and focus on degree program progression.

Hidden prerequisites in programs of study unbeknownst to the math departments are an issue. For example, the psychology statistics course PSCH 2317 requires College Algebra as a pre-requisite; this needs to be addressed in policy. The Dana Center provides resources for facilitating partner discipline discussions about hidden prerequisites.

The small institutions have challenges with fielding a team for meetings because staff are overwhelmed and often fill multiple roles. The Dana Center provided check-in meetings with DCMP regional coordinators to bring these teams up to speed. One regional coordinator brought all of the Lamar institutions to the table at Lamar University because one institution could not attend the leadership convening.

Maintaining the momentum to carry out work plans developed at meetings is difficult for institutions after returning home with all of their multiple demands. DCMP regional coordinators had check-ins to support teams with the work.

Lack of faculty, technology challenges related to scheduling and the like, and communication with advisors about co-requisite remediation are all major challenges for co-requisite remediation. Institutions that go “all in” (i.e., requiring everyone with developmental math needs to enter a co-requisite math course) helps with enrollment challenges. The Dana Center provided advising training and numerous co-requisite in-person opportunities as well as virtual trainings. As institutions move to full scale, more work is needed in the region.

Lessons Learned

Changes in math requirements for programs of study are highly dependent on the university offerings. The two-year colleges’ math requirements for programs of study typically follow the requirements of the lead transfer institution.

Progress on transfer issues related to math is easier if there are regular, facilitated face-to-face meetings with the transfer partners. This highlights the value of a regional approach in which transfer partners can more easily meet to resolve issues related to mathematics in programs of study.

Leadership changes at institutions create a challenge to maintaining momentum. The foundational work done must be revisited with a new leader, but the new person has not had the same experiences or may disagree with the direction/goals. This was a problem for Lee College; however, the new president has already reached out to the DCMP regional coordinator to develop a plan to meet goals established through this grant process.

Innovation and change management are difficult, particularly when leadership teams change. Regular contact with the highest-level academic administrator is critical. Often, these administrators delegate the management of these types of initiatives to others. Continued regular contact with these administrators as a group would be beneficial.



The University of Texas at Austin
Charles A. Dana Center

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Appendix A

The following table summarizes the current status of the implementation of mathematics pathways at colleges and universities participating in regional work funded by the T.L.L. Temple Foundation. An explanation of each table column is included at the end of this appendix.

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Institution	Offers At Least Three Pathways	Student Enrollment in Pathways ¹	Core Curriculum Has Multiple Pathways ²	Transfer and Applicability of Mathematics Pathways ³	Completion Data for Dev Math and First College Level in Two Years ⁴	Percentage of Dev Ed Math Students in Co-requisites in Fall 2019 ¹	Attended Capstone Convening in Fall 2019
Angelina College	Yes	Alg—50% QR—12% Stat—20% Bus—18%	Eight courses	Not applicable	DM—50% CL—26%	62%	Yes
Kilgore College	Yes	Alg—42% QR—13% Stat—40% Bus—5%	11 courses	Not applicable	DM—42% CL—31%	74%	Yes
Lamar Institute of Technology	Yes	Alg—58% QR—40% Stat—2%	Two courses, but many do not require a math course	Not applicable	DM—42% CL—25%	11%	Yes
Lamar State College—Orange	Yes	Alg—74% Stat—16% Teacher—10%	Six courses	Not applicable	DM—50% CL—24%	2%	Yes
Lamar State College—Port Arthur	Yes	Alg—70% QR—20% Bus—10%	Four courses (two are Algebra and one Precalculus)	Not applicable	DM—42% CL—30%	25%	Yes
Lamar University	Yes	Alg—57% QR—15% Stat—24% Teacher—4%	11 courses, plus 24 listed as possibility for second math	Most majors require multiple math courses	DM—59% CL—45%	73%	Yes

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Institution	Offers At Least Three Pathways	Student Enrollment in Pathways ¹	Core Curriculum Has Multiple Pathways ²	Transfer and Applicability of Mathematics Pathways ³	Completion Data for Dev Math and First College Level in Two Years ⁴	Percentage of Dev Ed Math Students in Co-requisites in Fall 2019 ¹	Attended Capstone Convening in Fall 2019
Lee College	Yes	Alg—78% QR—6% Stat—5% Bus—8% Teacher—3%	Seven courses	Not applicable	DM—16% CL—15%	14%	Yes
Panola College	Yes	Alg—36% QR—8% Stat—47% Bus—9%	11 courses	Not applicable	DM—69% CL—28%	87%	Yes
Stephen F. Austin State University	Yes	Alg—19% QR—19% Stat—35% Bus—16% Teacher—11%	Six courses	50% of programs say any core math or choose between a list of five	DM—67% CL—32%	66%	Yes
Texarkana College	Yes	Alg—57% QR—27% Stat—11% Bus—5%	Nine courses	Not applicable	DM—58% CL—32%	58%	Yes
Texas A&M University—Texarkana	Yes	Alg—43% QR—3% Stat—43% Bus—11%	Six courses	Default math listed for 75% or majors	DM—61% CL—49%	28%	Yes

¹Self-reported by institutions for fall 2019.

²College and university catalogs

³Texas Transfer Inventory 2017–2018, retrieved from <https://dcmathpathways.org>

⁴Texas Higher Education Coordinating Board (THECB). Developmental Education Accountability Measures Data (<http://www.txhighereddata.org>)

Table Layout and Contents

- Column 1** — includes the institutions participating in the grant based on the counties served by the Foundation.
- Column 2** — reports on the basic structure needed to implement mathematics pathways.
- Column 3** — reports on the percentage of students actually enrolling in the different mathematics pathways: College Algebra (Alg), Quantitative Reasoning (QR), Statistics (Stat), and Business Mathematics (Bus). Some universities also report Math for Elementary Teachers, which is a unique requirement for this program of study.
- Column 4** — displays the number of math courses that fulfill the core curriculum mathematics requirement.
- Column 5** — summarizes the math requirements for each program of study at the universities. For each university, the goal is to have a default math course listed for each program of study. This column illustrates where this is the case.
- Column 6** — is student outcome data for community colleges. THECB data is from the fall 2016 cohort. The data include students who enter the college not college-ready and then complete their developmental math (DM) requirement to be deemed college ready in two years. The second data point is students entering the college not college-ready and complete a college-level (CL) course within two years of enrolling at the community college. The time lag is due to the two-year window for student completion. Universities do not report these data.
- Column 7** — is the benchmark data on percentage of developmental students who were enrolled in co-requisite developmental math courses in fall 2017. Texas House Bill 2223 requires that 25% of developmental students be in co-requisite math in fall 2018, 50% in fall 2019, and 75% in fall 2020.
- Column 8** — documents the institutions that attended the Dana Center’s capstone convening in December 2019 at Stephen F. Austin State University.

Appendix B—Institutional Progress Reports

Angelina College

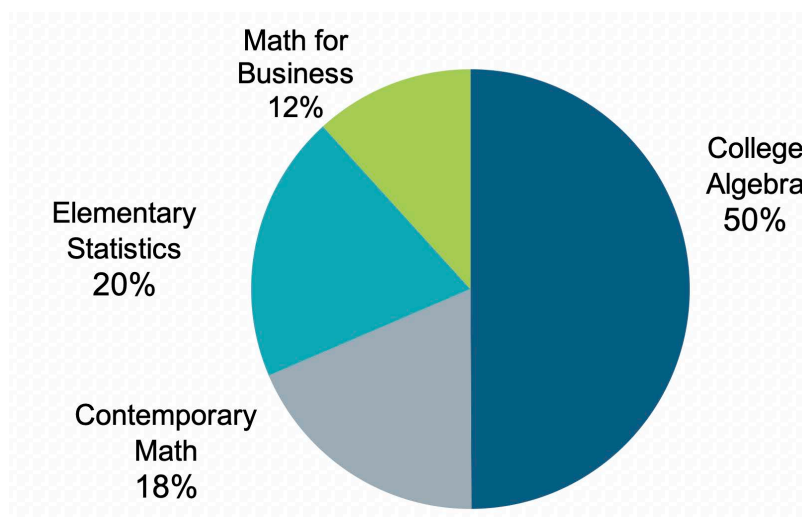
College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	26%	26%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	4%	50%	62%

Top 5 Programs of Study (FTIC, Fall 2018)	
General Studies	Teacher Education
Nursing	Criminal Justice
Business	

Angelina College did not provide program of study data for fall 2019. Data publicly available from the Texas Higher Education Coordinating Board (THECB) are presented.

Gateway Math Course Enrollment, Fall 2019



Angelina College has increased its co-requisite implementation from 4 percent of developmental offerings to 62 percent over the last two years. There is room for improvement in the college's gateway course distribution, which has remained steady and does not yet mirror the recommendations for its Top 5 programs of study.

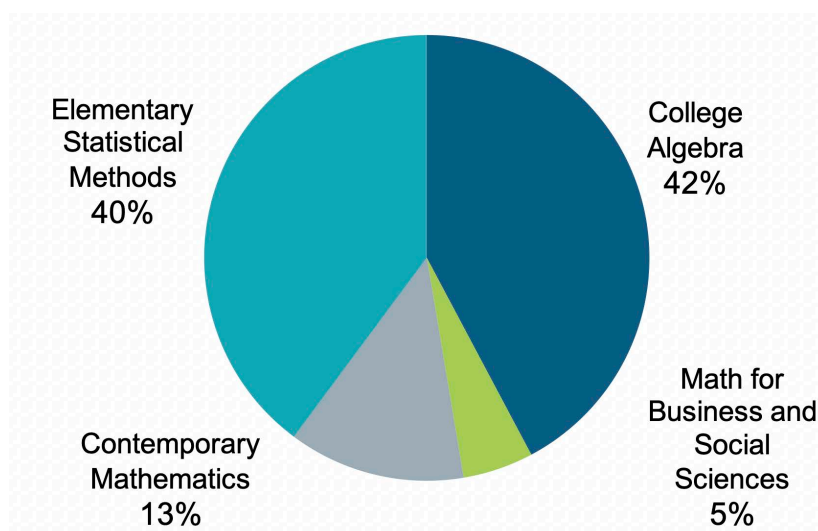
Kilgore College

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	13%	31%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	19%	25%	74%

Top 5 Programs of Study (All Students, 2019)	
Nursing	University Transfer
Business Administration	Kinesiology
Education	

Gateway Math Course Enrollment, Fall 2019



Kilgore College has shown progress in implementing co-requisite courses and aligning its mathematics pathways offerings to student enrollment in programs of study. College math completion for students with a developmental mathematics placement has increased from 13 to 31 percent over the life of the grant.

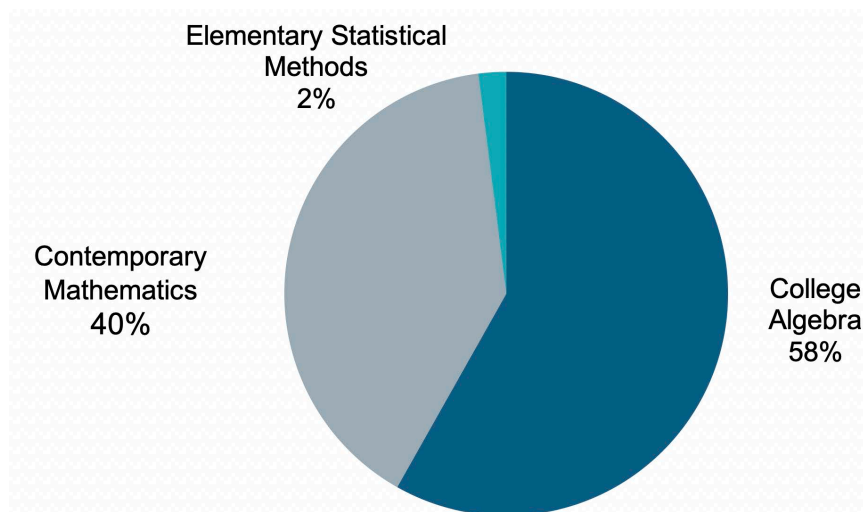
Lamar Institute of Technology

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	17%	24%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	0%	11%	No data

Top 5 Programs of Study (All Students, 2019)	
Process Operating Technology	Radiologic Technology
General Studies	Dental Hygiene
Instrumentation Technology	

Gateway Math Course Enrollment, Fall 2019



Lamar Institute of Technology has begun implementing co-requisite courses. It has also introduced an Elementary Statistical Methods course, increasing its pathways from two to three. The school should continue moving toward increasing the number of students enrolled in Statistics and Contemporary Math as its first gateway course since none of the students in its Top 5 programs of study require College Algebra specifically.

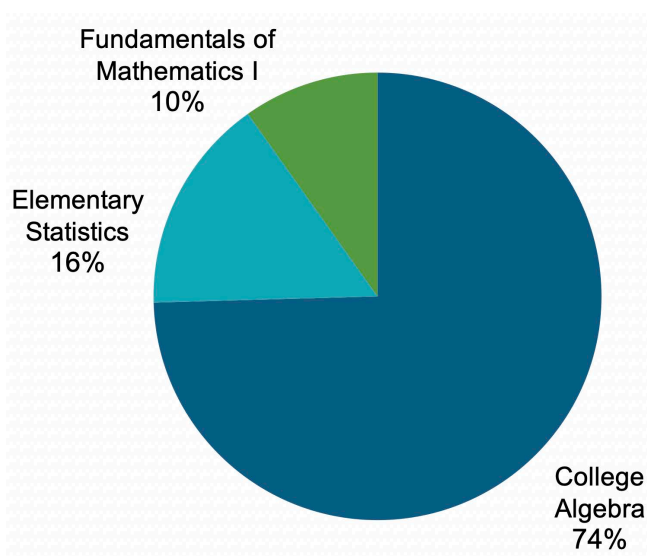
Lamar State College—Orange

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	17%	24%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	No data	No data	2%

Top 5 Programs of Study (All Students, 2019)	
Liberal Arts	Business
Prevocational Nursing	Associate of Arts in Teaching
Process Operating	

Gateway Math Course Enrollment, Fall 2019



Lamar State College—Orange has begun offering co-requisite courses. It has also increased the number of students placed into developmental math that are completing a college-level math course within two years. The college needs to continue moving toward enrolling fewer students in College Algebra to better align its pathways course distributions with the mathematics needs of its Top 5 programs of study.

Lamar State College—Port Arthur

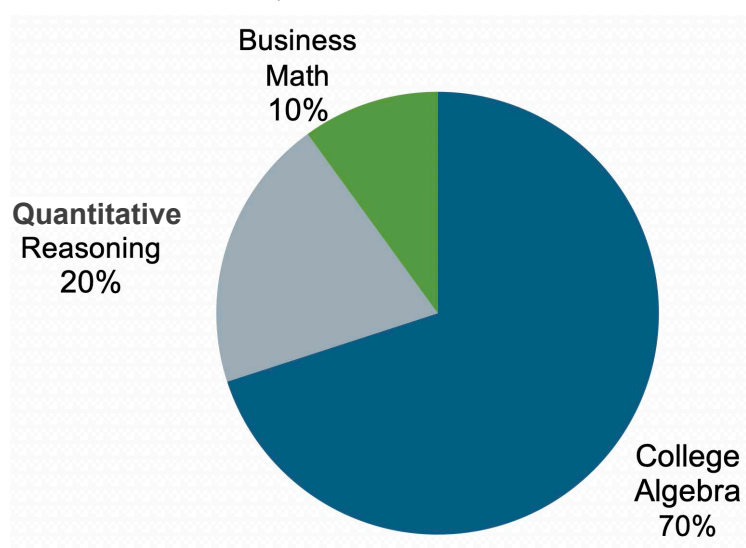
College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	20%	30%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	14%	25%	No data

Top 5 Programs of Study (FTIC, Fall 2018)	
General Studies	Business Administration and Management
Nursing	Surgical Technology
Chemical Technology/Technician	

Lamar State College—Port Arthur did not provide program of study data for fall 2019. Data from the fall 2018 data request are presented.

Gateway Math Course Enrollment, Fall 2018



Since 2017, more students placed into developmental math are completing college-level math courses within two years. Lamar State College—Port Arthur has also increased its co-requisite course enrollment since 2017. The course enrollment data provided by the college is from fall 2018.

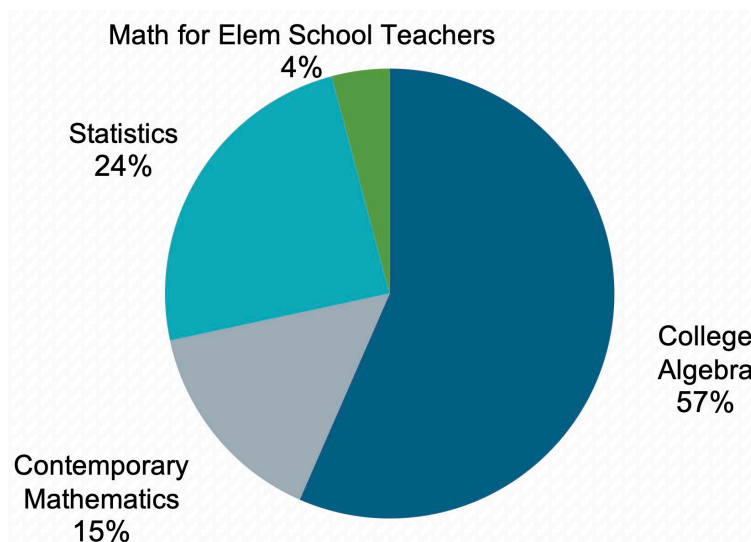
Lamar University

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	38%	45%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	10%	25%	73%

Top 5 Programs of Study (All Students, 2019)	
Nursing	Criminal Justice
General Studies	Chemical Engineering
Mechanical Engineering	

Gateway Math Course Enrollment, Fall 2019



Lamar University has increased its co-requisite implementation from 10 percent of its developmental offerings to 73 percent over the last two years. Additionally, more developmental students are completing college-level math courses within two years. The university is still overenrolling students in College Algebra and needs to continue to work on its course distribution.

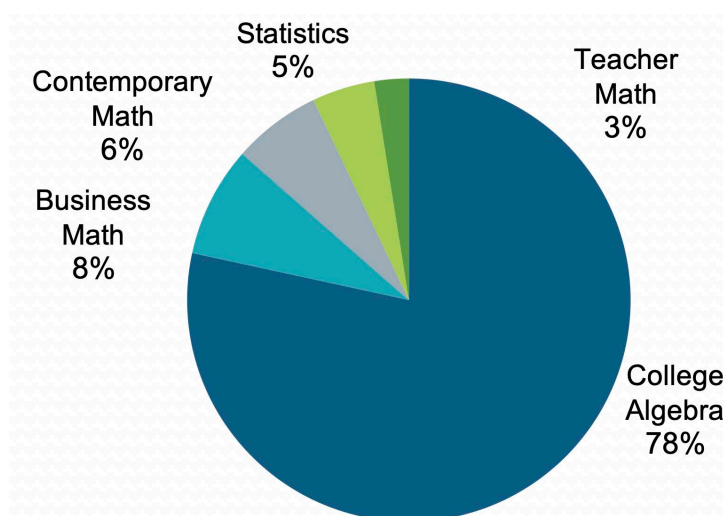
Lee College

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	8%	15%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	0%	15%	14%

Top 5 Programs of Study (All Students, 2019)	
General Studies	Process Technology
Microcomputer Networking	Instrumentation Technology
Transfer in Allied Health	

Gateway Math Course Enrollment, Fall 2019



Over the course of the grant, Lee College started implementing co-requisite courses. Since 2014, almost twice as many students who were placed into developmental math completed college math courses within two years. The college is overenrolling students in College Algebra, since 83 percent of students can go into any college math course.

Panola College

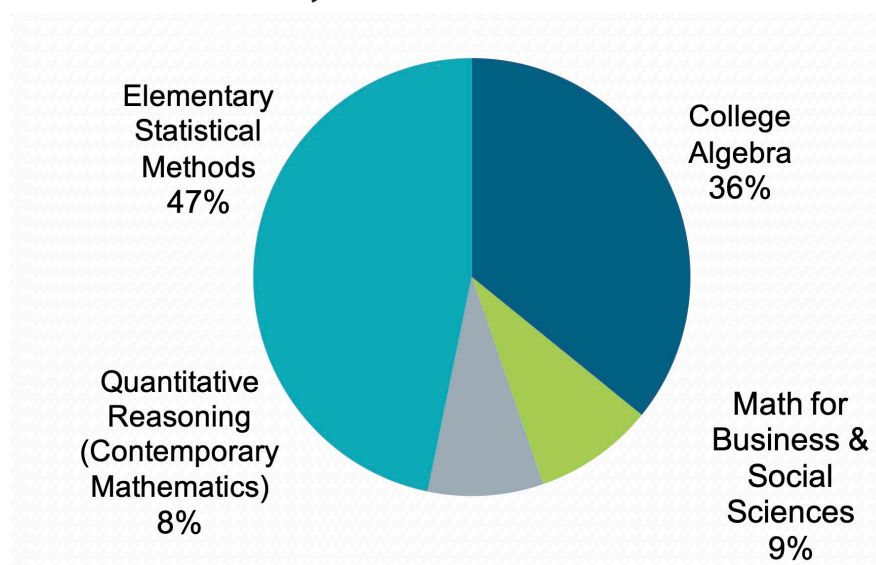
College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	13%	28%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	28%	75%	87%

Top 5 Programs of Study (FTIC, Fall 2018)	
Registered Nursing	Business/Commerce, General
General Studies	Administrative Assistant and Secretarial Science
Health Services	

Panola College did not provide program of study data for fall 2019. Data publicly available from THECB are presented.

Gateway Math Course Enrollment, Fall 2019



College completion has more than doubled for developmental students since 2014. Programs of study are well aligned to the course offerings. Panola College has increased co-requisites from 28 to 87 percent since 2017.

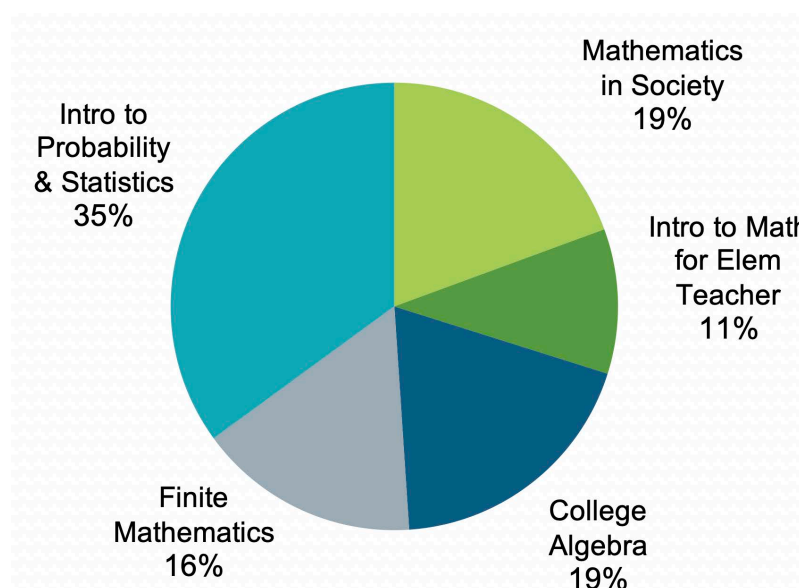
Stephen F. Austin State University

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	25%	32%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	7%	50%	66%

Top 5 Programs of Study (All Students, 2019)	
Nursing	Music
Interdisciplinary Studies	Psychology
Kinesiology	

Gateway Math Course Enrollment, Fall 2019



Since 2017, co-requisite implementation has increased at Stephen F. Austin State University from 7 percent of developmental course offerings to 66 percent. More students placed in developmental courses are completing their college math courses within two years. Additionally, math course offerings are well aligned with the most highly enrolled programs of study.

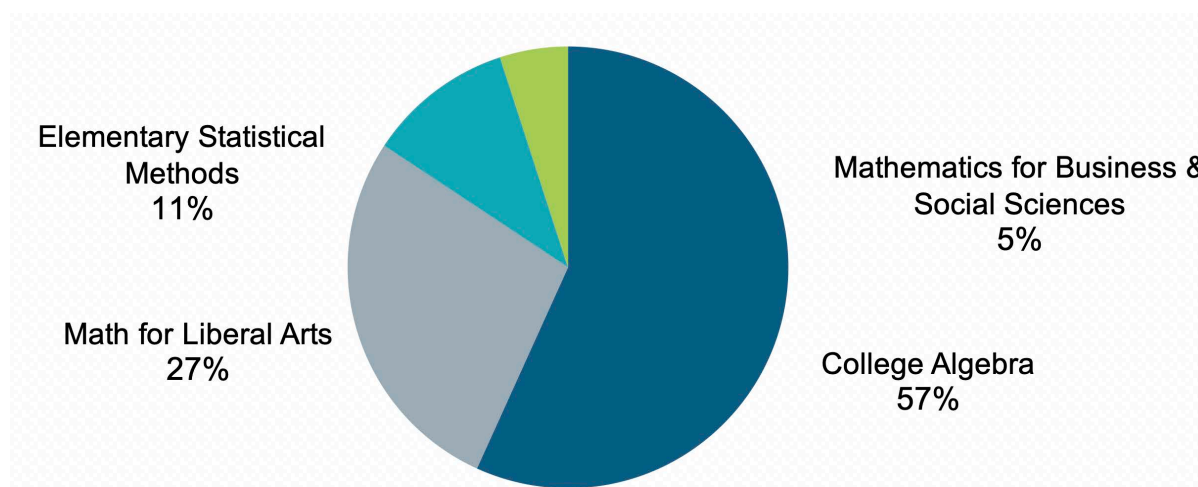
Texarkana College

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	26%	32%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	60%	60%	58%

Top 5 Programs of Study (All Students, 2019)	
General Studies	Behavioral Science
Business Administration	Criminal Justice
Nursing	

Gateway Math Course Enrollment, Fall 2019



Co-requisite implementation at Texarkana College has been holding steady at close to 60 percent of developmental enrollment. College math course completion within two years for developmental students has more than doubled since 2014. Only 8 percent of students are in degrees that require College Algebra, so those courses are still overenrolled.

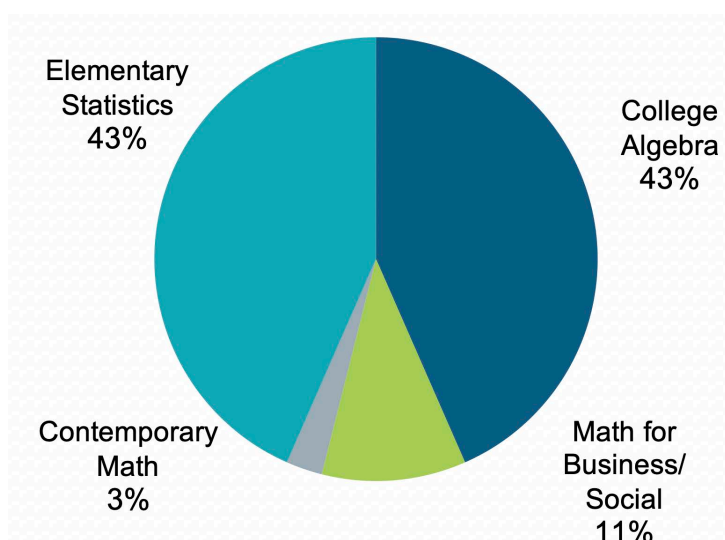
Texas A&M University—Texarkana

College-level Math Completion for Developmental Students within Two Years	Fall 2014–Spring 2016	Fall 2016–Spring 2018
	23%	49%

Co-requisite Implementation as Percentage of All Students Enrolled in Developmental Math	2017	2018	2019
	0%	34%	28%

Top 5 Programs of Study (All Students, 2019)	
Business Administration	Psychology
Interdisciplinary Studies	Applied Arts and Sciences
Biology	

Gateway Math Course Enrollment, Fall 2019



Texas A&M University—Texarkana has a gateway math course distribution that is well aligned with the math requirements of the Top 5 programs of study. The university began co-requisite implementation during the grant period and is now serving 28 percent of students enrolled in developmental math with co-requisite instruction. Additionally, twice as many students who are placed into developmental math are completing college math courses within two years since 2014.