

Texas A&M University-San Antonio

V-1 The Impact Report of the Quality Enhancement Plan

☒ Compliance ☐ Partial Compliance ☐ Non-Compliance

Narrative

Fifth Year Interim Report Part V Texas A&M University-San Antonio QEP Impact Report

Title	<i>Connect the Dots: Quantitative Reasoning</i>
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Executive Summary

In August 2018, the Quality Enhancement Plan (QEP) committee solicited and received topic ideas from faculty, staff, and students across the academic colleges and student success departments to begin the process of developing the QEP. One critical area for developing student success now and in the future is through quantitative literacy/quantitative reasoning (QL/QR). After careful consideration across the Texas A&M University-San Antonio community, quantitative literacy became the selected topic for the QEP, based on the review of various QEP proposals and university data. The budget to support the initiative can be found here [\[1\]](#).

A rapidly growing Hispanic Serving Institution, Texas A&M University-San Antonio (A&M-San Antonio) is poised to be a major economic driver for advancing knowledge that encourages opportunities to transform students' lives in South San Antonio and South-Central Texas. The current QEP infuses quantitative literacy and the use of quantitative reasoning into the student experience, which is aligned with the Texas A&M University-San Antonio mission statement: to provide Texas A&M-San Antonio students with a "quality higher education experience that is accessible and inclusive, and by empowering students for academic success, rewarding careers, and engaged global citizenship." The definition of quantitative literacy adopted by the 2018 QEP Committee is ***the ability to interpret, represent, and apply numerical information and models in personal, academic, and professional contexts***. Quantitative reasoning is the ***application of mathematical, logical, and statistical skills to interpret data and produce new information***. Quantitative literacy and quantitative reasoning are shared life-long skills that prepare students for learning during and after college.

Texas A&M University-San Antonio is committed to the inclusion of quantitative literacy and quantitative reasoning across the disciplines, not just in math or science. Therefore, the 2018 QEP Committee adopted the following two goals:

Goal 1: Establish quantitative literacy as an essential component of the student experience at Texas A&M University-San Antonio.

Tactic 1: Faculty and staff can attend quantitative literacy/quantitative reasoning workshops throughout the academic year.

Tactic 2: The university will establish a Quantitative Literacy center and a Quantitative Literacy Director.

Tactic 3: Texas A&M University-San Antonio students will graduate with at least two (2) quantitative literacy courses.

Goal 2: Develop curricular and co-curricular activities to ensure Texas A&M graduates' competency in quantitative literacy.

Tactic 1: Review current Texas A&M University-San Antonio courses and co-curricular programs for quantitative literacy/quantitative reasoning.

Tactic 2: Infuse quantitative literacy/quantitative reasoning into foundational core and upper-level courses so students experience quantitative literacy/quantitative reasoning whether they enter as a native TAMUSA or transfer student.

Beginning with the introductory UNIV 1300 course and throughout the academic programs across the University, the Texas A&M University-San Antonio QEP, "Connect the Dots," centers on both quantitative literacy/quantitative reasoning (QL/QR) skills to ensure Texas A&M University San Antonio (TAMUSA) graduates are prepared to be part of San Antonio's rising future as a globally focused city.

Connect the Dots: A Brief Description of TAMUSA's Quality Enhancement Plan

A&M-SA's QEP was titled "Connect the Dots." "Connect the Dots" is an apt metaphor to describe the quantitative literacy and reasoning skills students gain by learning how to represent, interpret, and apply numerical information and models in multiple personal, academic, and professional contexts. The 2017-2018 QEP planning committee applied the definitions of quantitative fluency expressed in the 2014 Lumina Foundations Degree Qualifications Profile document for bachelor's degree programs. The Lumina Foundation's two key learning indicators were used for developing quantitative literacy at the bachelor's degree level:

- Students translate verbal problems into mathematical algorithms to construct valid arguments using accepted symbolic systems of mathematical reasoning and can present any resulting calculations, estimates, risk analyses or quantitative evaluations of public information in papers, projects, or multimedia presentations.
- Students can construct mathematical expressions or visualizations in situations appropriate for issues initially described in non-quantitative terms.

Based on the outlined key learning indicators and the intent of the QEP, three goals and four student learning outcomes are central to the Connect the Dots QEP.

Goal 1: *Implement instructional strategies in QL/QR that promote student success.*

Outcome Goal 1 Target: The target is to have 60% of student assignments submitted from QL/QR designated courses successfully interpret mathematical forms evaluated against a QL/QR designated rubric.

Assessment: NSSE, internal data, course rubric, course assignments.

Goal 2: *Involve faculty, staff, and students in providing academic assistance in QL/QR for at-risk students.*

Outcome Goal 2 Target: TAMUSA offers high quality academic QL/QR opportunities for students and faculty. The second goal established a student learning outcome (SLO) map to guide curricular and co-curricular activities.

Assessment: NSSE, faculty development offerings, implementation of rubric in courses, student retention data.

Goal 3: *Increase student and faculty/staff engagement in QL/QR across the curriculum.*

Outcome Goal 3 Target: Hire a Director of QL/QR to oversee academic assistance for at-risk students. The goal was to highlight QL/QR in STEM-centered and non-STEM courses.

Assessment: NSSE, internal data, retention data presents the QL/QR team standards drawn from the initial QEP proposal to develop a flexible rubric for curricular and co-curricular activities.

The QL/QR team standards[2] from the initial 2018 QEP proposal developed into a flexible rubric for curricular and co-curricular activities.

Intended Student Learning Outcomes

The 2019 QEP team developed three required SLOs and one optional SLO to be implemented over the five-year period:

SLO #1: Students demonstrate the ability to interpret quantitative information presented in mathematical forms (e.g., graphs, tables, and diagrams) to analyze a real-world problem. (Required. Direct measurement through course assignments.)

SLO #2: Students demonstrate the ability to represent quantitative information in various forms (e.g., graphs, tables, and diagrams) to pose argument in the context of a real-world problem. (Required. Direct measurement through course assignments.)

SLO #3: Students demonstrate the ability to apply a model based on quantitative information to formulate a solution of a real-world problem. (Required. Direct measurement through course assignments.)

SLO #4: Students value quantitative literacy as an essential component of the A&M-SA experience. (Optional. Indirect measurement through NSSE.)

An overview of the QL/QR SLO map[3] developed for A&M--San Antonio's QEP aligns with the Lumina Foundation's 2014 model expectations for quantitative fluency for bachelor's programs. The following sources were used as evidence for developing the SLO map: Course syllabi; stated learning outcomes for courses, assignments, or co-curricular activities; learning objectives based on course textbooks content; specific disciplinary knowledge required in humanities, social science, STEM or finance and accounting courses; activity content for co-curricular events. Rutz and Grawe's (2010) model for applying quantitative reasoning to argumentation and writing tasks was the foundation for the assessment tool used for assignments. Table 4 illustrates the generic rubric the QL/QR team used to construct an assessment process for A&M--San Antonio courses and co-curricular programs with a QL/QR focus for the QEP beyond the introductory UNIV 1300 course.

QEP QL/QR Impact Metrics Years 1-5 (2019-2024)

A&M-SA uses multiple metrics to measure the QEP impact across the University. Depending on the course level and student academic program, different assessment approaches are used. Courses like UNIV 1300 use a high impact portfolio assessment with a specific rubric[4], while courses such as Marketing 3311 uses a real-life scenario with rubric scoring. Quantitative Reasoning-based courses use Rutz and Grawe's 2010 writing rubric[5] designed to address writing assignments paired with quantitative reasoning.

A 2022 quantitative literacy assignment[6] ("The Sniff Test") comes from an asynchronous Marketing 3311 course that used quantitative reasoning combined with a rubric based on Rutz and Grawe (2010) provided in Table 4 to determine whether students could apply quantitative reasoning to evaluate if a company's claims about a product were valid. The idea was for students to evaluate the marketing claims of a product using quantitative reasoning. Faculty used the Rutz and Grawe (2010) rubric to assess students' compiled results from the activity and how QR criteria were applied to the lesson .

Table 4 provides the QEP course performance metrics for select courses offered 2020-2023. The courses selected were regularly listed each semester and taught as QEP courses. The selected courses had Faculty Fellows connected to the quantitative literacy/quantitative reasoning QEP topic.

Table 4. QEP Course Performance Metrics for Select Classes 2020-2023

QEP PERFORMANCE METRICS SELECTED UPPER DIVISION COURSES 2020-2023			
2020-2021	COURSES	ABC	DWF
COURSES OFFERED ONLINE REMOTE -- COVID	ACCT 3301	88.5%	11.5%
	EDKN 3345	64.3%	35.7%
	PSYC 3448	65.0%	35.0%
	PSYC 4388	98.0%	2.0%
2021-2022			
COURSES OFFERED ONLINE & IN PERSON	ACCT 3301	86.7%	13.3%
	EDKN 3345	58.4%	41.6%
	PSYC 3448	54.0%	46.0%
	PSYC 4388	57.9%	42.1%
2022-2023			
COURSES OFFERED IN PERSON	ACCT 3301	83.5%	16.5%
	EDKN 3345	79.0%	21.0%
	PSYC 3448	73.9%	26.1%
	PSYC 4388	100.0%	0.0%

Data provided from Texas A&M University-San Antonio Office of Institutional Research course performance reports, November 2024

In Fall 2023, faculty were surveyed to gain insight into the QEP effectiveness in their courses. Twenty-two faculty members responded to a Qualtrics survey. A sample of responses is presented in **Tables 5, 6, and 7.**

Table 5. Faculty Who Stated Students Worked with Quantitative Reasoning in at least One Class

Students worked with quantitative reasoning (deductive logic, charts, dashboards, graphs, statistics, math, or deductive logic) in at least one of my classes this semester.	Percentage	Count
Definitely	73%	16
Probably yes	14%	3
Might or might not	0%	0

Probably not	9%	2
Definitely not	5%	1

Table 6. Faculty Who Indicated that Students Learning Quantitative Reasoning is Important in Courses

Students learning about QR is important for being successful in my courses or in degree programs offered in my department.	Percentage	Count
Definitely yes	50%	11
Probably yes	14%	3
Might or might not	18%	4
Probably not	18%	4
Definitely not	0%	0

Table 7. Faculty Who Asked Students to Use Quantitative Reasoning Approaches to Support Ideas

I ask students to use quantitative reasoning approaches to support their ideas.	Percentage	Count
Definitely yes	55%	12
Probably yes	18%	4
Might or might not	18%	4
Probably not	9%	2
Definitely not	0%	0

Data for Tables 5-7 from Center for Academic Innovation QEP Faculty Survey December 2023

Student Engagement with QL/QR

Students were also surveyed during the Fall 2023 term to gain an overall understanding of how undergraduates were engaging with the QL/QR QEP. Responses came from 104 students who self-selected to take part in a Qualtrics survey. The internal survey is a snapshot companion to the 2023 NSSE survey that provides data on FTIC students and seniors view the QL/QR experience. Noted in **Table 8** are four response areas that provided strong positive indication for students perceiving the QEP making an impact on their learning in specific skill sets.

Table 8. Student engagement with QL/QR in their classes (QEP Self-Perception Survey December 2023)

Question Asked	Percentage Positive	Percentage Neutral	Percentage Negative
Worked with QR in class during the past academic year.	73%	9%	18%
Learning about quantitative reasoning is important for my degree program.	72%	16%	12%
I find quantitative reasoning approaches a good way to explore ideas in my courses.	63%	20%	17%
I am confident I can use my quantitative reasoning skills to accurately interpret data, graphs, charts, or tables when I am reading a paper or discussing a topic.	62%	30%	8%

Data from Student Survey from Center for Academic Innovation, December 2023

Students appeared very positive about their QEP experience. Students indicated a high level of confidence in working with QR in a class and learning that QR is important for their degree programs.

NSSE

To gain a standardized perspective of student engagement, the 2017-2024 A&M-San Antonio NSSE data engagement indicators in Quantitative Reasoning between first-year students and senior students were reviewed to determine overall student development prior to and during the QEP five-year period.

Table 9.1 and 9.2 present the 2017-2024 NSSE results for Quantitative Reasoning at Texas A&M University-San Antonio.

Table 9.1 First-Year A&M-San Antonio Student Quantitative Reasoning NSSE Results 2017-2024

First Year Students	Year	A&M-SA Mean	Statistical Comparisons 2019-2024	Peer Institutions	Texas Regional	Public HSI	NSSE Top 50% Mean	NSSE Top 50% Effect Size	NSSE Top 10% Mean	NSSE Top 10% Effect Size
Quantitative Reasoning	2017	29.2	--	--	--	--	--	--	--	--
Quantitative Reasoning	2018	NA	--	--	--	--	--	--	--	--
Quantitative Reasoning	2019	24.2	2.2	2.4	2.4	--	2.4	-.19	--	--
Quantitative Reasoning	2020	27.0	2.36	2.3	2.4	2.4	--	--	--	--

First Year Students	Year	A&M-SA Mean	Statistical Comparisons 2019-2024	Peer Institutions	Texas Regional	Public HSI	NSSE Top 50% Mean	NSSE Top 50% Effect Size	NSSE Top 10% Mean	NSSE Top 10% Effect Size
Quantitative Reasoning	2021	NA	--	--	--	--	--	--	--	--
Quantitative Reasoning	2022	26.3	2.3	2.4	2.4	2.4	30.2	-.25	33.3	-.45
Quantitative Reasoning	2024	29.8	2.46	2.46	2.40	2.46	30.8	-.07	33.3	-.22

Senior Year A&M-San Antonio Student Quantitative Reasoning NSSE Results 2017-2024

Senior Students	Year	A&M-SA Mean	Statistical Comparisons 2019-2024	Peer Institutions	Texas Regional	Public HSI	NSSE Top 50% Mean	NSSE Top 50% Effect Size	NSSE Top 10% Mean	NSSE Top 10% Effect Size
Quantitative Reasoning	2017	28.2	--	--	--		--	--	--	--
Quantitative Reasoning	2018	NA	--	--	--		--	--	--	--
Quantitative Reasoning	2019	30.7	2.53	2.56	2.46	--	--	--	--	--
Quantitative Reasoning	2020	29.8	2.46	2.46	2.5	2.5	--	--	--	--
Quantitative Reasoning	2021	NA	--	--	--	--	--	--	--	--
Quantitative Reasoning	2022	31.2	2.7	2.5	2.56	2.56	32.5	-.07	35.3	-.26
Quantitative Reasoning	2024	29.8	2.46	2.46	2.5	2.5	30.8	-.07	33.3	-.22

Overall, both student populations improved during the QEP's first five years. NSSE data identification changed across the seven-year period, which is reflected in the tables. The First-Year students' mean score was comparable to the Top 50% Institutions in 2023 and 2024, according to NSSE (2024 Engagement Indicators, p.15) as the mean was $>-.10$. Senior students demonstrated consistent growth in quantitative reasoning compared to the baseline years of 2017 and 2018. The Seniors, who entered A&M-San Antonio during the Pandemic, demonstrated a slight increase from their first-year counterparts and were slightly higher than the desired mean of $>-.10$ for the Top 50% Institutions mean based on Effect Size.

Significant Changes Made to the QEP since Inception and Unanticipated Outcomes

The Texas A&M- San Antonio Connect the Dots QEP has been an evolving process. The initial focus of QL/QR focused on STEM courses was extended to the entire university starting in Year 3 as COVID-19 and remote ready instruction shaped Year 2. The original QR/QL Director and several faculty members highly involved with the QEP left the institution in Year 4; the staff changes shifted the focus of QL/QR from being centered on STEM courses to a broader institutional base that includes co-curricular activities in First Year Seminar and using UNIV 1300 as an entry-point for developing incoming and transfer students' quantitative literacy and quantitative reasoning skills. Additionally, changes in institutional leadership at both the President and Provost level occurred during Years 3 and 4; faculty turnover occurred in the three colleges; and in late 2023, QEP moved into a permanent home in the Center for Academic Innovation.

Unanticipated Outcomes

Multiple staffing changes and COVID-19 occurred in the first two years of the QEP. Consequently, various unanticipated outcomes happened. The delayed hiring and arrival of the QL/QR Director limited the First Year Seminar (FYS) module piloting and resulted in a modification to the QEP timeline. The focus in Year 1 in 2018-2019 was to develop the complete three-credit First Year Seminar curriculum for quantitative literacy/quantitative reasoning. The Year 1 focus was on hold until the QR Director arrived in early 2020. Consequently, Year 1 became a planning year.

Complete piloting of the FYS curriculum was to occur in Year 2, 2019-2020. However, in 2019-2020, COVID-19 disrupted the QEP process because of the move to remote ready instruction. To address the QEP, the QL/QR Director focused on math courses and placed QL/QR in the UNIV 1300 course in First Year Seminar (FYS). Although the QEP was to infuse quantitative literacy (QL) and quantitative reasoning (QR) across the university, the pairing of QL/QR and core courses continued with particular attention to the entry-level mathematics course and the arrival of the Director of Entry-Level Mathematics.

In 2021-2022, Year 3 of the QEP, multiple challenges were identified: many instructors were new to the QEP focus as the QEP expanded into core courses in the academic Colleges. A new First Year Seminar Director started in Fall 2021. Limited options for professional development existed because of a staggered return to campus from COVID-19, and individuals used numerous ways to organize, collect, and assess assignments. A high turnover rate for key staff members, including senior leadership, also contributed to challenges in building, maintaining, and growing a campus-wide initiative.

Additionally, limited technology access coming out of COVID restrictions was a central reason for challenges that occurred in Year 3. Late in Year 4, the QL/QR Director left the institution, and the Assistant Vice Provost for Institutional Effectiveness worked with the Center for Academic Innovation and Faculty Fellows to assure the continuation of the QEP. In 2022-2023, during Year 4, QEP became housed in the Center for Academic Innovation. A search for a permanent Executive Director for the Center for Academic Innovation ensued, and the Faculty Fellows conducted both the QEP across the curriculum process and the annual assessment. In October 2023, the start of Year 5, an Executive Director for the Center for Academic Innovation was hired. With a formally established Center for Academic Innovation, the QEP is now in place with a permanent home that supports cross-curricular innovation and staffed with three Faculty Fellows driving the assessment, curricular review, and data analysis of QEP activities.

QEP Successes

QEP Goal 1: Implement instructional strategies in QL/QR that promote student success. The goal was met in Year 4, as QL/QR practices became common across the curriculum and widely implemented in the UNIV 100 course. As we moved into Year 5, 2023-2024, the Quantitative Literacy/Quantitative Reasoning QEP became completely integrated into the UNIV1300 course, where incoming FTIC and transfer students gain the initial quantitative literacy and reasoning skills to be successful in future courses across the university curriculum where QL/QR activities take place. Select courses in the College of Arts & Sciences and the College of Business applied Quantitative Reasoning in the curriculum.

QEP Goal 2: Establish a student learning outcome (SLO) map to guide curricular and co-curricular activities that can be measurable. Throughout the five-year QEP cycle, an assessment process was built to include NSSE data, faculty development offerings, implementation of a rubric in courses to determine student course success, and student retention data.

QEP Goal 3: Increase student and faculty/staff engagement in QL/QR across the curriculum. According to the 2017-2024 NSSE statistical analysis data, A&M-SA students are statistically comparable to the Texas System Regional Institutions. Faculty who engaged with the QEP goal had students who engaged with the QEP goal and the results were students met Texas System Regional Institutions standards for quantitative reasoning

Reflection on What Texas A&M University-San Antonio has Learned from the First Five Years of the QEP experience

Engaging with a quantitative literacy/quantitative reasoning QEP during a period of institutional change and growth over the last five years provided TAMUSA with five lessons learned:

- **Change happens. Learn to navigate ambiguity.** Developing a good QEP process takes a great amount of time, effort, and focus. QEP teams develop a plan with the expectation that the process will roll out smoothly across the five-year period, yet QEP teams rarely consider the potential for change over time. Sometimes the QEP process is ambiguous and the process may not demonstrate extraordinary results, yet it is critical to center efforts on what we can do well and what we must improve.

What we learned through the current QEP process is that institutional change happens, sometimes abruptly, and the changes may require adapting the QEP to new institutional contexts. The QEP process taught the University that to seek continual improvement is to engage with change, and to move toward QEP excellence is to be open to changing often and adjusting as needed.

- **Create a data-informed university community.** Gathering data from the Offices of Institutional Research/Institutional Effectiveness to help construct a needs analysis that drives QEP topic options to consider across the institution is always important.

Applying the principles of quantitative literacy and quantitative reasoning to create a QEP became a valuable lesson. Using a data-informed process to guide a QEP topic provides also offers guidance on how to develop standard assessment methods to measure student growth and development is needed. Both steps help committees strive to generate a data-informed university community that uses a solid evidentiary base to determine QEP selection and assessment protocols.

- **Establish constant communication across all parts of the university for success.** Ensuring effective communication practices occur so the QEP principles and goals across the university has been an important lesson to learn in the first five years. Changes in administration, staff, and faculty sometimes led to different understandings and interpretations as to what the QEP was or needed to be, which hampered aspects of the QEP progress beyond the COVID-related course modality issues and concerns.

In programs like UNIV 1300, entry-level MATH 1314, as well as Psychology, Sociology, Accounting, Marketing, Education, and Biology courses where communication was constant and clear, the QEP took hold rapidly and successfully. Opportunities for growth remain in this area. The Center for Academic Innovation, the new home for the QEP, has established various activities, such as a Fall 2024 faculty presentation on connecting Qualitative Reasoning to the art of quilting to reach out to the A&M-SA community regarding quantitative literacy/quantitative reasoning beyond STEM-based courses.

- **Establish clear but adaptable assessment plans that are vital for student success.** In Year 4, the QL/QR Director and several faculty members from across the University published

or presented papers on the efficacy of the QL/QR process. Recent course additions to the QEP had assignments based on faculty judgment instead of a clear but adaptable rubric. In Fall 2024, the QEP Faculty Fellows took on the project of discussing Quantitative Reasoning assessment with departments across the campus.

From UNIV 1300 and courses where a rubric was used to assess assignments, we learned that having a well-designed rubric that faculty can adapt to fit the discipline is critical for student success on QEP assignments.

- **Link professional development opportunities to the QEP curriculum.** While a cadre of STEM-based QL/QR faculty presented six papers during the first five years of the QEP, more professional development opportunities connected to the QEP curriculum need to occur. In 2024, faculty began to offer Brown Bag[7] sessions to the A&M-SA community directly linked to the QEP.

Providing faculty and students with opportunities to present on their curricular and co-curricular research[8] and activities offer students and faculty new ways of discovering how real-world problems can be addressed through the QL/QR approach. Faculty and students can use these local professional development opportunities to establish larger research or presentation projects or grants that offer students and faculty great professional value. In Fall 2024, one of the Business faculty members received an invitation to present in Toronto, CN, regarding her work redesigning her marketing course to align with Quantitative Reasoning. To measure the QEP's continuous quality improvement, in December 2023 faculty received a survey to provide their input into how they view the QEP from the instructional side, selections from which are presented earlier in the QEP Impact Report.

Overall Result: The various faculty and academic units that enacted the Quantitative Literacy/Quantitative Reasoning QEP at Texas A&M University-San Antonio have made a positive difference in students' academic knowledge and in faculty's professional development opportunities over the past five years

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Assessment] *Across the Disciplines*, 6.**Evidence**

- [1]  [QEP Budget 2021-2025](#)
- [2]  [QL Standards Graphic](#)
Original 2019 QL Standards must be in report
- [3]  [SLOs QEP](#)
Original 2019 QEP SLOs
- [4]  [QEP Univ 1300 Portfolio Assessment Rubric](#)
Image for Univ 1300 Portfolio Assessment Rubric for QL
- [5]  [Rutz and Grawe 2010](#)
Demonstrate the rubric determined for the QEP.
- [6]  [QEP Image](#)
Visuals of the assignments
- [7]  [QEP Brown Bag Event](#)
Demonstrating QEP event
- [8]  [Focused on Pedagogy_QR Grading Rubrics for Written Arguments publication for QEP](#)
Article that emerged from faculty publishing during the QEP
- [9]  [Rutz and Grawe article](#)
Using PDF because link would break the document PDF.