

# Demystifying the Myths about Quantitative Literacy: Different Journeys for Students

A working knowledge of basic mathematics empowers individuals to engage productively in today's society and economy, yet all too often, mathematics is an obstacle rather than an opportunity for students who want to achieve their career goals through higher education. To better prepare and enable these students to succeed in mathematics, Arkansas public community colleges and universities, through the Strong Start to Finish Arkansas Initiative, offer two mathematics pathways: Quantitative Literacy and College Algebra. Each pathway teaches mathematics content that is relevant to students' academic and career goals.

This resource focuses on Quantitative Literacy (also known as Mathematical Reasoning) as a rigorous, relevant mathematics pathway in Arkansas. It demystifies commonly held myths about enrolling students in this mathematics pathway.

## What Is Quantitative Literacy?

According to the Arkansas Course Transfer System (ACTS), Quantitative Literacy (QL) is a mathematics course designed for students to gain an appreciation for mathematics and its application to everyday activities. Depending on the college or university, students will learn and apply their understanding to three of the following content areas:

- Personal, state, and national finance
- Mathematical modeling
- Statistics and probability
- Quantities and measurement

Almost 45 percent of all undergraduate degree programs across Arkansas community colleges and public universities accept QL as its general education mathematics course.

To see which Arkansas public institutions accept QL for their degree programs, go to:  
<https://utexas.box.com/v/SStFAR-MathPathwaysGuide>

## What Is the Strong Start to Finish Arkansas Initiative?

Since 2018, public community colleges and universities in Arkansas have collaborated to implement and scale mathematics pathways to normative practice. The statewide Strong Start to Finish Arkansas (SStF Arkansas) initiative is supported by a community of practice and technical assistance from the Charles A. Dana Center at The University of Texas at Austin. SStF Arkansas colleges and universities have helped students enter directly into mathematics pathways that are aligned to their programs of study and complete their introductory college-level mathematics and in their first year of college.

Read [The Case for Mathematics Pathways](#) to learn more about the national movement.

### Quantitative Literacy Recommended for These Programs of Study

- Communication, Journalism, and Related Programs
- Foreign Languages, English Languages, Literatures, Linguistics
- Liberal Arts and Sciences, General Studies, Humanities
- Public Administration and Social Services
- Visual and Performing Arts
- History
- Sociology, Political Science
- Elementary Education K–6
- Special Education
- Middle-Level Education (Language Arts and Social Sciences)

See [ADHE endorsement](#) for ACTS Math Review

## A Tale of Two Exploratory Students

Read each student story below. Consider the following questions to see how mathematics pathways can serve students well.

- What strengths does each student bring to the institution, and how might these strengths help them to identify and declare a major?
- How were each student's math journey the same? How were their journeys different?
- How might details of each student's math journey as well as the factors noted below increase student enrollment in Quantitative Literacy?

**Luis** is a first-time-in-college student who graduated high school with a 3.02 GPA. He completed computer science as his senior math/elective course and earned a 19 on his ACT math. He is eager to go to college but does not know what he wants to study. He is somewhat certain that he does not want to major in STEM.

In his visit with his academic advisor, Luis is identified as an exploratory student and **told he should take College Algebra** because "it's best for students who aren't sure what their major is."

- After his first College Algebra class, Luis was excited but felt disconnected from the content. He wasn't sure if or how he would use the information.
- Luis scored a 62 in his first exam. He then learned about the math tutoring center.
- After receiving help from a tutor, he scored a 71 on the midterm, but he still could not connect with the math content.
- He needed a B in his final exam to pass, but he scored a 68, failing the course.
- Luis is still unsure of his major, but now he is considering majors solely based on math requirements, narrowing his choices.

**Jennifer** is a first-time-in-college student who graduated high school with a 2.94 GPA. She completed SREB Math Ready as her senior math/elective course and earned a 17 on her ACT math. She does not know what she wants to study in college. She is almost certain that she does not want to be a STEM major.

In her visit with her academic advisor, Jennifer is identified as an exploratory student and **encouraged to take Quantitative Literacy** because "College Algebra is a prep course for Calculus and only a small percentage of students need calculus for their major. Plus, Quantitative Literacy is widely accepted across Arkansas universities."

- At her first Quantitative Literacy class, Jennifer quickly connected to the content about personal finances since she was trying to buy a car.
- Jennifer scored an 84 in her first exam. She then learned about the math tutoring center where she could get any additional support.
- She studied for the midterm and scored a 93. Jennifer had never felt so confident in her math skills. She really liked the problem-solving scenarios that she applied in her daily life.
- She felt confident going into her final exam and scored an 88.
- Jennifer is now considering taking additional math coursework, such as statistics.

### Factors That Raise the Stakes for Exploratory Students Placed in College Algebra

- Increases in attempted STEM credits reduce the odds of persistence past the first year.<sup>1</sup>
- Across Arkansas public colleges and universities, an average of 42% of students fail College Algebra,<sup>2</sup> which is not always a requirement for majors.
- The Theory of Math Anxiety suggests that student failure in a math course may lead to math avoidance and future math underperformance while the Theory of Self-Efficacy suggests that success begets further success.<sup>3,4</sup>
- Math anxiety may act as a barrier to choosing a STEM major as well as affect performance in math and other classes.<sup>5</sup>
- Less than 15% of students need Calculus for their undergraduate major. College Algebra is an entry-level math course designed to prepare students for Calculus; it should not be a terminal math course.<sup>6</sup>

<sup>1</sup>Romash, Z. M. (2019). *Leaving STEM: An examination of the STEM to non-STEM major change and how the STEM curriculum relates to academic achievement in non-STEM fields*. Seton Hall University.

<sup>2</sup>Charles A. Dana Center. (2020). *Student success rates – College Algebra and Quantitative Literacy* [Excel data collection workbook].

<sup>3</sup>Dowker, A., Sarkar, A., & Looi, C. Y. (2016). Mathematics anxiety: What have we learned in 60 years? *Frontiers in Psychology*, 7(508).

<sup>4</sup>Palestro, J. J., & Jameson, M. M. (2020). Math self-efficacy, not emotional self-efficacy, mediates the math anxiety-performance relationship in undergraduate students. *Cognition, Brain, Behavior: An Interdisciplinary Journal*, 24(4), 379–394.

<sup>5</sup>Daker, R. J., Gattas, S. U., Sokolowski, H. M., Green, A. E., & Lyons, I. M. (2021). First-year students' math anxiety predicts STEM avoidance and underperformance throughout university, independently of math ability. *NPJ Sci Learn*, 6(1).

<sup>6</sup>Gordon, S. P. (2008). What's wrong with College Algebra? *PRIMUS*, 6, 516–14.