Demystifying the Myths about Quantitative Literacy: Facts That Dispel Commonly Held Beliefs

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

"Historic attitudes toward rigor drive inequities…if you are not directly mapping content backwards from skills students need to know to succeed in their major courses, life, and relevant careers, you are creating unnecessary stumbling block for the most disadvantaged students."

Myra Snell, California Acceleration Project

Why Should Higher Education Stakeholders Encourage Student Enrollment in Quantitative Literacy?

Quantitative Literacy (QL) is designed to be rigorous and relevant to students' intended programs of study and applicable to their everyday lives, promoting increased levels of motivation and engagement in the classroom.[1] QL demonstrates rigor by fostering problem-solving and reasoning skills that are needed in future courses and careers with an emphasis on critical thinking, mathematical application, and communication. Students, especially Black and Latino students, are more likely to be engaged and form a mathematics identity when they see the relevance between what they are learning and their communities.[2]

Commonly Held Myths Preventing Student Enrollment in Quantitative Literacy

MYTHS	FACTS
• Skills and competencies taught in College Algebra is best for all students; it is more rigorous than Quantitative Literacy.	• 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.[3] • "A specific course such as College Algebra is **not** a proxy for defining rigor. Rigor involves many elements such as conceptual understanding and application of knowledge, not just computational fluency."[4]
• Students should enroll in College Algebra because it is widely accepted if students change their majors.	• Less than 10% of students change their majors from non-STEM to STEM programs.[5] Students are more likely to change from STEM to non-STEM programs. • Quantitative Literacy is widely accepted across Arkansas public universities. See SSTF Arkansas Mathematics Pathways Transfer Inventory
• College Algebra is the safest math pathways because all Arkansas public colleges and universities accept it. • College Algebra is especially safe for exploratory or undecided students as it will apply to any major.	• College Algebra is not a "safe" option for transfer as not all majors require it. Across Arkansas public colleges and universities, an average of 42% of students fail College Algebra.[6] Increases in attempted STEM credits reduces the odds of student persistence beyond the first year of college.[7] Students should enroll in College Algebra only if their major requires it. • If students are exploratory or undecided, they should take Quantitative Literacy as their first math course to continue their application of math skills (from high school) as well as to build their math confidence. Students who take Quantitative Reasoning and/or Statistical Reasoning as their entry-level math course can be successful in College Algebra if they elect to pursue a STEM pathway/major.[8]

[1] Rutschow, E. Z., & Diamond, J. (2015). *Laying the foundations: Early findings from the New Mathways Project.*
[2] Dadgar, M., Buck, D., & Burdman, P. (2021). *Solving for equity: Design and implementation of new postsecondary math pathways.*
[3] Gordon, S. P. (2008). What's Wrong with College Algebra? *PRIMUS, 6,* 516–514.
[4] Charles A. Dana Center. (2019, March 1). *Rigor: Evolving definitions in a changing landscape.*
[5] Charles A. Dana Center. (n.d.). *Prevalence of students changing to STEM majors: Implications for mathematics pathways.*
[6] Charles A. Dana Center. (2020). *Student success rates – College Algebra and Quantitative Literacy* [Excel data collection workbook].
[7] 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.
[8] Logue, A. W., Watanabee-Rose, M., & Douglas, D. (2016). Should students assessed as needing remedial mathematics take college-level Quantitative courses instead? A randomized controlled trial. *Educational Evaluation and Policy Analysis, 38*(3), 578–598.