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## MEMORANDUM

DATE: August 19, 2019

TO: Members, Committee on Educational Policy

FROM: Peter J. Taylor, Chair
Committee on Educational Policy

SUBJECT: Notice of Meeting – Thursday, August 29, 2019

The CSU Board of Trustees Committee on Educational Policy will meet in open session on Thursday, August 29, 2019 from 10:00 a.m. to 1:30 p.m. for a special public forum on the topic of quantitative reasoning for first-year admission. The meeting will take place at:

CSU Office of the Chancellor
Dumke Auditorium
401 Golden Shore
Long Beach, California 90802

The purpose of this meeting is to provide an opportunity for the Board to hear from the numerous individuals and organizations with interest in a CSU quantitative reasoning proposal. The meeting will begin with an overview of the quantitative reasoning concept by staff from the Office of the Chancellor. The overview will be followed by three sessions:

Session 1: Academic Preparation
Session 2: Admission
Session 3: Post-Secondary Success

Each session will feature three presentations from individuals and organizations representing all viewpoints. Following each presentation time is allotted for trustee questions and the meeting includes opportunity for public comment.

The entirety of the meeting will be live streamed and available online from the Board of Trustees homepage.

c: Members, Board of Trustees
Agenda Mailing List

**Addressing the Board of Trustees**

Members of the public are welcome to address the Board of Trustees. Every committee provides an opportunity for members of the public to directly address the committee on each agenda item before or during the committee's discussion or consideration of the item. Comments made at committee meetings must relate to an item on the committee's agenda. Members of the public may also address the full Board of Trustees during the plenary session on any non-agendized topic that is related to the University. The public may also address the full board on agenda items, but only if an opportunity to address the agenda item was not provided when it came before the relevant committee, or if the agenda item has substantially changed since the committee heard the item. Written comments are also welcome and will be distributed to the members of the board. The purpose of public comments is to provide information to the board, and not to evoke an exchange with board members. Questions that board members may have resulting from public comments will be referred to appropriate staff for response.

Members of the public wishing to speak must provide written or electronic notice to the Trustee Secretariat no later than **the working day before the committee or board meeting** at which they desire to speak. The notice should identify the agenda item the speaker wishes to address, or if the speaker wishes to address the full Board in the plenary session, the notice should state the subject of the intended presentation.

In fairness to all speakers who wish to speak, and to allow the committees and Board to hear from as many speakers as possible, while at the same time conducting the public business of their meetings within the time available, the committee or board chair will determine and announce reasonable restrictions upon the time for each speaker, and may ask multiple speakers on the same topic to limit their presentations. In most instances, speakers will be limited to no more than three minutes. Ceding, pooling or yielding remaining time to other speakers is not permitted. The totality of time allotted for public comment at the board meeting will be 30 minutes, and speakers will be scheduled for appropriate time in accord with the numbers that sign up. Speakers are requested to make the best use of the public comment opportunity and to follow the rules established.

**Note:** Anyone wishing to address the Board of Trustees, who needs any special accommodation, should contact the Trustee Secretariat at least 48 hours in advance of the meeting so appropriate arrangements can be made.

Trustee Secretariat
Office of the Chancellor
401 Golden Shore
Long Beach, CA 90802
Phone: 562-951-4020
Fax: 562-951-4949
E-mail: trusteesecretariat@calstate.edu

**AGENDA**

**COMMITTEE ON EDUCATIONAL POLICY**

**Meeting:** **10:00 a.m., Thursday, August 29, 2019**
**Glenn S. Dumke Auditorium**

Peter J. Taylor, Chair
Jane W. Carney, Vice Chair
Silas H. Abrego
Rebecca D. Eisen
Douglas Faigin
Debra S. Farar
Wenda Fong
Juan F. Garcia
Lillian Kimbell
Thelma Meléndez de Santa Ana
Romey Sabalius
Christopher Steinhauser

**Discussion**

1. Special Public Comment Open Forum on Quantitative Reasoning Proposal, *Information*

# COMMITTEE ON EDUCATIONAL POLICY

## Special Public Comment Open Forum on Quantitative Reasoning Proposal

### Presentation By

Loren J. Blanchard
Executive Vice Chancellor, Academic and Student Affairs
The California State University, Office of the Chancellor

James T. Minor
Assistant Vice Chancellor and Senior Strategist
Academic and Student Affairs

Marquita Grenot-Scheyer
Assistant Vice Chancellor
Educator Preparation and Public School Programs

### Summary

Academic preparation matters. To earn a bachelor's degree, students must demonstrate acquisition of broad knowledge through general education and focused knowledge in their discipline of choice. One of the greatest academic hurdles to college degree attainment is a lack of the fundamental skills associated with quantitative reasoning. Quantitative reasoning skills are challenged in both general education and major coursework across all disciplines, in the professional workforce and in daily life.

Too often, equity gaps are exacerbated by quantitative reasoning disparities in PK-12 schools that follow students to college and influence their academic and career options. Increased preparation in quantitative reasoning supports success in college and the workforce and creates more equitable opportunity in high-demand science, technology, engineering and mathematics – collectively known as STEM – majors and careers.

As the largest and most diverse four-year public university system in the nation, the California State University (CSU) is committed first and foremost to the success of students. This is reflected in a focus on closing equity gaps – the gaps between students from historically underrepresented communities and their peers – at all levels of the university. The CSU is considering a recommendation that would require incoming high school students, beginning with the entering first-year class of 2026, to complete one additional course of quantitative reasoning to meet the existing minimum qualifications for CSU admission. The recommendation is grounded in a report by the Academic Senate CSU Quantitative Reasoning Task Force and is supported by data and research linking quantitative reasoning preparation with college and professional success.

This quantitative reasoning requirement could be fulfilled through high school elective coursework with quantitative content, or an additional course in science or mathematics. Students could also meet the requirement with some Career and Technical Education (CTE) courses or with appropriate dual enrollment courses at a local community college. The CSU will continue to work with PK-12 school districts to ensure that they have sufficient capacity to offer qualifying courses and will provide an exemption for any student who could not fulfill the requirement because of a lack of resources at their high school.

To provide an opportunity for organizations and individuals to offer professional viewpoints and practical perspectives on the CSU's quantitative reasoning proposal, the Committee on Educational Policy is holding this special public forum. The agenda is included in this information item.

In addition, this item provides detail about the CSU quantitative reasoning proposal, including data and answers to questions raised by trustees during the July board meeting.

This information item does not include a formal proposal. A formal proposal will be brought before the Board of Trustees as an information item during the September 2019 meeting and as an action item during the November 2019 meeting.

**Special Public Comment Open Forum Format**

The Special Public Comment Open Forum on Quantitative Reasoning Proposal is scheduled for August 29, 2019, from 10:00 a.m. to 1:30 p.m. in the Dumke Auditorium of the CSU Office of the Chancellor. This meeting will be livestreamed. The agenda is as follows:

*10:00 a.m.* *Call to Order*
Peter Taylor
Chair, Committee on Educational Policy
CSU Board of Trustees

*10:10 a.m.* *Overview of Quantitative Reasoning Concept*
Loren J. Blanchard
Executive Vice Chancellor, Academic and Student Affairs
CSU Office of the Chancellor

Marquita Grenot-Scheyer
Assistant Vice Chancellor, Educator Preparation and Public School Programs
CSU Office of the Chancellor

James T. Minor
Assistant Vice Chancellor and Senior Strategist
Academic Success and Inclusive Excellence

*10:45 a.m.* *Session 1: Academic Preparation*
Jill A. Baker
Deputy Superintendent
Long Beach Unified School District

Diane Murillo
Math Instructional Coach/Teacher
Chino High School

*11:25 a.m.* *Session 2: Admission*
Audrey Dow
Interim Co-President/Senior Vice President
Campaign for College Opportunity

Elisha Smith Arrillaga
Executive Director
Education Trust West

Deacon John Wilson III
Education and Enrichment Program Director
West Angeles Church

*12:00 p.m.* *Break*

*12:15 p.m.* *Session 3: Post-Secondary Success*
David Barsky
Professor and Academic Senate CSU Senator
CSU San Marcos

Christopher Edley, Jr.
Co-Founder and President Emeritus
Opportunity Institute

Neal Finkelstein
Co-Director, Innovation Studies
WestEd

*12:50 p.m. (Estimated)* *Open Public Comments*

*1:20 p.m. (Estimated)* *Closing Remarks and Next Steps*
Loren J. Blanchard
Executive Vice Chancellor, Academic and Student Affairs
CSU Office of the Chancellor

Peter Taylor
Chair, Committee on Educational Policy
CSU Board of Trustees

*1:30 p.m.* *Adjourn*

**What is Quantitative Reasoning?**

Quantitative reasoning is the ability to think and reason intelligently about measurement, dimensions, design, capacity or probability in the real world. The National Council of Teachers of Mathematics defines quantitative reasoning as:

> …the developed ability to analyze quantitative information and to determine which skills and procedures can be applied to a particular problem to arrive at a solution. Quantitative reasoning, both generally and for assessment purposes, has an essential problem-solving focus. It includes the following six capabilities: reading and understanding information given in various formats; interpreting quantitative information and drawing inferences from it; solving problems using arithmetic, algebraic, geometric, or statistical methods; estimating answers and checking for reasonableness; communicating quantitative information; and recognizing the limitations of mathematical or statistical methods.

In a 2014 edition of the Association of American Colleges and Universities *Peer Review*, editor Shelley Johnson Carey wrote the following about quantitative reasoning:

> While not every student will use complex math skills professionally, in this data-rich era when information from the Internet is available instantly, all students must graduate with the ability to analyze and synthesize knowledge of the world around them. From deciding whether it is more advantageous financially to buy or lease a car to understanding the devastating effects of greenhouse gases on climate change, graduates need the ability to process quantitative information. This capability is called many things: *quantitative reasoning*, *quantitative literacy*, and *numeracy*.

**Does Additional Preparation in Quantitative Reasoning Support Student Success?**

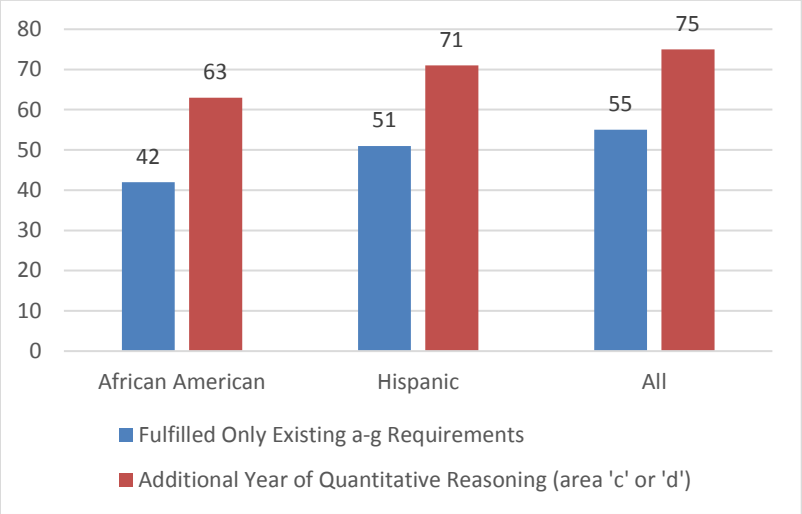
Student outcomes data and national research make a compelling case that additional quantitative reasoning preparation is associated with improved outcomes in college, regardless of a student's choice of major. While not an exhaustive list, several of the most compelling examples are included below.

*CSU Data*

The data in this section reflect outcomes for students who have taken an additional quantitative reasoning course (as measured in area "c-mathematics" or "d-laboratory science") in high school prior to enrolling in the CSU. Staff from the Office of the Chancellor are working with colleagues at the California Department of Education to expand the data evaluation to include a broader range of quantitative reasoning courses from area "g-college preparatory elective," courses that would count toward the quantitative reasoning admission requirement.

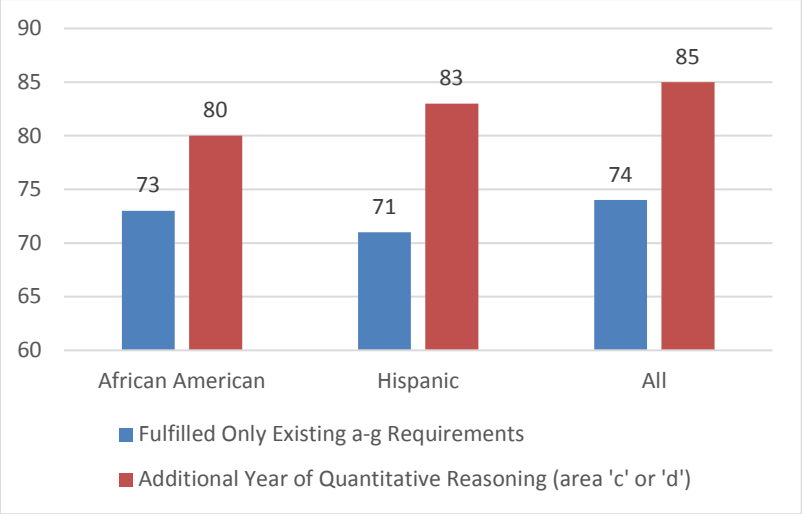
Successful Completion of the Quantitative Reasoning General Education Requirement

Additional quantitative reasoning preparation in high school dramatically increases the likelihood that a CSU student will complete the quantitative reasoning (Subarea B4) general education requirement during their first year. A review of fall 2018 first-year CSU student data for students from California high schools indicates that students with an additional course of quantitative reasoning (from areas ‘c’ or ‘d’) had a 20 percentage point higher successful completion rate in Subarea B4 compared to peers with less preparation. This is consistent across all ethnic groups, including African American and Hispanic students.



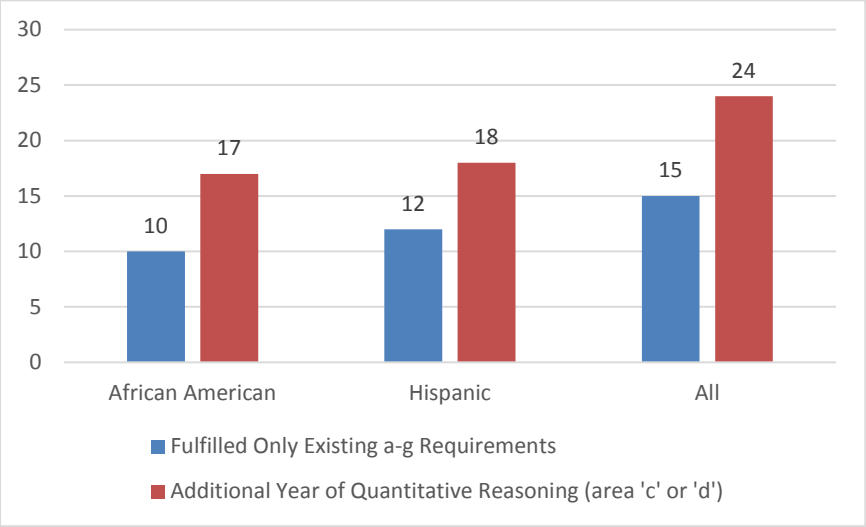
First-Year Retention

Students taking an additional quantitative reasoning course in high school are more likely to return for their second year of college. As shown below, 85 percent of CSU students who took an additional quantitative reasoning course (from areas ‘c’ or ‘d’) in high school returned for their second college year at the CSU, compared to 74 percent who only fulfilled the existing a-g requirements. This is consistent across all ethnic groups, including African American and Hispanic students.

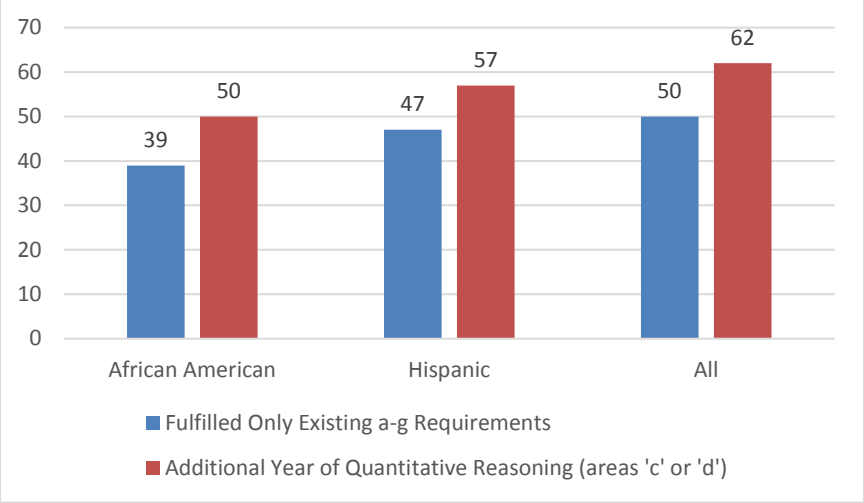


4-Year Graduation

Taking an additional quantitative reasoning course in high school is also linked to improved 4- and 6-year college graduation rates. As shown in the chart below, there is a seven percentage point difference in the 4-year graduation rate for CSU African American students – and a six percentage point difference for Hispanic students – who took an additional quantitative reasoning course in high school (from areas 'c' or 'd') versus those who fulfilled only the existing a-g requirements.




The chart below shows that 6-year graduation rates are also higher for all CSU students – including African American and Hispanic students – who receive additional quantitative reasoning preparation in high school (as measured from areas 'c' or 'd').



*Long Beach Unified School District*

The Long Beach Unified School District (LBUSD) – where 70 percent of students are from households below the federal poverty level and 86 percent are non-white – increased the high school graduation quantitative reasoning requirement six years ago to improve college readiness. Prior to changing the requirement, just 39 percent of students met the "a-g" requirements for admission to the CSU. Today, 56 percent of students meet the "a-g" requirements, and the district's African American and Hispanic students graduate at higher percentages compared to their peers in the county and across the state.

Despite early opposition to the change and concern that underserved students would be disadvantaged, the outcomes have demonstrated the opposite. Students of color in LBUSD are graduating and attending college at higher rates due to better quantitative reasoning preparation.

*San Diego Unified School District*

In 2011, the San Diego Unified School District Board of Education adopted new, more rigorous graduation requirements that align with the district's mission. The district is the second largest in California with more than 124,000 students, of which 23 percent are English Language Learners, 59 percent qualify for free or reduced lunch and 77 percent are non-white. The new requirements include specific high school courses that are aligned to the minimum subject-area course requirements for CSU and University of California (UC) admission and are aligned to the California Next Generation Science Standards.

The graduating class of 2016 was the first required to meet the new graduation requirements, which include three years of science (one year of life science, one year of physical science and one additional year of science coursework). Since adopting the new requirements, the percentage of graduates completing all "a-g" requirements in the district has increased 10 percentage points in five years, from 46 percent in 2013 to 56 percent in 2018.

Students fulfilling the high school graduation requirements in the San Diego Unified School District will have satisfied the CSU's proposed quantitative reasoning requirement without any additional coursework.

*Association of American Colleges and Universities*

In 2005, the Association of American Colleges and Universities (AAC&U) launched Liberal Education and America's Promise (LEAP), a national public advocacy and campus action initiative that champions the importance of a liberal education. A 2008 LEAP report, "College Learning for the New Global Century," includes quantitative literacy (another term for quantitative reasoning) among the 12 essential learning outcomes for students to be prepared for

21st century challenges. These learning outcomes were identified through "a multiyear dialogue with hundreds of colleges and universities about needed goals for student learning; analysis of a long series of recommendations and reports from the business community; and analysis of the accreditation requirements for engineering, business, nursing and teaching education."

In 2006 and 2007, AAC&U commissioned Peter D. Hart Research Associates to conduct several studies of employers' views on student learning in college. The surveys found that "a majority of employers believe that only half or fewer recent graduates have the skills and knowledge needed to advance or be promoted in their companies." And 60 percent of employers would like to see a greater emphasis placed on quantitative reasoning skills.

**What are the Central Tenets of the CSU Proposal?**

The CSU is proposing to expand the a-g requirements that determine minimal eligibility for CSU admission by requiring the completion of an additional course of quantitative reasoning that could be fulfilled by a quantitative reasoning course from the "g – college preparatory elective or from an additional course in area "c – mathematics," or "d – laboratory science." Such college preparatory courses in area "g" could include accounting, personal finance, computer science, coding and some CTE courses with quantitative reasoning content. The proposal will strongly recommend, but not require, that the additional quantitative reasoning course be completed during the senior year.

The current a-g admission requirements are included in the first figure below. Since 2003, the CSU has recommended that incoming students complete four years of mathematics.

The second figure shows the addition of the quantitative reasoning requirement in red.

## Existing CSU College Preparatory Course Requirements for First Year Admission

| Area | Subject | Courses |
|---|---|---|
| a. | **History and Social Science** (including 1 year of U.S. history or 1 semester of U.S. history and 1 semester of civics or American government AND 1 year of social science) | 2 |
| b. | **English** (4 years of college preparatory English composition and literature) | 4 |
| c. | **Mathematics** (4 years recommended) including Algebra I, Geometry, Algebra II, or higher mathematics (take one each year) | 3 |
| d. | **Laboratory Science** (including 1 biological science and 1 physical science) | 2 |
| e. | **Language Other Than English** (2 years of the same language; American Sign Language is applicable) | 2 |
| f. | **Visual and Performing Arts** (dance, drama or theater, music, or visual art) | 1 |
| g. | **College Preparatory Elective** (additional year chosen from UC "a-g" list) | 1 |
| **Total Required Courses** | | **15** |

## Proposed CSU College Preparatory Course Requirements for First Year Admission

| Area | Subject | Courses |
|---|---|---|
| a. | **History and Social Science** (including 1 year of U.S. history or 1 semester of U.S. history and 1 semester of civics or American government AND 1 year of social science) | 2 |
| b. | **English** (4 years of college preparatory English composition and literature) | 4 |
| c. | **Mathematics** (including Algebra I, Geometry, Algebra II, or higher mathematics or a comparable integrated pathway; take one each year) | 3 |
| d. | **Laboratory Science** (including 1 biological science and 1 physical science) | 2 |
| e. | **Language Other Than English** (2 years of the same language; American Sign Language is applicable) | 2 |
| f. | **Visual and Performing Arts** (dance, drama or theater, music, or visual art) | 1 |
| g. | **College Preparatory Elective** (1 year selected from “c – mathematics”, “d – laboratory science”, or a quantitative reasoning course from the “g – college preparatory elective” areas AND 1 additional year chosen from UC "a-g" list) | 2 |
| **Total Required Courses** | | **16** |

*Multiple Paths to Satisfy the New Quantitative Reasoning Requirement*

There are a number of paths for students to fulfill the quantitative reasoning requirement. As referenced above, high school students could fulfill the requirement with a science course (area 'd'). A number of California school districts (e.g. San Diego Unified School District, Oakland Unified School District) have adopted a three-year sequence of science courses as recommended under the California Next Generation Science Standards. This offers a curriculum in which two courses would satisfy the area 'd' laboratory science requirement, while the third science course would satisfy the new proposed quantitative reasoning requirement – resulting in every district graduate fulfilling the proposed requirement. Elk Grove Unified School District requires high school graduates to complete four years of mathematics and two years of science or three years of mathematics and three years of science. These graduates would therefore have already completed the CSU quantitative reasoning requirement as well.

Other students could fulfill the requirement with a more traditional mathematics course, such as calculus (area 'c') or through a qualifying college preparatory elective course (area 'g'). Examples of such courses, including CTE programs, are listed below. This list is by no means exhaustive, rather a small sampling of the types of courses that could qualify for the quantitative reasoning admission requirement.

- Personal Finance
- Accounting
- Computer Science
- Programming
- Coding
- Game Design
- Robotics
- Engineering (CTE)
- Forensics
- Veterinary Science
- Sports Medicine (CTE)
- Environmental Science
- Statistics
- Economics

A high school student could also meet the requirement through dual enrollment in partnership with a local community college.

The UC Board of Admissions and Relations with Schools has developed a proposal to require three years of college preparatory area "d-laboratory science" courses for admission to a UC campus. While this proposal is under review and has not been formally submitted to the UC's Board of Regents for consideration, it is important to note that, as currently developed, the requirement would align with the CSU's quantitative reasoning proposal. High school students completing three years of area "d-laboratory science" would simultaneously satisfy the CSU's proposed quantitative reasoning requirement.

**Does the Proposal Support the CSU Mission?**

The proposal is consistent with the CSU mission. As demonstrated in the sections below, California and the nation need STEM graduates to power the current and future workforce. At the same time, these careers are typically higher-paying, supporting the CSU's role as an engine for social mobility.

Currently, however, there are pervasive equity gaps, beginning with high school graduates' academic preparedness for college-level STEM education and continuing through STEM graduate rates and into the workforce. African American and Hispanic students are underrepresented in STEM majors and careers, those doors closed to them through no choice – or fault – of their own.

The CSU proposal to add a quantitative reasoning admission requirement supports educational and workforce equity by expanding access for all students to achieve their personal and professional goals, rather than limiting their opportunities at the point of college admission. By encouraging – and supporting – PK-12 school districts in increasing quantitative reasoning course availability, the proposal will ensure that a greater number of students from all backgrounds arrive at the CSU prepared for a diverse range of majors and career paths.

*California and the Nation Face Shortages in STEM Employees*

Between 2000 and 2010, STEM-related jobs grew at three times the rate of non-STEM jobs nationally. This growth is expected to continue, with the number of STEM occupations in the U.S. growing by 8.9 percent between 2014 and 2024.

In California, there continues to be a demand for STEM graduates. In May 2015, the California Employment Development Department indicated that the number of online job postings for STEM-related jobs outstripped the number of unemployed STEM employees by a ratio of 2:1.

A 2009 report by the California Council on Science and Technology highlighted attrition in the educational path between high school and college completion, specifically in STEM disciplines, as an impending threat to the state's workforce needs. Statewide, the 19,600 science and engineering baccalaureate degrees awarded in 2007 represented only 4 percent of the 9th graders who became that pool of college students. The report specifically cited attrition in STEM in the CSU system. Only 40 percent of the CSU students initially enrolling in STEM disciplines had completed or were continuing in those disciplines four years later.

*STEM Training Offers CSU Graduates High-Paying Employment Opportunities*

According to the U.S. Department of Commerce, STEM professionals are paid on average 26 percent more than non-STEM professionals. Additionally, STEM training in college is associated with higher earnings, whether or not a graduate is employed in a STEM occupation. According to Pew Research Center, non-STEM workers who hold a STEM degree earn – on average - $71,000. Meanwhile, their peers who hold a degree in a non-STEM field earn approximately $11,000 less annually.

*California Students are interested in Pursuing STEM Education and Careers, However Disparities in Academic Preparation Limit Opportunities for Historically Underserved Students*

In the ACT's "The Condition of STEM 2017" report, 52 percent of all ACT-tested students in California's 2017 graduating class indicated an interest in pursuing a career in STEM. However, only 31 percent met the benchmark for college readiness in STEM. When examined by ethnicity, the picture is starker: only 11 percent of Hispanic and 10 percent of African American high school graduates in California were prepared to pursue STEM education in college.

This disparity continues in college. As noted in a 2017 Brookings Institute national report examining quantitative reasoning disparities beginning in middle school, "STEM college graduates are predominately white or Asian, a pattern that has persisted for years despite historically high black and Hispanic college attendance and completion rates."

At the CSU, disparities in STEM graduates exist despite progress in closing equity gaps. In 2017-18, 24 percent of Asian students and 23 percent of white students earned a baccalaureate degree in a STEM field. However, only 14 percent of Hispanic and 10 percent of African American students earned a similar degree.

Additionally, African American and Hispanic students are proportionately underrepresented as STEM graduates compared to total overall degrees earned.

| Race/Ethnicity | Percent of CSU STEM Graduates | Percent of Total CSU Graduates |
|---|---|---|
| African American | 2% | 4% |
| Hispanic or Latino | 28% | 37% |
| Asian | 21% | 17% |
| White | 32% | 27% |

Unsurprisingly, these disparities extend beyond graduation into the workforce. Despite the growth in STEM jobs nationwide, in the Pew Research Center report, the authors found that "Black and Hispanic workers continue to be underrepresented in the STEM workforce. Blacks make up 11% of the U.S. workforce overall but represent 9% of STEM workers, while Hispanics comprise 16% of the U.S. workforce but only 7% of all STEM workers."

**Will California PK-12 School Districts have the Capacity to Offer a Sufficient Number of Quantitative Reasoning Courses?**

Today, every California high school currently offers at least one course that would meet the quantitative reasoning requirement. The challenge that exists is to ensure that high schools have the capacity to offer qualifying courses to all students. Through supporting and expanding existing partnerships with PK-12 schools, and through additional investment in STEM teacher preparation, the CSU is committed to supporting California high schools in this endeavor.

*All California High Schools Offer at Least One Qualifying Course*

Based on data from the "a-g" database, 99 percent of comprehensive California high schools with curricula that satisfies current "a-g" standards offer a mathematics course beyond Algebra II in area 'c' or a third area 'd' science course that would fulfill the quantitative reasoning admission requirement. Of the schools that do not currently offer a qualifying course, the majority are charter or alternative schools. When expanding the courses that will satisfy the proposed requirement to include area 'g' courses with a quantitative reasoning component, 100 percent of comprehensive high schools currently offer a course that would satisfy the new quantitative reasoning requirement.

*The CSU has Pledged Additional Investment to Develop the STEM Teacher Workforce*

As announced during the July board meeting, the CSU has committed to increasing its annual production of credentialed teachers in STEM fields through an additional $10 million investment over the next four years.

The CSU prepares the majority of California's teachers and is working diligently to address the current and projected need for new mathematics and science teachers. On average, the CSU currently prepares approximately 1,000 new mathematics and science teachers each year. Many of these teachers go on to teach in the state's high-need schools where 25 percent or more students come from families below the poverty line and mathematics achievement rates are significantly below statewide averages.

*The CSU Will Continue to Support PK-12 Schools in Expanding Course Capacity*

The CSU will support school districts and PK-12 schools that need assistance expanding the number of courses that would meet the quantitative reasoning admission requirement. Since 2016, staff at the CSU Center for the Advancement of Instruction in Quantitative Reasoning (CAIQR) have been working with the California Department of Education and PK-12 and community college partners to develop a "bridge" or transitional course from high school to higher education through the California Mathematics Readiness Challenge Initiative (CMRCI).

Transitional mathematics, defined as courses or curriculum needed to successfully transition to college-level mathematics, is crucial for student success. Analogous to the development of the Expository Reading and Writing Course for English language arts, five CMRCI sites (four at CSU campuses and one at a UC campus) currently work with more than 150 California high schools to offer such courses. In addition, CSU Northridge is currently offering a transitional mathematics course developed with the Los Angeles Unified School District.

These transitional courses are designed to fundamentally shift how mathematics is taught in high school, opening doors for more students to realize academic success. At the same time, these courses effectively fill resource gaps and address course availability needs in underresourced school districts.

The table below lists the current transitional courses developed at each CSU site, the number of school districts and schools at which the course is currently being taught, and the approximate number of students participating. Currently, more than 10,000 students are enrolled in a CSU transitional course.

| **CSU Campus and Course Title** | **Districts** | **Schools** | **Students** (approximate) |
|---|---|---|---|
| CSU Monterey Bay:<br>*Transition to College Level Mathematics* | 5 | 8 | 197 |
| CSU Northridge:<br>*Transition to College Mathematics and Statistics* | 1 | 48 | 2,131 |
| CSU Sacramento:<br>*Quantitative Reasoning with Advanced Math Topics* | 20 | 52 | 4,293 |
| CSU San Bernardino; Cal Poly Pomona; CSU Long Beach; San José State<br>*Mathematical Reasoning with Connections* | 20 | 48 | 2,963 |
| San Diego State:<br>*Discrete Mathematics for Pre-College Students* | 1 | 12 | 1,204 |
| **Totals** | **47** | **168** | **10,788** |

For reference, below is a list of the counties where these pilot transitional courses can currently be found in high schools:

- Los Angeles
- Monterey
- Nevada
- Placer
- Riverside
- Sacramento
- San Bernardino
- San Diego
- San Luis Obispo
- Santa Barbara
- Santa Clara
- Solano
- Yolo

The CSU will continue to partner with school districts to ensure that these courses are available by 2026, the proposed implementation year, with a particular emphasis on districts and regions with the greatest need. Further, the CAIQR is assisting and supporting school districts in building their capacities of qualified teachers to teach these courses.

*California's New Accountability Framework Supports Student Completion of Quantitative Reasoning Courses*

California's new accountability and continuous improvement system provides information about how local educational agencies and schools are meeting the needs of California's diverse student population based on a concise set of measures. Performance on these measures is reported on the California School Dashboard. Among the measures is the College/Career Readiness indicator. This measure is based on the number of students in a high school graduation cohort who are prepared for college or a career. College or career readiness means completing rigorous coursework, passing challenging exams or receiving a state seal. Of the eight measures supporting this indicator, six would be directly supported by the adoption of the quantitative reasoning requirement. These measures include: Career Technical Education Pathway completion, grade 11 Smarter Balanced summative assessments in mathematics, Advanced Placement exams, International Baccalaureate exams, college credit course completion and "a–g" completion.

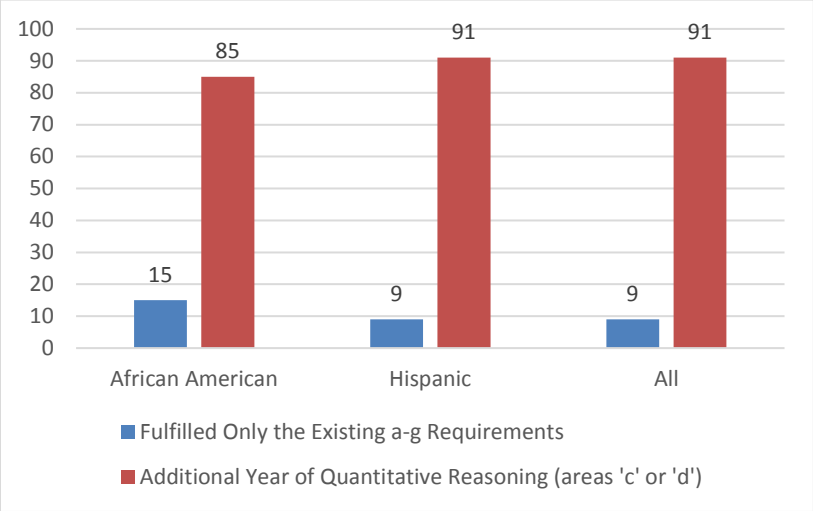
**Will a Quantitative Reasoning Proposal Harm Students from Historically Underserved Communities?**

The CSU is carefully developing the proposal for the quantitative reasoning admission requirement to ensure that no student is denied access to the university because they were unable to take a qualifying quantitative reasoning course in high school.

*Majority of CSU Students Already Fulfill the Proposed Quantitative Reasoning Requirement*

As shown in the chart below, 91 percent of all fall 2018 incoming first-year CSU students would have fulfilled the quantitative reasoning requirement by virtue of having taken an additional mathematics or science course. That figure holds steady when looking solely at incoming Hispanic students, while the figure dips slightly to 85 percent for African American students.

These data clearly indicate that the vast majority of students fulfill the requirement – today – solely through an area 'c' or 'd' course. If this was expanded to include the numerous area 'g' courses with a quantitative reasoning component (examples of which are outlined earlier in this item), it is reasonable to assume that virtually all incoming first-year students are currently taking an additional quantitative reasoning course in high school. The CSU continues to work with the California Department of Education to obtain data to validate this assumption.




At the July board meeting, a concern was raised through public testimony that a quantitative reasoning admission requirement would harm students who do not currently fulfill the existing a-g requirements. Without question, disparities exist in the completion of a-g requirements. Addressing these disparities involves the collective work of schools, colleges and universities and community-based outreach organizations.

The CSU continues to work with PK-12 schools and community partners to address these disparities. The CSU engages with more than 1.1 million elementary, middle and high school students annually through its existing outreach programs. This includes, but is not limited to, initiatives such as the "How to Get to College" educational campaign; the CSU Summer Algebra Institute, a six-week mathematics enrichment program for rising 9th-12th grade students; and GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs), which provides low-income middle school students the skills, preparation and encouragement needed to enter and succeed in college.

*An Exemption will be offered to Students who are Unable to Access a Qualifying Course*

As stated above, the CSU is working with PK-12 school districts and schools to build capacity to ensure that all students have access to a qualifying quantitative reasoning course. Additionally, the CSU is investing additional funds to prepare more STEM teachers to teach those courses.

If, despite these measures, a student is unable to take a qualifying quantitative reasoning course in high school because of course availability or a lack of resources, the CSU will provide an exemption to the requirement. This is consistent with the phase-in approach that was successfully implemented when the a-g requirements were originally enacted.

**Conclusion**

For decades, the CSU has been at the forefront of addressing the academic preparation of prospective and current students while maintaining a commitment to authentic access to a high-quality degree. To this end, groundbreaking programs like the CSU's Early Assessment Program, established in 2003, provide prospective students, families and schools with early guidance on preparation for collegiate study and opportunities to enhance preparation in the senior year of high school. Similarly, the Expository Reading and Writing Course, now offered in more than 1,000 California high schools, provides seniors the opportunity to complete a fourth-year course in English language arts that was co-developed by CSU and high school faculty to more closely align with college-level writing expectations. Most recently, the CSU implemented new academic preparation policies and practices, expanding the use of multiple measures for assessment and placement in English and mathematics/quantitative reasoning, replaced stand-alone developmental education courses with supported, credit-bearing baccalaureate courses and expanded the range of subjects that satisfy the general education quantitative reasoning requirement for graduation.

A quantitative reasoning admission requirement is being considered as the next step in ensuring equity and authentic access for all CSU students. The proposal will not curtail access or change the composition of the CSU student population. Instead, it will ensure that all students who enter the CSU are prepared to be successful in their coursework and participate in a range of majors and career fields.