

California Community Colleges Math and Quantitative Reasoning Task Force Recommendations – Part I

3-3-2018

Preamble

In fall 2017, the Academic Senate for California Community Colleges (ASCCC), the California Mathematics Council of Community Colleges (CMC³) and the California Mathematics Council of Community Colleges-South (CMC³-South) joined together and formed a task force to address math and quantitative reasoning education in the California community colleges. Math or quantitative reasoning is required for all majors: Science, Technology, Engineering, and Mathematics (STEM) majors and non-STEM majors, which may or may not have specific math requirements. In particular, this task force will examine quantitative reasoning as part of the general education pattern of curriculum design, especially in response to the requirements of AB 705 (Irwin, 2017) and the California State University Executive Orders 1100 and 1110 (EOs 1100/1110). The ASCCC is recognized in statute as the voice of the faculty in the California Community College system in regard to academic and professional matters, which includes curriculum, prerequisites, degree and certificate requirements, and student preparation. While the ASCCC reluctantly opposed AB 705¹, now that it is law, the ASCCC is working diligently to fulfill the direction of the legislature. CMC³ and CMC³-South are the California affiliates of the American Mathematical Association of Two-Year Colleges (AMATYC). AMATYC is the only organization exclusively devoted to providing a national forum for the improvement of mathematics instruction in the first two years of college. The California Community Colleges Math and Quantitative Reasoning Task Force (MQRTF) was formed to address the following as feasible:

1. *Research the various and diverse perspectives on appropriate content for math/quantitative reasoning education for non-STEM majors;*
2. *Develop recommendations on math and quantitative reasoning standards for non-STEM majors;*
3. *Develop a plan for how to provide opportunities for more students to consider STEM fields (since the United States is producing fewer and fewer STEM graduates, especially in groups that are disproportionately impacted);*
4. *Provide a report to the ASCCC, CMC³, and others, such as the California Community Colleges Chancellor's Office and Board of Governors, to consider that includes the research results and recommendations; and*
5. *Request a response from ASCCC, CMC³, and other stakeholders.*

The membership of the MQRTF was structured to include diverse perspectives in regard to math and quantitative reasoning with representatives from disciplines such as math, statistics, education, and chemistry. It should be noted that the MQRTF is guided by a commitment to

¹ AB 705 Oppose (ASCCC): <https://asccc.org/content/ab-705-oppose>

equity in math and quantitative reasoning, with the goal of providing a valuable education that meets the needs of all students, empowering them to be successful in a technologically evolving society. The following recommendations, which begin to address items 1 and 2 (above) in response to requirements of AB 705 and EOs 1100/1110, are the first part of two sets of recommendations from the MQRTF. The second set, or Part II will address item 3, and further address items 1 and 2.

Organization of the Recommendations

- C-ID: Overview
 - Process
 - MQR Pathways – Flow Chart
 - Descriptors
 - Foundations of Algebra for Math-Intensive Fields
 - Fundamentals of Algebra for Statistics or Liberal Arts
 - Elementary Mathematics
- “Drop back” Policy considerations
- Professional Development
- Data and Research
- Title 5 Stipulation
- References

Recommendations

C-ID: Overview

The MQRTF is bringing forth these recommendations as an option for colleges to consider for compliance with AB 705 and consistency with EOs 1100/1110. These recommendations are not intended to be used as required curriculum pathways. The C-ID course descriptors must remain as options for colleges to consider, but not required courses in curriculum pathways.

The MQRTF is presenting three draft C-ID descriptors that include content and objectives of the two algebra-based courses and one for more intensive instruction in elementary mathematics:

- Foundations of Algebra for Math-Intensive Fields – Elements of beginning and intermediate algebra as appropriate for long-term engagement in math-intensive fields– may include co-requisite support
- Fundamentals of Algebra for Statistics or Liberal Arts – Elements of beginning and intermediate algebra specifically designed for statistics, liberal arts mathematics, and other non-math-intensive fields – may include co-requisite support.

In the above two options, students with little or no elementary algebra skills may need additional prerequisite or co-requisite support.

- Elementary Mathematics – Elements of traditional arithmetic and pre-algebra for students needing to develop or improve computational and quantitative reasoning skills. This course is optional for those who choose this level of remediation.

Based on local placement policies, students will be provided the curricular support that they need to reach their academic goals. The proposed curriculum provides a structure for students to complete transfer-level math within a one-year time frame, as required by AB 705. Some students may require co-requisite or prerequisite course support.

Normally, this work would be done by the Faculty Discipline Review Group (FDRG). However, the ASCCC Executive Committee has requested that the MQRTF draft these descriptors and bring them forward.

These descriptors will include required and optional topics to allow colleges to tailor the courses to their student populations. In addition, the idea of offering groups of topics in these courses as modules will be introduced and considered. The descriptors will be sent to the math C-ID listservs and to the area meetings in March 2018. A resolution will be presented at the spring 2018 plenary session for the delegates to endorse the framework as an option that colleges may consider when addressing the requirements of AB 705. If the resolution passes, every effort will be made to accelerate the approval of the descriptors through C-ID.

Process:

Math faculty have been hesitant to endorse additional C-ID descriptors. The MQRTF agreed to recommend additional course descriptors provided some processes with C-ID approval be improved. Two of the most prominent concerns are:

- There is rigid adherence to the language in the C-ID descriptor for colleges to acquire course C-ID approval. We recommend reducing the level of detail required in the outlines and rely more on local faculty expertise and integrity. The descriptors should be refined so that they are including what is minimally necessary. For example, topics that are covered in a prerequisite course should not be required in the C-ID descriptor and specific real-world examples of concepts should be left to the discretion of the instructor or college. Perhaps a space where colleges may add additional topics as needed for their programs would be a beneficial option to assess the depth and rigor of course.
- With the passage of SB 440 (Padilla, 2013), “(C) A community college shall create an associate degree for transfer in every major and area of emphasis offered by that college for any approved transfer model curriculum approved subsequent to the commencement of the 2013–14 academic year within 18 months of the approval of the transfer model curriculum.” C-ID is used to develop descriptors for all transfer model curriculum. Thus, courses having C-ID descriptors have become a required component of the Associate Degrees for Transfer, with little room for other course offerings, especially at smaller colleges. These proposed course descriptors must remain as options for colleges to consider, and not as required courses in curriculum pathways.

Finally, many processes around curriculum approval at the state and district levels have been expedited and given special considerations in order to meet the mandates of AB 705. Likewise,

to meet the request of the ASCCC Executive Committee, the descriptor approval process for these particular descriptors will need to be given some liberty.

MQR Pathways:

Attached is a Flow Chart for Math and Quantitative Reasoning Pathways that meet the requirements of AB 705. These pathways are options for colleges to consider but should never be a required component of a college’s curricular offerings.

C-ID Descriptors:

Attached are draft C-ID descriptors for the following courses:

- Foundations of Algebra for Math-Intensive Fields – Elements of beginning and intermediate algebra as appropriate for long-term engagement in math-intensive fields– may include co-requisite support
- Fundamentals of Algebra for Statistics or Liberal Arts – Elements of beginning and intermediate algebra specifically designed for statistics, liberal arts mathematics, and other non-math-intensive fields – may include co-requisite support.
- Elementary Mathematics – Elements of traditional arithmetic and pre-algebra for students needing to develop or improve computational and quantitative reasoning skills. This course is optional for those who choose this level of remediation.

“Drop-back” Policy Considerations:

For some students an accelerated or co-requisite model may not meet their needs. It is important that we support those students in their educational pursuits and allow them to be advocates for their educational experience. This may include non-traditional or working students who cannot afford the time to add a co-requisite course.

Students should have the option to enroll in the Elementary Mathematics course. At the local level, colleges should be encouraged to develop practices and policies that will inform those students of the implications of this move and support the students with their learning needs.

Situations to consider:

- Initial enrollment in an Elementary Mathematics course, below where the student was placed
- Student enrolls in the course of placement, but then opts to drop-back to lower level to improve on prerequisite skills

Professional Development:

Increase and promote professional development opportunities for faculty, that are designed and facilitated by faculty in math and quantitative reasoning education. These courses are meant to be taught in a non-traditional model and many faculty have not had training in these newer and innovative practices. Professional development opportunities that are designed for pedagogy/andragogy that is applied to a broad base of models. In particular, some “how-to” sessions at the ASCCC Academic Academy in September 2018 would be just in time as colleges

are revamping their curricular offerings. It is also strongly recommended that colleges find release time to allow for faculty to work together to determine how to implement the changes, as well as the time for actual implementation. There are funds from SSSP, Equity, BSI, and the Guided Pathways Award program that could be appropriately allocated to do this required curricular transformation. Even though it is often difficult, or nearly impossible, for some of the smaller colleges to release their faculty to do this work, the work still needs to get done. At a minimum, stipends commensurate with the work being done should be provided.

Data and Research:

In addition to the typical data collection and research that takes place annually, colleges should examine the following:

- Self-reported high school transcript data compared to actual high school transcript data
- Students that take courses that are lower than placement recommends
- Students that drop before the census date
- Student feedback with new placement system and curricular pathways

It should also be noted that many colleges will have new curriculum, so student success comparisons between the “new course” and the “old course” may not be meaningful. Comparisons may be most meaningful at the transfer-level course, assuming the course content and rigor has not changed.

Title 5 Stipulation:

Currently, the following language is in Title 5 §55063:

Competency in mathematics shall be demonstrated by obtaining a satisfactory grade in a mathematics course at the level of the course typically known as Intermediate Algebra (either Intermediate Algebra or another mathematics course at the same level, with the same rigor and with Elementary Algebra as a prerequisite, approved locally), or by examination;

The competency requirements for written expression and mathematics may also be met by obtaining a satisfactory grade in courses in English and mathematics taught in or on behalf of other departments and which, as determined by the local governing board, require entrance skills at a level equivalent to those necessary for Freshman Composition and Intermediate Algebra respectively.

The language is quite clear—In order for a course to meet math competency requirements, it must require entrance skills at a level at least equivalent to elementary algebra.

Many colleges have created and offered courses that have been approved to meet math competency requirements, even though the courses do not require entrance skills at least equivalent to elementary algebra. It is argued that these courses do indeed comply with Title 5, at least in spirit, since these courses include the required entrance skills in the course content as well as content equivalent to that of intermediate algebra.

References:

- ASCCC: <https://asccc.org>
- AMATYC: <http://www.amatyc.org/?page=AboutUs>
- CMC³: <http://www.cmc3.org/index.html>
- CMC³-South: <http://cmc3s.org>
- AB 705: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB705
- EO 1100/1110: <https://www.calstate.edu/eo/>
- SB 440:
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB440
- C-ID Transfer Model Curriculum: <https://c-id.net/tmc>