

SOUTH DAKOTA BOARD OF REGENTS

Academic and Student Affairs

AGENDA ITEM: 6 – G

DATE: May 8-10, 2018

SUBJECT

System Math Pathway Proposal

CONTROLLING STATUTE, RULE, OR POLICY

[BOR Policy 2:7](#) – Baccalaureate General Education Curriculum

[AAC Guideline 7.6](#) – English and Mathematics Placement Guidelines

BACKGROUND / DISCUSSION

During their [August 2017](#) retreat, the Board received an update on the various strategies/initiatives underway during the past five to seven years to advance the systems completion agenda. One particular area of focus, was on efforts to improve student success in math, including our efforts to increase success for remedial coursework. Using data available in the SDBOR Grades Dashboard, the slate of remedial courses were evaluated from FY07 to FY16. Table 1 depicts the overall success rates for Math courses (remedial and non-remedial) at each institution during this time frame.

Table 1
English and Math Success Rates for Regental Institution FY07 through FY16

Courses	BHSU	DSU	NSU	SDSMT	SDSU	USD	System
Remedial Math Success Rate ¹	65.3%	56.6%	67.3%	77.8%	42.1%	45.8%	56.1%
MATH 102 Success Rate ²	70.8%	75.1%	81.0%	62.6%	59.8%	58.5%	66.4%
Math Success Rate - All Non-Remedial Courses	72.0%	73.9%	84.1%	69.1%	70.8%	67.4%	71.2%

¹ *These numbers do not include corequisite remedial courses, which enroll students in sections of MATH 102, as provide the student with additional help through addition remedial hours. There is no way in our Dashboard to distinguish these students, as they are integrated with regular students in traditional MATH 102 sections.

²² This number includes MATH 102 Corequisite courses. Therefore, some of these students are remedial students.

(Continued)

DRAFT MOTION 20180508_6-G:

I move to approve the recommendation for the system math pathway model submitted by the Math Discipline Council.

Improving math outcomes has been an important priority for the Board during the budget setting process the past three years. South Dakota School of Mines & Technology was successful in obtaining one-time funding during the 2015 Legislative session. The following year the Board prioritized two math initiatives from SDSU and SDSM&T in their budget request to the Governor for FY17. For FY18, a comprehensive system proposal was advanced to address developmental math needs at each campus. These subsequent requests were not advanced as a part of the Governor's formal budget request to the legislature. As these budget requests have been advanced, questions about comprehensive strategies underway in the system have been raised. Over the past decade, four interventions have been implemented with a goal of improving student success in their primary math gateway courses.

Quantitative Literacy Course Development: Conversation around math redesign in the Regental system have been unfolding over the past decade beginning with a USD task force intent on reviewing mathematics instruction in Spring 2005. A focus of the initial review was to improve quantitative literacy of the general student population, and the taskforce concluded that a course specifically designed to put math in a real-world context would be more effective in developing quantitative literacy skills for students and increase student success in general education mathematics courses. Consistent with the Mathematical Association of America standards for quantitative literacy, a pilot course was developed and offered beginning with the Fall 2007 term on an experimental basis. In December 2008, USD requested approval to have MATH 103 included as an approved course for SGR goal #5, and the Board deferred approval until an assessment of the effectiveness of the course could be completed. These data were provided to the Board during their [June 2010](#) meeting at which time the Board approved the addition of Quantitative Literacy to BOR Policy 2:7 and 2:26. Since MATH 103 was approved by the Board in June 2010 only a small number of sections have been offered. The ratio of students participating in MATH 102 over MATH 103 statewide is approximately 16:1. This disproportionate figure leads to the question if MATH 103 has been comprehensively promoted as an option for students in degree programs where additional courses in a math sequence are not required.

Table 2
Sections and Course Enrollments in MATH 102 and MATH 103 in the Regental System

	MATH 102	MATH 103
<i>Participating Institutions</i>	6	4
<i>Sections</i>	654	40
<i>Enrollees</i>	15,177	935

Co-requisite Math Implementation: Using one-time funds made available from the Legislature in FY13, representatives from Complete College America traveled to South Dakota and met with Math and English faculty in Pierre to discuss successful

strategies underway at institutions around the country. The session concluded with the release of an RFP related to the availability of \$350,000 in state funds to assist campuses in their efforts to create innovative, scalable programs that allow for a more flexible approach to remediation, and help students reach credit-bearing courses more quickly. Proposals were received from BHSU, DSU, NSU, SDSU and USD, and a brief overview and outcomes associated with the proposals were reviewed at the [April 2017](#) AAC meeting.

DOE College Algebra Readiness Course: For the past four years, the Department of Education has been delivering a [College Algebra Readiness](#) course aligned with the systems Math 095 curriculum where students sit for the Accuplacer diagnostic exam, have modules developed through the Pearson My Foundation Lab product, and then take the Accuplacer to validate their preparation for entry into Math 102 at the completion of the course. NSU has most recently taken on the administration and delivery of this particular program and piloted a dual credit option during the Spring 2017 term through support from the South Dakota Education Access Foundation (SDEAF).

Multiple Measure Approach to Placement: AAC and the Board of Regents adopted a Math Index during the [May 2016](#) meeting as a multi-measured approach for predicting student capacity for performing well in their entry level course. The adoption of this model required a more consistent approach to both entry and upper level math courses than what had previously been established, and campuses continue to work through the implementation of this approach.

While the addition of Math 095, MATH 102/102L, MATH 103/103L, and SP grades have offered new alternatives for students in the Regental system, math gateway courses continue to serve as barriers for student progression and success. During the [Western Academic Leadership Forum](#) in April 2017, representatives from the Charles A. Dana Center (University of Texas at Austin), and Montana State University, Bozeman outlined methods for improving student Math performance using the [New Mathways Project](#). Representatives from states that are implementing new math pathways in collaboration with the Dana Center provided an overview of the process used, lessons learned, and results from their respective initiatives. Additionally, in 2016 [Michigan State University](#) revised general education requirements to no longer require Algebra, and replaced the requirement with two quantitative literacy courses. Considering this background, a system math pathway model was discussed with the Board during their August 2017 retreat, and support was received for exploring options and bringing recommendations forward for consideration.

IMPACT AND RECOMMENDATION

Following AAC discussion at their [August 2017](#) retreat, an Improving Math Performance Taskforce³ was formed and chaired by Kurt Cogswell (SDSU). The group held their first meeting in October 2017, and in the following months engaged in a comprehensive review of math pathway initiatives across a number of states. The final recommendations that were eventually advanced to the Math Discipline Council (MDC), are based upon a number of factors. These include best practices in place in major national efforts to reform developmental mathematics education, input from faculty and researchers in another state where reform has been in progress for four years, and input from mathematics and other faculty across the SDBOR system. Following discussion at the March 2018 MDC meeting, the council accepted the task force recommendation outlined below. The formal recommendations which have substantial support from faculty around the state is for a system level plan for improving academic outcomes for students enrolled in developmental education courses (MATH 021, 095, and 101) with a goal of improving the overall throughput of these students to successful completion of a course that satisfies System Graduation Requirement #5: Quantitative Literacy. The major characteristics of the proposed recommendations include:

- A uniform, system-wide set of options for students currently placing into developmental education mathematics courses ensures ease of course transfer across the SDBOR system, while the ability to choose from these options gives campuses flexibility to best serve their own students.
- The options include existing non-credit-bearing, developmental education mathematics courses, but no student is required to enroll in one of these courses.
- The options include immediate enrollment in a course that satisfies SGR#5.

To achieve these outcomes, the system-level approved options for students currently placing into any existing developmental math class would allow for self-selected enrollment in MATH 021, MATH 095, MATH 101, or MATH 103 + MATH 093. Each campus must offer at least two of these options based on the respective needs of their students, and at least one of the MATH 101 or MATH 103+093 credit bearing options. A distinct change from the current remedial course placement process currently in place is that no student would be required to enroll in non-credit-bearing courses MATH 021 or MATH 095. Rather students will be given the option of enrolling in one of these two courses or to go directly into MATH 103+093 which would continue to satisfy SGR#5.

Those students enrolled in degree programs that do not require coursework with MATH 102 or higher as a prerequisite for program completion would not be required to take subsequent math coursework. When additional prerequisites must be met then, the MDC supports using MATH 103+093 as an allowable prerequisite for MATH 102, MATH 281, and STAT 281. The three potential pathways for students presented under this proposed

³ Additional institutional representatives included Jeff Palmer (DSU), Ricardo Rojas (NSU), Kyle Riley (SDSM&T), and Kevin Reins (USD).

approach can be found in the System Math Pathway Infographic available in Attachment I. Additionally, the update matrix for the Math and English Placement Guidelines can be found in Attachment II to reflect the recommendations being advanced above.

Additional considerations

The taskforce has also recommended the renumbering of MATH 102 as MATH 114 and MATH 092L as MATH 094. Additionally, they seek to rename but not renumber MATH 103 Quantitative Literacy as Introduction to Mathematical Reasoning. Information from states in which reform is in progress revealed that allowing developmental education students to enroll in general education courses typically increases the DFW rates in the latter courses. Provosts and other senior academic personnel should be aware of this likelihood. This same information emphasized the importance of providing substantial support to students enrolling in general education classes instead of developmental classes. Through the coming months, MDC will discuss the possibility of submitting a single system request to the legislature for additional base funding for student support, possibly coupled with an increase in the Math Discipline Fee. MDC will also discuss the possibility of creating or revising system level policies designed to promote student success.

As a council, AAC discussed these recommendations at their [March 2018](#) AAC meeting and supported that the approach be advanced to the Board for approval. If adopted, the changes would go into effect for the Fall 2019 term.

Board staff support the system math pathway model being proposed.

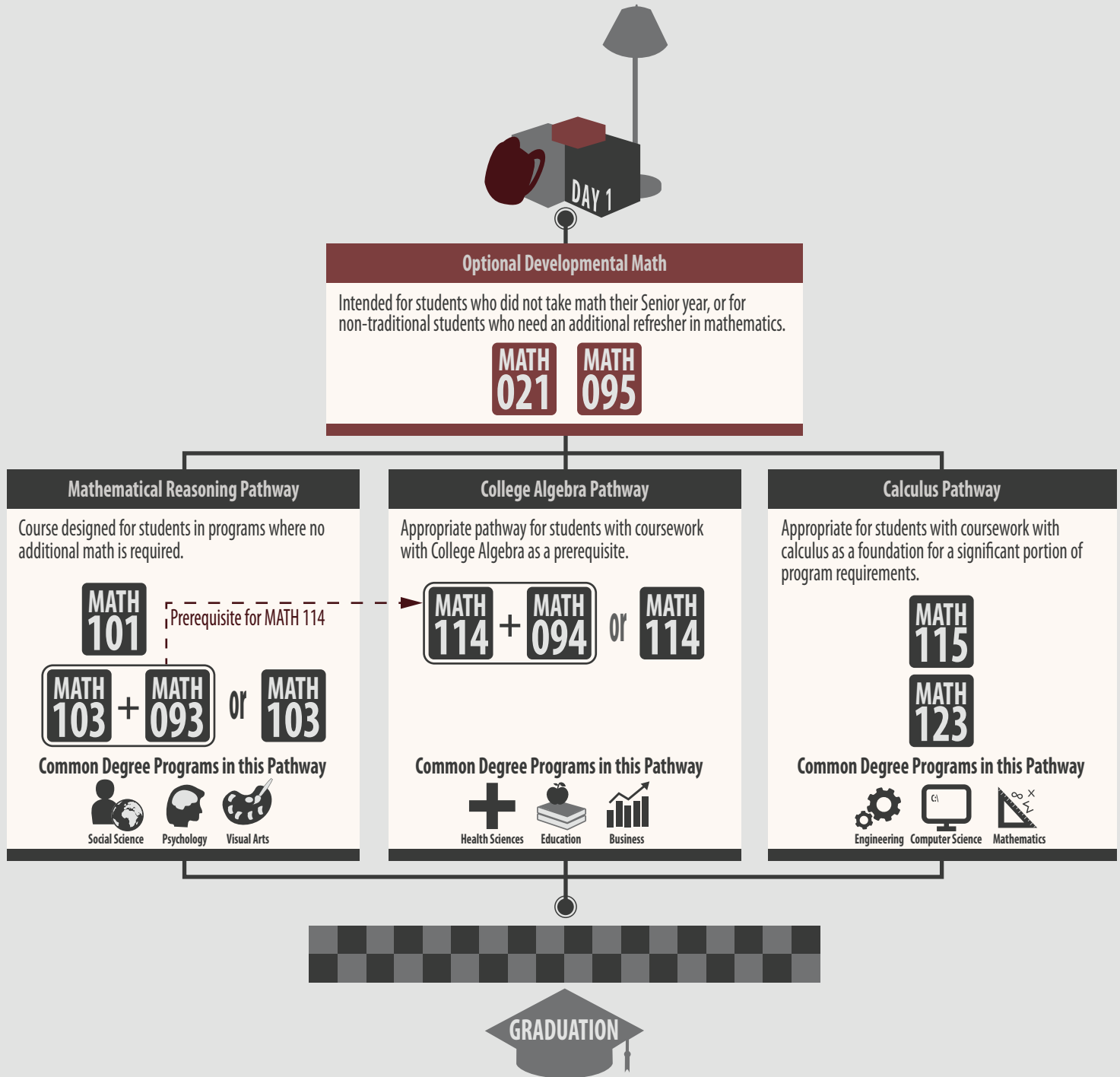
ATTACHMENTS

Attachment I – System Math Pathway Infographic

Attachment II – Revised Math Placement Matrix for the AAC Math and English Placement Guidelines

Regental Math Pathway Model

For more than a century, College Algebra has been the entry level course required for the majority of students seeking a bachelor's degree at postsecondary institutions around the country. However, many students struggle to successfully complete this entry level course. For some, College Algebra is not a required pre-requisite for higher level course work. As a result, 4-year institutions around the country have been working to develop appropriate math pathway options for students that better align mathematical principles to the degree programs students are pursuing, with a goal of improving student retention and graduation rates. The Regental Math Pathway model seeks to leverage this approach with a goal of allowing students to overcome this barrier to college success, while gaining the quantitative reasoning skills needed to be successful their field of study.



Additional Considerations to Improve Mathematics Course Delivery

Supplements to student support

Additional faculty, graduate students, peer mentors, and tutors; summer workshops; structured support by residence hall personnel or academic advisors.

Revising system-level policies

Limiting retakes of a given course attendance policies; require that the SGR#5 course be completed prior to certain academic milestones.

MATH 021 or MATH 095 or MATH 101 or MATH 103 w/093	Any student can take these courses				
If you want to take	MATH INDEX (MI) $250 * \text{HS GPA} + 17 * \text{MATH_ACT}$	Accuplacer Math Score (ACM)	Smarter Balanced Score	Only if no HS GPA is available, and thus no MI is available	CHALLENGE INDEX (CI) $290 * \text{HS GPA} + \text{ACM} + 220$
MATH 102 w/092L	950 or higher	Elementary Algebra 44-75	2543-2627	ACT MATH 18-19 or SAT MATH 421-470	950 or higher
MATH 102 or MATH 103 or MATH 104 or STAT 281 w/091	1150 or higher	Elementary Algebra 76-120 or College Level 0 - 50	2628 or higher	ACT MATH 20 or higher or SAT MATH 471 or higher	1150 or higher
MATH 115 or MATH 120 or MATH 121 or MATH 281 or STAT 281	1300 or higher	College Level 51 or higher	NA	ACT MATH 25 or higher or SAT MATH 570 or higher	1300 or higher
MATH123 w/123L	1300 or higher AND Accuplacer Calculus 16 or higher	1300 or higher AND Accuplacer Calculus 16 or higher	NA	(ACT MATH 25 or higher or SAT MATH 570 or higher) AND Accuplacer Calculus 16 or higher	1300 or higher AND Accuplacer Calculus 16 or higher
MATH 123	1300 or higher AND Accuplacer Calculus 19 or higher	1300 or higher AND Accuplacer Calculus 19 or higher	NA	(ACT MATH 25 or higher or SAT MATH 570 or higher) AND Accuplacer Calculus 19 or higher	1300 or higher AND Accuplacer Calculus 19 or higher