

Ohio Mathematics Initiative

Fiscal Year 2020 Annual Report

Ohio

Department of
Higher Education

The Ohio Mathematics Initiative annual report this year features descriptions of the OMI's impact from leaders who have been involved since the beginning of the initiative in 2013. Look for these sections included throughout the report.

The Initiative in Review

In July 2013, a group of 12 mathematicians representing several of Ohio’s two- and four-year institutions of higher education met with consultants from the Charles A. Dana Center and members of the Ohio Department of Higher Education to discuss postsecondary mathematics in Ohio. They convened at the urging of mathematics faculty members across Ohio to rethink postsecondary mathematics in the state.

By March 2014, the diligent work of this Steering Committee manifested itself in a report calling for the creation of mathematics pathways and practices that improved student success, allowed for effective transfer of credit, engaged the larger mathematics community, utilized data to improve course offerings and instruction, and bridged the gap between postsecondary expectations and high school practice. With these essential outcomes articulated, the true work of the Ohio Mathematics Initiative (OMI) began.

In the six years following the Steering Committee’s report, Ohio’s mathematics faculty have made great strides toward accomplishing these outcomes. The OMI Chairs/Leads Network meets regularly to discuss promising and best practices and to identify challenges and obstacles facing postsecondary mathematics. Five subgroups of the Chairs/Leads Network, representing the outcomes from the Steering Committee report and composed of mathematics faculty from across two- and four-year institutions, work together to review research, incorporate research-based teaching practices, engage and support each other in initiatives designed to further student success, and promote an appreciation of the beauty of mathematics.

Mathematics pathways to and through programs of study have been identified, course learning outcomes have been revamped to better promote the active engagement of students in the mathematics curriculum, data is collected and shared across institutions, and members of the mathematics community engage in solving one of the most important problems facing departments – promoting student success.

The work of the OMI is not done; it is not time to rest. Initiative members look back on their accomplishments and use those to inform the work that is yet to come. Sometimes progress is uneven and sometimes it is slowed, but work continues. Faculty members continue to rethink how mathematics courses are taught, structured, and connected to other programs of study. Our students reap the benefits of this work in countless ways. As Uri Treisman has said, “The true power in math pathways work is . . . in the connections within and across programs, institutions, and sectors that effect systemic and sustainable change.” And that is what the members of the Ohio Mathematics Initiative continue to work toward – systemic and sustainable change – to support the students who engage with them in mathematics, and to honor the discipline they love.

Michelle Younker
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Activities of the Chairs/Leads Network

In my view, one of the important developments in the Ohio Mathematics Initiative (OMI) was the creation of a forum in which the chairs and leads of mathematics departments from all public universities and community colleges in the state of Ohio discuss mathematics instructional issues, vote or reach consensus, and make recommendations to the Ohio Department of Higher Education. In fact, when I have talked to university administrators from other states who are aiming to emulate the success of the OMI, one obstacle that is often mentioned is a lack of a well-functioning forum like the Ohio Mathematics Chairs/Leads Network. This forum, which is at the center of the OMI, has had an enormous impact because, fortunately, lively discussion on important instructional issues has led to agreement and action statewide in Ohio.

Overall, the OMI has been moving in five directions, each represented by a subgroup of the Chairs/Leads Network. I will focus mostly on the development of mathematics pathways in the state of Ohio through the lens of The Ohio State University (OSU).

At OSU, a Quantitative Reasoning (QR) course, corresponding to one of the mathematics pathways, was developed and is replacing College Algebra as a gateway course taken by non-STEM majors. Moreover, the QR course has now become a foundational course in the new GE curriculum that has been developed at OSU. The new QR course at OSU uses co-remediation and allows students to avoid the trap of remedial courses to help them succeed in college.

In the STEM pathway, Calculus I and II have been redesigned at OSU, and a free online calculus textbook has been developed. In redesigning calculus, OSU identified a group of students that tends to do poorly in Calculus I. A two-semester version of Calculus I, *Calculus with Review*, was then designed with these students in mind and has been very successful. Students in Calculus with Review have occasionally outperformed students in the standard Calculus I course who always take a common final exam. The impact of these changes on the STEM pathway at OSU is expected to be the higher retention of students interested in STEM disciplines, and a reduction of failure rates. The STEM pathway redesign effort at OSU is not yet complete, and the OMI is still working on improvements to this important mathematics pathway.

Looking toward the future, a data science pathway is being developed within the OMI with the participation of the Statistics Department at OSU. We live in an era in which data is ubiquitous, and this pathway is expected to have a big impact in the data literacy of non-STEM students in the state of Ohio.

Finally, there is a need to attract women and underrepresented minorities to STEM fields in the state of Ohio. The OMI has discussed a joint outreach effort that plans to make mathematics attractive for many Ohio students before they reach college. At OSU this year, the mathematics summer camp "[Beyond the Classroom: Girls Exploring Math](#)" received several hundred applications from students all over the state of Ohio!

Luis Casian
Professor
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Chairs/Leads Network Meetings

November 1, 2019

The meeting began with an update from each of the five subgroups on the progress of their work since the last meeting. Subgroup 1 provided details about the regional professional development conferences they were planning across the state for faculty on co-requisite mathematics instruction. Faculty from all institutions were invited to attend. The workshops included speakers who provided examples of how to facilitate co-requisite mathematics courses. Subgroup 2 provided updates on its progress in the redesign of the Ohio Transfer Module (OTM). There is an urgency to develop technical mathematics courses due to the Ohio Guaranteed Transfer Pathways (OGTP) implementation of applied associate degree pathways. Twenty-five of the institutions already have some version of a Technical Mathematics course. The discussion also included approvals for Quantitative Reasoning (QR) courses, plus the need for Discrete Mathematics and Calculus for Life Sciences. Subgroup 3 discussed its plans for webinars aimed at faculty who are unable to travel to Columbus or the regional meetings. Subgroup 4 shared some of the data they have collected from institutions on implementation of the work from the OMI. The subgroup encouraged institutions to share detailed, but concise summaries on the changes that have been made in response to the OMI. Some examples of data to include are patterns of mathematics class education, success (C+ and above) rates, and graduation rates dependent on courses taken. Results from data collection efforts will be available in the Knowledge Base, which is a secure collection of information that has been designed for this purpose. The update for Subgroup 5 was included during an afternoon presentation on collaboration with the Ohio Department of Education (ODE) and Ohio Department of Higher Education (ODHE).

The next discussion focused on a potential Data Science course. With all the changes in the world following the introduction of the internet, it is easy to capture data now, and it is becoming of growing importance to have individuals skilled in data science to help our growing world adapt. A new Data Science course could instruct students on how to clean and process data. Rather than experimental data as is typically used in statistical courses, it would rely heavily upon observational data. This potential pathway course would not be calculus-based, and would be classified as a General Education (GE) core course for students in their first semesters. A Data Science course could be an alternative to the QR course, and used for those aiming to enter the data science or programming field. There should be a strong ethical component to the course, instructing students on some of the ethical issues in data collection. For example, a section of the course may focus on privacy or bias in data collection. The course would give students the predictive and data analysis skills to work with corporations and within the business realm.

In the afternoon, ODE and ODHE presented on collaborative mathematics projects. ODE began with an update on the status of the Fourth Year Transition Pilot. The high school transition course for mathematics has been renamed Mathematical Modeling and Reasoning (MMR). The high school transition course is year-long and focuses on

quantitative reasoning and mathematical modeling. It is student-centered, rather than a lecture-based pedagogy, and is considered ‘real-life heavy,’ meaning the examples and projects are focused on situations students would encounter in their lives. Meeting participants were shown a video that included students currently in the course who have benefited from this type of structure. ODE held a workshop to assist faculty and administrators in learning how to instruct students in this type of course. The workshop was four days long and included higher education collaborators, administrators, ODE, ODHE, and educational advocates from the state of Oregon. ODE requested that some of the faculty in the room consider becoming a higher education collaborator, as more will be needed in the future. Collaborators would perform periodic check-ins, both online and in-person in accordance with the collaborator guidelines. In addition, they would visit classrooms to provide both an introduction to postsecondary mathematics education and to occasionally co-teach a class.

ODHE continued the presentation with information on the Strengthening Ohio’s High School Math Pathways initiative. Having only one math pathway is a problem for the diversity of postsecondary aspirations among students. For many seniors in Ohio high schools, Algebra II is a terminal course – while it is supposed to be a preparation course for calculus. There is an opportunity to create pathways that emphasize equivalent thinking, but not equivalent content. A partnership between ODE, ODHE, the Dana Center, and the Education Strategy Group (ESG) intends to rethink the current Algebra II to STEM pathway by leveraging Algebra II equivalency to create new pathways for QR and statistical thinking. The goal is to maintain the rigor of Algebra II but ensure equity and flexibility to foster student success.

The next presentation from members of subgroup 2 focused on potentially including new pathways for mathematics for educators and technical mathematics. Technical mathematics pathways will be focused on providing a contextualized, applied experience presented in a QR format. A review of technical mathematics courses at institutions across the state was conducted, and it was determined that these courses were approximately similar and often used the same textbooks. This course is often designed to support and lead to a degree in Engineering Technology. As it stands, the new technical mathematics pathway would be composed of two courses, for which the four-year Engineering Technology degree students would take the second course as a pre-tech calculus.

The final discussion of the day gave consideration to a mathematics course for nurses. The discussion was prompted by conversations being held on a national level, as nurses frequently transfer between states and the mathematics required in their degrees are often inconsistent. As an example of the effects, Cleveland Clinic has developed a crash course in mathematics that nurses are required to complete upon hiring to ensure nurses are mathematically prepared for employment. There was a meeting held in Miami, Florida on Emerging Solutions for Nursing Mathematics. As it stands, some health institutions feel that the nursing accreditation boards are unclear on the specific mathematics content required. There has yet to be a consensus on what type of mathematics content should be included: QR, Statistics, or Calculus. In addition, as nursing is a fairly rigid program, there is confusion over how a course would fit within program hour restrictions.

May 8, 2020

The meeting began with a general discussion on changes precipitated by the arrival of COVID-19. The group shared information about the pass/fail grade policies from several institutions during the spring 2020 semester. Information was also shared about the COVID-19 policy updates provided on the Ohio Department of Higher Education website. Additional discussion focused on test proctoring in an online environment. Some institutions have tried various forms of proctoring software with varying levels of success. Others are shifting away from high-stakes assessments toward thought-provoking, reflective assessments. The third portion of the general discussion included plans for summer and fall 2020. At the time of the meeting, many institutions had not yet identified a definite course of action.

The next portion of the day featured an update from the Ohio Department of Education (ODE) and the Ohio Department of Higher Education (ODHE) on the partnership with Education Strategy Group and the University of Texas at Austin Charles A. Dana Center to strengthen Ohio's high school mathematics pathways. Through the use of a Math Pathway Advisory Council, and Math Pathway Architects groups that include the members of Subgroup 5, as well as focus groups, ODHE and ODE have begun to gather information and work toward developing an equitable, rigorous, flexible, and coherent math pathway. The new potential high school math pathway begins with an Algebra 1 and Geometry sequence, and then moves to Algebra 2 or equivalent courses. The options after Geometry are divided into four course options: Algebra 2 for STEM to Pre-Calculus, Discrete Math 1 (Foundations of Computer Science) to Discrete Math 2 (Advanced Computer Science), Probability and Statistics, and Quantitative Reasoning. School districts will be able to choose how many and which Algebra 2 Equivalency courses to offer. The placement of Data Science is still unknown. Math course requirements for various potential careers may vary by institution.

The next part of the meeting included updates from some of the subgroups. Subgroup 2 informed the group that learning outcomes for Technical Mathematics I and II have been endorsed statewide for inclusion in the Ohio Transfer Module (OTM). The subgroup also announced endorsed learning outcomes for Mathematics in Elementary Education I and II. The subgroup anticipates meeting during the summer to continue discussions on a Discrete Mathematics course, with plans to send out for endorsement in the fall. Subgroup 2 is continuing to develop a Life Sciences for Calculus course with a goal of having learning outcomes completed in the fall. The subgroup is also researching alternatives to Calculus in an effort to improve student success rates after Pre-Calculus.

Subgroup 1 updated the chairs/leads on its work in adopting and expanding co-requisite mathematics courses. The subgroup had a regional workshop at The Ohio State University at Lima. It also provided feedback from the most recent workshop that was held online. Working toward finding an academic mindset and the learning behaviors of students were found to be the most challenging aspects of institutional implementation of mathematics co-requisites. Institutions also expressed concern about balancing the faculty workload and online/hybrid instructional options. However, faculty and staff have begun to feel more confident about online instruction after the spring 2020 transition to distance learning. Additional feedback was provided regarding the most helpful

instructional strategies and tactics used to implement co-requisites. Some methods included using ALEKS instead of creating separate co-requisite courses, collaborating across all institutional levels and being open to data, and requiring more low-stakes assignments and supplemental instructors. In review of the anticipated institutional challenges with delivering mathematics co-requisites next year, alignment and workload were found to be significant variables.

Subgroup 4 encouraged the group to explore the Knowledge Base and gather its own data and results from transitions to Quantitative Reasoning, co-requisites, pathways, or other OMI outcomes. The subgroup is seeking data from institutions documenting successes and challenges during implementation.

For the final presentation of the day, representatives from Buckeye Aha! Math Moments (BAMM) at The Ohio State University gave a presentation to introduce their outreach initiatives from the Department of Mathematics. They informed the chairs/leads about their third summer camp program that encourages applications from female and gender non-conforming students and seeks to increase diversity and program reach to women and minorities. BAMM also hosts workshops once a month on Saturdays that introduce students to math-based games and puzzles. Within day-to-day activities, BAMM implemented a two-week-long mini-course at Metro Middle School and several visits to elementary schools, museum visits, a partnership with the Latinx Space for Enrichment and Research (LASER) and the African American and African Studies Community Extension Center, and several other programs that have faced issues due to COVID-19. Programs focused more on the Department of Mathematics include a recreational mathematics course, a recreational mathematics seminar, and an origami December holiday decorations workshop. Through the work of BAMM, students and youth can be introduced to mathematics in a non-traditional manner in order to create interest and promote future values of mathematics in the academic mindset.

After the presentation, there was discussion about extending the outreach project statewide. A survey was sent after the chairs/leads meeting to gather contact information for those individuals interested in getting involved. There is now a group of people interested in working together to lead outreach efforts around Ohio. There are plans for a virtual meeting to meet each other, see what everybody is interested in doing at their institutions, and also to brainstorm about possible collaborative projects.

Focused Online Collaborative Interactions (FOCI)

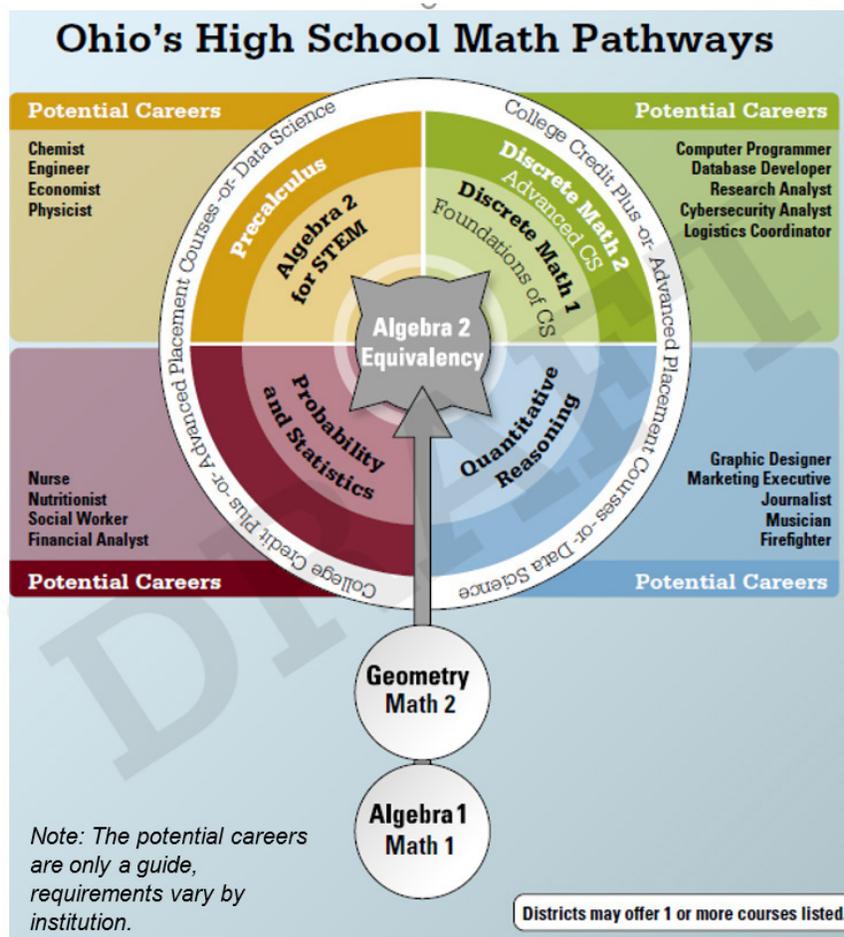
The Ohio Department of Higher Education sponsored a professional learning opportunity for faculty called Focused Online Collaborative Interactions (FOCI) offered by the Charles A. Dana Center. The online workshop consisted of six, two-hour-long sessions designed to provide faculty with an introduction to student-centered learning, effective student discourse, and collaboration. The first cohort of faculty attended workshops from the end of August 2019 until mid-November 2019, and the second cohort attended from mid-October until the end of April 2020. Overall, 44 faculty attended across the two cohorts. Facilitators from the two workshops reported that the Ohio cohorts were the most engaged cohorts with which they have worked. From the surveys sent at the end of the workshops, the Dana Center noted the largest amount of growth in the following areas:

- Using a variety of collaborative group structures
- Assessing group performance in a collaborative setting
- Assessing individual performance in a collaborative setting
- Using a rubric for student self-assessment

Collaboration with the Ohio Department of Education and Ohio Department of Higher Education

Strengthening Ohio's High School Math Pathways

During the 2019-2020 academic year, the Ohio Department of Higher Education partnered with the Ohio Department of Education, Education Strategy Group, and the Charles A. Dana Center to begin the initiative Strengthening Ohio's High School Math Pathways. The purpose was to create a smoother transition between secondary and postsecondary math pathways, focusing on equity, rigor, flexibility, coherence, and relevance. An advisory council, made up of representatives from a variety of education organizations, and the Math Pathways Architects Committee, made up of higher education and high school math faculty, were formed; both of these groups had representation from the Ohio Mathematics Initiative. The advisory council focused on equity, communication, and support of surrounding systems and structures. The Math Pathways Architects focused on aligning the math pathways between high school and college and career. Focus groups will give ongoing feedback during the initiative, and a course-specific workgroup will be formed to develop additional resources. The Architects created and the advisory council approved a draft of potential high school math pathways. Districts could offer one or more Algebra 2 equivalent courses in addition to their current Algebra 2 curriculum; these courses would satisfy the credit needed for Algebra 2.



Five workgroups have been formed: Algebra 2, Probability and Statistics, Quantitative Reasoning, Computer Science/Discrete Math, and Data Science. The workgroups' charge is to create course guidance documents such as standards, model curriculum, etc. They had one introductory meeting, but due to COVID-19 their work has been delayed. The Algebra 2 and Probability and Statistics workgroups decided to delay their work until spring 2021. The Computer Science/Discrete Math, Data Science, and Quantitative Reasoning workgroups decided to move the work forward virtually as best as they can. The current plan is to launch the pathways in fall 2021. The Algebra 2 and Probability and Statistics courses will leverage the work done in the overlapping High Quality Instructional Materials initiative. The Computer Science/Discrete Math and Data Science courses will need to be piloted and possibly developed. The Quantitative Reasoning course will be a modified version of the current Mathematical Modeling and Reasoning course.

Mathematical Modeling and Reasoning Transition Course

Twenty-two schools from across the state participated in the pilot of Ohio's high school math transition course titled Mathematical Modeling and Reasoning. This course is a Quantitative Reasoning course that was developed jointly by Ohio higher education and high school math faculty. Each pilot teacher was also assigned a higher education collaborator who taught quantitative reasoning at the collegiate level. Although initial anecdotal evidence has been promising, due to COVID-19 post-student data was not able to be collected.

Twenty-seven new schools plan to join the pilot for the upcoming 2020-2021 academic year. Each pilot teacher will be expected to attend the summer professional development and ongoing virtual professional development throughout the year. Data will be collected on the original 20 pilot teachers. The Planning Committee has continued to revise and improve the scope-and-sequence and lessons based on feedback.

Looking forward, the Planning Committee will revise the Mathematical Modeling and Reasoning course to become an Algebra 2 equivalent course during the 2020-2021 academic year.

Ohio Strong Start to Finish

The [Ohio Strong Start to Finish](#) (SSTF) initiative completed the second year of the three-year project to support developmental education reform and student success at Ohio public community colleges and universities. SSTF is a collaboration between the Ohio Department of Higher Education, the Inter-University Council, the Ohio Association of Community Colleges, and the 18 community colleges and 12 universities in Ohio that have committed to implementing the following priorities: ensuring that clearly structured programs of study exist for all majors; aligning redesigned gateway mathematics and English courses to all programs of study; implementing co-requisite remediation at scale in mathematics and English; and building advising structures to ensure all students register for coursework in sequences to meet their goal.

In the fall, institutions reported on the activities funded by the first round of the Campus-Level Action and Success Support (CLASS) grants. The majority of the funds were used to support curriculum development, scale co-requisite remediation in English and mathematics, and provide professional development. Proposals were received and reviewed for the second round of CLASS grant funding with the funds distributed in December.

The Fall Learning Network Convening, held on September 27 at the [Fawcett Center](#) at Ohio State University, attracted more than 200 participants with representatives from every Ohio public institution of higher education. [Jeremy Anderson](#), president of the Education Commission of the States, gave a keynote address reviewing changes and trends in state higher education policies across the nation. The agenda included over 40 presentations by faculty and staff from Ohio institutions.

SSTF's [partnership with Sova](#) produced a series of timely webinars in the spring:

- Leading Student Success Work in a Time of Crisis
- Supporting Healthy Teams in the Time of COVID-19
- Core Principles for Transforming Remediation Within a Comprehensive Student Success Strategy
- Core Principles and Evidence Supporting Ohio Priorities 1 and 4
- Core Principles and Evidence Supporting Ohio Priorities 2 and 3
- Supporting Faculty in Implementing Co-Requisite Remediation.

Videos of these webinars are available on the SSTF website under [Learning Resources](#).

In April, SSTF received an additional grant to support faculty professional development statewide. The grant will allow 120 faculty members who teach co-requisite mathematics or English courses to participate in the Association of College and University Educators (ACUE) effective teaching programs. The ACUE programs include courses for evidence-based best teaching practices for in-person or online classes. Faculty will be nominated for participation this summer and the program will begin in the fall.

Collaboration around Essential Components

The OMI has evolved from an initiative designed to address serious transferability issues in Ohio a few years ago to a powerful tool that has created partnerships among institutions of higher education. The OMI has facilitated communication between the two-year institutions and the four-year institutions. The dynamic structure of the groups that allows participation from any interested faculty in the state is now going beyond reviewing learning outcomes for proposed general education courses, but also working collaboratively with institutions in the design of these courses and the adoption of research-based pedagogies. The OMI groups are also working collaboratively with K-12 in the design of high school mathematics pathways. This is an important project that, hopefully soon, will facilitate smooth transition of high school students to postsecondary education, eliminating the inequities introduced by high-stakes placement tests. The OMI groups are involved in many aspects of higher education. Lately there is work being done on co-requisite structures in order to decrease the need for remediation, which also has been proven to be a barrier for graduation and disproportionately segregates groups of students. The COVID-19 reality has created new challenges for higher education, and institutions recognize the need to have a consistent approach to teaching and assessing students' learning. The OMI will play an important role in guiding faculty and institutions throughout this process.

Ricardo Moena

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Subgroup 1 – New and Alternative Pathways

Subgroup 1 organized several regional workshops in order for faculty to share ideas for co-requisite remediation. On November 8, 2019, Columbus State Community College hosted the first session, which was featured in [HigherEd Highlights Episode 122](#). The Ohio State University-Lima and Rhodes State College collaborated to present on December 6, 2020 in Lima. Due to the impact of COVID-19, regional workshops initially planned for delivery at the University of Toledo and Shawnee State University were migrated to a virtual workshop on May 1, 2020. Math faculty from Columbus State Community, Marion Technical College, The Ohio State University-Lima, Rhodes State College, Shawnee State University, Sinclair Community College, and the University of Toledo were among the presenters at the various workshops. Visit the [Bridges to Success website](#) to find presentations from the virtual workshops under *Faculty Workshops on Co-requisite Math Instruction (November 2019 –May 2020)*.

Subgroup 1 also reviewed data collected in spring and summer 2019 on how institutions of higher education in Ohio are implementing or planning to implement co-requisite mathematics remediation.

In addition, members of Subgroup 1 participated in the Ohio Strong Start to Finish Co-Requisite Forum to discuss and develop recommendations for taking co-requisite mathematics and English remediation to scale across the state.

In academic year 2020-2021, Subgroup 1 plans to focus on creating and sharing information and best practices on co-requisite remediation based on the robust work and data gathered to date. There will be a special focus on exploring supports for online and hybrid delivery of co-requisite remediation as well as leveraging recommendations from the Ohio Strong Start to Finish initiative. Subgroup 1 would also like to collaborate with OMI subgroup 2 to develop the role of co-requisite remediation for new gateway mathematics courses that are being developed.

Subgroup 2 – Revision of the Ohio Transfer Module (OTM) Criteria

Subgroup 2 has been an integral part of discussions surrounding updates to the Ohio Transfer Module and the creation of the Ohio Guaranteed Transfer Pathways. The subgroup has been very active within both initiatives, and is fully supportive of proposed changes to the structure of the OTM.

The following are the current projects of Subgroup 2:

- **Technical Mathematics**—On May 6, 2020, an announcement was sent to institutions that the following TMM courses are now officially approved as OTM courses: TMM014 - Technical Mathematics I and TMM015 - Technical Mathematics II.
- **Mathematics in Elementary Education I & II**—On May 8, 2020, an announcement was sent to institutions that the following TMM courses are now officially approved as OTM courses: TMM021 - Mathematics for Elementary Education I and TMM022 - Mathematics for Elementary Education II. The group has also agreed to create illustrations (sample tasks) to accompany these learning outcomes. These are expected to be completed in fall 2020.
- **Life Sciences for Calculus**—The group is continuing to work on drafting learning outcomes. The group anticipates endorsement by fall 2020.
- **Discrete Mathematics**—The group is continuing to work on drafting learning outcomes. The group anticipates endorsement by fall 2020.
- **Data Science**—The group is continuing to work on drafting learning outcomes. The group anticipates endorsement by fall 2020.

Subgroup 2 discussed the need to provide a sound foundation on functions to improve the success rates of students enrolled in Calculus courses. Several mathematics departments have expressed concerns with the current set of learning outcomes for College Algebra + Trigonometry and Pre-calculus and the need for updates. A faculty group will write learning outcomes for a possible two-semester OTM preparation for Calculus course. A faculty sub-subgroup has been identified to begin work on this project. A member from Subgroup 1 will also participate in this project with the intention to simultaneously write learning outcomes for co-requisite courses.

Subgroup 3 – Communication, Outreach, and Engagement

Subgroup 3 has continued to share information regarding the OMI and to support the other subgroups in their work. Members of the group shared Ohio's work in a variety of forums. Presentations about the work on Ohio's co-requisite models and about connecting mathematics pathways with our K-12 partners were shared at the American Mathematical Association of Two-Year Colleges (AMATYC) conference in November 2019. Members supported a variety of co-requisite webinars/presentations throughout 2019-2020, including face-to-face meetings on various dates/locations and a webinar in May 2020. Members of the OMI participated in discussions regarding math for nurses' curriculum throughout 2019-2020. Several members continued to serve as Mathematics Advisory Group (MAG) members for TPSE Math (Transforming Post-secondary Education in Mathematics). Members shared the work on OMI on their own campuses in department meetings, professional development workshops, and planning sessions for math pathways and co-requisite supported gateway mathematics courses. Members participated in the Chairs/Leads Network meetings as well.

Following a successful webinar about Open Educational Resources (OER) in spring of 2019, Subgroup 3 is planning for additional webinars. Potential topics for future webinars include: co-requisite courses and best practices, utilizing technology to support student learning, assessment considerations in online mathematics courses, and other topics. The subgroup continues to discuss ways of sharing the work of the OMI with those outside of the mathematics community – parents, high school students and teachers, counselors – and how to best reach those groups. Subgroup 3 is currently planning to share its work in July 2020 with participants in the Ohio Articulation and Transfer Network's [Transfer Talk Tuesday](#) series.

Goals for the coming year include hosting webinars about the work of the various subgroups and in support of the goals of the OMI; preparing media to share best practices in mathematics teaching and learning; offering presentations about Ohio's mathematics pathways, co-requisite courses, and related work; and providing support for the other subgroups.

Subgroup 4 – Data Collection, Analysis, and Sharing

At the request of Subgroup 4, ODHE has created the Ohio Mathematics Initiative Knowledge Base: Data Collection, Analysis and Sharing. The purpose is to share information between departments on results of OMI-related efforts to date, especially in quantitative reasoning and co-requisite labs. The subgroup is waiting for more institutions to submit information. In addition, they are in possession of preliminary statewide data on outcomes based on conditions present prior to implementation of the Ohio Math Initiative. They are waiting for the complete data to cover up to eight-year graduation rates for the 2012 cohort. The anticipation is that this data can serve as a control group for a long-term study of the effects of the OMI.

Subgroup 5 – Alignment between Secondary and Postsecondary Content and Instruction

Inspired by ODE’s Strengthening Ohio’s High School Math Pathways Initiative, Subgroup 5 is currently reorganizing to better bridge student transition from high school to college. Subgroup 5 are purposefully forming a diverse group of high school and college educators from across the State of Ohio who are interested in actively participating with construction of the new mathematics pathways. The goal is to become collaborators on both ends of the bridge to improve student success and educator awareness of the student transition. The subgroup’s collaboration projects will center on the new high school and collegiate mathematics pathways, including piloting of courses, such as the Mathematical Modeling and Reasoning course.



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