

Ohio Mathematics Chairs/Leads Network Meeting

Ohio Mathematics Initiative

The Ohio State University
240 Cockins Hall, Building 063
1958 Neil Ave., Columbus OH 43210
Friday, November 1, 2019
10:00 a.m. – 2:00 p.m.

Present: Ivan Soprunov, Andrew Tonge, Paul Zachlin, Blerta Ereditario, Tyler Maley, Paddy Dowling, Todd Eisworth, Michelle Younker, Karl Hess, Aaron McClure, Don White, Junfeng Shang, Luis Casian, Lee Wayand, Ricardo Moena, Sandy Siegrist, Arunasalam Rahunanthan, Phil MacLean, Kelly Stady, Robert Raupach, Xiang Yan, Marianna Doolittle, Jean LaFont, Elizabeth Bonawitz, Phil Blau, Jon Davidson, David Redett, Kevin Kreider, Steve MacEachern, Rod Null

ODHE/ODE Staff: Stephanie Davidson, Paula Compton, Candice Grant, Jared Shank, Jessi Spencer, Zoe Woodbury, Ellen Peterson, Michelle Blaney, Mitch Wilson, Stephanie McCann, Krista Maxon, Brett Visger, Anna Cannelongo

I. Welcome & Introductions

Dr. Luis Casian welcomed the chairs/leads to the Ohio Mathematics Initiative meeting and provided the group with an overview for the day's agenda. Dr. Casian also presented a data science course pathway at UC Berkley which he used as an example for a potential data science pathway in consideration for Ohio.

II. OMI Faculty Group Updates

a. Co-Requisite Courses

Mr. Karl Hess, a co-chair for Subgroup 1, began his presentation by detailing the tasks that the subgroup has completed within the past year. The group intends to hold regional conferences across the state to instruct faculty on co-requisite math instruction. Four workshops will be held in Ohio from November to April, and math faculty from all institutions are asked to attend. The meetings will include speakers who will provide examples of how to facilitate co-requisite mathematics courses. The workshops are free to attend, and flyers were given to all attendees to distribute at their institution.

Mr. Hess stated that the co-requisite courses offer a more relevant mathematics education to students who do not intend to pursue a math-heavy field. The co-requisite courses have data which demonstrates that students in these courses perform better. Mr. Hess stated that he concludes this may be a result of the students seeing more relevance in the material that they're studying to their future pursuits. The group also emphasized advocating the variety of pathways to high school faculty and counselors so that students are aware of the options.

b. Redesign of the Ohio Transfer Module Criteria

As chair of Subgroup 2, Dr. Ricardo Moena presented the group's progress in the redesign of the Ohio Transfer Module (OTM). Early in the presentation, one attendee said that he has worked with some programs who want to revert to using the College Algebra requirements instead of the QR/Statistics pathways. Schools are considering reverting as students who take one of the other pathways are performing worse on professional exams. Dr. Moena returned to his presentation to discuss technical math courses, of which 25 of the 35 institutions have some version of the course. He stated that there is an urgency to develop a technical math pathway in the OTM due to the Ohio Guaranteed Transfer Pathways (OGTP) implementation of applied associate degree pathways.

Dr. Moena stated that 21 institutions have Quantitative Reasoning (QR) courses approved within the OTM, and there is a strong push to have more institutions submit the course for approval. Dr. Moena says there is an urgency to have a discrete math pathways developed, which would be aimed at degrees for computer science, information technology, and information science. Mr. Hess also spoke up to state that there is a need to develop a calculus for the life sciences. Dr. Compton asked some of the attendees to share why their institution has yet to have a QR course approved or created. Some participants suggested that faculty at the institutions are having difficulties in teaching quantitative reasoning, and complaints are being sent to administrators unfamiliar with the structure of the course.

c. Communication, Outreach, and Engagement

Ms. Younker shared the ongoing projects for Subgroup 3, including webinars to share the initiatives of the OMI. The webinar will be aimed at faculty within institutions who are unable to travel to Columbus or the regional meetings. It is designed to cover the co-requisite models of instruction and will provide examples of well-implemented programs. Ms. Younker shared that there have been some delays in finding a shared time for the webinar, but they hope to hold one in December and again in the spring. The panel is also offering to send subgroup members or ODE/ODHE staff to institutions for one-on-one direction for working with co-requisite courses.

d. Data Collection, Analysis, and Sharing

Dr. Donald White shared some of the data that been collected on OMI implementation. Dr. White stated that he is working on the premise that the OMI will want to begin sharing data from their institutions now that the changes have been implemented and developed. He provided an example from his own institution, The University of Toledo, of how he would like the attendees to present their data. He has been considering if it would be better to dictate to institutions what data to share, versus having institutions share data they feel is

important. The committee is leaning towards allowing institutions to share what is important for now, until it is determined how to fine-tune the data request.

Administrators place importance on sharing the success rates, rather than the failure rates. Therefore, Mr. White has asked that they share a detailed but concise summary on the changes made in response to OMI. Some examples of data to include are patterns of math class education, success (C+ and above) rates, and graduation rates dependent on courses taken. An email has been distributed to mathematics chairs asking for data on these changes, and OATN staff asked that the data is entered into KnowledgeBase. KnowledgeBase is a secure collection of data on the implementation of QR courses, and has been designed for this purpose.

III. Discussion of Possible Data Science Pathway

Dr. Steve MacEachern, Chair of Statistics at Ohio State University, presented on a potential Data Science pathway. He began by discussing all the changes in the world, particularly following the introduction of the internet. He noted that 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. Therefore, Dr. MacEachern suggested the creation of a new data science pathway for the OTM with a strong statistical emphasis.

A new data science pathway could instruct students on how to clean and process data. Rather than experimental data as is typically used in statistical courses, it would heavily rely upon observational data. This pathway course is not calculus based, and should be classified as a General Education (GE) core course for students in their first semesters. Dr. MacEachern proposed that this pathway could be an alternative to the QR pathway, and used for those aiming to enter the data science or programming field. There would 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 upon 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.

IV. Lunch

V. Ohio Department of Education and Ohio Department of Higher Education Mathematics Projects

a. Fourth Year Transition Pilot Status Report

Ms. Anna Cannelongo presented some of the collaborative projects between ODE and ODHE within the mathematical field. She has worked to rollout the high school transition course for mathematics, which has now been renamed to Mathematical Modeling and Reasoning (MMR). The course is a part of ODE's strategic plan to focus on the whole child, rather than just test scores and data. The tenth strategic goal focuses on giving students a variety of ways to

demonstrate knowledge, similar to the QR course and pathways being developed by the OMI.

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 a student would encounter in their lives. Ms. Cannelongo showed the group a video which included students currently in the course who have benefited from this type of structure. The current school year is a part of the pilot implementation phase, where a group of schools are trying the course on a preliminary basis. The 2020-2021 school year will be the first phase of the launch on a statewide level. An Accuplacer test is being used pre- and post- course to evaluate student success and knowledge.

A workshop was held to help assist faculty and administrators in learning how to instruct students in this type of QR course. The workshop was four days long and included higher education collaborators, administrators, ODE, ODHE, and educational advocates from the state of Oregon. Higher education collaborators who attended the conference felt that the full four days were needed for instructors to learn the basics of how to facilitate this type of course. Ms. Cannelongo requested that some of the faculty in the room consider becoming a higher education collaborator, as more will be needed in future phases of implementation. 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 post-secondary mathematics education and to occasionally co-teach a class. Applications for collaborators are due in December.

b. Strengthening Ohio’s Math Pathways Initiative

Dr. Krista Maxon, Associate Vice Chancellor of P-16 Initiatives, stood to speak about the mathematics pathways initiative. She stated that it is imperative to re-visit post-secondary mathematics as of students who take college algebra only 10% go on to take Calculus I. As more gateway courses are being developed and implemented in high schools, there has been a growth in attainment. However, despite an educational attainment growth from 34.9% in 2008 to 44.6% in 2019 there are still widespread geographical and racial disparities between counties in Ohio.

Both ODE and ODHE have implemented a variety of initiatives to accelerate progress of attainment, such as College Credit Plus and Choose Ohio First. She reviewed that the one math pathway approach is a problem for the diversity of postsecondary aspirations among students. However, the Algebra II law requiring students to take the course or an equivalent has created a roadblock for many 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 which emphasize equivalent thinking but not equivalent content. The 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.

VI. Discussion on Calculus Sequence and Technical Mathematics Course

Mr. Moena and Mr. Wayand spoke about including new pathways for math for educators and technical math. Technical math pathways will be focused on providing a contextualized, applied experience presented in a QR format. A review of technical math courses at institutions across the state was conducted, and it was determined that these courses were approximately similar and often included 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, of which the 4-year Engineering Technology degree students would take the second course as a pre-tech-calculus.

They also made it a point to emphasize that Subgroup II issues including discrete mathematics, business and/or life science calculus, and resequencing calculus are also a focus.

VII. Discussion on Mathematics for Nurses Course

Ms. Younker stood to briefly give an overview of the current consideration for a nursing mathematics course. This conversation is being held on a national level, as nurses frequently transfer between states and are inconsistent in for the mathematics required in their degree. Ms. Younker gave an example that the Cleveland Clinic has actually developed a crash course in mathematics that nurses are required to complete upon hiring as they are often unprepared.

Ms. Younker stated that there was a meeting held in Miami, Florida on Emerging Solutions for Nursing Mathematics. As it stands, the health institutions feel that the nursing accreditation boards are unclear on the specific math content required. There has yet to be a consensus on what type of math content should be included: QR, Statistics, or Calculus. In addition, as nursing is a fairly rigid program, there is confusion over how the course will fit with program hour restrictions. The final nursing course will need to provide practical context to health settings.

VIII. For the Good of the Order

Dr. Paula Compton concluded the meeting by thanking the attendees for their attendance and hard work. In addition, she stated that she will arrange a webinar for the attendees to discuss what was not covered in the meeting due to time restraints.