

Ohio Public Colleges and Universities Mathematics Chairs/Leads Network Meeting January 20, 2017

The meeting was convened by Tim Carlson, vice chair of the OSU mathematics department, standing in for Luis Casian who is recovering from recent surgery. Professor Carlson summarized the meeting's key objectives:

1. Update the progress of the OMI Chairs/Leads Network faculty subgroups
2. Review the OMI's activities and events scheduled for early 2017
3. Review the Race to the Top mathematics regional meetings
4. Update on the Quantitative Reasoning workshop scheduled for March 2-3, 2017
5. Assess the organizational structure and membership of the OMI Chairs/Leads Network's faculty subgroups
6. Discuss OMI's campus-level progress
7. Review information about the Ohio Guaranteed Transfer Pathways
8. Discuss next steps for OMI

Update: Subgroup #2 (Redesign of the Ohio Transfer Module Criteria)

- Reporting for Subgroup #2, Ricardo Moena sought endorsement for two revised OTM

courses (TMM002 Precalculus and TMM003 Trigonometry), emphasizing their student learning outcomes and how they are assessed. Neither of these revised courses substantively changes the course in question, although each clarifies the areas in which successful students must be proficient.

- Subgroup #2 also reported on its efforts to ensure that the new Quantitative Reasoning courses (TMM011) being created at various institutions are truly college-level courses. OMI's March 2017 QR workshop will be designed to assist faculty in this area.
- Andrew Tonge talked about the need for a statewide discussion around reorganizing the sequence of Calculus courses. Suggesting that there is a need to adjust the order of topics and student learning outcomes, he stressed the importance of achieving consensus across campuses to ensure the transferability of students' credits. Again, Professor Tonge emphasized that he was only raising the possibility that a cross-campus conversation be launched.

Update: Subgroup #3 (Communication, Outreach, and Engagement)

- Michelle Younker highlighted the subgroup's efforts in recent months, including the following:

- ▶ Presentations to faculty meetings – mathematics and other disciplines
 - ▶ Participation in conferences and professional meetings, including national meetings
 - ▶ Distribution of printed materials, including FAST FACTS and the OMI newsletter
 - ▶ Preparation and distribution of OMI's 2015-2016 progress report
 - ▶ Participation in faculty/administrator workshops
 - ▶ Creation of video presentations
- Professor Younker asked attendees for new topics that can be addressed in printed materials and face-to-face presentations.

Update: Subgroup #4 (Data Collection, Analysis and Sharing)

- John Holcomb and Don White reported on efforts at Cleveland State University and The University of Toledo to analyze student performance and other data.
- Both faculty members acknowledged that five-year data will be needed to adequately assess the impact of programmatic changes on student enrollment patterns and success.
- Professors Holcomb and White reported that their group has developed a questionnaire for distribution to each subgroup asking about the research and data needs of their respective groups. All attendees were also asked to complete the questionnaire before leaving.

Update: Subgroup #5 (Alignment between Secondary and Postsecondary Content and Instruction)

- Andrew Tonge talked about planned efforts by ODE and ODHE to create high school transition courses to ensure that high school graduates are ready for postsecondary

success in mathematics. He and Stephanie Davidson, Vice Chancellor of Academic Affairs at ODHE have been discussing how Subgroup #5 will be a part of this work. He emphasized that the OMI wants to be part of this initiative, because far too many high school graduates begin college without being college-ready in mathematics. This delays their academic progress and ultimately reduces their odds of completing their postsecondary programs.

- Acknowledging the explosion of enrollment in College Credit Plus courses, Professor Tonge said this faculty group is beginning to analyze the data from the program, asking: Is College Credit Plus working? What does success look like? Are there differences between courses offered on campus and those offered at high schools?
- Attendees were quick to voice concerns about the comparability of College Credit Plus and other college courses in the same subjects.
- Stressing that “we are 100 percent behind you,” Vice Chancellor Stephanie Davidson reminded faculty that “these are your courses” and colleges have a responsibility to ensure the College Credit Plus courses offered on the high school campus are of the same rigor and quality as the courses on your campus. She indicated that ODHE’s new College Credit Plus Director, Larisa Harper, can be contacted if there are concerns about the quality or rigor of classes offered in high schools.
- Ohio Department of Higher Education consultants Jon Tafel and Peggy Kass talked about several efforts since 1980 to align secondary and postsecondary mathematics curricula (e.g., College Prep competencies, Early Math Placement Test, Ohio’s academic content standards, Common Core standards and the 2011 High School and Higher Education Alignment initiative).

Update on the New Direction for Subgroup #1 Regarding Co-requisite Mathematics Course Development

- With the three new mathematics pathways in place, Brett Visger reported on the ongoing efforts of Subgroup #1 to develop a robust co-requisite strategy.
- Associate Vice Chancellor Visger updated attendees on the progress being made by institutions in co-requisites in two initiatives. Nine institutions are working with the Bridges to Success initiative funded by the Helmsley Foundation. In this initiative, these nine are creating co-requisite pilots within redesigned mathematics and guided pathways. Thirteen institutions worked with a Complete College America institute to develop plans to scale co-requisite remediation. He reminded attendees that OMI is a key component and providing technical support to these pilots. There are purposeful knowledge management efforts to capture best practices and artifacts from these institutions.
- Associate Vice Chancellor Visger reported ODHE just received a new Helmsley grant, which will be used to support three institutions' efforts to scale up co-requisite opportunities institution wide. Again, ODHE will collaborate with OMI to back these institutions' efforts to develop co-requisite proofs points with funding and technical assistance.
- Finally, Associate Vice Chancellor Visger told attendees that while a co-requisite strategy offers many benefits, a robust advising and placement program that gives students much needed information and guidance also is needed.

Quantitative Reasoning Workshop (March 2-3, 2017)

- Presented with implementation as its focus, the workshop will feature Kenyon College professor Carol Schumacher, an expert in active learning.

- Through a series of mock classroom lessons, workshop participants will be introduced to new instructional pedagogies, based on research about how students learn from engaged active learning.

Structure and Membership of OMI Subgroups

- Prior to the working lunch, attendees talked about how the faculty committees were functioning and the need to revisit the membership of the five subgroups. Acknowledging that several faculty members have “moved on” since the subgroups were constituted, the OMI Chairs/Leads Network explored two alternative strategies – seeking nominations and active recruitment.
- Ultimately, attendees decided that the best way to proceed is to ask the five subgroup chairs to work collaboratively in selecting new members from the OMI Chairs/Leads Network nominations. This approach will assure the OMI is faculty-driven.

Feedback from Lunch Conversations

- In a brief “report-out” session, attendees agreed that the new mathematics pathways are working – that students and faculty are generally responding positively to the new structure of gateway courses.
- In addition, strong interest and support were voiced for the co-requisite pilots, which holds substantial promise for Ohio's efforts to bridge the gaps between secondary preparation and postsecondary success.

Update: The Ohio State University Calculus Redesign Project

- In January 2016, Jim Fowler provided the OMI Chairs/Leads Network with an overview of this project involving innovative formats for the teaching of calculus. At this meeting, he provided more details and updated information on this research, which is being

funded by Ohio State's Office of Academic Affairs, the Shuttleworth Foundation, Ximera (NSF DUE-1245433) and an ALX grant from OSU's Office of Distance Education and eLearning.

- Professor Fowler reported that the project has 2,257 students who consented to participate in the research during the 2015–2016 academic year. By Spring 2016, there were 416,346 responses to the project's multiple choice bank.
- The project's core metrics include:
 - ▶ Pre/Post-tests including the Calculus Knowledge Assessment and the Calculus Concepts Readiness test
 - ▶ Student surveys
 - ▶ Exams in common across all sections
- Professor Fowler said the project incorporates five interventions and controls, designed to improve Calculus 1 outcomes:
 - ▶ Traditional ... large lecture and small recitations
 - ▶ XIMERA ... an open-source text and homework system
 - ▶ Active learning ... with peer instruction and clickers
 - ▶ Flipped ... meeting twice per week and online
 - ▶ Class size ... both large (HUGE) and small (EPSILON)
- Finally, Professor Fowler highlighted some of the project's early results, including the following:
 - ▶ Students in open-source sections are more likely to see improvement in **post-course enjoyment** and **post-course confidence**.
 - ▶ Active learning strategies, which involve short lectures followed by peer instruction, whole class discussion and recitation sections where students work on worksheets in small groups, **improve learning outcomes** for some subpopulations.
 - ▶ "Good teaching" is measurable and **impacts both student attitudes and learning outcomes**. Students benefit when they perceive that their instructor provided explanations that were understandable, when instructors listened carefully to students' questions and comments, when they helped students become better problem solvers, when they gave students enough time to understand difficult ideas, and when they made students feel comfortable in asking questions during class.
- According to Professor Fowler, plans for the project's future include the following:
 - ▶ Introduction of a year-long "stretch calculus" course for students who may not flourish in the semester-long course
 - ▶ Continued use of advisors and math/stat learning center to work with students, which (along with the stretched course) provides opportunities for just-in-time remediation
 - ▶ Improved alignment between course content and pedagogical goals. For example, can the engineering-focused Calculus 2 course be better aligned with other engineering courses?