



Ohio Mathematics Initiative

Friday, April 26, 2019

10:00 am to 2:00 p.m.

The Ohio State University (240 Cockins Hall)

1958 Neil Ave

Columbus, OH 43210

Present: Mike Snider, Mysti Hobson, Jean LaFont, Lee Wayand, Serita McGunia, Cosmin Roman, Jim Fowler, Brad Findell, Luis Casian, Anna Jedick Cannelongo, Stephanie McCann, Ricardo Moena, Jon Davidson, Don White, Greg Goodhart, Patrick N. Dowling, Phil Blau, Steven Gubkin, Michael House, David Hare, David Redett, Marianna Doolittle, Paul Zachlin, Kevin Kreider, Chelle Younker, Elizabeth Bonawitz, Blerta Ereditario, Tyler Maley, Ayse Sahin, Michelle White, Sara Rollo, Arunasalam Rahunanthan, Todd Esworth, Thomas Wakefield, Ivan Soprunov, Robert Raupach, Nick Shay, Aaron McClure

ODHE/OATN Staff: Jill Dannemiller, Stephanie Davidson, Paula Compton, Brett Visger, Brenda Haas, Jessi Spencer, Jared Shank, Michelle Blaney, Nicole Chain

I. Welcome and Introductions

Dr. Luis Casian, Dean of Natural and Mathematical Sciences at The Ohio State University (OSU), welcomed the group. Dr. Casian provided an update of work that OSU Natural and Mathematical Sciences is conducting. He pointed out the Integrated Math and English major and the Girls Exploring Mathematics (GEM) program, which OSU Visiting Mathematics Professor Dr. Erika Roldan Roa further described. The outreach programs are designed to show the community that everyone can enjoy a love for mathematics, just as everyone enjoys music.

II. Summary of Chairs/Leads Survey and Summary of Faculty Survey

Dr. Paula Compton of the Ohio Articulation and Transfer Network (OATN) thanked OSU for hosting the group and commended the OMI chairs/leads for their progress over the past five years, which was represented by the Quantitative Reasoning (QR) workshop that was held the prior day. Dr. Compton also acknowledged Dr. Jim Fowler of The Ohio State University for being featured in the OSU Alumni Magazine. Additionally, Dr. Compton commended Dr. Chelle Younker of Owens University for receiving an award from the American Mathematical Association of Two-Year Colleges.

Ms. Jessi Spencer of the OATN welcomed the group and explained the work that was conducted in surveying the mathematics chairs/leads and faculty across Ohio. She started the presentation by reviewing the chairs/leads survey, which was distributed between December 2018 and February 2019. 33 institutions responded, (21 two-year and 12 four-year). The survey focused on three main areas: mathematics courses at institutions, professional development interests, and ranking of future projects and

priorities. Regarding mathematics courses at institutions: 13 of 33 institutions offer a technical mathematics course; 12 of 33 offer a math career technical pathway, with 1 respondent unsure; 10 of 33 offer an online QR course; and 17 of 33 have open source textbooks available. Regarding professional development interests: 18 were interested in forming a calculus faculty network; 18 were interested in forming a math military faculty network; 12 of 33 were interested in leadership positions in the OMI; and 15 of 33 were interested in forming QR faculty network groups. Future projects and priorities were then ranked in the following order (from highest to lowest priority): a QR workshop, math for nursing, a tie for pre-calculus and STEM pathways and calculus, and a tie for applied math and math for military faculty. One respondent expressed that co-requisites should be a #1 priority in the upcoming year.

Ms. Spencer then reviewed the summary of the faculty survey, which was also distributed between December 2018 and February 2019. 122 faculty across the state responded to the survey (42 from two-year institutions and 80 from four-year institutions). Regarding professional development interests: 56 of 122 were interested in forming a calculus faculty network, with 2 unsure; 22 of 122 were interested in forming a math for military group, with 1 unsure; 24 of 122 were interested in leadership positions in the OMI; 57 of 121 were interested in a QR faculty network; and 71 of 122 were interested in a QR workshop. For many of the respondents who were not interested in these categories, many indicated that a colleague at their institution would be interested. Future projects and priorities were ranked in the following order (from highest to lowest priority): QR workshop, calculus, pre-calculus and STEM pathways, math for nursing, applied calculus, and math for military faculty. Other suggestions included focusing on statistics, math for early childhood education, open source textbooks, and math for career/tech pathways. Ms. Spencer noted that the analysis from these two surveys will be distributed following the meeting. One representative wondered whether the technical math courses were mostly offered at community colleges, and this was confirmed. Dr. Younker, Dr. Ricardo Moena of the University of Cincinnati, and Dr. Lee Wayand of Columbus State Community College are working on developing a technical math course, though.

III. Further QR Learning Opportunities

Dr. Compton then discussed several QR learning opportunities. In the fall, the Dana Center will be hosting an online program called the FOCI series. Six 2-hour sessions will be conducted through a webinar for a cohort of 30 faculty members. Topics of discussion will surround establishing a culture of student-centered learning. This series would be very beneficial for adjunct faculty. If 60 people express interest in the series, there could be funding for two cohorts. Additionally, Dr. Compton advertised Ohio Project Kaleidoscope, which will be held at the University of Dayton on May 18th. This conference is a professional development opportunity focused on increasing STEM student success in higher education.

IV. Update from Faculty Groups

Dr. Karl Hess, Chair of Mathematics at Sinclair Community College, provided updates on co-requisite courses. A survey was sent to institutions, and there are three main models in discussion. Dr. Hess also described a meeting they recently held with panelists, faculty, and administrators to exchange ideas and discuss implementation at various institutions. The results of the survey were positive. Another meeting is being planned, and there is interest in having meetings on a more regular basis. Dr. Stephanie Davidson of the Ohio Department of Higher Education also explained that Strong Start to Finish funding could be available for co-requisites if needed.

Dr. Ricardo Moena provided an update on the re-design on the OTM mathematics criteria. Thus far, sixteen QR courses have been OTM approved, three are pending approval, and several other institutions are working on the submission of QR courses. The greatest challenge is that faculty tend to treat QR as a course where students develop many skills, whereas the course is truly about reasoning. Dr. Moena also explained that many faculty at the QR Workshop were interested in the Knowledge Base platform, a statewide repository of projects.

The OTM math panel is also working on developing technical math courses for various programs. Dr. Lee Wayand explained that they have gathered 26 syllabi from various campuses with descriptions of technical math courses. The panel will review the syllabi, search for common patterns, and construct college-level technical math learning outcomes. Eventually, the group would like to have a TMM number for a technical math course. This work has important implications for the OGTP. In the fall, the group will look more at applied associate's degrees and technical bachelor's degrees and see if technical math courses could be used in these pathways.

Additionally, the math panel is working on developing mathematics courses for nursing programs. Dr. Chelle Younker has been working at the national level with Quality Safety Education for Nurses (QSEN), partnered with the Cleveland Clinic, to study preparation of entry-level nurses. Recently, nurses have been entering the workforce unprepared to conduct their work safely and effectively and have been retrained. It is thought that a lack of partnerships between math and nursing departments has been contributing to this issue. Dr. Younker has been speaking with QSEN and the Cleveland Clinic to determine the common content that nursing programs throughout the U.S. should value in a preparation program.

Dr. Brad Findell of The Ohio State University discussed the math education pathway. There are two subcommittees who are writing learning outcomes for math courses for elementary and middle school teachers, respectively. For elementary school grade levels, the biggest challenge is identifying overlap between elementary and middle

school math. A second challenge is putting learning outcomes into courses. At least 8-10 hours is needed for elementary school grade levels and more are needed for middle school grade levels. The main source material used as a starting point is The Mathematical Education of Teachers II from the Conference Board of the Mathematical Sciences.

Finally, Dr. Moena explained that the OTM math panel would like to replace College Algebra in the OTM with QR, per OTM and Gen Ed work. QR is a rich, diverse gen ed math course for non-STEM majors. College Algebra, on the other hand, is a specific skills-based course. In terms of pathways, QR can mold to what students need in their respective programs, whereas College Algebra is a remedial course disguised as a college-level course. The group may also deconstruct and reconstruct College Algebra. Currently, Columbus State and Ohio State are designing a pre-calculus course and it bears no resemblance to College Algebra. The two institutions have decided on a two-semester pre-calculus sequence for those entering STEM pathways. This will be an ongoing project. Ultimately, it is up to programs to decide what their math requirements should be.

Dr. Jim Fowler of The Ohio State University and Dr. Chelle Younker then provided an update on the Communication, Outreach, and Engagement subgroup. The subgroup has been having a vision discussion about what direction they would like to go in the next approximately 3-5 years. Dr. Fowler discussed how the OMI has the potential to connect grassroots groups of faculty working on various projects. Such collaboration could especially benefit smaller institutions with limited resources. The subgroup could match people's interests and encourage faculty to talk with each other about their shared interests. Having big dreams and a big vision centrally could encourage people to collaborate. The subgroup invites the OMI chairs/leads group to think about the OMI vision so that time can be allotted on the fall meeting agenda to discuss the future direction and priorities of the OMI.

The subgroup has also been working on communication pieces with the OMI chairs/leads group, other faculty, and sometimes other disciplines. A new Fast Facts publication will highlight the three co-requisite models identified by the Co-Requisite Courses subgroup. Finally, the subgroup hosted a webinar on Open Educational Resources. Dr. Fowler, Garratt Webber from the Ohio Association of Community Colleges, and Anna Davis from Ohio Dominican University discussed components in the Ohio Open Ed Collaborative. The group is considering future webinar topics and would appreciate input from the OMI chairs/leads group on issues relevant to the campuses. Mr. Jared Shank suggested that perhaps math departments could utilize social media more frequently. Perhaps ODHE could craft a centralized message and ask institutional math departments to share the message through social media.

Dr. Donald White of the University of Toledo then provided an update from the Data Collection, Analysis, and Sharing subgroup. The subgroup would like to propose creating a table with data on courses offered in the past and present, students enrolled in these courses, and DFW rates to examine the impact that the OMI has had. Additionally, a Knowledge Base for this group is needed for the sharing of ideas. Dr. White also suggested discussing what the group would like to accomplish with intermediate data (we already have data pre-OMI and will collect data post-OMI). A report could be written on the 2012-13 data and such reports could be written on an intermediate basis. Dr. Luis Casian suggested that perhaps a PhD student in education or educational statistics could work on one of these items for a thesis project. Dr. White suggested developing a form and partnering with ODHE and the HEI system.

Dr. Jill Dannemiller of the Ohio Department of Higher Education shared data on completion rates of gateway mathematics courses taken at Ohio's public institutions. The data was gathered from academic year 2017-18 as part of the Strong Start to Finish grant, which focuses on increasing the successful completion of math and English courses in the first year of college. 15 of 23 two-year institutions were represented in the data, as were 8 four-year institutions and 9 regional campuses of four-year institutions. Analysis revealed that the average course completion rate for gateway math courses is 75%. Four-year institutions' completion rates were highest, followed by those of regional campuses. Completion rates for two-year institutions were much lower at 68%. Types of gateway courses included QR (which comprised just a small portion of gateway courses), college algebra, calculus, and statistics. For two-year institutions, QR completion rates were higher than completion rates for other courses, demonstrating the success of QR courses. The completion rates of math gateway courses are lower than overall completion rates for all courses. However, this compares students in gateway courses to students in all courses, including students who are further along in their degree. Dr. Compton suggested that as time progresses, the change in completion rates can be examined and perhaps an explicit goal of increasing completion rates by approximately 5% could be created. Additional future projects might include examining completion rates of co-requisites, completion rates of sequenced courses, and demographics of students in these courses.

V. Lunch

The group disbanded for a short lunch break.

VI. Update from Faculty Groups (cont.)

Dr. Brad Findell, Dr. Serita McGunia of Cuyahoga Community College, and Ms. Anna Cannelongo of the Ohio Department of Education (ODE) provided updates on the Alignment Between Secondary and Postsecondary Content and Instruction subgroup. Ms. Cannelongo presented an update on the state's development of a fourth year transition course, which is now titled Mathematical Modeling and Reasoning (MMR).

The pre-pilot is occurring this academic year and students and teachers have expressed positive opinions and support towards the course. One goal of ODE is to increase the annual percentage of high school graduates who one year after graduation are enrolled in and succeeding in a postsecondary learning experience. ODE also aims to identify pathways to future success and give students multiple ways to demonstrate skills needed to succeed beyond graduation. While the transition course leads directly to a college-level QR course, the advisory committee feels that if a student improves in the MMR or QR course, they could also be successful in college algebra or statistics. Teaching the MMR course has been a significant change for teachers' style of instruction, causing them to shift to more of a supporting role. However, by forcing students to rely on themselves and use their own resources to tackle problems, teachers are able to see significant improvements in their students. There is high interest in this type of course. The pre-pilot involves schools in each region in Ohio, spread throughout urban, suburban, rural, and non-traditional areas. As the MMR course expands, professional development will be needed to maintain quality of courses. Each teacher will be paired with a higher ed collaborator for support, establishing professional development communities throughout the state. It was suggested that perhaps QR professors could be collaborators. One representative wondered whether the MMR course is actually a college-level course and should give CCP credit. However, it is up to colleges to decide whether a course is college-level, and there are no current plans to make this course CCP. Perhaps in the future there would be definitions of what makes a QR course high school or college level.

VII. Open Discussion of Common Areas of Concern

The question arose of whether statistics should be included in the OTM since three universities have separate statistics and mathematics departments. This will be something for future consideration. At the fall meeting, the OMI group will work on collaboration, next projects, and envisioning. There is interest in starting a calculus network, which might discuss the re-sequencing of calculus and open-source textbooks. Ms. Cannelongo will also provide an update on the pilot of the fourth year transition course. With no other points of discussion, the meeting was adjourned.