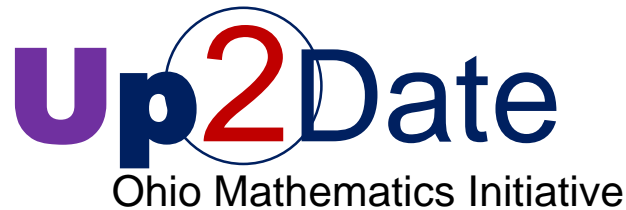


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## Ohio Public University and College Mathematics Chairs/Leads Network Meeting

**January 22, 2016**

The meeting was convened by Luis Casian, professor and chair of the Department of Mathematics at The Ohio State University. Professor Casian highlighted the meeting's primary objectives:

1. Update participants on recent revisions to the Ohio Transfer Module (OTM)
2. Discuss proposed Ohio Mathematics Pathways
3. Brief attendees on the progress made by other Ohio Mathematics Initiative (OMI) subgroups
4. Review OMI activities and events planned for early 2016
5. Discuss active learning in Calculus courses
6. Talk about next steps

### **Recent OTM Revisions**

Members of the OTM subgroup described recent efforts to give institutions greater flexibility in designing gateway mathematics courses and in identifying course learning outcomes for the Transfer Module. Much of their presentation focused on the new Quantitative Reasoning course, which along with the existing College Algebra and Statistics courses gives institutions and their students three fully developed mathematics pathways.

### **Ohio Mathematics Pathways**

Patrick Dowling led a discussion about efforts to develop expectations and processes that result in each campus offering pathways in mathematics that yield increased success for students in the study of mathematics, a higher percentage of students completing degree programs and effective transferability of credits for students moving from one institution to another.

Citing the final report of the Ohio Mathematics Steering Committee, Dowling talked about the need for high-quality entry-level courses and pathways connected to coherent programs of study for students majoring in mathematics, other mathematics-intensive majors and majors that are not mathematics intensive. The three pathways that have been developed by mathematics faculty are designed to begin discussions within and across institutions on the mathematical concepts that students need to be successful in their chosen career paths. The three pathways are:

- *Statistics Pathway*

College-level introductory statistics courses designed for students without a calculus background and who do not require College Algebra or Calculus

- *Quantitative Reasoning Pathway*

College-level courses designed to emphasize quantitative thinking and problem solving using quantitative methods



- *STEMM Preparation Pathway*

College-level courses (i.e., College Algebra, Pre-Calculus, Trigonometry, Business Calculus, and/or Calculus) designed for students in mathematics-intensive majors

According to Dowling and subgroup members, all students must take a minimum of one college-level mathematics course to earn a degree, regardless of major. It is recognized that for some majors the pathways may overlap.

An additional pathway based on a new Ohio Transfer Module course may be developed for Early and Middle Childhood Education majors. Such a course may be known as Mathematics for Early Childhood Education Majors, Mathematics for Middle Childhood Education Majors, Mathematics for Education Majors or Mathematical Foundations for Early/Middle Childhood Education Majors.

### **Other OMI subgroup updates**

- *Communication, Outreach & Engagement*

Formed to improve communication among mathematics faculty and stakeholders across Ohio's public postsecondary campuses – and to engage the larger mathematics community in the OMI – this subgroup has been exceptionally active in recent months. According to Michelle Younker, presentations have been made to the Inter-University Council of Ohio, AMATYC National Conference, Ohio Section MAA Fall Meeting 2015, OhioMATYC Spring Meeting 2015, Ohio Math and Science Coalition, TLHE Conference, Pearson Redesign Workshop, Accuplacer/CLEP National Conference, the New Mexico Mathematics Summit and other organizations.

In addition, numerous talking points, briefing papers, OMI newsletters and FAST FACTS have been produced and distributed in recent months.

- *Data Collection, Analysis & Sharing*

With a charge to develop quality measures for improving student success in mathematics – and then collecting, analyzing and sharing relevant

data – the data subgroup adopted a two-pronged strategy: (1) search for data collected at **the state level** that might be used to inform OMI initiatives and (2) see what research and reports generated by **mathematics departments and/or institutions** could be used to improve student success in mathematics.

These “searches” are underway, and a timeline has been established for the development of data templates and the identification of ongoing research needs – by the end of 2016.

- *Alignment Between Secondary & Postsecondary Content & Instruction*

Andrew Tonge told attendees that much of this subgroup's work has been dependent on the efforts of the other subgroups – that is, changes in OTM course requirements, clarification of gateway course learning outcomes, well-defined mathematics pathways, co-requisite remediation strategies and the like.

Yet, subgroup members have not been waiting idly for these “products.” Tonge reported that following up on the spring 2015 Student Success Summit, the subgroup has reached out to include K-12 mathematics faculty and administrators and is now ready to launch new alignment initiatives.

### **Active learning in Calculus courses**

Jim Fowler, assistant professor of mathematics at The Ohio State University, briefed attendees on a department-wide project involving innovative formats for the teaching of calculus. With a focus on “active learning” strategies, the project reinforces important material, concepts, and skills; provides more frequent and immediate feedback to students; addresses different student learning styles; and gives students an opportunity to think about, talk about, and process course material. At the bottom line, **active learning refocuses the responsibility for learning on learners.**

Fowler described the project's multiple interventions (e.g., traditional 180-student lectures with 32-student recitations, use of an open-source text (XIMERA) with homework,

brief presentations with peer instruction and clickers, multiple lectures per week and online instruction).

While acknowledging that the analysis of data is still in the early stages, Fowler reported that certain formats may produce better results for certain students, open-source textbooks can be just as effective as other formats and that building of “community” matters.

More results will be forthcoming from the OSU project in the months ahead, and efforts will be made to identify and report on similar research initiatives at other public campuses in Ohio.

### **Early 2016 initiatives: Getting the word out**

Stephanie Davidson announced that the Ohio Department of Higher Education has scheduled three workshops or training sessions to support some of these initiatives:

- *FACULTY TRAINING ON QUANTITATIVE REASONING WORKSHOP*  
March 14, 2016  
Columbus State Community College

Eric Gaze, director of the Quantitative Reasoning Program at Bowdoin College, will provide training on effective QR pedagogy. Three faculty members from each of Ohio’s public institutions of higher education, including the chair/lead of the mathematics department, will be invited to attend.

- *DESIGNING MATH PATHWAYS*  
April 6 and 7, 2016  
Columbus State Community College

Faculty from the Charles A. Dana Center at the University of Texas at Austin will provide a two-

day workshop to help Ohio faculty and administrators plan for all aspects of designing and implementing mathematics pathways. Ohio public colleges and universities will be encouraged to send at least two mathematics faculty members, representing both developmental and gateway math programs, and an administrator such as a dean who oversees math programs and has the authority to support cross-institutional work. Mathematics faculty should attend both days. Administrators will be invited to attend both days or may select to attend only on day two.

- *BRIDGES TO SUCCESS: LINKING CO-REQUISITE COURSES, GATEWAY COURSES AND DEGREE PATHWAYS*  
April 20 and April 21, 2016 (Two workshops)  
Location to be determined, but planned for northern and southern Ohio

The Ohio Mathematics *Bridges to Success* initiative is intended to link redesigned gateway mathematics courses with co-requisite developmental education strategies and degree pathways. These workshops will require campuses to send teams of 10-12 faculty and administrators from a variety of disciplines. The workshops are supported by the Helmsley Charitable Trust and will lead to a grant opportunity for Ohio’s public institutions of higher education. Because there is a connection to earlier workshops, it is hoped that some of the faculty who attend the Faculty Training on Quantitative Reasoning and Designing Math Pathways workshops will also participate in the Bridges to Success Workshop.