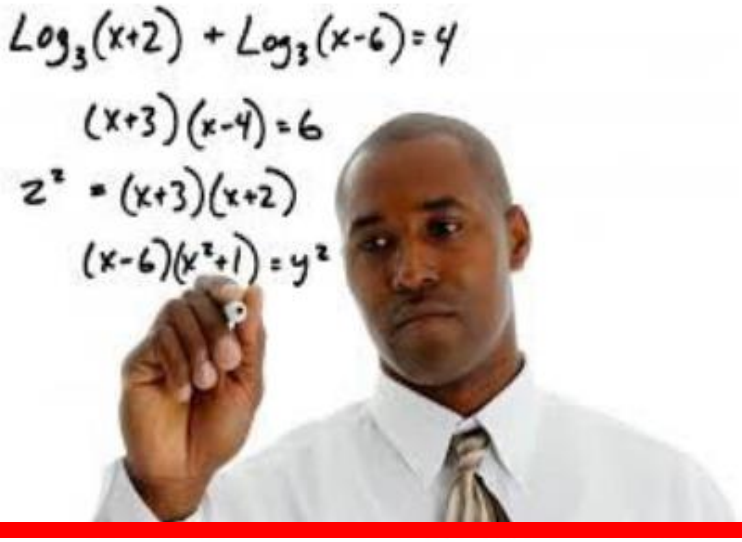


# Creating the Future

## OF POSTSECONDARY MATHEMATICS

**Ohio Mathematics Initiative**

2016-2017 Fiscal Year Progress Report

## A Message from the Chancellor:

Twenty years ago, the National Academy of Sciences joined with three other prestigious national academic "councils" in declaring that many students were not adequately prepared for a world that is being transformed by scientific and technological advances. These distinguished groups reported that the education that many children and young people received in science, mathematics, engineering, and technology did not give them the knowledge and skills required for success in the 21st century workplace. Furthermore, these students were not sufficiently familiar with the basic concepts of these disciplines to think critically about the world and to make informed decisions about personal and societal issues.

The Ohio Mathematics Initiative, in part, is a response to the challenge set forth by these groups. To ensure that Ohio remains competitive in the 21st century's global economy, mathematics faculty and other stakeholders at all our public campuses are working to increase success for students in the study of mathematics, ensure that a higher percentage of students complete their degree programs, and facilitate the effective transfer of credits for students moving from one institution to another.

Together, we are working to give students the quantitative tools, logical reasoning, and analytic and problem-solving skills that define a highly qualified and competitive workforce.

Chancellor
Ohio Department of Higher Education

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## Reshaping mathematics education: A race without a finish line

Mathematics is a dynamic field that continues to evolve, which means that any effort to design and implement quality postsecondary programs is never done. It is a race without a finish line.

Why is this "race" being run? Very simply, Ohio's economic vitality – its growth and the well-being of its citizens – demands it. To compete in the 21st century's global markets, Ohio must grow an economy that supports high-tech companies powered by workers with applied knowledge and skills grounded in mathematics and science. These workers must be conversant with technology and its applications in multiple forms. And, that means they must acquire the high-level knowledge and skills in mathematics and science that will be springboards for their careers.

The 21st century's knowledge economy poses a distinct change of mission for mathematics education at the P-12 and postsecondary levels. It necessitates an understanding that mathematics plays a foundational and crosscutting role in preparing students for challenging and successful careers – and in enabling significant advances across a broad array of occupational fields.

> ***Much of 21st century science and engineering is going to be built on a mathematical foundation. Yet, the reach of the quantitative sciences doesn't stop there. They are fueling innovation and discovery in many areas. Medicine, business and finance, transportation, manufacturing, communication, and other economic enterprises depend on the mathematical sciences, which consist of mathematics, statistics, operations research, and theoretical computer science.***

Ultimately, this is the basis for the Ohio Mathematics Initiative (OMI). Reflecting the state's commitment to delivering excellent postsecondary mathematics education to a growing number of students, the OMI has addressed – and is providing answers – to questions essential to the present and future well-being of Ohio and its citizens. What kinds of entry-level courses and learning pathways connected to coherent programs of study should institutions of higher education offer to their students? How can mathematics departments use co-requisite learning models to support underprepared students?

Additional questions include, how should mathematics departments augment their cooperative efforts with "partner disciplines" to serve students needing to meet basic mathematics requirements? How can postsecondary institutions better align their mathematics content and instruction with that of secondary schools? How can postsecondary institutions enhance student mobility by promoting the effective transfer of course credits? And, how should mathematics departments reshape their curricula to meet the needs of a well-educated workforce in the 21st century?

These questions must be answered in the context of a changing learning landscape. And, in this way, Ohio can make significant changes – we can lead the way – in promoting mathematics education practices that encourage young people and adults to learn and to experience what learning entails.

In addressing these and other questions, the OMI has proceeded with an understanding that it is one thing to analyze and identify recommended change strategies for moving ahead; it is quite another to implement those recommendations. Therefore, from the outset, the individuals and institutions involved in this initiative have agreed that the real work of change must be done on the campuses of Ohio's 36 public colleges and universities.

It is appropriate, then, that the primary focus of this progress report is on public colleges' and universities' efforts to implement critical elements of the OMI's change agenda.

# Ohio Mathematics Initiative: A brief overview

The Ohio Mathematics Initiative (OMI) is a collaborative effort of mathematics faculty members from the state's public colleges, universities, and high schools. The initiative is revisiting and rethinking mathematics courses and curricula and the relationship of mathematics to other disciplines.

One catalyst for the initiative is the need to better align course options to students' academic and career goals – in part to promote student success and higher levels of degree completions. In addition, OMI is a response to the establishment of Ohio's Uniform Statewide Standards for Remediation-Free Status, which guarantee placement into college credit-bearing courses for all students achieving at or above a benchmark assessment score and matriculating to an Ohio public college or university.

Other drivers of this work are increasing difficulties with course and credit applicability within the Ohio Transfer Module (OTM) and the introduction of Ohio's New Learning Standards for K-12 students.

***OMI's core strategy***

*Rethinking Postsecondary Mathematics*, the OMI's initial action plan, was structured around five "essential components" of the work required to meet the Chancellor's charge:

1. Develop high-quality entry-level courses and pathways connected to coherent academic programs of study for students majoring in mathematics, other mathematics-intensive majors and academic majors that are not mathematics intensive.
2. Develop policies and processes that foster effective transfer of course credits while encouraging course innovation on all public campuses.
3. Support constructive engagement of mathematics chairpersons and faculty within campus communities and across campuses to shape curricular policy, improve instruction, and bolster student support and advising.
4. Develop high-quality measures for improving mathematics course offerings and instruction; and collect, analyze, and share relevant data.
5. Improve student success in college-level mathematics courses by aligning postsecondary expectations and high school practice.

*In the early days of the OMI, Chancellor John Carey acknowledged that mathematics is a major stumbling block for so many of Ohio's postsecondary students. He made it clear that this is unacceptable, since our state's ability to compete and to win in the 21st century's global economy depends on its citizens' capacity to succeed in jobs that require advanced knowledge and skills – the kinds of jobs that are available only to those who have earned a bachelor's degree, associate degree or a postsecondary certificate with value in the marketplace.*

*Determined that Ohio would create a new future for the study of mathematics, Chancellor Carey gave the OMI the following a charge:*

> ***To develop expectations and processes that result in each of* Ohio's 36 public colleges and universities *offering pathways in mathematics that yield:***
>
> ***(a) increased success for students in the study of mathematics,***
>
> ***(b) a higher percentage of students completing degree programs, and***
>
> (c) ***effective transferability of credits for students moving from one Ohio public institution to another.***

From the pages of ...

The Columbus Dispatch

# Professors trying to develop math courses that inspire

Wednesday, May 17, 2017
By Mary Mogan Edwards

Ohio's college math teachers are aware of the bad rep: Math often is blamed for driving students away from science and engineering majors or out of college altogether.

Thing is, though, those teachers not only love math for its own sake, they're also passionate about its importance to a life well lived, no matter how one makes a living. So they want to fix it.

*Jim Fowler, an assistant professor of math at Ohio State University, is helping make math more interesting and relevant to non-STEM majors in college.*

Jim Fowler, an assistant professor of mathematics at Ohio State University, likes to call math "the Hogwarts of the modern world — we're teaching people to be magicians." But he knows not all undergraduates see it that way, so he has a leading role in the Ohio Math Initiative, an effort by college-level instructors across the state to reform both what is taught in undergraduate math courses and how it's taught.

The fact that everybody needs math doesn't mean that everybody needs the standard beginning algebra college course, reformers maintain — a course in which, according to a 2015 scholarly report by several math professional societies, half of students got a D or F.

Scholars participating in the initiative are developing alternatives: along with the traditional track for students in STEM (science, technology, engineering and math) majors, they're creating one focused on statistics and another on quantitative reasoning, in which math concepts are used to solve problems in many different academic disciplines.

Ohio's work is attracting national attention. Uri Treisman, a math professor and head of the Charles A. Dana Center, a research center for math and science education at the University of Texas at Austin, said it has been featured at national meetings and that at least 10 other states are emulating it.

He praised the Ohio Department of Higher Education for convening the reform group and putting faculty members in the driver's seat. "In my 45 years of work in the mathematics community, I've never seen such a constructive working relationship between governance officials and rank-and-file faculty," he said in an email.

*continued on the next page . . .*

*"In my 45 years of work in the mathematics community, I've never seen such a constructive working relationship between governance officials and rank-and-file faculty."*

Uri Treisman
Charles A. Dana Center

Quantitative-reasoning courses allow students to use math to solve problems they care about solving. They might use modeling, Ohio State's Fowler said, to explain something such as the tracking and predicting of infectious diseases, or how a viral news story might spread based on the shape of a social network.

David Kish, an OSU master's-degree candidate in mathematics, wrote his thesis on developing a quantitative-reasoning course. One exercise is based on a well-known prank from 2009 in South Africa. An IT company, frustrated with the slow speed of the country's biggest Internet carrier, instead sent data via a carrier pigeon carrying a memory stick. (The pigeon won handily.)

Figuring the whimsy of the problem might catch students' fancy, Kish asks them to imagine re-enacting the pigeon project, considering factors such as how much one pigeon could carry. "I wanted to get them to ask themselves the questions about what variables we need to look at," he said. "What if we use more pigeons? Hopefully, it's a sort of interesting and entertaining problem."

Beyond the problem with introductory algebra, Fowler is appalled that, for many non-STEM majors, the final math class they're required to take "might be called 'pre-calculus,' and that is just offensive," Fowler said, because that's a course designed to lead into something else. A student's "terminal math course," he said, "should be final. It should celebrate all the math they've learned, deepening and expanding on their high-school courses."

Along with offering a different kind of math content to non-STEM majors, the reformers believe the style of teaching should change, too, including for STEM students. They're encouraging instructors to build "active learning" into their classes. That's when, rather than absorbing lectures and laboring alone on worksheets of problems, students are put in pairs or groups to solve problems.

It emphasizes having students explain the problems to one anotherand defend their answers. "If you as a student have to convince a fellow student that your answer is correct, you have to think about your answer in a different way, and hopefully that might unlock a bit more understanding," Kish said.

Fowler thinks relieving the tedium of traditional math classes could keep more talented people in STEM majors. "A lot of the people who are switching out of STEM, they got an A in calculus," he said. "But for some reason, they didn't see the beauty of it."

And for the business or history or communications major, a more-engaging math class could impart valuable skills, Fowler said.

"It makes the class not just about computation, but about the communication of mathematical ideas," he said. "It's the ability to persuade with numbers or data. They might want to convince somebody to do something based on numbers that they'll see in their lives."

## Where the real work is being done: Assessing progress on Ohio's public campuses

One of the core elements of OMI has been the redesign of entry-level mathematics programs with learning pathways that give students course options more closely tailored to their degree programs.

***What is the rationale for the development of alternative pathways?***

Far too many students never earn credit in a college-level mathematics course. Often, this is due to students' placement in a mathematics course that is not aligned with their academic majors and career pathways. Consequently, mathematics has become a major barrier to many students' completion of a postsecondary degree or certificate program.

Historically, college algebra has been the default entry-level mathematics course for most students. This course is designed to prepare students for calculus and a subsequent series of mathematics courses required for students majoring in science, technology, engineering, and mathematics (STEM) fields. Yet, few of the students in college algebra intend to enroll or ever do enroll in a calculus course. In addition, college algebra's standard teaching methodology, with its emphasis on procedural manipulation, does little to prepare students with the reasoning, problem-solving, and data analysis skills necessary for most careers.

***How do Ohio's mathematics pathways address these issues?***

A mathematics pathway is a course or sequence of courses that a student takes to fulfill the mathematics requirements for a program of study. The term is often used as shorthand for a strategy in which an institution offers a small number of mathematics pathways aligned to students' programs of study.

In March 2014, the Ohio Mathematics Steering Committee, to which the Chancellor gave responsibility for designing the state's mathematics education reform initiative, recommended the development of differentiated pathways to serve the needs of students in clusters of academic programs. Less than two years later, the Ohio Articulation and Transfer Network (OATN) announced endorsement of a new Ohio Transfer Module (OTM) course with learning outcomes in Quantitative Reasoning.

The development of this new course gave Ohio students three well-defined, faculty-developed learning pathways in mathematics – a Statistics Pathway; a Quantitative Reasoning Pathway; and a STEM Preparation Pathway – with the prospect of increased success for students in mathematics, a higher percentage of students completing degree programs, and effective transferability of credits for students moving from one institution to another.

| Statistics | Quantitative Reasoning | STEM Preparation |
|---|---|---|
| College-level introductory statistics courses for students without a calculus background and who do not require college algebra or calculus | College-level courses designed to emphasize quantitative thinking and problem solving using quantitative methods | College-level courses (i.e., college algebra, pre-calculus, trigonometry, business calculus, and/or calculus) designed for students in mathematics-intensive majors |
| Designed for part of the general education requirement for majors in fields that may include nursing, nutrition, social work, and applied associate degree in business | Designed for part of the general education requirement for majors in fields that may include communication, criminal justice, fine arts, history, education (elementary), and the social sciences | Designed for part of the general education requirement for majors in fields that may include business, chemistry, engineering, physics, and education (e.g., mathematics, science, and technology) |

### *Ohio's mathematics pathways: A view from college and university campuses*

If the real work of change is done at the campus level, it is important to discover how the state's new pathways have been received by faculty and administrators at Ohio's public two-year and four-year institutions, and what is being done to make these learning pathways available to students. For this purpose, Complete College America and the Charles A. Dana Center at the University of Texas at Austin collaborated with the Ohio Department of Higher Education in conducting a survey of the state's 36 public postsecondary institutions.

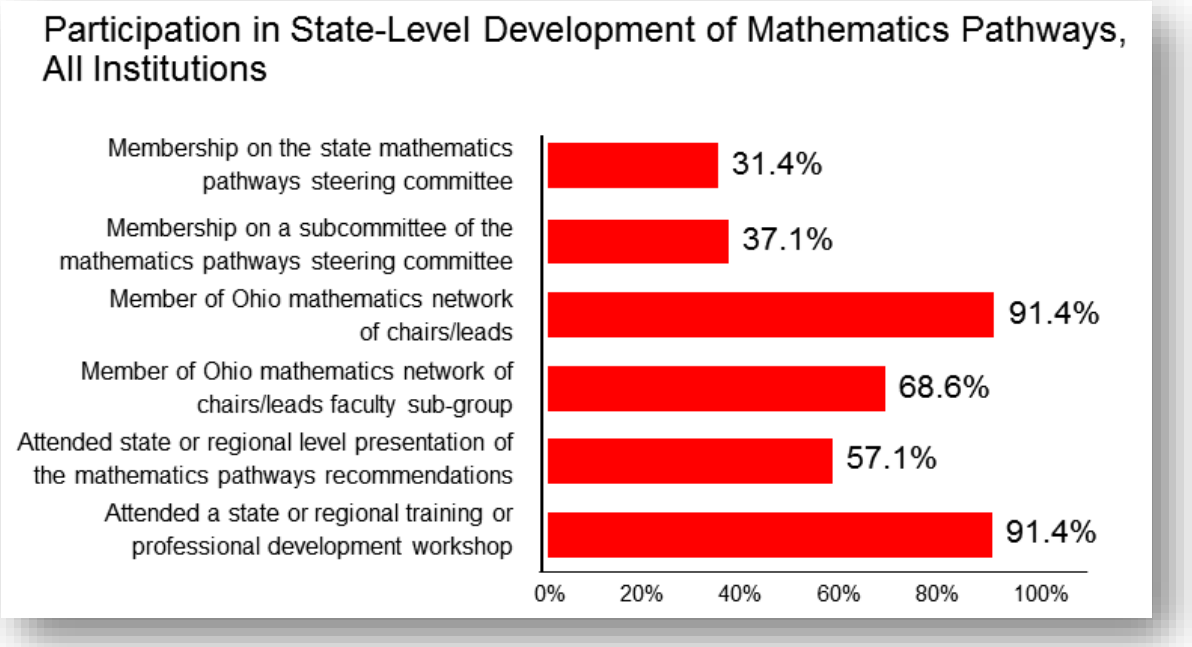
It is impractical to try to report all the findings from this research here, but highlights from the Winter 2017 *Building Math Pathways into Programs of Study Institutional Survey* tell an encouraging story: Most campuses have embraced the state's new pathways and are using them to redesign their entry-level mathematics programs. The commitment to implementing mathematics pathways is high, and detailed execution plans have been put into place. Virtually all stakeholder groups have favorable attitudes about the pathways.

Here are some key takeaways from the survey, based on responses from 35 of the 36 institutions.

- ***Virtually all public colleges and universities were involved in one or more state-level activities that led to the development of Ohio's new mathematics pathways.***

  Dating back to 2013, the OMI was built on a broad range of conversations, task forces, committees, and "summit" conferences. From the beginning, the Ohio Department of Higher Education made it clear that the initiative had to be "owned" by mathematics faculty and administrators at the state's 36 public colleges and universities.

  Accordingly, development of the new mathematics pathways – and more broadly, the entire reform initiative – offered multiple opportunities for campus-level involvement. More accurately, it ***encouraged*** it. The survey results show that as many as one-third of the institutions were actively involved in the steering committee's work, while up to two-thirds participated in a subgroup of the chairs/leads network and/or attended presentations on the pathways recommendations. Virtually all campuses participated in the OMI network of chairs/leads and attended a training or professional development workshop on the pathways.



- ***The policy recommendations of the Ohio Mathematics Steering Committee have been well-received by key stakeholders at the state's public colleges and universities.***

  Fully 88% of mathematics faculty members like the recommendations of the Ohio Mathematics Steering Committee, with modest reservations in some cases. Similarly, the recommendations have the support of 63% of institutions' academic affairs staff.

  Support among other campus stakeholders is not as high, primarily because other-discipline faculty, advising and student services staff and campus leaders have less familiarity with the recommendations.

Reception of the Mathematics Steering Committee Report Recommendations by Key Campus Stakeholders, All Institutions

| | Well received, no reservetions | Somewhat well received, modest reservations | Non-committal | Somewhat negative, significant reservations | Very negative, opposedto report recommen-dations | No answer or did not report |
|---|---|---|---|---|---|---|
| Mathematics faculty | 45.7% | 42.9% | 2.9% | 2.9% | 0.0% | 5.7% |
| Other discipline faculty | 11.4% | 22.9% | 8.6% | 5.7% | 0.0% | 51.4% |
| Academic affairs staff | 31.4% | 31.4% | 2.9% | 2.9% | 0.0% | 31.5% |
| Advising staff | 11.4% | 28.6% | 5.7% | 5.7% | 0.0% | 48.5% |
| Other student services staff | 11.4% | 14.3% | 5.7% | 5.7% | 0.0% | 62.9% |
| Campus president | 31.4% | 8.6% | 0.0% | 0.0% | 0.0% | 60.0% |
| Other campus staff | 11.4% | 11.4% | 0.0% | 2.9% | 0.0% | 74.3% |

- ***Campus-level commitment to implement the Ohio Mathematics Steering Committee's recommendations is high.***

  The survey asked each campus about stakeholders' commitment to implement five specific recommendations of the Ohio Mathematics Steering Committee. The answers from 35 institutions, presented on page 10, show that, with one or two exceptions, institutions are either fully supportive or supportive with reservations of the implementation of all five recommendations.

Campus Commitment to the Implementation of the Recommendations of the Ohio Mathematics Steering Committee, Two- and Four-Year Institutions

| | | Fully support or support implementation with reservations | Significant reservations about recommendations | Strongly opposed to implementation |
|---|---|---|---|---|
| Improve student success in entry-level courses by aligning mathematics to academic programs of study and by improving instructional delivery mechanisms | All | 97.2% | 0.0% | 0.0% |
| | 2-Year | 95.4% | 0.0% | 0.0% |
| | 4-Year | 100.0% | 0.0% | 0.0% |
| Develop, implement and evaluate co-requisite strategies to support underprepared students | All | 91.4% | 8.6% | 0.0% |
| | 2-Year | 90.0% | 9.1% | 0.0% |
| | 4-Year | 92.3% | 7.7% | 0.0% |
| Redesign OTM course criteria and processes to focus on student learning outcomes | All | 97.2% | 2.9% | 0.0% |
| | 2-Year | 95.4% | 4.5% | 0.0% |
| | 4-Year | 100.0% | 0.0% | 0.0% |
| Increase departmental flexibility in determining prerequisite courses and credit hour requirements for OTM courses | All | 97.1% | 0.0% | 0.0% |
| | 2-Year | 95.5% | 0.0% | 0.0% |
| | 4-Year | 100.0% | 0.0% | 0.0% |
| Define what distinguishes a course as "college-level" | All | 94.3% | 2.9% | 0.0% |
| | 2-Year | 90.9% | 4.5% | 0.0% |
| | 4-Year | 100.0% | 0.0% | 0.0% |

- ***Two-thirds of Ohio's pubic campuses have already built pathways or revised existing pathways in Statistics and College Algebra/STEM Preparation; three-fourths have either built or are presently building pathways in Quantitative Reasoning.***

  The building of mathematics pathways is well under way on both two-year and four-year campuses. Quantitative Reasoning pathways have been built on only 40% of college and university campuses; another 34% are currently building them. Statistics and STEM Preparation pathways have been built at 65% of all institutions, while another 20% are in the process of building them.

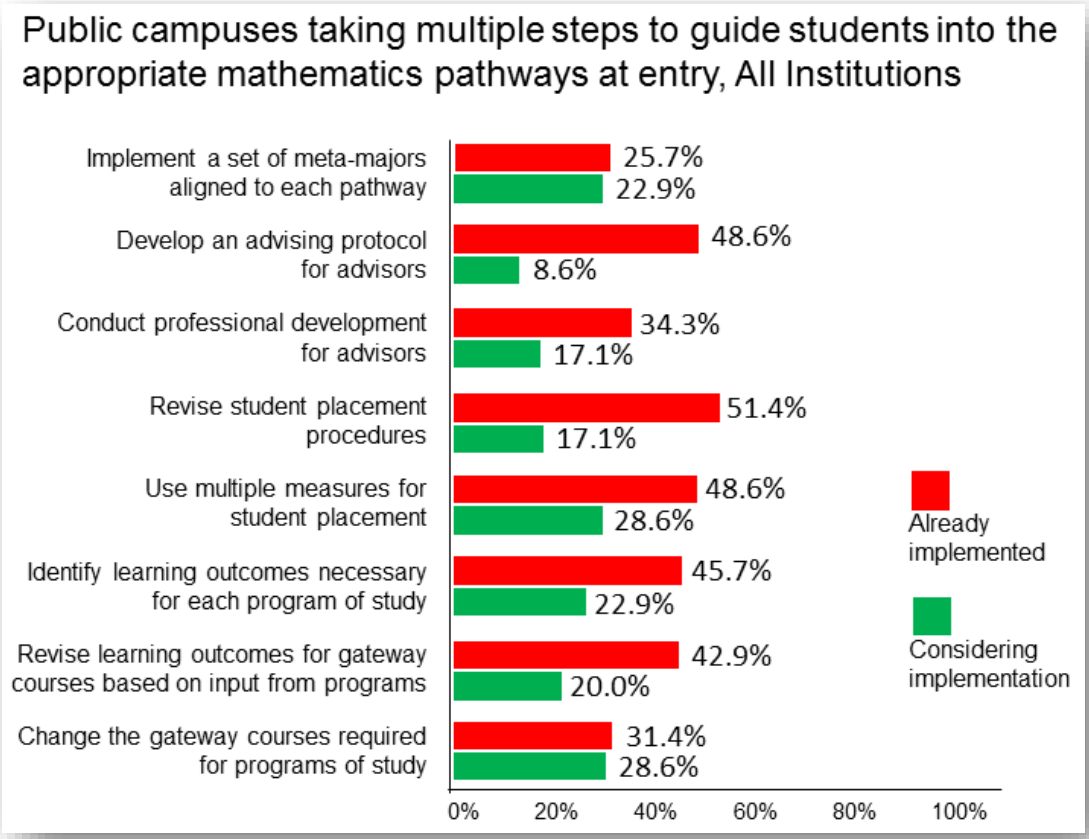
  Two four-year institutions reported that they have no plans to build a Statistics pathway, while one indicated that it has not yet begun such a pathway. On the two-year side, four institutions reported no plans to build a Quantitative Reasoning pathway; two more have not yet begun to build one.

- ***Most institutions have taken multiple steps to guide students into the appropriate mathematics pathway at entry.***

  The value of mathematics pathways aligned with students' academic programs and career objectives can be easily compromised if students are not fully informed of their existence and purposes. Therefore, coordinated efforts to guide students into the appropriate pathways ***at entry*** are critical to the effectiveness of any pathways system.

  The survey results depicted on page 11 suggest that institutions have taken this challenge seriously. Approximately half of all institutions have revised student placement procedures, used multiple measures for student placement, developed an advising protocol for advisors, identified learning outcomes necessary for each program of study, and revised learning outcomes for gateway courses based on input from programs. About a quarter of all institutions are considering taking these steps.

In addition, a growing number of campuses have either implemented or are considering implementation of a set of meta-majors aligned to each pathway, a professional development course for advisors, and changes in the gateway courses required for programs of study. All are encouraging and much-needed steps.




- ***Participating institutions cited two factors – lack of implementation resources and the resistance of faculty in other disciplines – as the key barriers to the implementation of mathematics pathways.***

  Understanding that there are barriers to the effective execution of a new program or practice, even in the best of situations, the survey asked institutions to assess the seriousness of six specific barriers. Their responses were as follows:

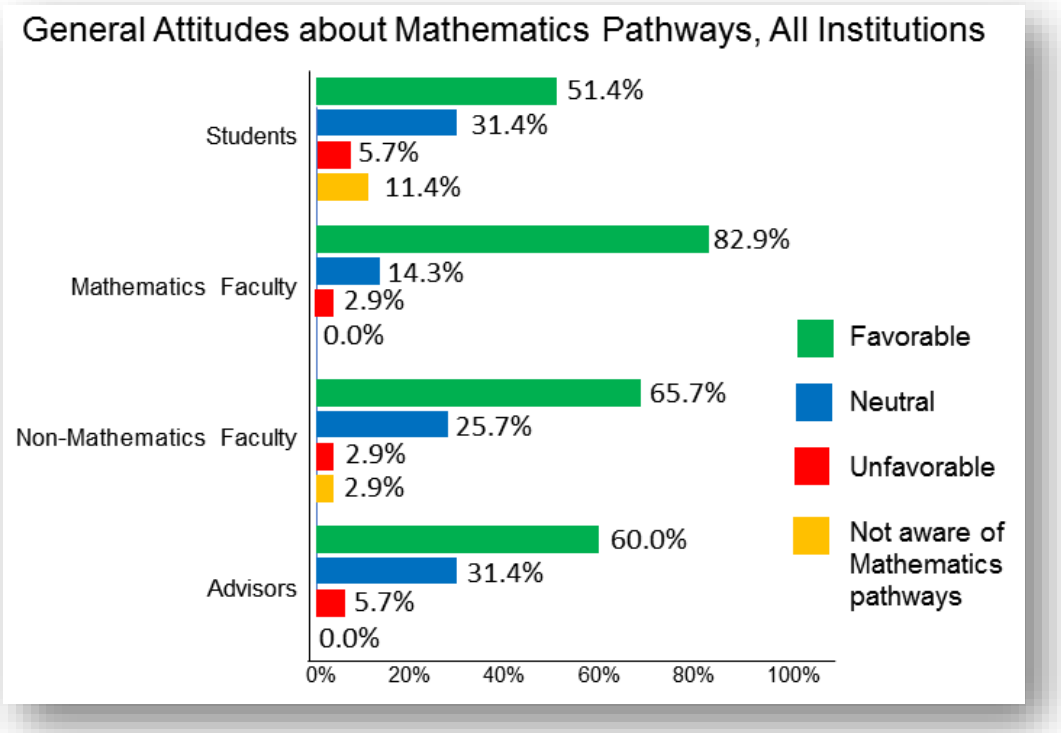
| | | |
|---|---|---|
| Lack for resources for implementation | 12 | institutions |
| Resistance of faculty in other disciplines | 10 | |
| Resistance of mathematics faculty | 2 | |
| Lack of technical support from the state | 1 | |
| Resistance from administration | 0 | |
| Not a priority for the institution | 0 | |

Given the opportunity to identify other barriers, respondents pointed to the following:

- Accreditation requirements
- Students' intended transfer institutions that still require college algebra for certain non-STEM bachelor's degrees
- Concerns that the state will require open educational resources (OERs) for ALL pathways, and that perceived top-down mandates will infringe upon intellectual freedom of individual departments
- Creating the new Quantitative Reasoning course and explaining to staff how this is a different kind of mathematics course
- Heavy credit commitment in one semester for some majors
- Financial sustainability of the initiative
- Lack of understanding by advising staff
- Not enough qualified people to implement the initiative
- Classrooms and staffing issues
- Student and parent attitudes

- ***Finally, general attitudes about mathematics pathways are favorable among all stakeholder groups.***

Reflecting on the attitudes of four stakeholder groups, institutions reported widespread acceptance and support for the new mathematics pathways. The "favorables" for all four groups were above 50% – as high as 82% among mathematics faculty. More telling, perhaps, is the fact that the "unfavorables" were less than 6% across the board, and lack of awareness was present among students only (11.4%). Clearly, the environment for change is positive.



## Highlighted OMI initiatives, 2016-2017

The 2016-2017 academic year saw tremendous advances, particularly at the campus level. Yet, some important steps were also taken at the state level. Five of them are highlighted here.

- ***Faculty subgroup #2 oversees revision of Ohio Transfer Module (OTM) courses***

  Two newly revised OTM courses (TMM002 Precalculus and TMM003 Trigonometry) were endorsed by Ohio's public colleges and universities. Neither of these revised courses substantively changed the course in question, although each clarified the areas (i.e., learning outcomes) in which successful students must be proficient. Additionally, faculty subgroup #2 worked to ensure that the new Quantitative Reasoning courses (TMM011) being created at various institutions are truly college-level courses.

- ***Faculty subgroup #1 redirects its attention***

  With the continuing implementation of mathematics pathways, faculty subgroup #1 shifted the focus of its attention to the development, implementation and evaluation of robust co-requisite strategies to support underprepared students. With this new direction, the subgroup will work with Ohio's public colleges and universities to assist in integrating supplemental support (including supplemental instruction, intrusive advising and a high degree of programmatic coordination) directly with credit-bearing courses. Campuses will be encouraged to address gaps in knowledge on a "just-in-time" basis.

  Subgroup members also will review co-requisite models in Ohio and other states and identify a small number of recommended models for use by Ohio's public institutions. Promising examples of strategies that support alternative entry-level courses include Quantway/Statway, New Mathways Project statistics, quantitative reasoning and STEM-prep pathways, and co-requisite models such as the one developed at Austin Peay University.

- ***OATN and OMI offer Quantitative Reasoning workshop for mathematics faculty***

  In March 2017, the Ohio Articulation and Transfer Network and the OMI offered a two-day workshop to help faculty design their institutions' Quantitative Reasoning courses, built around a rigorous, well-structured curriculum that is delivered in an ***active learning*** classroom environment. In such settings, content is connected to real-life situations, and students master such intellectual skills as analytic inquiry, critical and creative thinking, written and oral communication, information literacy, teamwork, and problem solving.

  The workshop featured Dr. Carol Schumacher, professor of mathematics and chair of the faculty at Kenyon College. A leader in active learning strategies, Dr. Schumacher told attendees that lectures aren't the answer to learning. For one thing, they assume that it is possible and desirable to smooth out the "messiness" of learning processes. And second, they cause students to assume that any failure to learn is their fault.

- ***FAST FACTS delves further into active learning***

  The purpose of education is learning, not teaching. It seems so obvious. Yet, even today, "good teaching" continues to draw more attention from those who make and carry out education policy than "effective learning." And, the academic lecture continues to be the dominant feature of instruction in most college classrooms.

Research tells us that the passivity of the lecture experience leads to lower levels of engagement – and less learning. It tells us that learning is enhanced when it is experiential and active. To be sure, there is no single, best pedagogical approach in any classroom. Just as students learn in a multitude of ways, the most effective teachers are those who make use of multiple instructional approaches: problem-solving exercises, brief lectures followed by discussion, small group work, "flipped" classes, simulations, hands-on experimentation, other forms of inquiry-based or active learning, and more.

Therefore, faculty subgroup #3 (Communication, Outreach and Engagement) focused a spring 2017 issue of ***FAST FACTS*** on active learning, which engages students in the process of learning through a series of classroom (and outside the classroom) activities and/or discussion. Arguably, forms of inquiry-based learning are the most well-known examples of active learning in mathematics.

- ***Knowledge Base now accessible to OMI users***

Knowledge Base (KB) is an information repository system that provides a way for information to be collected, organized, shared, searched, and utilized. KB has been developed for Ohio's public colleges and universities and can be used by the Articulation and Transfer Clearinghouse (ATC), the Course Equivalency Management System (CEMS), and Ohio Mathematics Initiative (OMI) users. Currently, KB's OMI version is available for Quantitative Reasoning discussions only.

KB allows users to create various types of articles (e.g., posts, issues, discussions, announcements, and downtime notices) and share information seamlessly across all participating institutions. New articles can be grouped into specific categories. A dashboard with sections for viewing prepopulated reports, recent comments, and downtime notices are available, making this tool user friendly and effortless to navigate. Users can get instant email notification on updates to articles by managing the robust subscription settings. Articles that are deemed as informative will be moved into the FAQ section by OATN administrators.

### *OMI Knowledge Base*

- *A secure, reliable platform with authenticated logins*
- *Threaded discussion area for members (by institution)*
- *Ability to post documents*
- *Pinned posts for popular topics*
- *Ability to subscribe to discussion posts*
- *Search functionality*

For a Knowledge Base webinar training presentation, see https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/ATC_KB/Knowlege%20Base%20Webinar.pdf

There is a sign-up link in the resources section of the OMI website. Department chairs/leads will need to provide approval before access can be granted. Prospective users can contact Michelle Blaney at mblaney@highered.ohio.gov if they have questions relating to the OMI Knowledge Base.

## A look ahead

Since its launch in 2013, OMI has brought significant changes to the content and delivery of postsecondary mathematics education on public college and university campuses across Ohio. This initiative – with faculty members in the driver's seat – has redesigned entry-level mathematics programs by establishing three well-defined learning pathways aligned to students' academic objectives. As part of that work, it has built a Quantitative Reasoning pathway that focuses on the application of mathematics to the analysis and interpretation of real-world quantitative information in the context of a single discipline or across multiple disciplines.

In addition, OMI has promoted co-requisite remediation strategies to support underprepared students. It has facilitated easy credit transfer and accelerated student mobility by using faculty panels to review and revise the existing Ohio Transfer Module courses with an emphasis on student learning outcomes. And, it has worked to improve the alignment of P-16 mathematics content and instruction.

Going forward, OMI's change agenda seeks to build on the momentum created during the past four years by bolstering activities already under way and launching new initiatives rooted in the Chancellor's initial charge.

As we continue to make plans for the 2017-2018 academic year, here is a look at seven of our priorities.

- ***Develop more Quantitative Reasoning courses*** that make institutions' entry-level mathematics offerings more robust with options that inspire learners.
- Continue to ***promote student-centered active learning pedagogies*** that make students responsible for their learning, and that teach skills for problem-solving rather than instilling information for periodic regurgitation.
- ***Develop more co-requisite remediation courses*** to support underprepared students. With the co-requisite remediation model, students who demonstrate that they are just below the college readiness thresholds are placed immediately into an entry-level, credit-bearing, college-level mathematics course ***and*** a co-requisite remedial course or other remedial support.
- ***Accelerate efforts to improve K-16 mathematics alignment, including the development of 4$^{th}$ Year Transition Mathematics courses.*** Working together, Ohio's secondary and postsecondary mathematics communities will explore opportunities to ensure that more students graduate from high school able to meet remediation-free standards. Their collaboration also will create more opportunities for students to qualify for courses that earn college credit while enrolled in high school.
- Develop ***a common protocol for collecting, analyzing, and reporting data*** relating to student success and program effectiveness.
- ***Continue communication and outreach activities,*** using periodic newsletter, *FAST FACTS*, face-to-face presentations, and other tools to familiarize key stakeholder groups, including campus-level groups, with the OMI's core initiatives and accomplishments.
- Foster campus-level conversations ***about how the new mathematics pathways fit into institutions' degree programs.*** Some of these conversations have already begun as part of the work of the Ohio Guaranteed Transfer Pathways Clusters.

For more information about the Ohio Mathematics Initiative,
visit our website at ohiohighered.org/mathematics-initiative

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