

MEMORANDUM

September 5, 2018

The Faculty of Mathematics is happy to endorse the two year progress report for the Masters of Mathematics for Teachers (MMT) September 2018.

Three of the six recommendations are now completed. The recommendation for dividing the Director of MMT and Director of CEMC position will be done in 2019/2020, and the delays upon acting on this recommendations are reasonable given the circumstances.

The recommendation to develop a curriculum map for co/pre requisites is expected to be done this Fall.

The last recommendation, to expand online part-time programs is something that the Faculty is taking into consideration, but is beyond the scope of the MMT program.

Regards,



Stephen M. Watt
Dean, Faculty of Mathematics



Two-Year Progress Report

Master of Mathematics for Teachers (MMT)

September 2018

Background

The MMT is a part-time, online only, professional Master's program aimed at high school teachers. The MMT is an outreach program created to strengthen the mathematics abilities of teachers and enrich their appreciation of the breadth and utility of the discipline. Most teachers in the program teach full-time while taking one or more courses each term. The primary goal of the program is to help current teachers deepen their knowledge of mathematics. A secondary goal is to help teachers become aware of the breadth of the mathematical sciences.

The MMT is housed in the [Centre for Education in Mathematics and Computing](#), which is a unit within the Faculty of Mathematics. The faculty members who participate in the MMT come from almost all units in the Faculty of Mathematics. Each of these faculty members has primary duties within his or her home unit, and then participates in the MMT with consent from his or her Chair/Director. Despite the fact that there are no faculty members whose primary responsibility is to the MMT, the program receives strong support and commitment from across the Faculty, chiefly in the form of support from units in allowing some of their best instructors to participate in MMT course development and instruction and in providing many of their highest-rated teaching assistants to MMT courses.

Since the MMT is a course-based, part-time, professional Master's program, there is no explicit traditional research component to the program, nor is funding available from the University to MMT students. The MMT does have a "supervision component" through its capstone project, which is a required component of the program taken by each student through the course [MATH 699](#). Through their work in MATH 699, students will design a mini-course on an approved subject in mathematics. As part of their project, students are required to design lessons and create problems and solutions to accompany these lessons. The capstone project is designed to give students an opportunity to work on an independent project that demonstrates their knowledge of the subject matter that they teach and/or the knowledge that they have gained in the program and to provide a forum for bringing that knowledge into their own classroom.

The MMT was launched in September 2010. As such, the review done in 2015/2016 was its first cyclical review. The review was done early to align with reviews being done across the Faculty of Math.

The reviewers' provided the following summary of the program, along with six recommendations:

“The MMT program has far-reaching implications for mathematics education, improving the skills of mathematics teachers benefits secondary students provincially, nationally, and internationally. The program effectively surpasses the mandate of the degree.”

Recommendations:

1. “Consideration should be made to separating the role of the program coordinator from the Director of CEMC. There are too many expectations in each of the roles for one person. It would also allow for greater cohesion if the tasks were divided.”

Status: In Progress

Details: The CEMC agrees that these roles should be split and aims to do so in 2019/2020. This has taken longer than anticipated because of a previously committed administrative leave for the current CEMC Director in 2017/2018, as well as the difficulty in training a new person to be Acting Director of CEMC for a year and a person to be the new Director of the MMT simultaneously, and other commitments for appropriate candidates for MMT Director.

2. “The regulations and guidelines within the Graduate Studies Office should be reviewed to better match the living experiences of part-time online students. It should be possible for MMT students to elect one, two or three term absences without penalty. The part-time online professionals (normally teachers) have different needs than full-time on campus students.”

Status: Completed

Details: The specific issue of inactive terms has been solved. There are likely to always be nuances for the type of program than with more traditional graduate programs that bear discussion with the GSPA.

3. “We suggest that the Faculty of Mathematics investigate the possibility that the part-time online model of the MMT be used for expanding to other markets for different fields within Mathematics. However, it should be recognized that the online model does not scale easily: interactions with students through email and discussion boards takes significant time. That is, the online model works well only with relatively small class sizes (unless there is significant additional instructional support).”

Status: N/A

Details: This recommendation is beyond the scope of the MMT program. The Faculty of Mathematics certainly continues to expand its online presence.

4. “The wording of the admission requirements posted on the MMT website (<http://cemc.uwaterloo.ca/mmt/mmt-admissions.html>) should be reviewed, with an eye to aligning the wording with current practice and encouraging any applicant who is actively teaching in mathematics, science, or computer science (not just those with a Bachelor’s degree in a STEM field) to apply provided they have taken at least 3-4 post-secondary courses in mathematics.”

Status: **Complete**

Details: Relevant calendar changes were approved and came into effect in 2017/2018.

5. “The development of a curriculum map to visualize the co-/prerequisite structure of the courses in the MMT program would be helpful.”

Status: **In progress**

Details: We aim to publish this in Spring 2019 along with more useful lists of MMT courses broken down by GDLEs, by style of course, etc.

6. “Now that the program is mature and there is a good selection of courses available, it is worth considering whether the program would benefit from establishing a set of core requirements to ensure as complete a coverage of the GDLEs as possible. Core requirements should include at least MATH 600, 692, and MATH 699. Additional requirements could be MATH 647, 661, 680, and one of MATH 630 or 631. Alternatively, additional requirements could be set up by area (e.g., student must complete at least X credits in courses with a modelling component, Y credits in courses with a computing component, etc.).”

Status: **Complete**

Details: After significant discussion at the program level and within the Faculty, it was decided to formally create a set of core requirements that include the half-term introductory courses [MATH 600](#) (Software) and [MATH 692](#) (Proofs), the Capstone Project course [MATH 699](#) (which was already required), and the new course [MATH 681](#) (Problem Solving). The core requirements were not expanded beyond this set in an explicit effort to maintain one of the original goals of affording flexibility to the teachers in the program. Since teachers only take 9 courses to complete the degree, we did not want to require more than the equivalent of 3 courses. This allows teachers to tailor their course selection to their background and to the usefulness pertaining to the vastly varied circumstances in which they teach. We believe that the upcoming appropriate

categorizations of courses referred to in #5 above will assist teachers in choosing courses.

Explain any circumstances that have altered the original implementation plan

Recommendation 3 was not implemented as discussed in the section above.

Address any significant developments or initiatives that have arisen since the program review process, or that were not contemplated during the review

The MMT continues to grow and thrive. Our incoming class in Fall 2018 includes roughly 105 teachers, as compared to 70 in each of the past several classes. If this growth continues, we will need to work with the Faculty of Math to think more about resourcing both the administration of the program and the instruction of individual courses.

Updated Implementation Plan:

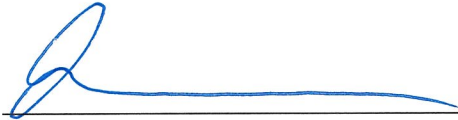
	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Consideration should be made to separating the role of the program coordinator from the Director of CEMC. There are too many expectations in each of the roles for one person. It would also allow for greater cohesion if the tasks were divided.	Positions will be separated	Ian VanderBurgh, Director of CEMC and MMT	2019/2020
2.	The regulations and guidelines within the Graduate Studies Office should be reviewed to better match the living experiences of part-time online students. It should be possible for MMT students to elect one, two or three term absences without penalty. The part-time online professionals (normally teachers) have different needs than full-time on campus students.	Completed		
3.	We suggest that the Faculty of Mathematics investigate the possibility that the part-time online model of the MMT be used for expanding to other markets for different fields within Mathematics. However, it should be recognized that the online model does not scale easily: interactions with students through email and discussion boards takes significant time. That is, the online model works well only with relatively small class sizes (unless there is significant additional instructional support).	N/A Beyond the scope of the MMT	N/A	N/A

4.	The wording of the admission requirements posted on the MMT website (http://cemc.uwaterloo.ca/mmt/mmt-admissions.html) should be reviewed, with an eye to aligning the wording with current practice and encouraging any applicant who is actively teaching in mathematics, science, or computer science (not just those with a Bachelor's degree in a STEM field) to apply provided they have taken at least 3-4 post-secondary courses in mathematics.	Completed		
5.	The development of a curriculum map to visualize the co-/prerequisite structure of the courses in the MMT program would be helpful.	Map and categorization of courses to be created	Ian VanderBurgh, Director of MMT	Spring 2019
6.	Now that the program is mature and there is a good selection of courses available, it is worth considering whether the program would benefit from establishing a set of core requirements to ensure as complete a coverage of the GDLEs as possible. Core requirements should include at least MATH 600, 692, and MATH 699. Additional requirements could be MATH 647, 661, 680, and one of MATH 630 or 631. Alternatively, additional requirements could be set up by area (e.g., student must complete at least X credits in courses with a modelling component, Y credits in courses with a computing component, etc.).	Completed		

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.

Date of next program review: 2022/2023

Signatures of Approval:



Chair/Director

26 Sept 2018

Date

AFIW Administrative Dean/Head (For AFIW programs only)

Date



Faculty Dean

2018-09-26

Date

Associate Vice-President, Academic
(For undergraduate and augmented programs)

Date



April 26, 2018

Associate Vice-President, Graduate Studies and Postdoctoral Affairs
(For graduate and augmented programs)

Date