
▲ RE4MUL8: CREATING AN ONLINE AND MOBILE TECHNOLOGY SUPPORT FOR GRADES 7–8 TEACHERS OF MATHEMATICS

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Dr. Daniel Jarvis is an Associate Professor in the Schulich School of Education, Nipissing University, North Bay, Ontario. He would like to thank the participating teachers and coordinators/coaches who took part in the math lessons and subsequent debriefing interviews, which now form the basis of the RE4MUL8 Project teacher resource.

The main purpose of this brief paper is to present the mathematics education community with a newly created and freely available resource for coordinators and for teachers of mathematics, entitled RE4MUL8. The project involves a web/mobile platform featuring videos of classroom lessons and teacher interviews, Twitter/Facebook news feeds, and links to other mathematics resources.

Background

In 2003, the Ontario Ministry of Education (OME) commissioned a mathematics education resource document entitled *Targeted Implementation and Planning Supports: Grades 7, 8, and 9 Applied Mathematics (TIPS)*¹ (Consortium of Ontario School Boards, 2003). As a doctoral candidate at that time, I was among the approximately 40 teachers, coordinators, and university faculty who were brought together to write and develop the TIPS materials. TIPS featured a number of different components (e.g., research summaries, problem-based lessons, planning templates, posters, downloadable files) and was well received in the province (Jarvis, 2006). Based on positive feedback from the field, TIPS was then revised and expanded two years later (2005) to match the then newly revised Grades 1–8 Ontario curriculum (Ontario Ministry of Education [OME], 2005); to offer completed Grades 7–8 and Grades 9–10 Applied-level lessons; and, to address specific areas such as English Language Learners, learners with special needs, and split-level classrooms. Since that time, TIPS has continued to

expand in content and has been incorporated into the OME website, Math GAINS², and as such, now forms an important archival part of a much larger support network of useful resources and activities for Ontario teachers.

Having interviewed a group of 64 participants in 2003–2005 including teachers, administrators, coordinators, and OME representatives, regarding the TIPS resource development and implementation for my doctoral research study (Jarvis, 2006), my findings highlighted some of the perceived professional learning needs of Intermediate Division³ mathematics teachers. *Choice, voice, and ongoing support* emerged as three main characteristics of quality professional development models. First, mathematics teachers tended to prefer the opportunity to *choose which type of professional learning they require* at any given stage in their career (e.g., self-selected individual or collaborative action research projects); second, teachers required a *means of sharing classroom results/information* with other mathematics teachers both within and beyond their school and board (e.g., division meetings, PD/conference presentations, online learning systems); and, third, mathematics teachers desired *ongoing professional development* (e.g., multiple sessions throughout the school year, and often involving an online component which allows for increased accessibility and social networking/support).

Abrahamson (2004) differentiated between what he called “creative destruction” and “creative recombination,” the latter term referring to the repeated use of existing quality initiatives and projects in new configurations, as opposed to the complete abandoning of former ideas simply for the sake of change (cited in Fullan, Hill, & Crevola, 2006, p. 14). The videotaping of Grades 7 and 8 instructors implementing TIPS-based lessons, and then being interviewed following each lesson, sought to likewise “creatively recombine” these existing quality resources which had already been used in varying degrees throughout Ontario. But first, I would like to share a few words about the thinking, listening, and writing that have led to the creation of the new project.

Middle Ground

Several years ago, I submitted a paper to the *Gazette* entitled *Thinking Outside the Rectangular Prism: Fostering Problem-Based Mathematics Learning* (Jarvis, 2008). In

¹ Ontario Ministry of Education TIPS for Revised Mathematics (TIPS4RM) Resource: www.edu.gov.on.ca/eng/student/success/lms/tips4rm.html

² Math GAINS (Growing Accessible Integrated Networks) is accessible at www.edugains.ca/newsite/math2/index.html.

³ In Ontario, Canada, the Intermediate Division refers to students in Grades 7–10.

this work, I presented a problem-based approach/checklist and made the case that any teacher who regularly implements these kinds of activities would automatically be covering the seven Ontario Curriculum Math Process expectations (i.e., problem solving, reasoning and proving, reflecting, selecting tools and computational strategies, connecting, representing, and communicating) within their mathematics program.

I recently asked my Bachelor of Education pre-service teachers to write a short essay regarding their mathematics teaching experiences involving reform methods during their school practicum placements. With their permission, I here share a few of their insights regarding the collaborative learning aspect of reform-based teacher practice:

Teacher 1: One other thing that I saw while teaching math that interested me was how enthused a classroom could become about a problem if they did it collaboratively, while it was equally impressive to see how deadened the class could be at the prospect of a worksheet. Like I said earlier, I didn't learn this way. I did worksheet after worksheet growing up and I knew how boring they were. So, this group work was new to me and I got enthused along with them as they worked to solve a problem. I did worry when it was time to test the students at the end of the unit on measurement because so much work had been done in groups, and all of a sudden, it was time to work alone, but they all did well.

Teacher 2: Students had the option to work alone, in partners, or small groups. I did caution them that they should each know how to solve the problems, and that group work did not mean one person does all the work and you copy the answer. It was very beneficial for the weaker students to be paired up with stronger students to work their way through the problems and talk it out. I learned that many students learn best while working in groups as opposed to individually for math. That was one of the big adjustments that I had to make as a teacher because I was always used to math being quiet pencil-and-paper work.

While these collaborative strategies are learned and implemented by many new teachers during their formal preparation in faculties of education, it is often harder for experienced teachers in the field to move toward this perhaps very different approach (i.e., collaborative structures and rich problem-based lessons) to

mathematics teaching and learning.

A colleague of mine and I crafted another article for the *Gazette* entitled "*Messy Time*" *Transition to Reform-Based Mathematics Teaching and Learning* (Jarvis & Franks, 2011), in which we presented the results of some case-study research, wherein teachers were asked to describe the "messy" process of moving from a traditional teaching model to a more problem-based approach. They were also asked to comment on how they were coping with trying to plan and implement a "balanced instructional" program that would feature both types of classroom mathematics activities (i.e., memorization/practice/mental estimation skills, as well as more problem-based learning (PBL) with group work/manipulatives/technology/etc.). One teacher highlighted a perceived polarity of practice:

Teacher 3: Do you have to do a problem every day to be teaching through problem solving? No. You don't have to be doing a problem every single day, but I think it's hard to feel like you're in between. I think people feel like you're either here or there.

Time required to prepare PBL lessons, particularly when one is first beginning to use this approach, was cited as being one of the main challenges in striking the curricular "balance," as noted by this educator:

Teacher: I find that it's taking me more time to prepare because I have to rethink the way I did stuff. So, I'm trying to do more stuff where it's more verbal and fewer paper-pencil tests. So, it's because it's new—I know the math program, but to find new ways to do it. We have a lot of good resources, but it's to go through the resources and find what I'm looking for, for what I want to teach, in a different way—I find that quite time-consuming.

With the advent of new technologies (social media, smartphones/mobile devices) and the rapidly growing use of these tools in society, I was curious to know how these kinds of tools might be used by pre-service (soon-to-be) and in-service (novice/experienced) teachers in terms of facilitating and supporting problem-based mathematics planning and teaching in Ontario schools. An online video database of teacher lessons and interviews would allow Intermediate Division mathematics teachers the ability to easily view lessons and interviews to which they could relate, and from which they might possibly draw inspiration and ideas for changing and sustaining practice. Mobile device options would allow teachers even fuller access, as well as providing a mechanism for receiving math news updates.

Foreground

To *reformulate* means “to formulate again, or in a different way; to alter or revise; to reformulate plans.” At its heart, the RE4MUL8 project advocates for changed thinking (teacher beliefs) and related pedagogy (teacher practice). Six different district school boards in Ontario were approached with an invitation for a mathematics coordinator and a teacher (i.e., an effective, reform-based Grade 7 or 8 teacher, recommended by the coordinator/board) to become involved in the project. Six sets of coordinators/teachers did volunteer (one site eventually involved four teachers/coaches), and when all research ethics approvals had been secured, filming finally began. In each case, a teacher was asked to deliver a problem-based lesson that was tied to one of the Targeted Implementation and Planning Supports for Revised Mathematics (TIPS4RM) *Continuum and Connection* topics (fractions; integers; patterning to algebraic modelling; perimeter, area, and volume; proportional reasoning; and solving equations and using variables as placeholders), and then to further take part in a post-lesson debriefing/interview (usually with the coordinator if he or she was in attendance and wanting to participate) that was audio- and video-recorded. Interviews were then transcribed by a research assistant, and these were returned, along with the completed video vignettes, to participants for final checking.

In 2010, with funding from Nipissing University and a Schulich STEM Initiatives grant, over 22 hours of video footage (two cameras) was edited for preparation and inclusion in the 20 project videos. A subscription to VIMEO Plus was purchased in order to upload completed video clips to a secure, web-based server/channel for storage and access. Twitter and Facebook accounts were established for micro-blogging of math-related issues/events at the local, provincial, national, and international levels (see Figures 1 and 2).



Figure 1. RE4MUL8 Twitter account for sharing math-related news.



Figure 2. RE4MUL8 Facebook page for sharing math-related news.

The video footage links and Twitter/Facebook components were then merged into the web-based resource, using an *edublog* (see Figure 3), which was in turn linked to a newly registered Canadian domain name for easy access (www.re4mul8.ca).

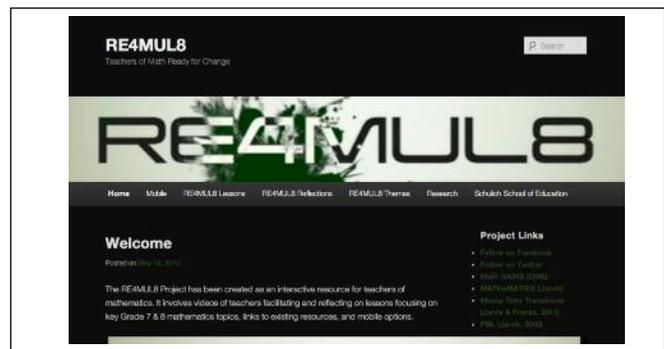


Figure 3. RE4MUL8 teacher resource available at www.re4mul8.ca.

The RE4MUL8 resource presently features an introductory video, seven TIPS-inspired lessons, and seven debriefing interviews, often conducted with both the teacher and the coordinator/coach. Further, in five thematic video compilations, teachers and coordinators/coaches share insights on the following topics: co-teaching, problem-based learning (PBL), “messy time” transition to reform-based teaching, math coaching, and the Ontario Ministry of Education’s CLIPS math teaching resource. Links to the two above-mentioned *Gazette* articles, the OME MathGAINS site, the MATHeMATRIX, the Twitter/Facebook feeds, and the new web app for mobile device access (e.g., smartphones/tablets) are also available via links from the index page.

Please be encouraged to visit and share this new resource (online and/or using the web app). The insights provided by both the new and by the more experienced teachers and coordinators/coaches are informative, honest, sometimes quite humorous, and timely. I trust they will inspire Intermediate Division teachers to adopt,

or to become increasingly adept with, problem-based teaching practices in mathematics classrooms. For those who are involved in the crucial work of supporting teacher practice within a city or board jurisdiction, may the informative comments of your counterparts shared in the interviews likewise serve as a challenge and reaffirmation of the great work that is already taking place in Ontario. The reflective interviews and themes may prove to be particularly useful in teacher professional development sessions, since they represent a wide range of teacher comfort/progress with PBL methods. Feedback relating to the resource is welcomed and can be emailed directly to the author.

References

- Abrahamson, E. (2004). *Change without pain*. Boston: Harvard Business School Press.
- Consortium of Ontario School Boards. (2003). *Targeted implementation and planning supports: Grades 7, 8, and 9 applied mathematics*. Toronto: Queen's Printer for Ontario.
- Consortium of Ontario School Boards. (2005). *Targeted implementation and planning supports for revised mathematics*. Toronto: Queen's Printer for Ontario.
- Fullan, M., Hill, P., & Crevola, C. (2006). *Breakthrough*. Thousand Oaks, CA: Corwin Press.
- Jarvis, D.H. (2006). *Tracking the TIPS mathematics document: Curriculum negotiation and professional development models*. Doctor of Philosophy dissertation, The University of Western Ontario, London, Ontario, Canada.
- Jarvis, D.H. (2008). Thinking outside the rectangular prism: Fostering problem-based mathematics learning. *Ontario Mathematics Gazette*, 47(2), 23–28.
- Jarvis, D.H., & Franks, D. (2011). "Messy time" transition to reform-based mathematics teaching and learning. *Ontario Mathematics Gazette*, 49(4), 28–34.
- Ontario Ministry of Education. (2005). *The Ontario curriculum, grades 1–8: Mathematics, revised*. Toronto: Queen's Printer for Ontario. ▲

▲ SCHOLARLY ACTIVITIES OF MATHEMATICS TEACHERS

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Acknowledgements

We gratefully acknowledge support from the Alberta Advisory Committee for Educational Studies and the Math Council of the Alberta Teachers' Association.

Scholarship of Teaching and Learning

As mathematics educators at post-secondary institutions in Alberta, we have witnessed shifts as the expectations of teachers' professional practice continues to move out of the closed doors of the classroom and enter into public spaces for shared reflection and inquiry (Shulman, 2004; Smith & Smith, 2006). The teaching in post-secondary institutions is undergoing a similar shift in an effort to place teaching on par with other scholarly endeavours (Boyer, 1990). In our work with pre-service and in-service teachers, we believe we could both learn from and contribute to the Scholarship of Teaching and



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