

Book Review / Recension d'ouvrage

Thoughts on Teaching and Learning Mathematics

Toronto, Ontario: Queen's Printer for Ontario, 2015, 4 hours

ISBN: 978-1-4606-6609-8 (DVD)

Reviewed by / Revu par

Pauline Quan

University of Ontario Institute of Technology

Thoughts on Teaching and Learning Mathematics is a video compilation of interviews of education experts recorded during the 2015 Ontario Association for Mathematics Education (OAME) conference. The resource is aimed at mathematics educators at the elementary and secondary school levels. The topics resonate with current issues in mathematics classrooms throughout Ontario and are explained by individuals who are well respected by mathematics educators in the province. Unfortunately, although the individuals who were interviewed cite a few pieces of research, the resource as a whole is not heavily research-based. LearnTeachLead attempted to section the resource into small, usable sections consisting of 5- to 10-minute video clips; in actuality, however, the resource is dissected in such a way that it is hard to follow or to extract meaningful content. Interview questions were not asked on video, meaning that the viewer needs to remember the title of the segment to understand the subject under discussion. While the closed captioning helps slightly with comprehension, the resource overall is not an effective means of communicating about the issues. The DVD is available on the LearnTeachLead website (http://learnteachlead.ca/project_category/mathematics/). Full transcripts of the interviews have been published online and are a slightly more effective choice of media for this resource.

The first segment addresses mathematical thinking for every learner. In this segment, Chris Suurtamm speaks of what she thinks are the causes of mathematics anxiety

and how to overcome it. She challenges teachers to think of different ways in which students think about problems, different ways to solve them and to accept the possibility that teachers themselves do not always have all the answers. She invites teachers to involve parents in students' mathematical learning, to help change the society's perspective of mathematics learning, and to look at the curriculum for what the students should be doing in the classroom. Suurtamm also stresses the importance of having teachers deepen their understanding of mathematics knowledge for teaching through collaborating with their colleagues. She also argues that sound assessment is ongoing assessment in which teachers are listening and responding to how students are thinking. She stresses that students need to receive feedback as to how they are doing, as opposed to just a mark.

Nora Newcombe presents the second segment, which addresses spatial reasoning. Newcombe defines spatial reasoning and provides examples of how certain mathematics principles can be thought of spatially. The concepts she mentions are shapes, the equals sign, and the continuous number line. Pedagogically speaking, she believes direct instruction and play-based learning should be used together. On the topic of gender, Newcombe speaks briefly about her belief that the scientific community should realize that both girls and boys can be engaged and can improve their special reasoning skills. Educators should therefore simply dedicate themselves to learning and not to figuring out the gender differences. Finally, Newcombe describes some research she has completed with preschoolers. Her research suggests that although digital manipulatives may be useful, physical manipulatives led to better conversations about the shapes and therefore may be more useful for learning.

Marian Small begins her interview about substantive mathematics learning by saying that it makes sense to use games to help kids learn automaticity. Casual learning makes learning fun and inviting. She believes that it is important to have good mental mathematics skills and that the development of good mental mathematics skills should be part of the goal of mathematics educators. On mathematics anxiety, she believes that students pick up anxiety from teachers and parents. For Small, "confidence building trumps everything." Small believes that the most important process of mathematics is reasoning and that teachers still need some help "in seeing how reasoning works in math." She encourages parents to be casual but intentional in the learning of mathematics. She also encourages teachers to make "reflective decisions" on and to pursue what they believe is right for their students, even if it means respectfully disagreeing with what the "education

system” is asking for. She also points out that technology does not make one a better teacher but can be used enhance teaching. As for the administrator’s role, Small believes that administrators should push for change instead of seeking harmony. To Small, the most important part of learning is to be purposeful; teachers need to know why they are teaching what they are teaching and students need to know what their goals are on a daily basis.

Unlike the interviews with the other experts, Damian Cooper’s segments are snippets of his actual presentation at OAME. Cooper urges educators to begin with the end in mind and to make sure that the mathematics is authentic. He says tasks should involve generalizing, applying, and transferring; and not simply culminating procedures that have been learned along the way. A dynamic model of “diagnostic assessment, differentiated teaching, formative assessments, providing feedback and summative assessment” is necessary and should be mainstream in mathematics learning. Cooper claims that authentic assessments are critical, and assessments for different purposes are equally important. Most important is feedback, cannot be mixed with scores. He notes that feedback should not involve teachers correcting answers, but should highlight and direct students to problems so that they can address them themselves. Summative assessments should be designed so that students may take their learning and apply it in new or unfamiliar situations, while addressing multiple overall expectations. Finally, Cooper states that the role of educators is not to cover the curriculum in the same way for all students. The focus for evaluation should be on overall expectations and not on specifics.

Joan Moss speaks about her project, Mathematics for Young Children. She recommends that teachers use a guided approach when they teach mathematics, to find the time to listen to children’s reasoning. Mathematics educators need to be strong in their mathematical knowledge for teaching, which involves knowing the mathematics, knowing the children, understanding pedagogy and putting it together, but also involves knowing specifically how to teach the topics. Moss reports that there are times in which early years teachers’ mathematics anxiety is a hindrance. She also notes that even though early years education is play-based, discussions about mathematics should be regarded as an excellent learning opportunity. She speaks about the importance of paying attention to spatial reasoning, including visualizing shapes and mentally rotating them. Moss recommends that educators find ways to inject more mathematics into the full day. Just as literacy is relevant across all subjects, so should mathematics be, as well.

Connie Quadrini addressed mathematics for all students. She recounts her experience on the Middle Years Project, which was funded by the Ontario Ministry of Education. The project focused on mathematics learning among students with learning disabilities. The project involved educators and administrators from Grades 4 to 9 at both the elementary and secondary levels, and attempted to link mathematics learning to students' individual education plans (IEPs). The segment comprised snippets of Quadrini's presentation at the OAME conference. She describes two tasks that were completed as a collaborative inquiry within the Middle Years Project. The educators found that their students approached the process of solving the tasks differently. Even though all students used manipulatives, some students, in particular those with a perceptual reasoning need, needed other forms of support. In general, however, Quadrini points out that manipulatives help students lessen the load on their processing speed and working memory.

Overall, while the some of the ideas that Suurtaam, Newcombe, Small, Cooper, and Quadrini raise in the DVD are timely, it is unfortunate that the information has been published in this particular format. The segments are inconsistent: some are sit-down interviews while others are actual conference presentations. The DVD has an unfinished feeling to it. Some interviews digress, while others bore the viewer by providing too much detail with few or no visual aids. While some of the points that the presenters raise truly challenge the approach of current mathematics teaching, I doubt that many educators will have the patience to view this resource attentively.