Code: Solomon

APD 1210 RESEARCH PRACTICUM COURSE

PROJECT DESCRIPTIONS 2026-27

FALL/WINTER

Name and Title: *Dr. Tracy Solomon, Assistant Professor Teaching Stream*

Lab Website:
https://www.oise.utoronto.ca/aphd/Home/Faculty_and_Staff/Faculty/141918/Tracy_Solomon.html

TITLE OF RESEARCH PROJECT: *Effective Strategies for Math Teaching and Learning*

NUMBER OF STUDENT PLACES AVAILABLE: *2 students*

PRIMARY MODE OF RESEARCH PLACEMENT PARTICIPATION: *Hybrid/Flexible*

OBJECTIVES AND METHODOLOGY:

The overarching goal of my research program is to investigate effective strategies for teaching and learning mathematics, with an emphasis on the preschool through elementary school years. Practicum students can expect to have their own project to focus on and will also contribute to research activities on other ongoing projects in the lab as needed.

There are currently two projects for practicum students. It should be noted that both projects are at early stages, so student can expect to focus mostly on literature review. However, depending upon the size of the literature to be reviewed and student progress, it is possible that these projects might progress to study design and data collection.

The first project is concerned with the development of math fluency – automatized knowledge of addition, subtraction, multiplication and division facts. Committing math facts to long-term memory is of critical important as it frees up limited working memory resources, that can then be used to attend to the deeper or more conceptual mathematics to be learned. The challenge is to find engaging ways for young children to learn their math facts. Accordingly, this project will involve reviewing the literature for different pedagogical methods to helping children to acquire math fact fluency, the contribution of student characteristics to their effectiveness, as well as the potential positive impact on other mathematical outcome measures such as problem-solving. Depending upon progress with the literature review, this project could advance to a study to compare the impact of different approaches to teaching fact fluency with elementary school aged children.

The second project is concerned with the role of manipulatives that are used to support mathematical learning, particularly "hands-on" learning. Manipulatives may be concrete math specific items such as Dienes blocks or generic, everyday items like popsicle sticks or bingo chips that are re-purposed for math learning. Moreover, they may be 3-D objects such as wooden blocks, 2-D representations such as images of wooden blocks or virtual representations. Research on the latter in particular is relatively new, so a review of the literature would be timely and helpful. As with the fluency project, depending upon progress with the review stage, this project could advance to a study on the impact of various types of manipulatives on math learning.

DESCRIPTION OF STUDENT PARTICIPATION:

Students on both projects will be mainly focused on carrying out a formal review of the literature using PRISMA guidelines. See https://www.prisma-statement.org/. In terms of contribution to ongoing projects, they may be involved in the preparation of study materials, participant recruitment and data collection with preschool aged children, which will involve local travel to preschools/daycares, usually by public transportation (to be reimbursed).

The expected time commitment to the lab is 8-10 hours/week.

DESCRIPTION OF PREFERRED SKILLS/BACKGROUND (OPTIONAL): Students must be reliable, conscientious, able to work independently to meet agreed upon deadlines, and sufficiently fluent in spoken English to be able to communicate effectively with young children. Some background in quantitive research and experience working with young children would be advantageous.

DAY AND TIMES OF LAB MEETINGS: Meetings are expected to take place weekly or bi-weekly according to need and progress; day and time will be established at the start of term. Meetings are likely to involve myself and both practicum students to maximize students' learning and growth in their research knowledge and skills.