UNIVERSITY OF TORONTO
OISE | ONTARIO INSTITUTE
FOR STUDIES IN EDUCATION

Code: **Solomon**

APD 1210 RESEARCH PRACTICUM COURSE

PROJECT DESCRIPTIONS 2022-23

FALL/WINTER

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

Lab Website: https://discover.research.utoronto.ca/9442-tracy-solomon

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

NUMBER OF STUDENT PLACES AVAILABLE: *1 student*

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. Currently, there are two projects that could accommodate a DPE Med student.

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 here is to develop engaging ways for young children to learn their math facts. Accordingly, research on this project involves comparing the effectiveness of different pedagogical methods for helping children to acquire math fact fluency, the contribution of student characteristics to their effectiveness, as the potential positive impact on other mathematical outcome measures such as problem-solving.

The second project is concerned with the development of a preschool math supplement. The supplement includes age-appropriate activi†ies and resources, as well as teacher training and accompanying resources to help children develop the critical math skills and knowledge they will need to profit from the Kindergarten curriculum. The student activities are designed to be compatible with play-based learning so that they can be incorporated into any existing, coherent preschool curriculum. This project is currently in the development phase but research testing out the feasibility and effectiveness of the new activities are ongoing. Hence, research here will be focused on evaluating the impact of the student activi†ies on student math outcomes and some teacher surveys and interviews.

DESCRIPTION OF STUDENT PARTICIPATION:

Students involved in the math fluency project may be involved in all aspects of the research process, in cluding literature review, study design, data collection and preliminary data analysis, with support (according to student background and preparation). There may also be opportunities to contribute to the write up of a paper resulting from this work.

Students involved in the preschool project may be involved in the development of student and/or teacher resources to support execution of the activi†ies and games that are part of the preschool math supplement. Students may also be involved in study design, data collection and preliminary data analysis, with support (according to student background and preparation) and may contribute to the write of any papers resulting from this work.

For both projects, the time commitment expected is 8-10 hours/ week. Meetings are likely to take place over Zoom, in person, or in both formats, according to schedules and availability. Students should also note that data collection is expected to take place in person and thus will involve travel to city schools, usually by public transportation. However, students should also note that data collected may be adapted to an online format, should there be any issues regarding student accessibility, such as due to daycare/school rules regarding COVID-19.

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; day and time will be established at the start of term. Students should note that meetings will be one-on-one with me, rather than as part of a research team. Thus, there is the potential for considerable growth in terms of students' research knowledge and skills.