# Mathematics & Mathematics Education Seminar

Date: 10 August 2022
Time: 1030 – 1130
Venue: Via Zoom

ID: 86500494042
Pwd: 100822

An Institute of

NIE NATIONAL INSTITUTE OF EDUCATION SINGAPORE

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

# Cognitive and Epistemic Practices in Mathematics through Mathematical Reasoning and Modeling


**Abstract:**

The presentation includes a series of studies using the framework of the mathematical modeling - the theoretical and epistemic, and the cognitive perspectives. The first three studies will illustrate how cognitive attributes are connected across the disciplines of mathematics and science; how students develop the cognitive attributes over time; and the effect of a student-centered learning environment on students' cognitive development and critical thinking abilities. A professional development project that was designed based on the perspective of mathematical reasoning in the framework of mathematical modeling process will be introduced. In the project, elementary teachers were trained to use the mathematical reasoning and modeling approach in mathematics classrooms. The outcome indicates that teachers improved mathematical knowledge for teaching on Numbers and Algebra, but not on Geometry after the training, and showed changes in their belief on rule-based and reasoning-based instructions. Students learned mathematics from the participating teachers improved mathematics achievement scores as well as critical thinking abilities. The sequence of studies will be presented as a process of inquiries that I have gone through presented studies and projects.


**Biography:**

Kyong Mi Choi is an Associate Professor of Mathematics Education in the Department of Curriculum, Instruction, and Special Education at School of Education and Human Development, University of Virginia since 2017. Prior to UVA, she was working at University of Iowa from 2009 till 2017. She received a B.A. from Seoul National University, and M.A. and Ph.D. from Teachers College, Columbia University. She was also a high school teacher in New Jersey before pursuing her PhD degree.

Professor Choi's research interests span both student learning and teacher education. Her more than 40 publications include topics of mathematically gifted students, students' cognitive practices and learning outcome, and in-service teacher education using various qualitative and quantitative research methods such as CFA/SEM and CDM. She led several teacher training projects as a principal investigator to improve teachers' content and pedagogical knowledge in mathematics in typically underserved areas.