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*The Visual at the Core of Mathematics*

The brain we do math with, is a brain that evolved before mathematics and science. A number of sources suggest that much of our mathematical work is done in the non-verbal, visual and kinesthetic parts of our cognition. This is true not only for elementary students, but through to the highest levels of applying mathematics and research in mathematics. It is not true just for geometry, but throughout mathematics. However, the public face of mathematics suggests that the visual skills are optional and visually engaged students are on the margins in mathematics classrooms and assessment.

### **Session 1. The Visual in School Mathematics**

What do we mean by visual and kinesthetic cognition in mathematics?

What does this mean for our students?

Can effective visual thinking be learned?

Can visual thinking and expression be taught?

What support is needed for students to improve their skills working with visuals?

What assessment is appropriate?

### **Session 2: Visual Thinking in Mathematics and in the World**

What do we mean by visual and kinesthetic cognition?

Do you see what I see?

Can we change what we see and how we think?

When is this important in doing mathematics?

How does the role of this change with age levels?

What does this mean for the person applying mathematics in their work or in their participation in civil society?

### **Session 3. Preparation of Teachers and Teacher Development.**

What do future teachers experience in their undergraduate programs?

Can teachers learn to 'see mathematically'?

What is the role of technology in visual exploration and communication?

What barriers does technology present?

Visuals in mathematics and equity issues.