IS THERE A PLACE FOR PHILOSOPHY IN MATH CLASSROOMS?

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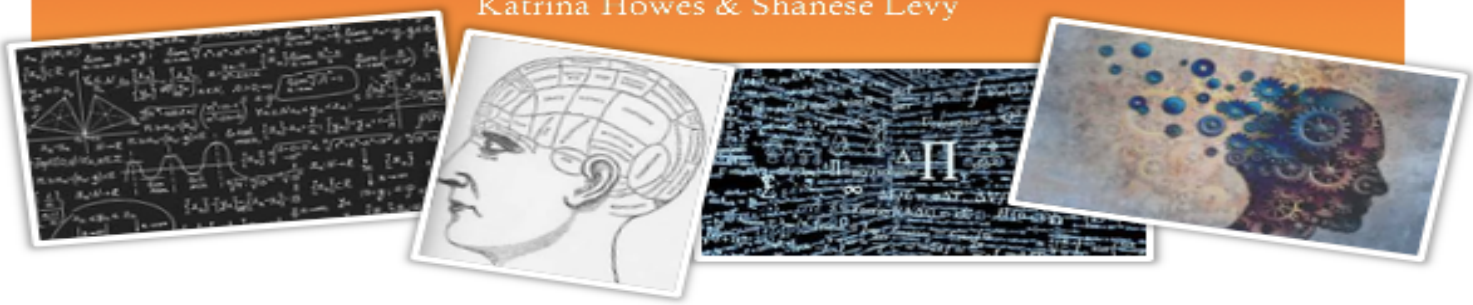

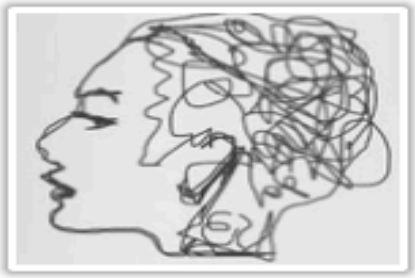

Logicism

Logicism is thought to be foundationally intertwined and almost synonymous to the concept of mathematics (The Editors of Encyclopaedia Britannica, 2014). Under logicism, propositions are accepted as "true" based on their form rather than their content; thus, they can be generalized to all contexts (Snapper, 1979).

Formalism

Formalism does not represent a single viewpoint, but rather a group of associated viewpoints under a common framework (Shapiro & Detlefsen, 2007). Formalists, like logicists, focus on form over content; however, formalists do not believe that such forms/the syntax connected to those forms actually exist universally, but rather solely in the context of that discipline and their associated truths (Snapper, 1979)

Intuitionism

Intuitionism looks at math as a mental activity, not as a set of theories, as logicism would suggest. Intuitionism proposes that all humans are born with natural inclinations (i.e., numbers, time, etc.) and once those have been mentally constructed in its entirety, we move on to the subsequent concept (Snapper, 1979).

Socratic Method

This method is comprised of a series of questions and answers in the form of a cooperative argumentative dialogue. The systematic questioning and inductive reasoning stimulate critical thinking and expose what parties already know or assume to be true. By exposing already existing beliefs, it attempts to name general characteristics that are consistent among the group (Overholster, 1993).

Dr. Christine McKinnon

"There are certainly interesting questions of metaphysics, ontology and epistemology relevant to mathematics. The metaphysical questions include whether mathematical 'objects' exist. The epistemological questions include what makes a mathematical statement true." *Dr. Christine McKinnon (Professor of Philosophy, Trent University)*

Dr. Franz Huber

"The role of philosophy in mathematics, as well as other disciplines, is not finished for the simple reason that there are many open questions regarding the foundations of these disciplines." *Dr. Franz Huber (Associate Professor, University of Toronto)*

Dr. Byron Stoyles

"I do not think the role of philosophy is 'finished' in math. As noted above, the rules and relations of math and logic overlap (if they are not identical). Thus, there is a sense in which math and logic—which is thought to be part of philosophy—are inseparable." *Dr. Byron Stoyles (Associate Professor of Philosophy, Chair of the Department of Philosophy, Trent University)*

What Does This Mean for The Math Classroom?

- The way we explore math in classrooms today has roots in logicism. Is there a need to explicitly address this connection?
- Inquiry is tied to the Socratic Method (Jackson, 2001). There is a wealth of knowledge about how inquiry leads to more purposeful and transferable knowledge. Maintaining the ties of mathematics and philosophy in this way is useful going forward.
- Philosophy is tied to metacognition - an essential skill for math. If we are intentional about the relationship between the two, we may see student benefits.
- Philosophy can help students look beyond simply numbers/calculations and can hopefully inspire children to associate math with real-life conditions; thus, deepening their understanding of how math is related to other areas of life. Teaching philosophy and math together may create this foundational habit of systems-thinking.

References

Jackson, T. (2001). The art and craft of "gently socratic" inquiry. In A. Costa (Ed.), Developing minds: A resource book for teaching thinking (3rd Ed). Alexandria, VA: Association for Supervision and Curriculum Development.

Overholser, J. C. (1993). Elements of the Socratic method: II. Inductive reasoning. Psychotherapy: Theory, Research, Practice, Training, 30(1), 75.

Shapiro, S., & Detlefsen, M. (2007-06-04). Formalism. In The Oxford Handbook of Philosophy of Mathematics and Logic.: Oxford University Press. Retrieved 20 Nov. 2019, from https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780195325928.001.0001/oxfordhb-9780195325928-e-8.