

## Grid Algebra – Conceptualization through visualizing arithmetic operations, order of operations, functions, inverse functions, algebraic thinking, equation solving on a grid.

Elementary Math Focus Afternoon: January 16, 2017 by Fred Harwood , Math Mentor Teacher @HarMath [fharwood@sfu.ca](mailto:fharwood@sfu.ca) <https://harmath.wordpress.com/>

At SFU, our Numeracy cohort were watching a grainy video from the late 70s showing Dave Hewitt working with a class. As Dave Hewitt's pointer banged on a blank blackboard, progressively moving, creating a visual/auditory image of arithmetic operations as motion, my heart stirred. Pre-seeded with the name, 'Grid Algebra', I immediately saw the possibilities for conceptually stretching the arithmetic into algebraic expressions. He was doing this with a pointer, a blackboard and a times table grid! I wanted to see more of his work. I started to search the web but initial efforts only found his modern work on the software Grid Algebra (2009+). This program was only in the PC environment and was relatively expensive which took the shine off some of my added excitement of seeing the power of this well-designed program. His videos, introducing the program, did show some screen captures that I thought could still be created without technology and used to good effect in aiding students' conceptual understanding.

I am extremely excited by the possibilities of Grid Algebra. Here are two videos highlighting the thinking. These are to introduce the PC only app but Dave Hewitt taught with the concepts on a blackboard for years before the tech solution. This approach will work from beginning counting on, skip counting, multiplying, dividing, pre-algebraic thinking, order of operations, inverse operations, variables, expressions, and solving equations! It focuses thinking on the 'movement' and not on the number; which is truly a powerful transformation in understanding. I think you will be amazed!

Getting to know the Grid: Grid Algebra 1: <https://www.youtube.com/watch?v=HmVjprJWInM>  
Movement: Grid Algebra 2: <https://www.youtube.com/watch?v=zuDdBqRxWq0>

There are several more videos that go into inverse operations and equation solving but you can follow the links from the first two.

What grade level does this fit into?

$$5 \left( \frac{3(c+4)-12}{6} + 3 \right) - 10 = 40$$

I had a group of grade sixes solving this conceptually after two short periods. Shall we begin?

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