Discovering Discovery Math

One Parent's Experience

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I recently accepted the role of Executive Director for Parents for Choice in Education partly because of my experience bringing my children through their educational journeys; in particular, my children's engagement with Discovery Math, the good, the bad and the ugly.

Discovery Math had the best of intentions at the outset-to teach to the unique learning style of each child-so no child is left behind. I was such a 'unique' child, often left confused and frustrated in Mathematics classes from an early age because I couldn't seem to retain my basic facts and I could not conceptualise why classic math mechanics (algorithms)-such as carrying- worked as they did. I was left unable to stick the math 'tricks' to memory-a key to progress into advanced mathematics. My middle son, in turn, appeared to have the same issues (in the area of mathematics) that I had had so for this reason-and others-I tentatively brought him home in 2005 (the tail end of his grade 3 year) in the hopes of salvaging his future educational success. As I explored a variety of curriculum in search of one that would fit my son's learning style I found a few that I have used through the years that have given him, and myself, just the right level of differentiated instruction (and unique strategies-such as stories to memorize multiplication) to fit our needs. As I taught him I often found myself thinking things like, "Why didn't anyone 'show' me why carrying worked that way? I could have understood math from the beginning!" With these tools we were able to return to the short cuts of traditional math algorithms and gain the speed and fluency traditional techniques allow for, with a depth of understanding that has transformed my son, now in Grade 10, and me-a bonus- into proficient mathematicians.

The intentions of Discovery Math were to do what I was able to do at home, one-on-one, with my son, for an entire class of children. The unfortunate error in the final development and implementation of the Discovery Math curriculum was that the scale tipped-instead of to a balanced approach-entirely in the other direction. Traditional math algorithms (methods and equations used to complete math challenges) were thrown away and replaced almost entirely by multiple math techniques-differentiated and inquiry learning-and packaged as 21st Century learning.

My other two children, who remained in a public school classrooms or aligned with the Alberta Education Discovery Math, faced a curriculum that had all but tossed out the traditional algorithms entirely and instead began teaching a myriad of constructivist approaches for each math question (multiple modalities for multiplication, another group

of hands-on approaches to division, and on, and on, and on). This curriculum does not stop at showing each technique of model, so as to catch 'unique' learners, but requires every student to show proficiency in each technique. Whether the correct answer is the result is no longer the focus; rather, whether the child *shows* the right technique becomes the focus. The idea is that the students will then all comprehend the reason why math works the way it does. Instead, my children were left deeply frustrated and confused and I, as a parent, found the models so strange that I couldn't assist them. The new way educators test proficiency has made matters worse because the focus has gone from getting the correct answer to using the right method. The result is predictable, and we saw it play out with our children, the majority of students without unique learning styles who would have become proficient mathematicians with the traditional algorithm based math curriculum and direct instruction are confused by the new modalities (and punished for not using them) and the children with unique learning styles still have little to no grasp of the 'reason' they are learning in this array of styles because the methodology is no longer brought to bear on traditional math algorithms or outcomes.

To make matters worse measuring proficiency becomes murky. One student could get all the right answers on an exam and still get a poor grade for not showing the correct work or model, while another student could pass because they showed the work, even though the answers were all wrong, showing a false positive. Because the grades received by children are distorted by the new testing modality, the students are no longer being graded on understanding, but rather on correct *technique*, thus parents are being left in the dark as to how poorly their children's math comprehension really is. As for educators, as stated by Mike Schomker (*When Pedagogic Fads Trump Priorities*), "they are '*required* to integrate DI (differentiated learning) into all their lessons-against their better judgement". I have had teachers throw their hands up in dismay when I have confronted them about the pitfalls of Discovery Math, stating they were on my side, but had no say. Though most teachers can see the new math isn't working, they are mandated to teach it.

The result is sad but predictable. My eldest son, who had appeared to be a fairly strong math student through grade nine with this new math curriculum, could barely cope with the Math 10c class his first year in Alberta high school. We, as parents, were shocked and dismayed. While he was able to graduate at the math pure level in 2014, his grades were disappointing, and he is a self-described *glorified button pusher* because of his inordinate dependence on a calculator. He will have difficulty competing to enter post-secondary education. My son should not have struggled in mathematics throughout his high school years. We know that he was one of those students who could have been proficient in the traditional math curriculum. We feel our first born child was failed by Discovery Math and we were left blissfully unaware until it was too late.

Because I had my first son's experience as evidence I did not align my homeschooled son in junior high, and have since brought my youngest daughter home as she was showing a similar reduction in math comprehension under public school Discovery Math. I use an American curriculum that focuses more heavily on traditional math, with

occasional remedial explanations and models as to why the math works as it does. My second son is aligned this year for the first time since grade six. The result is that he, who is actually a weaker math student than my first, is not having similar struggles in Math 10c. He has a foundation of understanding that my first born was stripped of by Discovery Math.

My experience is not unique. As stated by Margaret Wente (*Canada's Math Woes Are Adding Up*), "In the 2008-09 school year, the province introduced "discovery math", which encourages kids to find new and creative ways of solving math problems (some of them quite cumbersome) and throws standard methods out the window. Alberta's math scores, once among the highest in the world, promptly plunged. In 2012, 15.1 per cent of Alberta's students failed to meet the minimum standards on PISA's international math test-more than double the failure rate (7.4 percent) in 2003. The percentage of top-scoring students declined to 16.9 percent from 26.8…The lone exception is Quebec, whose teachers have clung to some of the old-fashioned ways; the province now leads the nation in math performance." The tragedy is that, "Just a decade ago, Alberta's education system was the envy of the world."

One would think these statistics would raise alarm bells across Alberta Education and give all government officials and edu-crats cause to reconsider this new learning for the 21st century that focuses entirely on inquiry/differentiated learning. Instead of bringing the scale back into balance, it appears as if the intention is to continue down this road with Inspiring Education, which would see differentiated learning introduced across all subject matter in school regardless of the fact, according to Mike Schmoker, "(there is) no research or strong evidence to support its widespread adoption."

So, what is the answer? Well, it seems clear to me as a parent that it is time to bring balance back into mathematics education, and we should put a halt on any expansion of differentiated learning techniques-like Inspiring Education. It is time to return to proper teaching. As described by Mike Schmoker, "Good lessons start with clear curriculum-based objectives and assessment, followed by multiple cycles of instruction, guided practice, checks for understanding (the soul of a good lesson), and ongoing adjustments to instruction."

The difference between my approach with my one unique learner at home, and the approach taken by Discovery Math, is that I did not swing the pendulum entirely in the opposite direction-abandoning traditional math outright. I continued to keep the core of my son's math education focused on the tried, tested, and proven traditional math methods, and only when, after testing for proficiency and finding a gap in comprehension or retention, did I layer his lessons with other methods of instruction to help him to understand the concept at a deeper level. When we arrived at an examination I gave my son the right to use any technique that worked for him to get the CORRECT answer-not expecting him to perfect a barrage of methods-and I graded his exams for correct outcomes; which, let's all admit, is all that matters in math.

The issues around Discovery Math and Inspiring Education- which would see this errant imbalance spread across the curriculum-are very plain to see, and very easily corrected. Discovery Math and Inspiring Education has good intentions, but good intentions do not always lead to good outcomes. These curriculum changes have and will continue to lead to poor outcomes because of the heavy handed, all-or-nothing approach that does not respect years of traditional curriculum that has proven its worth. The answer is give the power back to the teachers, and to parents, to choose the best curriculum for their learners, and to start testing on the proficiency of the outcome once more, not on the proficiency of the methodology. If we do this, then every child will truly have the opportunity to become as proficient as they are capable in mathematics and in every other subject matter they engage on in their education journeys.

It is clear to Parents for Choice in Education, and me as Executive Director, that it is time to separate pedagogy from curriculum in Alberta once more. This would enable teachers to teach to their student's needs, and parents to have genuine choice when in search of an educational setting best suited to their children's unique learning needs. Government involvement in education should be limited to defining a rigorous set of basic skills outcomes for Grades 1-12-while staying out of pedagogy, or the 'how' these skills should be taught. Government should discern a standardised model for testing to ensure these skills are being taught effectively. Finally, government should return parent education taxes to the education settings of the parent's choosing. With a solid foundation of expectations in place, government can leave the pedagogy in the hands of educators, and foremost, in the hands of parents, who know their children best!

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