The Wilkie Way

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The Industrial Revolution

Can we learn from history or do we continue to make the same mistakes in the belief that "evidence based" research on the best way to teach mathematics is the magic bullet?

The pendulum on the best way to teach mathematics began over 200 years ago through the publication of two opposing philosophies of teaching methods published just over 30 years apart.
In the 30 years between 1788 and the text written by Pike, and 1821 and the text written by Colburn the world had seen a huge change. The world was poised at the beginning of what is now termed the industrial revolution. To create the "revolution" required people who were able to think critically, creatively, strategically and logically.
Pike's philosophy of the teaching process based on state a rule - give an example then complete practice exercises was not sufficient to develop the use of mathematics required to solve unfamiliar and yet to be invented problems.
Colburn's text stated the need for sequenced questions using concrete materials and to postpone practice until the student understands the mathematics.

The philosophy of our current curriculum statements appears to be biased towards a belief that mathematics is about getting correct answers and students need to be able to recall facts and apply set procedures to familiar problems in everyday life. (The word "memorise" appears numerous times in the document well before students will have had the opportunity or experiences to understand the mathematics)
If the goal is to get answers correct then all a student requires is instructional understanding as in Pike's publication that met the requirements of mathematics 240 years ago.

If our goal is to to look good on narrow assessment tests then Pike's philosophy will suffice.

If our goal is to produce people who are able to think critically, creatively. strategically and logically then we should be swinging towards Colburn's philosophy.

The Mathematics and statistics processes,(still very well hidden on Tahurangi) investigating, representing and connecting situations, generalising and explaining and justifying findings, push us in the direction of Colburn's philosophy.
The philosophy is based on the belief that students need to build an understanding of mathematical concepts, to explore why processes or formulas work, to connect pieces of knowledge together. It takes into consideration the recognised requirements for a rapidly changing world.

The one aspect both sides of the pendulum agree on is the need for practice but practice for improvement requires intrinsic motivation and the desire to improve.

The way a teacher implements the curriculum in their classroom is heavily influenced by their own philosophy of mathematics. and pressures from outside influences - School leadership, parents, ERO and MOE.

Unintended Consequences of Teaching

Teaching that focuses on students understanding both what to do and why, results in transferable mathematics knowledge. As the new knowledge is connected to knowledge students already know the new learning is easier to remember. (The sequenced structure of the curriculum is intended to support this gradual building of mathematical knowledge). This type of understanding is one of the most intellectually satisfying experiences.
However this type of understanding develops over time and becomes more complex as a student makes more connections between ideas. Teaching for this kind of understanding takes time and a teacher with a conceptual understanding of the mathematics.

Having the curriculum set out with the expectation that students are taught the content of their year group rather than their next step in understanding will for some students defeat the objective of new knowledge building onto known knowledge. We all know students do not all learn at the same rate.

For many students who struggle with mathematics, teaching instruction is limited to instructional understanding. This allows for students to appear to make progress. They get more answers correct on tests. They learn facts by rote and can recall them at speed. This is often used as a measure of mathematics success. However there is no real understanding and not understanding is one of the most frustrating and ultimately defeating experiences.

Students whose school mathematical learning experiences have been limited to instructional understanding will often, but not always, be defeated and end up seeing themselves as no good at maths. Hence the myth arises that you are born with or without a maths brain. For many students this results in maths anxieties which are a very real barrier to mathematics learning.

Unintended Consequences of Assessment

What happens when a student's learning is measured in a high stakes environment (any one off timed test where the results are shared with a third party)?
For students it is not learning occurring and then being measured, it is learning being changed for the measurement and by the measurement. (Teaching to the test)
The intended real understanding is changed for many students to instructional understanding to meet the measure.

And what about the teacher?

A successful implementation of the curriculum is reliant on the teacher standing infront of the class and not on the curriculum document. Four days professional development on unpacking the document does not build the required conceptual understanding of the mathematics.
Teachers are also the result of an education system that for many left them with an instructional understanding of mathematics. Most teachers state they can do mathematics, many have secondary qualifications in mathematics but that does not necessarily mean they have a conceptual understanding of the mathematics required to enable them to assist students to make connections that they themselves may not yet have made. This is especially true for the early levels of mathematics as many of the early concepts are in the unconscious and often not even recognised as early mathematical conceptual building blocks. Connecting these ideas is how concepts deepen and expand and become more complex. If early ideas are missing then further development is impossible. The current phase one curriculum is conceptually overloaded and will result in instructional understanding to get through the content. This will give the illusion of progress. Phase two teachers will have a hard job building onto the somewhat shakey foundations. The current curriculum for years 7 & 8 has become very much pure mathematics , which really requires the expertise of a specialist teacher.

The idea that teacher qualifications (as a previous Minister of Education assured me) ensures teachers completing their qualification will have everything they will ever need to know to teach mathematics, is, and never was realistic .

Schools in countries that achieve highly value their teachers as learners and professional learning is built into their working week.

Without ongoing professional learning over time to meet individual teacher's learning needs their development of mathematical conceptual understanding will be limited and therefore real understanding for all students in all schools will never be achieved. Many students will only have access to instructional understanding and thus the number of numerate adults required for our rapidly changing future will continue to be compromised.
When this was pointed out to the "man from the ministry" in 2002 his response was, "We can't acknowledge the actual problem as it would open a can of worms." Is it any wonder we have made no progress in the last 24 years and without opening the can of worms no progress will be made in the next 24 years?

Tales from the classroom

I've Come to help Miss!

Come in! COME IN!
Will you see who is at the door Zane.

Oh, it's Michael again. Hello Michael, what do you want this afternoon?
You've come to help us again , how nice.
Yes James he can help your group if you promise to be sensible.
They are drawing pictures of their number stories, perhaps you could write the number sentence for them.

Michael, please don't draw the picture for them.
You are good at drawing James and getting Michael to do it for you won't help you learn.
No, he can't do it while you play with the bricks!

Michael, perhaps you had better help a different group. How about helping the playdough group. They are making playdough numbers. Keep an eye on Solomon, make sure he isn't eating it.

What's the matter Raukawa?
Michael has got all the playdough.
A very kind thought, but you are not supposed to make the numbers for them.
Maybe you had better help another group.
The home corner!
That's a good idea, You can play with Tiana, Courtney and Eru in the home corner.

Now lets see how these number stories are coming along.
What beautiful pictures Zane and William, I can see so many dinosaurs. Oh, they're cats today are they!
James, what a super picture, see you didn't need Michael's help after all.
Yes, you may go and play with the bricks now.

How are my playdough people. What lovely numbers.
You're right Solomon, playdough doesn't taste very nice. Oh, Raukawa was eating it today was he?

That's a lot of giggling coming from the home corner.

MICHAEL!

I think you had better go and help next door.

Wilkie Way Membership - annual subscriptions

Individual Membership
$60.00
payable via Paypal

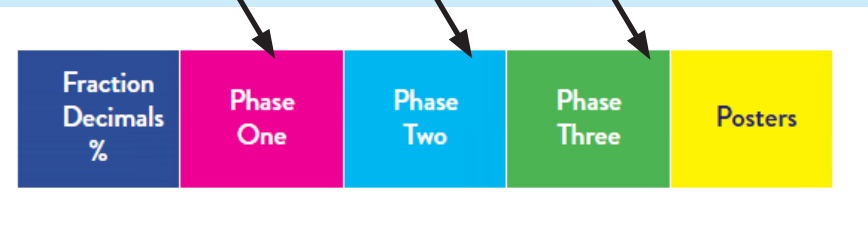
School membership - via invoice
Under 30 students $65 + GST
31 to 100 students $180+GST
101 - 300 students $290 + GST
301- 500 students $400 +GST
501 - 700 students $520 + GST
701+ students $630 + GST
Non NZ School $750 - paid via paypal

Recently uploaded resources

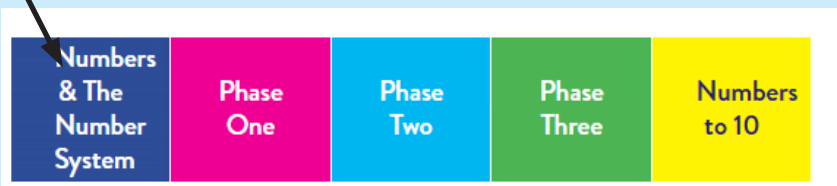
I have been spending some time unpacking the new curriculum and I stand by my first impressions of a curriculum that it not particularly teacher friendly in its design.

Most recently I have been looking at the rational number section and find distinct areas for creating a classroom programme very mixed up. The practices not directly aligning with the knowledge - being just one of my frustrations.
I can quite see why teachers would ignore the curriculum and rely entirely on the resources provided.
(I have my reservations)

Ensure you are covering everything you need to cover in the fractions, decimals and percentages space.
I have re-organsied and aligned the knowledge and practice for each year group from year 1 - year 8
Locate the documents here, from the membership directory page



Place Value is perhaps the most mis understood part of the curriculum - developing number sense is about understanding how the number system works which is far more than place value - the value of the digit in the place it is in.
I have created a document using the curriculum links for the teaching of “place value” from year 1 - year 8
Locate the document here, from the membership directory page.



All the overview plans and unit plans for years 1 - 8 have been updated to reflect the latest curriculum. They are labeled October 25 Curriculum Unit Plans. The April 2025 unit plans are still available for schools still using these for this year.