



NUMICON CASE STUDY

International School of Düsseldorf, Germany



School Profile

Teacher: **David Lyttle** (Learning Support teacher for Elementary Maths)

Curriculum: **International Baccalaureate - Primary Years Programme (PYP)**

Pupils on roll: **400 students** (in Elementary School)

English as an Additional Language: **75%**

Nationalities Represented at ISD: **45** (in Elementary School)

Native Languages spoken at ISD: **30** (in Elementary School)



Why did you choose to use *Numicon*?

For effective mathematical teaching, the school believes in a guided inquiry approach to teaching that goes from the concrete to the pictorial and then the symbolic, in line with the seminal studies of Jerome Bruner. *Numicon* appeared to be a fantastic concrete material that would clearly show mathematical concepts in a fun, engaging way and greatly assist our present short-term number based intervention program.

How do you find the teaching resources? And how well do you think these resources link to the PYP?

My reaction to the entire suite of *Numicon* resources is very positive. I love how interactive my lessons have become with the assistance of *Numicon*. *Numicon* helps structure activities that enable children to actively explore, engage, and construct understanding. *Numicon* also provides a model which the pupils can refer to when they reflect on how and why operations work. *Numicon* materials assist my students in testing hypotheses and generalising mathematical concepts. I believe the potential applications of *Numicon* in showing patterns and other aspects of our number system are really limited only by the

imagination. I have found it easy to link *Numicon* to our guided inquiry approach to teaching maths and feel that it aligns very well with overall inquiry based philosophy of the PYP.

How did the pupils engage and react to *Numicon*?

Really well. The children loved using the *Numicon* shapes. It was incredible to observe just how fast and effortlessly the pupils could use and apply the *Numicon* patterns to demonstrate number bonds, the base 10 system, and perform various mathematical operations. *Numicon* helped children create regular 'light bulb' moments as they developed deeper connections and understandings about how number works.

What do parents think of *Numicon*?

During our student led conferences, the parents were able to see the children's enthusiasm for *Numicon*, as well as see the various mathematical connections being made. One parent commented that "I wished I was taught maths like this when I was at school." Another parent commented that they "could not believe that math could actually be so fun, engaging, and at the same time cement genuine understanding."



What impact has *Numicon* had on the Maths intervention program at ISD?

Raw data results were collated for all students that participated in the intervention programme from Grades 3 to 5 using a standardised benchmarking numeracy interview (GLoSS) upon entering and exiting the program. The results are remarkable. Students have progressed in terms of conceptual understanding an average of 2.55 Grade Level Equivalent (GLE) years in Addition and Subtraction, 1.5 GLE years in Multiplication and Division, and 1.67 GLE years in Fractions and Ratios. Moreover the average stay in the intervention programme was less than 15 weeks. So this positive success happened at a very rapid rate. In following up these students at the end of the academic year, 97% of students maintained or improved upon their assessment scores, indicating that the conceptual knowledge learned during the intervention program has been cemented into their long-term memory. Unfortunately I have no baseline from before we used *Numicon* in our intervention program that would allow me to quantify exactly how much of this result can be attributed to *Numicon**. However, I strongly feel that our intervention program has benefited immensely from incorporating *Numicon* and these results are at least partially attributed to our extensive use of *Numicon* resources.

Can *Numicon* be used for assessment?

Absolutely! *Numicon* is an excellent formative assessment tool. As *Numicon* is a concrete resource, formative assessment of student performance is very straightforward. Every simple activity becomes a performance task that allows the teacher to observe and take notes of students' confidence, competence, and overall conceptual understanding. This data can then be used to guide the overall pacing of the lesson and identify the next steps in learning. Such data could also be formalised into a Curriculum Based Measurement to record ongoing student progress.

How will ISD use *Numicon* into the future?

The remarkable success of the intervention program has led to a decision to add *Numicon* resources into our mainstream classrooms in both Prep and Grade 1 in 2015. It will also be used as a resource for enrichment and extension for children in higher-grade levels.

