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Why Is Good Numeracy Important?

“Good numeracy is the best protection against unemployment, low wages and poor health” (Schleicher, 2014).

Numeracy is present in our daily routines, telling the time, paying for shopping and understanding utility bills. Increasing with age when choosing the right mortgage, deciding which interest rates are suitable for you or decorating a room, all require numeracy skills. Confidence in numerical ability ensure informed decisions are made, which effect all aspects of life, financially, professionally and socially. A report by Pro Bono Economics in 2021 revealed that 57% of working adults in England and 60% of working adults in Ireland have low numeracy skills in comparison to Japan at 36%. It is believed to cost £1,600 per year to each individual with poor numeracy skills. In this essay the writer will explore the importance of secure numeracy and its impact upon the wider community, both politically and socially. It will display connections between key trends in attainment in numeracy. Also, Procedural Numeracy and Reasoning Numeracy. Including the theoretical perspectives of Behaviourism, Cognitivism and Liberalism.

It widely accepted in the United Kingdom to have a negative attitude towards numeracy. It may well stem from early experiences at school. In 2013 a study of respondents claimed 25% were still affected by negative memories of school mathematics (Marine-Society, 2024). In the 1960 education was teacher lead, with children sitting at desks facing a chalk board. Reading, writing and arithmetic were the core subjects. Children learnt by rote, chanting times tables. Mistakes were not tolerated and discipline was strict (Castelow, 2015). This behaviourist approach was advocated in schools at that time. Skinner believed in rewards and punishment. With the emphasis on reward. Skinner’s findings proving punishment resulted less favourably (Pound and Hughes, 2005, p. 43). The Plowden Report (1967) revealed a need for a more advanced level of mathematics in our society. Educators believed the subject needed to be more interesting and practical. It supported a change in attitude, with a child centered approach claiming “at the heart of the education process lies the child”. Piaget’s theory of cognitive development was prevalent throughout, illustrating that children think and reason differently according to their stage of development and their experience in the environment. The report also supported providing opportunities for discovery and practice to consolidate their experience.

The Cockcroft Report (1982) continued to endorse the power of mathematics as a means of communication to adulthood, workplace, further education, and other subject studies. Promoting practical experiences for primary schools and specially equipped classrooms for secondary pupils. Changing mindsets with an appreciation of the subject through hard work. (Education UK, nd).

Critical thinking has been highlighted as a vital skill for students of the 21st century. In a world of advancing technology, sustainability and care for the environment, we must possess problem solving skills (Kurnait et al; 2024). Results from PISA in 2022, show

Wales with an average score of 466 in mathematics compared to an OECD average score of 472 (Gov.wales, 2022). According to the Institute for Fiscal Studies there are poor outcomes across Wales, particularly from children with disadvantaged backgrounds, also second- generation immigrants. In addition, between 5-9% of post 16-year-olds were not in higher education, training or employment compared to 11% of a UK average (Institute for Fiscal Studies, 2024).

Paulo Friere strongly believed education could free people from oppression. His own impoverished childhood in Brazil, experiencing social and political injustice encouraged his own critical thinking. Friere's adult literacy schemes created cultural circles in poor areas allowing debate amongst teachers and learners. Thus, familiarising themselves with the learner in their own environment and recognising what is important to them, known as praxis. Through dialogue and praxis learners and teachers enter conscientisation, where reading is essential, allowing the building process with and from the communities to begin instead of for them. Empowering both learner and teacher to reflect and act, known as problem-posing (Aubrey and Riley, 2019, pp. 166-170).

In conclusion Friere is encouraging critical thinking and an active pedagogy in which, he invites people to participate. His theory encourages questions to change inequality or injustice. Friere wants to eliminate "the banking concept of education" moving from the teacher controlling the giving of information and the learner just receiving (Currell, 2020). According to Friere "The teacher is no longer merely the-one-who-teaches, but one who is himself taught in dialogue with the students, who in their turn while being taught also teach. They become jointly responsible for a process in which all grow" (Friere, 1975). The Welsh Government's aim "is to achieve high standards and aspirations for all, by tackling the impact of poverty on educational attainment and supporting every learner". It will continue to focus on all four core purposes within the curriculum, whilst recognising the importance of cross curricular subjects to raise standards and support skills for life, education, training and employment. Evidence from National Numeracy suggest people with low numeracy skills are twice as likely to experience unemployment and poor wages. British Cohort Studies claim poor numeracy can lead to depression. Children with social, emotional and behavioural difficulties may find numeracy challenging, regardless of ability. Children with poor maths skills in secondary education are twice as likely to play truant or be excluded. It also revealed poor numeracy skills link to crime with 65% of prisoners with a numeracy level of an 11-year-old and quarter of those held in youth custody that of a 7-year-old (Schleicher, 2014). Mathematics Support Programme Wales is a government funded scheme to improve standards, boost confidence and encourage more young people to take up maths. Cabinet Secretary for Education, Lynne Neagle claims it will provide sustained improvements in attainment and raise standards in school. It will give real world examples of budgeting, borrowing and highlight a "can do" mindset (Gov.Wales, 2024). The digital age requires numeracy skills to process and understand the data. 90% of new graduate positions request a high level of digital ability (Schleicher, 2024). Mathematics and numeracy are vital to future generations. To be able personally budget,

understand financial literacy, will increase employability and earning potential. Thus, adding value to the Welsh economy (Gov.Wales, 2023).

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Element 2 - Blog

From Zero To Hero



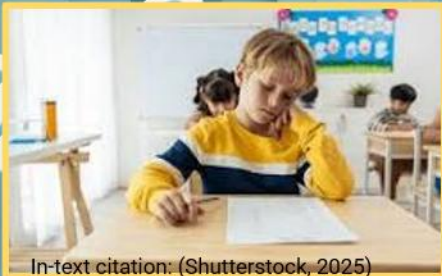
In-text citation: (Cute, 2025)

"Maths. The only place where people buy 60 watermelons and no one wonders why" (Quora, 2019). This reminds me so much of my own maths education. Word problems that did not relate to my world, chanting endless times tables and the dreaded test every Friday morning! However, things are about to change..... The Welsh Government are on a mission to raise numeracy standards for today and future generations (Gov.Wales,2023).



(Ranheim, 2020)

Why not let the practical journey continue with primary and secondary students. Cooking and baking for example, encourage weights and measurements. Buying the ingredients, comparing prices and offers are transferable to real life skills (Mathscurious,2024). Not only are you making a cake but making formulas more engaging and less abstract!



In-text citation: (Shutterstock, 2025)

Young children learn through first hand experiences, experimenting ,practicing and consolidating their learning through play. The joy of singing rhymes, counting songs, sharing stories and playing games are only the beginning of an amazing journey into the world of numbers! (Welsh Gov, 2015).



(Istockphoto.com, 2025)

Cross Curricular

Numeracy links to other subjects with great ease !

- Expressive Arts, exploring pattern, symmetry and music.
- Health and Wellbeing, money managing our daily lives and the consequences of debt.
- Humanities, sorting and analysing data to produce an entrepreneur of the future!
- Language, Literacy and Communication, bilingual songs and rhymes.
- Science and Technology, inquiry, evidence, design and development (Welsh Gov, 2022).

Who knew maths could be so versatile!

Personalised Assessment

Bruner believed in hands on discovery learning. Exploring, experimenting and concluding. Encouraging critical thinkers for the future! (Main, 2023).

Froebel concluded we should celebrate a child's individuality and the connection not only to their world but the creativity connecting areas of learning (Tovey, 2017).

Links To Theories

On line personal numeracy assessments engage the children with questions depending on their previous answer. Correct questions receive higher challenges and incorrect receive an easier option. The feedback provided enables teachers to plan individually for each child's needs (Hwb.Gov.Wales, 2024).

In-text citation: (Coutts, 2019)



Understanding



Fluency



Problem-Solving



Reasoning

My own experience with maths changed when I reached the dizzy heights of School Tuck Shop Assistant and connections were made! Now that's what I call a real hands-on experience!

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Information Resource Sheet for Numicon

What is Numicon?

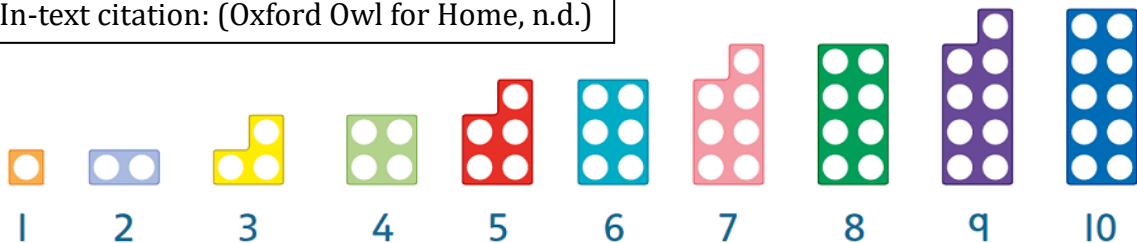
Numicon is a multi-sensory learning tool which helps children to visualise, feel and understand mathematical concepts. Based on the results of a research programme conducted by Ruth Atkinson, Romey Tacon and Dr Tony Wing. It follows the concrete-pictorial -abstract approach. The hard-wearing Numicon Shapes are made from plastic and are colour coded with the correct number of holes to represent each number from 1 – 10 (Team E, 2021).

A teaching pack comprises of Numicon shapes, baseboards, overlays, pegs and number line (Marlow, 2021).

Who Uses Numicon?

Numicon is a market leader in children's maths and numeracy development. It is used around the world by Early Years Foundation Phase, Key Stage 1, 2 and bridging gaps in Key Stage 3. It also supports kinaesthetic learners. It is ideal as an introduction to young children to familiarise themselves with colour, shape and number order (Twinkl, 2021). Numicon can be used at home with parents and childminders. As a whole school approach or as an intervention (Oxford Owl, 2025). It can also benefit children with Additional Learning Needs through its Breaking Barriers teaching programme (Numicon, 2025).

In-text citation: (Oxford Owl for Home, n.d.)



Why Do We Use Numicon?

Numicon is a physical resource of brightly coloured shapes, when placed in order children can easily identify with pattern and their value of one more, one less. Holding Numicon helps children to make that connection with concrete objects that are visually appealing. Helping children to understand from an early age how numbers connect. This Concrete-Pictorial-Abstract approach will give a secure foundation for future learning in KS1 identifying number bonds and beyond in KS2 resources extend to 100 allowing children to explore, reason, represent and extend their mastery of maths (Structural Learning, 2021).

How To Use Numicon

The first four stages of Numicon are:

- Pattern recognition
- Ordering smallest to largest
- Counting each hole individually
- Simple calculating, placing 2 and 3 together and comparing to shape 5

As children progress and become more confident Numicon can support:

- Places value, recognising teen numbers
- Adding and subtracting
- Number bonds
- Times Tables
- Fractions (Marlow, 2023).

How To Assess Progress

Numicon uses a formative approach:

- Assessment opportunities are listed at every activity
- Milestones mark children's progress of the previous 4-6 weeks
- Red, Amber, Green marking system
- Modelling Books shared with children show what is being learned
- Children discuss their own progress, strategies and goals with teachers, each other and parents (Numicon, nd).



In-text citation: (Inspire My Play, n.d.)

Supporting Learners

Dyscalculia is a neurological condition which reduces a child's sense of numbers. It cannot be prevented and is a recognised specific difference to maths (Knight, 2022). Children in a Nursery setting with dyscalculia experience difficulty counting, recognising numbers, ordering and making the connection between number and object (Cleveland Clinic, 2022).

Children with dyscalculia also experience difficulty processing and remembering information that has already been taught (Knight, 2022). Numicon provides multi-sensory experience, children are learning with their heads, hands and bodies too (Structural Learning, 2021). Numicon is an ideal resource for CPA learning style (Primary, 2020).

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Element 4

<https://youtu.be/6xFmGs08fNo> - link to numicon activity video.

Element 5

Evaluation

Numicon is a multi-sensory approach to support children's mathematical development. It was created by Ruth Atkinson, Romey Tacon and Dr Tony Wing after a research project to understand children's difficulties understanding abstract concepts. Numicon are brightly coloured plastic shapes, each shape has its own colour and hole to represent its number from 1-10 (Early Years Resources, 2025).

In this essay I shall evaluate the effective use of Numicon in the video example. The advantages and disadvantages of the product. Also, its connections to the Numeracy Framework and learning theories.

Children learn through first-hand experience. Their play allows them to experiment and consolidate their learning in environments that are fun and promote curiosity (Welsh Gov, 2015). The activity took place with a nursery child. The numicon was placed on a brightly coloured table inside an attractive box, creating interest for the child. Once opened, the intrigue continued with drawstring bags to be opened to find the Numicon inside! Much to the delight of the child. The bright colours appealing to her. I did not ask the child to identify the colour as they are secure in this area, but you could for others who are not. The sturdy shape was easy to hold and was securely counted by holding with one hand and placing the finger in each hole while counting. I acknowledged this with positive directed praise. Numicon is a versatile teaching tool and the holes lend themselves to the cheerios perfectly, demonstrating that every day objects can be counted. The presentation of the cheerios again holding the child's interest, prolonging engagement with the activity. They were counted orally into the shape and counted again using one-to-one correspondence. When the second shape was produced the child was able to make an estimate and explored the number by counting, comparing numbers and quantities (Welsh Gov, 20222). By visually comparing the shapes and retaining the information already learnt the child was able to identify the largest and begin to recognise the meaning of mathematical language. The Numicon shapes support discussion, helping children to explain their thinking (Twinkl, 2021).

Numicon is considered to be leading the way in developing maths skills around the world (Structural Learning, 2021). There are many advantages to Numicon and its appeal to children. Numicon was designed after research funded by The Teacher Training Agency. Each brightly coloured shape represents its own number with a corresponding hole, it also has a differentiated weight with its numbers 1-10 (Hope Education, 2020). Numicon offers a multi-sensory experience feeling, seeing and talking about the numbers make maths less abstract. Children can see the numbers grow as each piece has one more hole than the previous shape. This concrete-pictorial-abstract approach helps support numbers and their value from an early age (Structural Learning, 2021). Numicon is versatile and can be used in Early Years through to KS2. It can also be used along with other maths resources developing children's understanding further (Marlow, 2023). The concrete-pictorial-abstract approach used in Numicon supports Maths Mastery a theory developed by Benjamin Bloom, he believed that a subject is best learnt when broken down into smaller steps, accomplishing each step before moving

onto the next. Depth of knowledge rather than speed. Therefore, building secure knowledge over time and moving away from dated rote learning (Hope Education, 2020). The CPA approach used in Numicon also supports children with dyscalculia, allowing them to see the problem and to understand what is being asked. This approach supports all children, not only children experiencing difficulty, making Numicon inclusive to all (Knight, 2022). Numicon can be used in many areas in early years, setting up a shop would give a real-life experience and connect to other areas of the curriculum, understanding the world. This roleplay opportunity of children playing together, personal, social and emotional development. Children identifying number and numicon, mathematics. Discussing pricing, communication and language. Using number in context (Department of Education, 2022). This demonstrates a link between real-life, the purpose and language of money (Welsh Gov, 2022). John Dewey believed children learn by actively doing, experiences needed to be meaningful and a hands-on approach is the best way of learning (Main, 2023). Numicon may also be used outside and in large form (Marlow, 2024).

There are disadvantages to Numicon, a starter pack is £329.99, a Breaking Barriers One to One pack is £139.99, with a separate Breaking Barriers Group Pack £274.99 (The Dyslexia Shop, 2024). The packs appear to be very similar if not the same. There is a vast range of products and supports, each with an added extra cost. Children can become too reliant on the colour and see the bright coloured shapes as toys (Marlow, 2024).

I have shown and discussed how Numicon can be effectively used in the classroom. It is an attractive maths resource that supports a hands-on learning approach allowing children to make basic concepts that can be applied during their play and other classroom activities (Welsh Gov, 2022). Numicon's concrete-pictorial-abstract approach, which supports Bloom's theory can be linked to Conceptual Understanding, progression step 3, where concepts can be built on and deepened (Welsh Gov, 2022). Numicon's approach on seeing and doing with speaking and listening, give all children a positive experience (Numicon, 2025). Making Numicon an inclusive to all. A study by Numicon revealed that 91% of teachers found it "had a positive impact on children's mathematical learning" and is a market leader in primary schools around the world (Twinkl, 2021).

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