Befriending numeracy

As previously stated in the article *Oral Language*, literacy along with numeracy rates frequently make their way into news headlines. The main reason for their reoccurring feature is because data states that each skill has a profound impact on one's physical, emotional and psychological wellbeing and lifestyle outcomes. The reaction from governments therefore attempts to eliminate poor literacy and numeracy outcomes to ensure that no child's potential is compromised.

Regardless of the above, numeracy is a subject in which many children consider themselves inadequate. For these (among other) reasons, children often avoid numeracy related tasks and/or state they cannot improve because there is a belief that numeracy competence and IQ are directly related. While IQ and aptitudes undeniably play a role in the level of ease an individual may experience when undertaking numeracy tasks, there are things that can be considered to support the advancement of numeracy skills and improve overall ability in this area. This article will discuss some ideas.

Numeracy relies on cumulative knowledge

Numeracy concepts do not exist in isolation. Instead, the work undertaken in each grade/year level is essentially scaffolded by previous work. Today's education system often produces fast-paced lessons to ensure that every element of the school curriculum is covered. Unfortunately, the downside to approaching teaching in this manner is that numeracy is often taught quickly. For some, such speed may reduce their chances of developing an understanding of concepts before they move onto the next. To highlight this point, two examples will be provided below.

When undertaking my own teacher training (yes, I am an over-achiever and have qualifications in social science and education), a teacher explained to me that she was tutoring a child. Said child had gone to many tutors prior to her and remained at a D standard in math. The key to getting this child up to a C and beyond, she explained, was not to make sure he could recall the steps of each task, but rather to help him reach a proficient level of mathematical understanding of all the concepts they had covered in earlier years. Initially, the parent was not happy paying for tutoring that took the child over concepts taught four years earlier, but the results spoke for themselves. Within six months, this child had stopped stating that they could not do math and they were achieving a B standard.

Another example exists again from my teacher training. When observing a literacy class (my apologies that this is not numeracy related) I made a comment that the children were very good at being able to identify all the elements of a sentence and grammar. It was quickly explained to me that at the beginning of the year most of the class could not do either. After enquiring how the children improved so much, the teacher simply smiled and said, "I took them back over grade one, two, and three curriculums until everyone understood how to do grade four tasks."

While it is great that teachers know the above strategy is essential in getting children to do well in numeracy, parents often do not. As such, trying to help children plough through their daily homework tasks may be in vain if there is no consideration of whether other lessons need to be revised first. Conversations with children's teachers may help shed some light on what might be done to support and develop children's competency in this subject and/or enhance their understanding of a particular task.

Anxiety about doing math

Numeracy tasks are synonymous with provoking feelings of helplessness and anxiety. In extreme cases, it can lead individuals to avoid numeracy tasks and develop unfounded beliefs about their ability to be competent in this subject. While a formal diagnosis is needed to determine if a child is suffering from math anxiety, a

diagnosis itself does not determine one's inability to achieve in this subject and improve over time. Instead, like any emotions that provoke feelings of dis-ease and worry, the trick is to learn how to calm oneself and instill a belief in the capability to overcome adverse situations, including those invoked by math-related tasks.

In order to calm oneself, it is important to avoid situations and/or behaviours that provoke more anxiety. Rushing children, comparing them to siblings or other children their age, and becoming flummoxed by the fact that children were able to complete a task one moment and not the next, will do little more than ensure feelings of anxiousness are prolonged. When thinking about the neurobiology of the brain, it is important to remember that any situation that creates stress will prevent individuals from being able to problem solve and access the knowledge they have already acquired to complete a task. As such, talking slowly, asking the children to explain the steps they are going to take to work out the answer, and/or getting them to write down a list of steps to work out the problem may help assist them to remain more relaxed.

Highlighting successes

The biggest problem with mathematics is that there is a right and wrong answer, yet hidden beneath the answer are a series of steps to reach the correct answer. Despite instances where children may get many of the steps leading to the answer correct, they will get the overall calculation wrong. When the focus is trained at the cross on their page, it can contribute to a child's deteriorating belief that they are incapable of succeeding. In instances where children make mistakes, highlighting the steps they did get right can help lessen the blow of getting things wrong and help to challenge their perception that they are bad at math. In other words, rephrasing the way we see things helps to recalibrate the brain and teach it to view a wrong answer as containing one or two mistakes rather than the whole thing being incorrect.

Practicing a little equates to practicing a lot

Numeracy is everywhere and is connected to a lot of things we do. Practicing numeracy does not have to replicate a classroom environment. In fact, very young children are extraordinary when it comes to finding ways to practice math in their everyday lives, for example, they will count as they jump, they sing songs that have counting concepts imbedded in them, they ask about numbers when they see them, and they ask adults to listen to them count. As children get older, however, the dazzle of learning math lessens, especially once it gets harder and success is not so easily achieved.

One way to practise math in everyday life, just like children did when they were smaller, is to embed practice into everyday life experiences. When going shopping, ask children to figure out which product is cheapest and/or the best value. Get them involved in supervised cooking experiences where they have to measure, pour and set ovens to correct temperatures. Create competitions by getting them to estimate how long it will take to get somewhere or how many kilometers/miles it is from point A to point B. For children that have a weekly technology time limit, get children to add up how many minutes they have been playing so that they can monitor and record their own playtime and understand when they have exceeded their time limits and have to put their device away (this strategy will, of course, need to be closely monitored). Getting children to help out when building things or put things up at home (such as a picture hook) helps them to think about a range of numeracy skills. Avoiding monotonous tasks that make math appear boring can help children to enjoy math, for example, playing board games, car license plate games and getting them to take charge of their own budget.

Being mindful of learning styles

Learning styles can greatly impact the degree which an individual experiences success in any given subject, numeracy notwithstanding. While each individual will benefit from a different approach, it must be noted that

it is the kinesthetic learners (those who respond best to carrying out physical activities) who may need additional support because their learning preference is one that is least catered for as they get older.

In formal classrooms it is typical to see children use concrete objects to help them work out problems, for example, unit blocks. Over time, however, these concrete aids are removed with the view that children of a certain age do not need them as they once might have. This view, however, can be seen as an oversimplification of age-appropriate needs. In instances where children continue to struggle, concrete aids can and will continue to help them until they reach a point where they no longer need them. Evidence of the benefits of aids can be witnessed in Chinese culture where all students learn to use an abacus and can, once proficient at using it, calculate advanced sums successfully without one. This example serves as a reminder that learning aids continue to be a benefit, if and when needed, especially if numbers and calculations do not come easily to a child.

Every-day problems

Previous articles published on this website have postulated the importance of letting children figure out problems on their own. As an adult, it is overwhelmingly tempting to want to help children figure out ways to overcome the adversities they face, whether it be with their friends, when they are trying to build/construct something, or trying to figure out how something works. The child who is always helped will undoubtedly feel supported in that instance, however hidden problems can arise. When others fix our problems, we learn not to think. Instead of seeking a solution we wait for one, thus meaning that our brain lies dormant when it should not be. When problems occur, children who are encouraged to think outside the box (even when we can see that their efforts might not be successful), will be quicker to learn that there is more than one way to solve a problem and they will learn to run towards such difficulties with an attitude of 'I can' rather than 'I cannot'. A big part of numeracy is learning how to problem-solve, thus meaning that numeracy skills can be aided by simply asking children what they are going to do to figure out how to fix a problem rather than telling them how to do it.

Summing up numeracy

Helping children improve their numeracy skills is not just a matter of sitting down and making them do extra homework. Multiple factors are at play when talking about numeracy ability and it is up to those supporting children to identify the best ways to help children practice, understand and problem-solve so that they can develop the belief that they are competent in this subject. Furthermore, numeracy success cannot be viewed or delivered in a one-size-fits-all manner. When children do not understand mathematical concepts, it may be important to look backwards rather than forwards to progress their learning. If children do not understand a concept, it may be necessary to identify the step taught prior to establish how knowledge has not yet been successfully scaffolded. Furthermore, the approach and the intensity of one's emotions can interfere with a child's ability to complete numeracy tasks and hinder their belief in their ability to succeed. Helping them stay calm and relaxed can be key to keeping them on track and encouraging them to persevere. Highlighting the things that children are doing/getting correct and allowing children to think of solutions for everyday problems can help challenge a child's thinking and make them question self-prophesising beliefs that tell them they are not good at numeracy and/or at figuring things out.

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