

The NCETM Maths Podcast Episode 79

Understanding Dyscalculia

Julia Thomson: Hello and welcome to the NCETM Maths Podcast. I'm Julia Thomson [JT] from the NCETM Communications Team, and for this episode of the podcast I speak to Cat Eadle [CE] from the Dyscalculia Network. Our conversation explores what dyscalculia is, how it might differ from more generalized maths difficulties and, more importantly, how every child can be supported to do and enjoy maths with the right support and teaching.

We understand that pupils with SEND need support tailored to their needs that can motivate them to engage positively with maths and help them to overcome their difficulties. And whilst dyscalculia is a particular struggle that pupils might have in maths, many of the approaches we discuss in this episode would be appropriate for any child experiencing difficulties with maths.

We firmly believe that all children can succeed in maths and are passionate about helping teachers find ways to achieve this. I really hope you enjoy this episode and find it as interesting as I did.

Cat, I have so many questions for you, but first of all, for the benefit of our listeners, can you just tell us a little bit more about who you are and what you do?

CE: Yeah, of course. Hi, it's nice to be here. My name's Cat and I'm one of the co-founders of the Dyscalculia Network, along with Rob Jennings. I'm an experienced dyscalculia specialist maths teacher. I've been a maths teacher, a dyscalculia specialist since 2003, so this is my 20th year. I run my own tuition business supporting learners of all ages with dyscalculia and maths difficulties. And I'm the co-author, with Steve Chinn, of a new series of books called Succeed with Dyscalculia.

JT: Excellent, thanks for that. So, my first question is how did the Dyscalculia Network come about and what are your aims as an organisation?

CE: So, the Dyscalculia Network came about because I was tutoring, running my own tuition business and I live in a tiny village in rural Oxfordshire. All of a sudden, I was getting inquiries from all over the country, questions about dyscalculia, asking for tuition or asking for general pointers towards who else they could find help from. And I realised that there wasn't anywhere else to send people. There was no overall organisation in the UK working on dyscalculia and dyscalculia awareness. So, the idea formed in my head that we could have some kind of network to bring people together who were dyscalculia specialists and connect them to people who needed help and I met up with Rob. I convinced him it was a great idea and we have been working on the Dyscalculia Network since then.

So that was 2018, and our aims have broadened as we've grown in the last five years and we now aim to not only raise awareness, to connect parents to help through tutors or specialist assessors, but also to help adults with dyscalculia and to help workplaces and projects working with adults to support them in the workplace and support their further education in maths, and to also work with our teams of assessors and tutors to help them progress in their careers. And we do lots and lots of work with schools, of course, being maths teachers ourselves.

JT: Lovely. So, an important question, I suppose, because as teachers we've often had children who might really struggle, but every now and then there is a child that sort of confounds our understanding, really, of what the issue is and how we can support them. I know I had a child like that in Year Six and it was really challenging. Can you explain exactly what dyscalculia is and, perhaps, what it isn't?

CE: Okay, so I think that we have to think of maths difficulties as a spectrum. And I think of it as a long line of which dyscalculia falls at one specific end of that line. Dyscalculia is distinguishable from other maths issues due to the severity of difficulties, as you say, you can see that pupil in your head who's really struggling. Difficulties with number sense in general things like subitising, so that means recognising a small number of counters or objects without having to count them individually.

A bit like, if you imagine a mother duck with her little ducklings behind her. She will just glance around and she will know if she's got all of her ducklings there or if there's one missing, she's going to stop and go back and look for it. And people with dyscalculia don't have that innate ability to just know how many are there just by a quick look.

Often, they struggle with comparing things and ordering numbers, things like that. And generally working with numbers, in general. And adults with dyscalculia would say things like they struggle with managing time, with managing money, with counting and with estimating, particularly estimating how long things take.

So, I think we define it as a specific and persistent difficulty in understanding numbers, which can lead to a range of difficulties with maths. It occurs through all age ranges, levels of education and abilities. And it can occur singly, but it often comes with a friend. There's a lot of co-occurrences with dyscalculia and other specific learning difficulties, which can muddy the waters as far as diagnosis goes. And we see that co-occurrence between dyscalculia and other specific learning difficulties like dyslexia or ADHD.

JT: You mentioned dyslexia. Why do you think the diagnosis, of conditions such as dyslexia and dyscalculia, is important?

CE: I think we can look at this in two ways. There is a point there to be made that if we're giving brilliant support to children in classrooms, then the diagnosis isn't the most important thing; the most important thing is the progress they're making and the support they're being given, because if we get a diagnosis and nothing happens after that to change anything, nothing's going to get better for the child.

So that is one side of looking at it. But we also have to look at the side of children's mental health and well-being. And often children who have dyscalculia or dyslexia are very aware that they're different to their peers, or that they find maths or English more difficult, or they have different challenges.

I think when a child has those different challenges and that we don't acknowledge that they have them and that there is a reason for them, and we're not saying they're to be used as an excuse or a label, we're saying it's a way to help a child understand what's going on in their own head and how they are thinking and learning.

And the reason we increasingly feel this is important is because a lot of our work is with adults with dyscalculia. And we frequently have comments on our social media, emails to us, private messages to us saying, I've just heard of the word dyscalculia and I just looked up what it is and it's me. I can see this is me and I felt stupid my whole life.

We had a woman in her 70s from Scotland contact us and say, I can't believe that I'd never heard of this, and nobody had ever said to me this was what the issue was, and she said for the first time in my life I don't feel stupid. I feel like there is a reason for the fact that I find this so hard.

And that's a really powerful thing. For an adult you can make that choice yourself. You can say, does it really matter to me that I have a diagnosis or not? But for a child, they're not in that position yet to know whether it really matters to them or not.

So, I think we have to err on the side of caution there and think that if we can get a diagnosis for a child who's clearly really struggling with a subject, and we can then use that diagnosis to give them better support, more specific support, funding potentially, then that can be really beneficial.

JT: Yeah, absolutely. And I think when we have children in our schools who struggle at primary, it might not seem like such a big issue, but I had a child in my class who had dyslexia in Year 6 and she had very low self-esteem as a consequence of that.

I think the situation can change quite dramatically as children go up to secondary school and have these issues. So, diagnosis can be a really powerful thing.

CE: If you feel there's a child in your class who's got dyscalculia and you can really see they're really severely struggling and they're a really long way behind their peers, then the first thing to do is to start to gather some evidence about that.

Maybe you'd like to look into using a dyscalculia checklist. There's a free one available on our website. There's also one by Steve Chinn on his website. And you might like to start to gather evidence. A checklist is just a checklist. It's just a way of starting to help you to gather information. It isn't a diagnosis, but it helps maybe, help you think about the kind of things that they're struggling with and things they can and can't do. So that's a really useful starting point. Also bringing that up if you're a TA or, if you're a class teacher, bringing that up with

your SENCO and start putting some process in motion, saying I think there's some concern here because the sooner we start helping children, the more chance we've got of helping them to make progress and get better at maths, before the anxiety really kicks in. So that would be my first piece of advice, is for you to start gathering some evidence and get them the help that they need as soon as you possibly can.

JT: Brilliant, that's really good advice. So, what about supporting a child who has difficulties consistent with dyscalculia or a child that you suspect has dyscalculia? What's the best way to support them in the classroom?

CE: As far as working with the children with dyscalculia, we have to think about how maths works in general. Maths is a building block subject, so everything relies on a previous layer, and we call this the 'Jenga effect'. So, if we have a really nice, strong Jenga tower, like we do at the start of the game before we start taking pieces out, then that would be a really strong maths tower for the child. They've got every layer of maths understanding and it's all nicely firmly lined up. There're very few bricks missing, and they understand maths really well. But what tends to happen with children with dyscalculia and maths difficulties is that some of those bricks, especially the early bricks, are missing.

The things like number bonds. There's nothing wrong with counting on fingers when children are little, and our adults with dyscalculia will still use their fingers. We're not saying that's a bad thing, but we can notice that they don't really understand the relationships with numbers often when fingers are being used, or they run out of fingers and don't know what to do next.

So, we have to think about which bricks are missing, because when we have bricks missing at the bottom of the tower, but we keep building more and more understanding on top of that, then we end up with a tower that's unstable. And this is when we see children start to feel really wobbly about maths.

And that's why we say as we see them progress through the school years, we see the problem exacerbate, and we see the anxiety becoming worse, and the children starting to refuse to interact with maths at all in the worst cases.

JT: So, I've had learners in my class, one very obviously, I think, had dyscalculia. I'm interested, how widespread a problem is dyscalculia?

CE: Well, the latest research shows it affects about 6 percent of the population. This was some research by Kinga Morsanyi at Loughborough University in 2018 and we have to bear in mind that 6% is approximately 1 million children, 2.5 million adults. That's a lot of children in the UK who actually have dyscalculia.

And her research showed about 24 to 25% of children also had difficulties with maths. So that's about a quarter of your class. So, about a quarter are going to struggle with maths and there's going to be one or two dyscalculics in every class. So those are pretty high numbers. Despite these figures, less than 0.5 percent of people with dyscalculia are being recognised in schools at the moment.

JT: Right, so that's an awful lot of, adults who are going to really struggle.

CE: Yeah, it's approximately, a child is 100 times less likely to be diagnosed with dyscalculia even than dyslexia, and we know that dyslexia is underdiagnosed.

JT: That is really interesting. I think that schools that are doing a lot of work in that area in terms of teaching children to subitise, looking at number bonds, those schools are probably going to have a much better opportunity of identifying children who are struggling with those sorts of relationships early on.

So, obviously, the early diagnosis of dyscalculia is very important, but realistically, and I know this from the child that I had that struggled in Year 6, there will be children with dyscalculia who arrive at secondary school really struggling. Why is it important for secondary colleagues to be gaining an understanding of dyscalculia?

CE: I think that's a really, really important question. I think that everybody should have an understanding of dyscalculia, the same as people have of dyslexia broadly. Dyscalculia is probably about 30 years behind in people's understanding and in research than dyslexia, so we have a long way to go to make sure people understand.

But I think anybody who's teaching maths, or any teacher in a school — because maths is in science, it's in history, it's in PE, it's everywhere — needs to have an awareness of what dyscalculia is, but particularly maths teachers, because maths teachers in secondary schools are often subject specialists who have found maths very easy themselves.

And so, it's quite a big jump in your head, when you find something naturally easy, to think about the people who really don't find that naturally easy. So, I think secondary maths teachers have a harder job in a lot of ways, because they often have to go back to primary maths, that they might feel is obvious, and really break it down for their learners.

Because if a learner has got to secondary school and they are still really struggling with the basics, carrying on will not make any difference to that pupil. In fact, they're likely to disengage even more and to struggle more and more. And you'll just see them making less progress, not more. Because the foundations, as we say - the 'Jenga approach' - are so important.

So, in secondary school, particularly, the opportunity to take children out of class potentially, or to give them support in class, and really build up on that firm foundation if they haven't got it yet, is really essential. And to do that, they need teachers who understand that it's not that they don't want to learn. It's just that they need a lot more help.

JT: So, in terms of teaching for mastery then, and thinking about some of the key elements of it in terms of things like mathematical structures and manipulatives, what should secondary maths teachers be doing when it comes to supporting pupils in their classes? Are there particular approaches that would work better or that you would recommend?

CE: Well, I think that this applies to all teaching, whether it's primary or secondary. The mastery approach has a lot of strengths that benefit people with dyscalculia.

I was talking to Judy Hornigold the other day, a maths specialist, about maths mastery. And she was saying, which I totally agree with, that maths mastery is about building number sense, about communication, about making generalisations and connecting maths. Using concrete, pictorial, abstract approaches, and metacognition. So, thinking about what we're thinking. And these are all areas that dyscalculics struggle with. Dyscalculics struggle with number sense. They have a difficulty understanding maths. They need extra communication. They find it difficult to generalise. So, we need to encourage them to start thinking about the patterns and relationships.

They find it difficult to see maths if they haven't got the visual or kinaesthetic resource. So, we need to give them that. And they also often become dependent on a procedure over understanding. So again, we need to be thinking about them thinking about maths.

And we always say it's not just concrete, pictorial, abstract. It's concrete, pictorial, visualise in your head. So, visualisation and verbalisation is really important for children with dyscalculia, to talk about their thinking and for teachers to model what they're thinking to these children. So, I think across the curriculum, mastery in general, the whole concept of it, is really important, but it is based again on that Jenga approach. It's based on building a firm foundation and building up, and if we get to secondary school and we haven't got that firm foundation, we need to be thinking about how we can try and implement strategies to help that and manipulatives are really, really important. As is making sure the work is at the level that the child is at as well. And that, if necessary, accommodations being put in place, whether the GCSE is the right thing for the child at that time, whether that's something that maybe could come later, and there are other qualifications that might be better for that child at that time. And, also, making sure they have things like extra time and so on.

JT: I do think that perhaps there is kind of a moving to the abstract at secondary school and not making the most of some of the opportunities that manipulatives give us to really develop children's conceptual understanding and to support them to make connections so, absolutely, I can see that maths would get even more challenging for children who struggle and children who have dyscalculia as they move up to secondary, if that kind of mathematical approach completely changes to something that is a lot more abstract.

We're thinking very much about maths in school, maths in primary, maths in secondary. I'm interested to know, what do adults with dyscalculia say that they wish they had learned at school in maths?

CE: Well, that's a really good question. So, adults with dyscalculia that we talk to — we talk a lot to adults with dyscalculia because we have an adult advisory board and they're very vocal in their opinions of what went on — I think the key for them is that they wish they'd learned what we would say is 'maths for life'.

They wish that they'd been taught more of the basics for longer. So, things like money, because they struggle with budgeting greatly. Things like telling the time and managing time,

because they really, really struggle with that. Things like looking at timetables and understanding what they mean.

Understanding simple spreadsheets, things that they're going to use in life and work every day. And those things, at school, we tend to move on to other areas of maths, but for dyscalculics and for those with maths difficulties, if we could really focus on the fact that they need life skills that would be really important.

In a report from 2009, the annual economic damage caused by poor numeracy skills in the UK, showed it was about 2.4 billion pounds every year. And that was back in 2009, so if we can think about getting people to have 'maths for life' skills, and our adults with dyscalculia agree with that, and we really focus on those skills throughout schooling, then we can put adults into the workforce who are able to advocate for the things that they find hard, but also have the basic skills, like understanding time and money and understanding those basic maths concepts that they really need for life.

JT: Absolutely. I suppose it's looking at the child more holistically, rather than just thinking about GCSE, SATs. Maths is a beautiful subject and, if you can do it, it's wonderful to look at the magic of all of the different things you can do with maths, but there is a practical, gritty element to maths that everybody needs.

It's quite sobering really to imagine those children that you have in front of you struggling as adults, standing at a bus stop, unable to get to a job interview or struggling with things that we all find so simple. Thinking about just being able to structure your time, knowing what time you have to leave for the bus and how long a journey is going to take, all that stuff that we take so much for granted.

CE: Absolutely. And I think, also, and there's a key point here, is that it becomes not fun to do something that's really, really hard for you.

So, if we can get the right level of maths, to the right child, then we can make it fun for them and re-engage their spark and interest. Because maths is an amazing subject, and it has so many wonderful connections and patterns. And, in our learners who have dyscalculia and maths difficulties, we don't find that they don't enjoy maths when it's at the right level for them.

My pupils love their lessons. They particularly love games, and I should really emphasise the importance of making maths fun, because if we can make maths fun, we take the fear out of it and they are enjoying maths and they're engaged with maths and, in that way, we can help children to then feel like they're positive about maths. And that's something parents could do as well, at home, is to be positive about maths and to point out maths all around us.

JT: So, obviously, we've really just scraped the surface here. But can you recommend any further reading or resources for teachers interested to learn more about dyscalculia, Cat?

CE: Absolutely. I mean, there's lots of great books out there that you could be having a look at. They're all on our website, but books by Jane Emerson and Patricia Babbie, *The Dyscalculia Assessment* and *the Dyscalculia Solution*, are excellent. All the books by Steve Chinn and Judy Hornigold as well, they're really good books to look at. Ronit Bird has some great books on games.

There's a new dyscalculia assessment called the MDA, Maths and Dyscalculia Assessment, that's being published next year by Rob Jennings and Jane Emerson. And that's what does the child really understand and what they don't. And that's suitable for any learner who you're trying to work out, what do they really understand in maths and what they don't.

And a plug for my own books with Steve Chinn. We have a new series of books called *Succeed with Dyscalculia* that are teaching tips with worksheets, because we often find that, for older learners - especially secondary or adults - the worksheets, like place value to a thousand or number bonds or times tables, are very much geared towards younger learners and not towards their age group. They need something more grown up. So, these worksheets are very clean and designed for any age learner, so they're very helpful.

We have a couple of amazing events coming up in March time. First of all, it's Dyscalculia Day on 3 March, and we have an educator conference on Friday 1 March online. More details will be on our website very soon.

And we also have the UK's first ever dyscalculia show, in person, at the NEC on 15 and 16 March that we're running in association with the SEND group and the Dyslexia Show. So, we hope many of you will be able to join us then as well and we can all meet face to face.

JT: Fantastic. So, you have a very busy March scheduled.

Well, Birmingham's a bit far from me, but I know that we have some NCETM colleagues who live down in that part of the world. So, I'm sure that they'll be happy to go along. Well, thank you so much, Cat. That was so interesting. And I still have lots of questions, but perhaps we can talk again another time.

But I'd just like to take this opportunity to thank Cat for joining me today on the podcast. And, as always, all of the resources and books and events that Cat mentioned will be put in our show notes. Thank you so much, Cat.

CE: Pleasure.

JT: And thank you for listening. If you enjoyed this episode, do please share it with colleagues and don't forget to like the podcast and follow us wherever you get your podcasts. It really helps us to reach a wider audience. You can also follow us on Instagram @themathspodcast. Until next time.