

# Transcript

## Digging for the Why – Season 2

### Episode 4 – Defining The Purpose of Maths with Susan Okereke

Published: 23 July 2024

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Special Guest: Susan Okereke

**Andy: 0:17**

Hello, and welcome to this episode of season two of Digging for the Why, the podcast for maths teachers where we explore the thoughts behind asking why. I am Andy, one of your hosts, and I'm joined as ever by the [insert adjective here] that Andy doesn't understand, Alison. Hello, Alison. How are you this morning?

**Alison: 0:32**

I'm extremely well, thank you, Andy. Well, that sounds very good. I was interested to see whether you were going to put an adjective in there or not. But

**Andy: 0:41**

Don't give the illusion away that this is scripted, Alison. Jeez, I mean, this is all off the cuff.

**Alison: 0:45**

It's just that you often put an adjective in there.

**Andy: 0:48**

I know, but I've realised I don't know what they mean. So I don't put one in just in case it's the wrong one. If you're listening to this thinking, what is he on about? Go back and listen to season one; where was it enigmatic? I can't remember which one it was. It was something that I thought sounded amazing. And it didn't quite have the official meaning that I thought in my head. So I taught maths and didn't really understand words. Anyway, we are thrilled today to be joined by Susan Okereke. I had the pleasure of watching her speak at the MNI conference last year. When we were thinking of people to get on, Alison suggested Susan, and she ticks every single box. What she's about, what she does in her work, what she does outside of her work. So I thought, I'll just go and get my little intro. I'll do my usual bit of stalking on social media. And it tells me, and I can tell you guys, that Susan is a maths teacher and a communicator where her aim is to encourage thought and discussion about how we can improve numeracy levels in this country. She's also a podcast host of Maths Appeal. So we better pretend we know what we're doing here, Alison, a little bit. She's a BBC Radio 4 puzzle writer. Susan's aim is to show maths is everywhere and for everyone. Which I think, anyone listening to this, who's listened to any of our shows before, that is digging for the why, trying to show people that everybody can ask why about this. So, hello, Susan. Good morning. Thank you so much for coming on Digging for the Why. How are you doing today?

**Susan: 2:12**

Hey, good morning. Thank you for your lovely intro, Andy.

**Andy: 2:16**

That's all right. It's what you write about yourself and what other people say.

**Susan: 2:21**

Thanks for reading what I write about myself. That's very kind of you.

**Andy: 2:23**

Exactly. That's what blogs are for. Right. That's what it's all about. Now throughout this season, we are doing it slightly differently. So we're trying to have some common questions to ask guests. And just to kind of see where the chat goes. So I'm going to start with our standard first question for this season, which basically, Susan is in the last couple of weeks. What's happened to make you ask why?

**Susan: 2:45**

Oh, well, I had a big think about this. And I suppose the last couple of weeks, there's been a bit of chat nationally about the idea of getting everyone to do maths until they're 18. I think that's a big question. But what highlighted for me was the fact that this country, that's the UK, we're so emotionally attached to this subject. I don't think we dig enough into why so many people are traumatised by maths. So, this question of people doing maths until they're 18, in many respects, everyone has to do maths anyway until they're 16. An extra two years, why should that be such a big deal? But if you look on social media and talk to people who aren't maths teachers, the charged emotion and negativity around the subject just really struck me. I knew about it already, but it really raised it up last week. And my question is, what is that? Why is that? It's not about judgment. It's about understanding what's going on within our country for that to be the situation. What can we do to change that? Because the idea of an extra two years of maths isn't fundamentally a bad one, but there's a lot to discuss around it. What's happening in the 11 plus years of compulsory education that's not working? People aren't just not feeling confident using maths; they're also terrified of it or angry about the idea of having to do more. For me, what is that about?

**Andy: 4:31**

It's strange, isn't it? Maths has this bizarre badge of honour, which is either I really like maths, I find it interesting, some of it's really hard, but it's great. Or it's like, I hated maths, couldn't do it. How do you survive every day if you

**Susan: 4:51**

couldn't do it?

**Andy: 4:52**

Exactly. I've said many times on this podcast that people, the older they get, have this badge of dishonour where they talk about how they don't like maths, hated maths, couldn't do maths, and all this rubbish. I just wanted to ask you, Susan, you know, you talked about how we can improve numeracy levels in this country, how we can get the discussion about improving numeracy levels in this country. Are you talking about children or adults, or across the board?

**Susan: 5:52**

It's multifaceted. There's so much around it. I've reached out to maths teachers, like at the MEI talk I did and other talks. I focus on what we can do in our classrooms to make them safe and welcoming for students. There's a lot about how we can teach well, and there's loads about that. But attitudinally, how do we help our students to feel safe and think that maths is okay?

That's a bubble. The reality is it's not just me in my maths classroom with my students having a nice time. Their parents have the biggest impact on their lives. What the parents say and do, how

they interact with their children about maths, has a huge impact on how students perceive maths. I've witnessed parents saying they can't do maths or hate it, and they send their children to the other parent for maths homework. I've heard kids say no one in their family is good at maths. This type of thing needs to be addressed. We need to support parents and not say these things. It's not true, and it affects the mindset of learners. If you believe you can't do something, you won't. If you believe you can, there's a chance you will.

That's one thing. Teachers have some impact because I work with teachers and am a teacher, but there's the wider society. I would love to encourage the discussion about why, in this country, it's okay to say that you're not good at maths or hate it. The impact nationally is terrible. It's not just about not being good at maths. People aren't able to pay their bills or look after their homes. We're in a living crisis, and people need to understand probability, percentages, basic addition, and ratios. Not being good at maths has a huge impact on your life. We should challenge the idea that it's okay to say you're no good because it's costing the country money, costing individuals money, and affecting people's health.

It's not one thing. That's why I was frustrated last week when they talked about doing maths until 18 because it felt very basic. It's a complicated question that goes to the core of why. Why is Rishi Sunak talking about adding two extra years of maths in schools? There's an issue with poor numeracy in this country, and it impacts our economy. But just adding two extra years without addressing the 11 plus years beforehand is a waste of time. Plus, we have a shortage of maths teachers and not enough specialist teachers.

I would love to see us think about the marketing of this subject. As a teacher, I'm aware some content I teach isn't relevant to students' lives. I wish I was spending more time on personal finance or getting people competent and confident with numbers to think strategically and methodically about problem-solving, critically about data, and asking good questions. That's numeracy.

I've said it before, and I'll say it again: I think there should be two qualifications at school. There should be a numeracy GCSE that everyone has to do, and it should be pass or fail. Everyone needs basic, good, competent everyday maths to go into the world with data literacy, understanding statistics, and problem-solving. Maths should be an option and should just be higher. I think the foundation GCSE is not fit for purpose at all.

**Andy: 11:07** No, I completely agree. Having taught for 20 years in secondary, I remember picking up a class when I went to a school in London. I picked up a year 11 class, bottom set. The aim was to try and pass, trying to get Cs. In the first couple of weeks, I wanted to figure out where they were at and what they could do. They didn't want to be in the classroom or school. This is year 11. They've got five months left or something, and they had enough. I kind of said to them, right, our job here isn't to get Us because we're not going to get there. They were going to either fail or get a G. So, I grabbed Metros from the train station, gave them to them and said, find something you don't know about maths. What is in here that's current in the world right now? Do you want to know? Because in these next few months, at least I can give you those skills. It kind of worked. They asked about things like stocks and shares and graphs, asking what these show and how to work them out. You can gradually get them back to the curriculum and try to get some things out of them.

**Susan: 12:14** You're obviously a really confident maths teacher who understands the idea of getting these people engaged first and then showing them something interesting to learn from. The reality is, having worked with foundation GCSE students for many years, it's such a journey. You know that a number of them are going to, I hate the word fail because it's not failing, but

they're not going to get the four. In somebody's eyes, where there's this magic number that you have to get.

**Andy: 12:55** Society's eyes, like they know. It's not failing, but in our society, on that day in August when they get the results, it's seen as a failure. They have to resist because it's seen as a failure.

**Susan: 12:57** There's a real challenge if you are given a year 11 bottom set, which I have been given a number of times. You have to rethink how you work with them because there's a fragility to that. It might be through their bad behaviour, disengagement, learning difficulties, or whatever. They know in that group that they've got to do an exam in the summer that matters. It really, really matters. If they're in denial, some of them might think they'll pass it even though they might not. Others know they won't pass it. You're dealing with months of them being disconnected. But what you said about getting them engaged with what matters in a practical, real sense, like maths in the real world, why shouldn't we be doing that with them? Why am I trying to shoehorn Pythagoras' theorem into their existence because it might get them some crossover marks? These people need to be super confident with percentages. They need to be able to comprehensively read a question and understand what it's saying. We should spend time on that. If they are 15 or 16 years old in year 11, they'll have done a lot of maths already. What's frustrating is they've seen a lot of the maths you're trying to shoehorn into a year, but they haven't engaged with it properly. That is sad. It's for a variety of reasons. You get to year 11 bottom set, and there's a story there. All of them have a story. It's about working out what we do with those students because the system is messed up. Thirty per cent of students every year are not going to get a four. That is the system in our country. Of the kids who are doing it, 30 per cent are not going to get the 4 and have to resit it. Even if, in one year, there are loads of students who do really well, 30 percent of them are still not going to pass it. There's a problem there. We need to let the students know that resits are a thing they might have to do. It's okay. It isn't failure. If you get a 3, why is a 3 terrible for some students? Why is it terrible? Shouldn't we be thinking, well, you've got a three for this, but what other maths qualifications can you do that will help you in the real world? With actual life. In jobs that probably we don't even know exist yet. How can we get them prepared for that? Because being able to do prime factorisation might get you three marks on a GCSE foundation paper, but after that...When am I ever going to use this in my life?

**Andy: 16:11** You're not. There's no other answer to it. You're not. It's problem-solving skills. That's what you get.

**Susan: 16:18** I don't hate teaching it. I love it because loads of kids really enjoy the whole process of getting a number and recognising primes. They enjoy the process of it. But if we talk about it more like, what skills are you getting from doing this topic? What transferable skills are you gaining by being methodical? Why is it useful to know prime numbers? Is it useful to notice patterns? Yes, yes, yes. Can you notice what's going on to recognise multiplication or other patterns? That is the conversation we should be having with the students. Not whether we have covered stem and leaf graphs. Who cares? We shouldn't be having that conversation at 15 or 16 years old.

**Andy: 16:59** Oh, another massive question.

**Susan: 17:02** Yes.

**Andy: 17:03** This is the point you were making, I think. This is one of the reasons we did this podcast, to try and talk about one of the episodes in season one. What happens to them from primary school? They have this curiosity and thrill of learning maths. All of a sudden, we get them at secondary, and they can just be turned off. We discussed a lot of that in the first season. Where do we lose them? If a kid has to come to me at 15, 16 and ask when they will ever use this in real

life, something has been missed in their journey and teaching earlier on for them to understand the point of what they're trying to get out of the maths they're learning.

**Alison: 17:42** They're saying that earlier and earlier. I've heard primary school children ask, what's the point of this? When am I going to use this? I think it links back, Susan, to what you were saying about attitudes in society around mathematics and the messages they're getting from the adults in their lives. Adults say I've never used this. I don't know why you're bothering. This isn't important. I was working with primary maths subject leads yesterday. We were trying to look at the impact they have on children's mathematics in their school. There's a lot of talk about what I had done as subject lead and what I had asked my colleagues to do. The conversation stopped there. Evidence of what we changed in maths in the school went as far as what we as adults had done. I needed somebody to ask the awkward question that we've now started asking, what's changed with the children? We got to thinking yesterday about a bigger, huge question. Why are they there? What is this education all about? Why are we sitting in school for hours a day doing stuff that we can't really see the point of? There's a big missing question. I think it's possibly also missing with the adults standing in front of them. How do we see our role? I remember two really interesting conversations I had. One with a year four child who asked me what my proper job was. I was his class teacher. He viewed me as like the scout leader, minding the kids for the day. He thought when they went home at 3:30, I went and did my proper job. I said, well, this is my proper job. Did they call you Arkayla as well?

**Alison: 19:36**

They didn't call me Akela, no, no. But various, I'm sure other things behind my back, but not Akela to my face, no. And then, a few years later, with the year six class, we were writing; there was something we were collecting words on the board, and there was a word that I couldn't spell. I said, "Oh, I hate this word. I can never spell this word." I can't remember what it was now. And one of my year sixes was a much better speller than I was. And she gave me the spelling. And one of the kids said, "Oh, there's a first, a child telling a teacher something." I thought that's not a first and it certainly shouldn't be a first.

We stopped the science lesson at that point and had a real talk about why I was standing there not wearing a school uniform and why they were sitting there wearing a school uniform. I said, "Well, I've got a few years on you. I went off to university, and I've got some bits of paper that say I'm qualified to stand up here and do this. You lot are going to be better mathematicians than me, better writers than me. Most of you are already better artists than I am. I might give you a run for your money with music. I'm quite good at that. But you have the potential and all I'm here to do is to try and make sure that you see that potential and are equipped with the skills to go and meet your potential." I probably didn't say it in exactly those words because they were 10 and 11, but there was a real moment of, "I think I might have got this a bit wrong with what this whole setup's all about."

**Susan: 21:04**

But I love what you've just said there, in the way that, as teachers, we should primarily be like model learners. This idea of us knowing everything is kind of nonsense. But it's also that with maths, and I say this loving the subject, I really enjoy teaching it. But I think we should be talking about the content of what we're doing and why we're doing it. We can rock up with the same content and change the scheme of work slightly, but it's the same content year after year. We get better at doing it, but it's the same content. And I'm like, right, yes. I like doing that because I'm now quite good at teaching some of the stuff I've done so often.

But the question is, how helpful is this to the students we're teaching? How ready for the real world are we actually making them? And if you're saying, "Oh, this student, these kids aren't getting this," you're like, well, yeah, okay. But why is that? Is it even worth us asking them to get it in the

first place? I know it's quite a disruptive thing to ask, but the world we're living in is changing so quickly. We need people to be critical thinkers. Loads of jobs now that people would normally be able to walk into and not have to be well trained for are disappearing. They will not exist in five to ten years. The thing that makes us different to automated robots that can do manual jobs better than us, is the fact that we can be critical, observe things, and notice differences. This is what we should be doing in our maths lessons. Thinking about personal finance, we're in a cost-of-living crisis. People aren't able to do basic percentages, which means they're throwing money where they don't have. The country is losing money for no real reason, because 100% of kids are doing maths, but the content, how helpful is it for them?

We should ask, what are we doing in the 11 years that they're in school to prepare them for the world outside? To be honest, there needs to be change in the subject.

**Alison: 23:36**

I think there's also the two sides to it, which you sort of touched on. There's the actual content of what we teach and its usefulness to everyday life. But there are also, as you said, those critical thinking skills. I was just having a look because I read something a few months ago. I'm terrible at remembering the stuff I've read. And that causes me issues.

**Andy: 23:57**

I know I will find it for you because I know I wrote loads down about it, and I probably even created a document to share with somebody else as well. So I will find it, Alison, and it will get a link. But it was talking about all these, it's overused, but the unpeeling, the onion bit, and in the middle of the onion is the maths that we, the maths that is useful to us in our everyday life and the maths that we want children to learn. Wrapped around that, there were all those critical thinking, problem-solving, the meta world of the classroom. I was thinking about what you said about Pythagoras. Okay, Pythagoras is not always very useful. I used it very often in my life.

But what fascinated me and fascinated me again when I heard somebody else teaching Pythagoras was the fact that people seek these generalisations; people seek these general truths that will always happen given a set of criteria. Knowing that things like that exist helps me to think and look for them in other places. No, the actual nuts and bolts of the square and the hypotheses equal to the sum of the squares on the other two sides in the right angle triangle, I don't use very often. But the fact that those generalisations and those rules and proofs exist helps me to go and look for them in other aspects of my life. It might be that I'm looking for them in music, in the structure of the tunes that we play. It might be, you know, I can kind of apply it to cooking that, you know, if you get the same ratio of flour, eggs and butter and sugar, you will make a cake. You can then vary it by adding your different flavourings. But if you've got that, that generalisation of a cake, you can then extrapolate from it.

I think we get so caught up in the content that we don't ask the question of why are we learning maths. What is the learning of mathematics giving to us as thinkers? Giving us in terms of the ability to interact successfully with the world around us.

**Susan: 26:02**

Yeah, well, because what you've just said there, I think is really useful to think about. What is maths giving us? What upsets me is the fact that if you think about, and I'm going to be quite general here, I think the majority of the UK, you ask them, they don't like maths. A lot of people like it, but the general narrative is, "I hate it. Can't do it. It doesn't really matter, or I can't do it. It's really important, but I can't do it." There's this whole thing, and there are people obviously within that like us who are like, "We love it. It's great." But the way it's talked about in general is like, "Maths is hard and boring and whatever."

What is sad is this word "maths" is just thrown around like it's a simple thing. It's just not simple. It's a really complicated, interwoven, connective thing that's huge. It is content, but it's also a skill. It's also a transferable skill. It's also a tool, it's huge, massive. What is sad is when it gets reduced to "I hate it, there's no point in it." And you're like, "No, there's definitely a point in it, but I understand your thinking," because people are saying this because they've been hurt emotionally. Let's not get that twisted. People have had awful experiences with this subject. I think it's one of those that a lot of people have locked onto and realise that they're not alone in it, so they feel safe to say it. The number of times I've gone to events and met friends of friends, my friends aren't teachers. I feel quite blessed in that it's quite a variety of people that I meet. When I tell them I'm a maths teacher, I'm at one with this space; I'm quite up for feeling this. But to begin with a maths teacher, you'd see their faces change, like pain, actual pain. And, "Oh, gosh. One. You must be so clever. Okay. Question mark two. Oh, you can see that back to wherever it was, the place they were.

**Andy: 28:12**

That instant little I'm going to be a 15-year-old where I hated this. Couldn't do it.

**Susan: 28:17**

Humiliated. Felt stupid.

**Andy: 28:19**

So many times.

**Susan: 28:20**

And you just go, it's okay. It's fine. I'm not that person. I'm cool. We're cool. Tell me about it. And actually, what I've found is most of them use to scratch the surface. They want to tell you about it. They really are traumatised by it. If you're like, "Talk to me, what is that?" I love teaching it. I think everyone can do it. And they just are quiet, they're like, "Everyone can do it. What do you mean?" I'm like, "No, seriously. That's why I do this job. I sincerely believe most people, if they are up for the challenge, come in, and they're into it, trust me. And they're willing to struggle. In a safe space, willing to find it a bit difficult and up for giving it a go. Progress can be made without a problem. I 100 percent believe that. I love teaching it for that. You can come in and think, 'Oh, I can't.' And you're like, 'Trust me, have a go, sit in the space.' That feeling, on the other side, is absolutely fantastic for them. And to witness it as a teacher is, I just love it."

But I just know so many people have not had that feeling of struggle and then success because that is what people who love maths yearn for. Give someone who loves maths a problem, and they're like, "It's difficult. It's really hard. I'm going to get it. I'm just going to get it." And they go, "Ah, see, it's amazing." And that's the thing, people who say, "I hate maths or can't do it," they've not had that feeling of, "Oh, I can't do it. I'm going to try. It's difficult, finding it really hard. Oh, it's starting to make sense. Oh, I've done it!" And that success is the addiction that people who like maths have.

**Andy: 30:07**

The mathematical kick that you get when you prove something when you solve something from whatever age you are, right the way through to us. I'm rapidly approaching my mid-forties, and I don't remember a time. Obviously, I've always enjoyed maths. I've always been, you know, Inverted commas, which you can't see on a podcast, good at maths, but you know, I still don't; I've said to Alison before that I don't count myself as a true mathematician. I've got a degree in maths. Who's good at maths?

**Susan: 30:34**

Yeah. Same. I'm a teacher.

**Andy: 30:35**

Who's good at maths.

**Susan: 30:36**

Snap. Snap. And that's the thing. I don't think of myself as good at maths at all. I very much think if I can do it, everyone can, but what's crazy is, you know, if you A lot of people see us on a pedestal and I kind of go, no, no, no, like, you know, and that's what I find super interesting. It's like, I don't think of myself as very different to anyone. to everyone, really. And that's what makes me feel sad when so many people say they can't, so I'm like, oh no, you definitely can.

**Alison: 31:02**

I think it's really interesting to define what it means to be good at maths because I've been told I'm good at maths, and I was told I was good at maths at school. I have a reasonable memory for mathematics. I could remember how to do things. And I got an A level in maths, and I needed a bit of support to get my A level, but I did get an A level in maths, after I got my A level in Maths, I was presumably fairly good at Maths. I worked in a pub after I left sixth form before I went off to university. And it was then, working in that pub, where the landlord said it had to be women behind the bar and we all had to wear skirts. Which is, there's some, there's some wise to us there as well, I think. We weren't allowed to use the cash register or a calculator. He had to do all the maths, mental maths. And so I was 19 when I made the discovery that if you had a number with a 7 in the, in the pennies, an amount of money with a 7 in the pence and a 5, you'd always end up with something with a 2. I had an A level in maths, and I distinctly remember post-A level discovering that. And so I think my definition of being good at maths, I was good at maths at that point because I worked hard, I remembered stuff and I regurgitated it on the, on a paper. And I still remember the sense, that sense of way, when I proved that  $\lambda$ , the coefficient of restitution, equals a third; that was one of the highlights. I nearly got up and ran around the exam hall. But, I restrained myself, and I sat down. And. But I now consider myself to be an awful lot better at maths because I actually understand it, and I don't, I can't, I can't calculate the coefficient of restitution anymore because I haven't studied that bit of maths in the way that I now feel I kind of understand the key stage, well, early years one, two and three curriculum probably. There are elements of the key stage four curriculum that I haven't done for a long time and key stage five, I'd have to do a lot of work to get there, but I think I would have a better stab at it now because I've got a much more. interconnected understanding of why maths works the way it does. And I, I just go back and I think I've probably said it in, in possibly even more than one of the, of these podcasts. The fact that a lot of the reasons that our young people give for not liking maths is that there's too much to remember. And the reason that people give for liking maths is there's not a lot to remember. And that goes back to that warm, fuzzy feeling of understanding when you, when that, that moment when two bits of information locked together in your brain. And I. Why does that make sense? Why does it not make sense? And I think our pupils don't maybe ask that and they don't recognise that.

**Susan: 33:41**

I kind of do want to challenge the idea of being good at maths, though. Like I have a real, it's a bugbear of mine. Because I think I just,

**Alison: 33:51**

yeah, I've got No, I completely agree. I think it is. And I think it's a, it's a, I think when we say that, what we, What do we mean by that? And I don't think that's, I don't think it's worth defining, we can all be good at maths.

**Andy: 34:05**

That's the problem though, isn't it? It is defined as someone who is at the top of the pyramid of calculus, they're good at maths.



**Susan: 34:11**

Yeah, this is it.

**Andy: 34:13**

And it's like, well no, because you know what? I've taught people who, at their level, are really good at maths. Also, I've got better. Yeah, and they don't need to go and do a degree in maths or study calculus at that level or solve these horrendous equations that you might have to solve. They don't need to do that. It's a competence level though.

**Susan: 34:30**

I think it's taking away from, like, I just almost wish it wasn't a subject. Because there's so much, it's so loaded as a subject, as a name. Because it's like, actually, like what you said, Alison, like you, you said you did your A Levels, and then you went, you know, you kind of went and you worked in the real world, and you said you noticed something about, like, you know, these numbers, seven and five give you a two in the unit. Nice, okay. And it's a type of thing that that's like, The exploration and noticing of these things, I think, is where the magic of the subject of maths is. And I think it's never-ending. Like I, like, in theory, I should have been the best at maths. and maths after my degree. And I just, what, I'm so much better now in a way I say better now in an area, in, in school maths, school maths. I'm like, you know, especially now like key stage three maths where I've spent a lot of time thinking about the different ways we think about representing things. Like, I've been on training stuff and talked about proofs, and we've done it using like blocks and like bits of blocks. And I'm like, Oh my God, it's. This is insane like it's so awesome being able to draw a thing that represents odd and even numbers that then you can generalize and make into algebra, like in a way that I was very good at quadratic equations. I could differentiate and integrate blah, blah, blah. I could, and I had a basic understanding and I have a much better understanding of that stuff having taught like higher GCSE and like A level because I've had to go deeper in that space for my understanding and it's like just the label of good at maths I just wish would be just thrown away like it's almost like, oh, you're a good reader, who cares? Like, can you read? That's the thing, you know, in Maths, can you use this tool in the world? And also, can you use a tool in the classroom?

**Alison: 36:22** I think there's also, though, the reading is deeper than that, because working in, in primary education, as I have, there were kids who were labelled as good at reading, who did what was, what was rather unkindly called, Barking at print and they could decode the words and make it make sense, but there was absolutely no sense of understanding. There was no comprehension. And so they could bark out a paragraph at you but have no sense of what they'd read. And I think there's a danger that we, that we We transpose that into, into maths and that if you know your times tables, there's an obsession with knowing our times tables. I could know my times tables, but they wouldn't do me any use if I didn't understand what's underlying it, what the multiplicative structures are, and what four times five means. You know, and if I see a four and a five in a problem, how do I know whether I've got to add them or multiply them or subtract them? them or do, how do I know if they're linked additively or multiplicatively? And so I think, I think the, the, there are parallels between the sort of the, the, there are parallels. There's a, there's a, there's a, there's a basic bit of maths that we can get to, but unless we go below that and say, well, what does it, yeah, but what does it mean? Okay. Seven and three is 10. Great. What, why, why and what, and how can I, how's that useful to me in the future?

**Susan: 37:46** But yeah. But I do think there are two, this is why I'm like, I almost feel like it's campaigning for, I do think there needs to be more discussion on this idea of numeracy and maths, because numeracy As a function in our day to day existence, everyone should have, everyone should, I think I should, with that throw in analysis of data, throw in personal finance, like, and the people should have basic numbers, like know about like measurement units, thinking about like ratio, thinking about the real world, like that is, can you do the maths necessary in the

real world for you? and your potential family to succeed to, and in your workspace. And a hundred percent of people need that. A hundred percent. Even people with learning difficulties, like we're trying to encourage people to have independence. It's something that everyone should have. Like being able to read and write. Numeracy, everyone should be numerate. Full stop. The maths thing, people who have an affinity for or are going to do psychology, or going to do geography, or going to do engineering, or going to do architecture need to know about Pythagoras and understand where it comes from. Need to know about generalizations. Need to be able to think, why is this happening with this structure in math? And be able to analyse that and use that, which will then be used in the specific area of the career later. Not everyone needs that information. Some people love it, and they want to do it higher, at a higher level, because they love to see those connections and like generalizations and enjoy the idea of justifying proofs and all the rest of it. Wonderful. But not everyone needs that. And we, I think we just need to understand that as a thing, as like, as a, education industry and the education system that we need to be preparing people for the real world one. And then for those who are interested in going into STEM subjects or just love maths as a thing, you know, then they have to do maths that is effectively the higher-level stuff that is about really, really looking at how things work and, you know, questioning that, thinking about mathematical thinking or the rest of it. And I just think we need, because we're not serving people currently, not properly.

**Andy: 40:02** So how do we, how do we make those decisions? You know, when do we make those decisions? That's the bit that always, I completely agree with you. And the bit I always get stuck at and always have done for 20 years of teaching and being in education is I don't want to pigeonhole this kid. 14 to say, Oh, you're going to do this course. I don't want you to have access to that maths because you're not going to need it because I'm the adult and I can make that decision. And that's the bit that always. I'd go, Oh, but when, when can I make that decision?

**Susan: 40:36** I think year nine is a really interesting space in this country. I think in year nine, there's a lot going on within that. But I think, I think I would say everyone has to do numeracy. And then, people have to take options anyway. This happens anyway. I think making maths as in the subject, which will be higher maths, would be like effectively the higher content of the GCSE. Make, and again, I'm thrashing this idea out for the first time properly, and this is a good question you've asked me, because I'm like because I think, I really think this is important, I think we should talk about this properly, and I think it should be an option at year eight or year nine where, but students need to know what options there are, so it's like, if you're looking to get into engineering, you know, I think careers need to be, needs to be better in schools. For people to be making decisions at the age of, of like, 13, just like cutting off stuff, but we don't, I think, careers in schools, we need to put more money into that. That's just the thing that needs to improve full stop. And on the back of that, then students can make more informed decisions. And I think year nine is a safer space to do that than year eight, I think. And then, and I think, I think 100 percent of people should do the numeracy GCSE until year 11. Like, I just think, you know, because even still, I think even students who are doing the higher, doing the GCSE maths higher level should still leave school at 16 having done the numeracy because they need to be on point with that. That is something that you leave school, and you should be skipping into the real world going; I know about percentages. I know how to; I know what a mortgage is. I know how to look at a graph and say that is rubbish data. Everyone should leave school able to do that. And so, yeah.

**Alison: 42:16** Is this a sort of, is this I don't know. Is this an, an argument in favour of Core Maths GCSE?

**Susan: 42:23** Yes. Yes, and yes, again. Like I taught it, I taught it a few years ago. And I was asked to teach it and I was like, oh, I don't want to. It's a new subject. It's like, you know, it's a. Like I had some spare space and they were like, Oh, we see it's a new course. And I was like, Oh, they went to the training. I was like, Oh, it seems quite interesting. And I taught it and I was like, this is

awesome. It's awesome. Everything I said was like; this is a hundred percent useful. Every single thing I'm saying is useful. It's a small group, and I was able, and I was able to explore maths in a way I've not done, but I was learning stuff before speaking to them. I've got a degree in mathematics and business studies. Like I was reading and learning and going, Oh, wow, I didn't know that. Yeah, I was able to work out that, you know, it tells you, you can work out your income tax. Everyone should know what's going on with their tax when it comes to their income. A hundred percent of people should understand what's happening with their wages. But that isn't the case. And there's only a tiny set of people who potentially take Core Maths if their school offers it. Potentially. Will have that knowledge. Unless they do accounting or whatever. That's nonsense.

**Andy: 43:47** Yeah, yeah, yeah. It is a wonderful course. Yeah, I think, you know, I think you could easily turn it into a, almost like a four year course, two years of GCSE style Core Maths. This is what you need. And then you kind of go into Core Maths A level, or you go into A level maths, or, you know, you've done your GCSE maths alongside like you're suggesting. I think it's interesting that, you know, at this point, Alison will probably giggle because I always say the exact same thing. Just conscious of time. Honestly, I could sit here and talk to you all day. Absolutely could do that all day, but I'm just. I sit here and think about what I want. I always want somebody to take something away from an episode if they listen to it. Yeah. Yeah. Well, and as we said at the start, it's amazing really how, you know, we've done a couple of these for season two now, and we've basically asked one of our questions, and then we just go where it goes, and it's been great. It's been really, really good. And I think that the overall message that I'm hearing from you is that we don't disagree that maths till 18 is a good idea. Yeah. I mean, it would be nice if Core Maths had been mentioned at the point of mentioning that. So I, I tutor a kid in year nine. I've said this to Allison before, I think I've said it on the podcast before. First thing she said to me was like, I don't was like, you don't actually have to do A level maths. There's other courses available. Like, and she was like, really? I was like, yeah, yeah. You know, there are other things and it's a wonderful course. And actually I really like it. But yeah, there's this kind of change in the narrative around maths, around numeracy. You know, could you imagine if, if we had more informed parents, more numerate parents, with an understanding of what their kids are learning at school and why, then the decision to choose a GCSE maths or GCSE Core Maths, if you like, or something in year nine, that's an informed decision that parents can help with. Yeah. Then that would sit a lot easier with me than me being a teacher going, Stamp, you're through. Stamp, you're not through kind of thing. And that's why, that's why I don't like it. And I think we need to He talked earlier about failure. And kids failing, and kids don't like failing. Kids hate failing. People don't like failing.

We have to, as teachers, create the atmosphere, and you said this earlier, Susan, well, that's fine. You know, there's a wonderful, my oldest kid is six. She was teaching about split digraphs the other day, no idea what they were, but she was teaching me, and it was great because I can sit there as a 43-year-old with my, you know, daughter in year one telling me, Daddy, that's a split digraph. I'm like, I have no idea what you're talking about, Chloe. And she said, well, it's this, and she explained it to me, and I was like, Oh, that's kind of cool. So, you know, we had that discussion and I can be you know, broad shoulder than if you like, or whatever it to be go. I don't know what that is, you know, teach me, I want to learn about that. And you alluded to that earlier, Susan, where yes, we've got degrees in maths, but you know what? I was, my mind was blown when I first saw the yellow and red counters to represent plus one, huge. When I saw some of the ways of introducing, taking away negative numbers and adding, I just saw that, and I was like, Oh, this is amazing. And some of the other things that I've seen in numeracy and, you know, of course, I can add numbers up and take numbers away, but it's not about me. It's about the kids in front of me. And there's a wonderful program on Netflix. It's a, it's a book series really from Ada Twist, scientist and Rosie Revere, engineer, and Iggy Peck, architect, and she's got friends. They're all in the same class and this author is amazing. Ada Twist scientist now does a show on Netflix, which the Obama's commissioned and paid for, I think and it promotes, I think there's six or seven, the kids in it and they have songs, but one of the things is, it's about being, you know, learning and

there's a song where it's like, I want to give up because it's not working. And they sing, they say, you know, don't give up, don't give in. You have to learn to make failure your best friend. And it's like, that is everything about education because too many people will go are failed at that bang, switch off down tools done. That's me. That's me finished. And that's what happens to kids in year nine maths and then into GCSE maths. And it's like, bang. Oh, you still can't do this one. Bang. You still can't do this one. Bang. You still can't do this one. And that's it.

**Susan: 48:03**

It's just, but this is, this is where I think that the narrative around maths has to shift and that's the, that's the discussion I'm, I'd love to kind of encourage. I don't know where you start this. It's like, it's because the failure part, like, maths. When you do problems, you get, you make mistakes, and it gets you closer to the answer. A lot of the time, failure is a part of success. Like this is what can you learn from your tripping over or making a mistake? What can you learn from each other? Like, I think also matters can be so collaborative and powerful when other people see the mistake you've made and move you forward. And I just wish there was a narrative. You have to be quick, you, it only matters if the answer's correct, you know, that all this nonsense, because it's not nonsense, but it is like, it's not the most important thing, because as a maths teacher, the skills around it are so much more important than the answer. Do you know what I mean? And that's like, and I think parents, there's an old school way. I think that that's a hangover to that because the parents maybe who are taught in an old school way, you've had an awful time or it's okay to say maths is hard and really like difficult, feed that to the kids and the kids will say stuff like, Oh, it doesn't matter. I've got the right answer. And you're like, no, no, that's changed. That is different. I don't care. I don't care about your answer. How did you get there? And that is like this idea that mistakes and failure are good. If you learn from them, that's what we need to be encouraging in the maths classroom. And I think the talk around maths needs to be much more about inclusivity. Because I think also there's a massive problem with loads of people who feel confident in maths and actually get off on making people feel rubbish. I mean, social media is terrible. So people will actively say, if someone says, I found something difficult, make a mistake, they will just publicly shame them. That should not be acceptable. I don't lose my temper much in the classroom, but if somebody laughs at someone else for making a mistake, I lose it. It's not acceptable. You know, the learning process involves mistakes. What can we learn from what that person has said? I think this idea that. People who are good at Maths are up here, and people who are bad at Maths are down here.

But actually, people down here are in a community of, like, being okay to say that Maths is rubbish. So then there's this divide between people. So there shouldn't be a divide. We need the subject to survive. That's what it is. It comes, well numeracy anyway, we all need the subject to survive. We all need to be confident in the subject. And that's what needs to happen. And there's a part of me that kind of goes, maybe separate numeracy and Maths first. So everyone just goes, because no parent, I think can say, you don't need to understand basic Maths. to live. Because actually, most parents will know, if you go to the shops, if you've got any bills, if you've got to decorate your house, if you've got to work at your wages, you need skills, and they want their kids to have that. That's not a discussion, that's like, people need basic maths skills, that isn't an argument. The maths thing is a bit separate, and that's like another marketing thing that needs to be discussed. And so my big push is, we need to get people prepared and ready to go into the real world, confident and competent in the basics, and we're not doing that currently. And that's the discussion I really want to make. How do we change that? I think maths teachers are the key. I think we are What happens in parent people's houses, we don't have much control over. Yes, it's the most important thing. That's had the biggest impact on kids. We can't argue that. But, school's also quite a powerful place. And if you can create a space where kids don't mind coming into your room, they feel safe to try, they feel safe to make mistakes, they feel it's okay to say that maths is okay, and they leave your classroom thinking it's all right. That is power for them, you know,

because they need to go into the world with that attitude. And we as maths level teachers have, we have a lot of power in that really, I think.

**Andy:** 51:58

That is a perfect place, I think, to finish because that's the story of this episode. Let's, you know, change the narrative around what people think about maths and get people asking why and wanting to know why. Right. Conscious of time. It's been a pleasure. An absolute pleasure, Susan. Thank you so much for coming on. Thank you, Alison, it is a wonderful suggestion to ask Susan to come on here. So, oh, you guys, that has been brilliant. Forget season three. And considering that we've just basically decided we're having a season two, hey, we'll get you back on again. I'd love to chat more maths with you.

**Susan:** 52:34

Absolutely. I could talk till the cows come home. It's been wonderful talking to you guys too. Really great.

**Andy:** 52:42

I will get all the links to Susan's podcast, and you can see more about her Twitter handles, etc. I'll put all that in the notes. Thank you so much for listening. I hope you guys have taken something away from this episode. And we look forward to talking to you again in the future. Thank you, Alison, for today.

**Alison:** 52:57

Thank you. It's been a pleasure.

**Andy:** 52:58

Thanks again, Susan. We will talk to you all again in another episode of Digging for the Why. Take care.