# School B Teacher 1 – 23 Jan 2017

Speaker 1: [inaudible 00:00:00] I'm transcribing it.

Speaker 2: Yeah.

Speaker 1: ... And all that stuff. I don't need to say that before I turn the ...

Speaker 2: I know. I know that.

Speaker 1: Yes and N–. I noticed that he had all the ones that had, had wheels on them and he'd take them off.

Speaker 2: Yeah.

Speaker 1: And then he said the second set he actually asked for them not to have wheels.

Speaker 2: ... To have wheels. Yeah. It's the best way for them to be.

Speaker 1: It makes perfect sense but it's one of those things that ... Even somebody who works in a school but doesn't necessarily teach wouldn't necessarily [crosstalk 00:00:31]

Speaker 2: No. You wouldn't think of it and so ...

Speaker 1: You wouldn't ... Until they start flitting around the room.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... But ... No, those teachers are great ... Not teachers, kids. [crosstalk 00:00:46]

Speaker 2: Oh yeah, great.

Speaker 1: They were really ...

Speaker 2: Good.

Speaker 1: ... And talkative and it was nice ... It was good using the library. One of them seemed to have an assistant of some sort.

Speaker 2: Oh right? Okay, We might have had some of the autistic facility kids. We have the county Strategic Autistic Facility in school.

Speaker 1: Okay.

Speaker 2: Which is mainstream so most of the children who are on the autistic spectrum are in [inaudible 00:01:12] lessons.

Speaker 1: I mean, it was fine. It was just this one came in slightly after [inaudible 00:01:16] and she didn't actually say, which one. [crosstalk 00:01:20] I didn't know. She just sat in the back of the [crosstalk 00:01:22]

Speaker 2: I'll work it out for you in a minute but yeah ...

Speaker 1: It doesn't matter, it was just kind of funny because there was this little person ... I almost invited her to come and take part but ... Interesting ... There's this balancing act that taking place and I think every school doing it slightly differently. How do we balance ICT that we know they need and computing that we have to do.

Speaker 2: Yeah.

Speaker 1: ... And trying to sus out and I think it's really interesting. It's ... The kids are aware of that at different levels.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... And some are very aware of the difference between computing and ICT and some just ... It's all the same thing.

Speaker 2: Yeah.

Speaker 1: ... And are aware of the difference. They don't think of them differently it's all stuff you do on the computer ... And it's also really interesting talking to them about the future because what they see themselves using computing for and there was a girl who said she wanted to be a vet but didn't want to have to do much on the computer. And on one hand you can kind of see how that works and on the other hand you think well the types of diagnostic instruments that are coming along, computers are going to be vital to anything medical, I would imagine.

Speaker 2: Yeah. They are.

Speaker 1: Particularly animals. [crosstalk 00:02:48]

Speaker 2: One of my brothers is a doctor and his school didn't do IT as GCSE and I made him do it, at home ... And he is so grateful for that because when he had to do all his research and big databases and so on, he felt here was just ... Advantage over people that hadn't ... Hadn't done that.

Speaker 1: Yeah.

Speaker 2: Yeah.

Speaker 1: Well, I learned ... My dad is a doctor and I learned a lot about computing broadly from him and he was one of the first small practises in the US to have digital records I remember the conversion and it was a huge conversion to digital records and I think still has a basement full of them.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... Paper records. It's now become so much of a norm but it was huge thing and he's was ... And also the other thing that he did ... Again I don't know if this is norm yet but his nurses all carry around a lab top and he experimented with different things and just carried a lab top between [inaudible 00:03:54] rooms.

Speaker 2: Yeah.

Speaker 1: He says diagnostic technology is where ... Is one of the biggest improvements we'll see.

Speaker 2: I think that's vital skills for people to have.

Speaker 1: Yeah, but it shows how over arching computing skills are ... That really, there aren't going to be many ... I'm struggling to find many areas ... Many broad areas where people won't use computing in some way or computer skills. There might be specific jobs and there'll be different degrees but a degree of ICT literacy ...

Speaker 2: Yeah.

Speaker 1: ... Will fairly relevant.

Speaker 2: Which is why I find it bizarre that the government is taking it off time table because there is this naïve belief that because a child has an iPad and can swipe across a screen that they can use software effectively, and they can't.

Speaker 1: I think it is something ... I mean I don't think I can measure it per say but I think that the further people are away from teaching kids not having children but teaching kids the more likely they are to believe that children generally have computing skills.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: So you have policy makers who are quite far away, who believe because they see their own kids who have advantages or they don't try to teach their own kids, they just see them using ... Or they see stories and kind of in the national discourse and so they believe that there is this idea that a digital native who knows how to use computers and is confident using computers ... And I think they also don't have deeper level of ICT skills either so they don't see where that deeper level of ICT skills came from.

Speaker 2: Yeah.

Speaker 1: ... Or will be valuable.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: That was one of the really useful things about talking to, was it Rick?

Speaker 2: Yeah.

Speaker 1: Doing these interviews, names go in and I write them down. They go out.

Speaker 2: Yeah.

Speaker 1: So, this is an interview but it's a semi-structured so I've got questions. We will answer some of them. I might ask questions and say, I think we've answered this already and if it's yes you can say yes. If, we don't answer all the questions it doesn't matter. It's a conversation and ... Yeah, do you have any questions before I start?

Speaker 2: No.

Speaker 1: No?

Speaker 2: That's fine.

Speaker 1: You know a bit about the research. I think I told you already, I'll try to do an executive summary thing at some point and so the school's don't have to read the whole thing.

Speaker 2: Right.

Speaker 1: ... But still get to benefit a little bit. So, as a bit of context, how long have you been a teacher? How long have you been teaching here? Did you do anything before you became a teacher?

Speaker 2: Yes, I did. I have been teaching in this school ... This is my 17th year. Before that, I taught in a school in Carlyle for 12 years. That school, being my first teaching there ... Year there became one of the first 12 technology colleges we applied for and I went in as an [inaudible 00:07:10] head of department.

Speaker 1: Which school was that?

Speaker 2: It was called Harabie. It's now gone and we were one of the first 12 technology college and so it was quite a ... IT had come in as a new subject and it was a big steep learning curve. I was sent off to ICL Bermont every school holiday for about 2 year. I did a lot of training with ICL.

Speaker 1: Okay. What's ICL?

Speaker 2: ... Because ... It is in our Fujistu. Fujitsu? Yeah, ICL was ... It's like ... It was a big company. In the computer world in the past ...

Speaker 1: Big computer ...

Speaker 2: In the past ...

Speaker 1: They come and go.

Speaker 2: Yeah, they do, but before I went into teaching I worked for [inaudible 00:07:55] because my degree is law. At least, my first degree was law ... And then, I worked for a tour operator doing their ... Initially, they had problems ... Looking at the problems with their networks and why they were getting a lot of complaints ... And then programing their system to stop them getting complaints and problems.

Speaker 1: So, when did you learn to programme?

Speaker 2: I did a couple of modules. I sponsored my degree because you know you can take extra things that you're quite interested in. Then, kind of on the job and workplace I sat down with this little man from Goer. This black with green writing on it and where you go ...

Speaker 1: Those were the only colours that the screen did is black and green.

Speaker 2: Yeah, and I was there for about 12 months doing that, sorting out the problems and making sure that the system was picking up the right things from the right places and the right fields going to databases and so on so that they weren't getting people not being there for transfers and stuff like that. Yeah.

Speaker 1: So in some ways, you have a background whereas ... You don't really have a background in computer science but you have a background in the ...

Speaker 2: The full face ...

Speaker 1: The full face and somewhat ...

Speaker 2: Yeah the core face of the earth, yes, of the industry ... Yeah.

Speaker 1: ... But I think in some ways it's not an analogy to different areas down where people are ...

Speaker 2: Well more recently I've done like CCNA Cisco training and all that sort of thing. I did a year at Sundal and stuff like that. So I have done stuff since.

Speaker 1: ... But you're familiar with that struggle between the people who know nothing and the people who know everything ... And trying to get the to speak to each other.

Speaker 2: Yeah, I do it ... And the real impact it not working in industry. You know, some of those bills that I would have to go and query with clients ... You know, people are buying holidays that are 20, 30 thousand pounds ... Because, you're talking long haul tour operations here. It's big money when you bring somebody up and say, "Hey, there 5,000 pounds missing off your holiday because this formula's not been applied correctly."

Speaker 1: You should have been charged twice as much.

Speaker 2: Yeah.

Speaker 1: Sorry.

Speaker 2: Yeah. So, that sort of stuff.

Speaker 1: So how has ... How long have you been at this school? I forget.

Speaker 2: I've been here ...

Speaker 1: 12 years.

Speaker 2: This is my 17th year at this school.

Speaker 1: Right.

Speaker 2: ... Because I changed the logon system for kids. They've started with 2017 this year so that must be my 17th year.

Speaker 1: Right.

Speaker 2: Yeah, we changed the logon system when I started.

Speaker 1: Right. So, you said ... How many years did you teach before that?

Speaker 2: 12.

Speaker 1: 12 years before that, so you've been teaching for quite a long time.

Speaker 2: Yeah, I have. Mm-hmm (affirmative).

Speaker 1: And when you've been doing that addition for [crosstalk 00:10:29]

Speaker 2: ... Well, it's lots.

Speaker 1: It's lots? It's a big number.

Speaker 2: Yeah.

Speaker 1: How has the field of computing and ITT changed throughout that whole time?

Speaker 2: It's come full circle, because when I started it was the end of TVIX. I had 9 BBCB's and some Masters and when I started the staff would take them all home over some holidays and the head ... Have to issue letters of fret to get them to bring them back into school ... And then the head and I built our first network. The pair of us stayed back after school one night, with instructions that said do this, wire this ... And he and I sat down we wired this room up and we built our school ... It's first networked computer room.

Speaker 1: Wow.

Speaker 2: ... And we did that for a couple more computers the head rooms ... The head was an English teacher and just said, "I need to know about this new subject that's coming in ..." But when we started we had all these BBCB's and I found all the TVIX equipment and I set up a room to do lots of robotics and programming.

Speaker 1: Mm-hmm (affirmative).

Speaker 2: Well, we had cranes and things that moved and we built those in ... Those sort of things as well as the IT skills. We built the programming type things in and I ran computing at A level as well as IT at A level. At that time, because the two quite closely had come to do some crossover units ... And get Bert qualification both. So, and then it moved more towards IT and away from computing but I hold on to my robotics because I always felt it was quite important that kids knew how things worked ... And I had this wonderful year when one of the special needs schools in Carlyle was closing and those primary schools were wanting equipment.

So I sold all my BBCB's to a man called O– ... I can't remember his name right now ... He was the manager ... He became the director of B–, in charge of B– and I want to say Lynch. I sold him all my BBCB's, sold them at 200 pounds each to him and I went to this local special needs school that was closing down and I bought those off them for 50 pound each and I was set up and ready to with him with a lot more robotics kit.

Which I felt was a good marketing ploy on my part.

Speaker 1: Yeah.

Speaker 2: ... A business play. So, yeah ... So we did lots and lots of you know, moving stuff about and building machines ourselves.

Speaker 1: It's stuff that now you would call physical computing.

Speaker 2: Yeah. Look, oh yeah, there's a lot of [inaudible 00:12:59] in this school I've networked myself.

Speaker 1: Yeah.

Speaker 2: ... When I first started here.

Speaker 1: Do you feel like there's a big difference in the interest from senior management? ... Because you were saying that originally you know, you had help do it with you.

Speaker 2: Well I find this very interesting because when I first started my previous head at my previous school was very interested and we moved computing a long way in that school ... And we ended up with stage ... We nearly had the kit took IT A level as a sort of ... In fact, the last year I was there, every single child in the sixth one ... Wasn't a big sixth one. Everybody took IT A level but here it was a different scenario there was no IT department. They were in big trouble when I started here. They had been warned at offset that the IT wasn't working it was cross curricular et cetera. So, I came into the department thinking this would be interesting. It'd be a challenge. And started this new department with just me and the head. The head got in trouble for teaching. But we had a real interest lighting computing. And so he and I taught it and then we just took more and more. We ended up with staff, about 7 in the department.

Speaker 1: Okay.

Speaker 2: It was quite a big department.

Speaker 1: It shifted a lot then.

Speaker 2: Yeah it has.

Speaker 1: Like, up, and down and ...

Speaker 2: Yeah, because after he left the next head kind of left it alone but the one after that decimated my department. He felt that children were absorbed in iPads and he ...

Speaker 1: So what year is that?

Speaker 2: That would be about five years ago.

Speaker 1: Okay.

Speaker 2: And, he took the core key stage 4 off. So we have a whole 6 form who have no IT skills at all unless they've taken IT or computing as an option or they took IT or computing as a GCSE and that has had a [inaudible 00:14:35] effect in the children have been turned down for apprenticeships at gen 2 and other places because they don't have an IT qualification at key stage 4. And so in his 3 years as headmaster he managed to cause considerable changes to my department and redundancies, which has not been good really for the staff ... And reduced the profile of the subject in the school because if kids aren't taking the subject, they don't see it. It's not on their profile as something they have to do.

Speaker 1: IT also had a huge impact on kids.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: Kids lives ...

Speaker 2: ... And our head was put in the position last year where he had to make people redundant because of this situation.

Speaker 1: Yeah.

Speaker 2: So, I produced a report for him in September. I explained what the problem was and we've had meetings, and we've sat down ... Very receptive ... And, he said we will put the IT back online as an option botch at GCSE and at A level, which he has done. And he was looking at and very keen to run the European driving licence for all students as a core lesson at key stage 4. The only reason we haven't done that is because the European driving licence is under investigation by Ofqual and I said to him, I wasn't confident about putting it in our requirements in our core curriculum that they would do this qualification if in fact Ofqual [crosstalk 00:16:03] removed it, because I didn't think it was fair on the head to put the school in that position ...

Speaker 1: Yeah.

Speaker 2: So, he said fine we'll review it again once Ofqual have made their decision. So, he is much more receptive to the idea of there being a need for children to have IT skills.

Speaker 1: So, again it's that difference between seeing children as digital natives and seeing ICT as a key set of skills.

Speaker 2: ... Set of skills, yes it is, because in the digital natives thing there's a tonne of stuff in there that ... That's all the digital literacy stuff and things that kids just do not have by default and that needs teaching. You know, we spend probably nearly a term in each year group at key stage 3. It's supposed to be 8 weeks but it always ends up being much more going through all the digital literacy requirements to make sure we've got everything covered across the key stage, which we map and S–, whose responsible for his safety, he keeps an ... It's an appendix on his, his stuff or what we cover and where we cover it at key stage 3.

Speaker 1: So, they all got a broad set of digital literacy ...

Speaker 2: Yes.

Speaker 1: ... And internet safety.

Speaker 2: It's all ...

Speaker 1: eSafety.

Speaker 2: It's mainly eSafety. The bit that's missing is the IT element and the reason that that is gone is because once the previous head took IT off timetable at key stage 4. I felt that my responsibility of head of department was to develop the skills that children would need to go on and do a GCSE with us rather than a set of skills that wouldn't have given them a qualification and wouldn't make a difference [inaudible 00:17:35] because it's no good if kids go in there and say that we use a spreadsheet because then [inaudible 00:17:38] is going to say, "Where's your certificate?" And they won't have them. So ...

Speaker 1: Especially around here where it sound like the technology based inquires want a high level ... Need a high level ...

Speaker 2: Yeah.

Speaker 1: ... To accept apprenticeships.

Speaker 2: I mean, I went out and I spoke to a number of employers. I spoke to people like White and Green, [inaudible 00:17:55] some of their staff at the associate director level, and I said to them, "What skills are you looking for in your employees?" ... And they said, we would expect people to have good IT skills and that they would need to be able to use Word Processing and desktop publishing effectively. We would need them to be able to produce effective presentations. We need them to be able to manipulate spreadsheets. We need them to be able to set up relational databases because they said they waste a lot of money paying people to set up what are relatively simple relational database systems that their own employees should be able to do and they need people to be able to manage and update content management systems for the web ... And those are the basic skillset that they expect employees to have.

Speaker 1: And those aren't covered in the current curriculum?

Speaker 2: Nope.

Speaker 1: That's all ... Okay.

Speaker 2: Unless [crosstalk 00:18:47]

Speaker 1: Unless you shoot for ...

Speaker 2: Unless they opt for IT at key stage 4.

Speaker 1: Yeah. But they're not covered below key stage 4.

Speaker 2: Nope. [crosstalk 00:18:51]

Speaker 1: SO content management for example, it would be far easier from my experience to teach HTML or Dreamweaver ...

Speaker 2: Yup.

Speaker 1: ... Then it would be to teach using a content management system. Even though if you look at people who are using it the kids are far more likely to use ... Even somebody like me ...

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... I'd use a content management system fairly regularly. Far more than ... And when I want a website, I got to find someone who can do the website.

Speaker 2: Design one. And that's keys such that we used to teach, to design websites from HTML. You know, right from scratch and kids used to build some really lovely complex websites.

Speaker 1: Yeah.

Speaker 2: ... And I don't know, I felt it was quite a useful skill. I mean, was talking to this carpet fitter at home the other day and he said, " Do you remember you taught me at school Misses? My website ..." He said, "Go look at my website." He said, "I built that on skills you taught me."

... and I thought well that's great, isn't it? You know.

Speaker 1: Reminds me when I was doing journalism in Carlyle and we had an HTML module.

Speaker 2: Yeah.

Speaker 1: We had a multimedia module on part of that list and a little kid said, "Oh we don't want a learn ... Journalists don't need to know about HTML, we don't need to know about making websites. " ... And then teachers said, "Well you know, I've had people come back and say my first job at the paper was doing website because nobody else could do it."

Speaker 2: Yeah.

Speaker 1: And now if you look at journalism, everybody is doing cross platform, putting it online, putting it out on different mediums.

Speaker 2: Yeah. [crosstalk 00:20:10] It worries me that kids haven't got those skill because they're not [inaudible 00:20:14] they just you know, breath in and develop by default.

Speaker 1: I wonder as well, if one of the difference for people my age versus kids now is that when I was 16, 17 it was new. HTML, for example was new and learnable so it wasn't that unreasonable to be interested in ...

Speaker 2: Mm-hmm (affirmative).

Speaker 1: [crosstalk 00:20:39] ... Make this our own thing. There was no, "It's so pervasive."

Speaker 2: Mm-hmm (affirmative).

Speaker 1: There isn't that same excited on a ... How can I build my own ... I mean, there were sites like GOCD's and even Myspace where knowing a bit of HTML really made a big difference ... And I don't think those exist, those venues exist in the same [crosstalk 00:20:59].

Speaker 2: No, I think you're probably right. However, when you kind of show kids a website and go and view source code they go, "Whoa." You know?

Speaker 1: Whoa!

Speaker 2: Yeah, and that's quite liberally so ...

Speaker 1: Yeah.

Speaker 2: I do think they need to [crosstalk 00:21:09].

Speaker 1: MY favourite is x-ray goggles, where you can ... Change stuff on a website ...

Speaker 2: ... That's ... Yeah. It's good and that's the sort of thing that ... It's getting them engaged and interested isn't it? That's quite important ... And it's finding a latch to get them engaged. I mean, recently I feel I'm ... I've had a whole epiphany.

I've been watching a series on Netflix. I can't remember what it's called now. It's called "Cameron" something, and it's about one of these 16 to 18 year old boys who calls themselves a social media influencer and I thought, well see what the kids in school know about this Cameron ... Cameron Dallas ... I said to my year 9 group, "Hands up if you've heard of Cameron Dallas." Not a boys hand went up and all the girls were like ... This little hand just appearing and all of the boys look around ... "Who are you talking about?" And you know, he's got like, 6 million followers or something online and he's using all these different social media methods to keep his follows going but what I found really interesting was the fact that he analyses every video he puts out there. He uses spreadsheets.

He uses charts. He looks at how the data has been received and what keywords people were receptive to and it was when I showed the kids that, and what he was doing with stuff ... It wasn't just a case of this is my blog online. He was seriously analysing the data, and that to me was like a hook because that's where the kids could say oh I can see why she's doing spreadsheets now. I can see she's doing this, because they couldn't where it affected them now and that was kind of, a link where I thought maybe I could build on this, the fact that you know these kids that they are following in social media are not just blindly putting stuff out on the web. There is a business model behind it. That kids maybe need to be aware of.

Speaker 1: Do you feel that it's harder to find that hook in for the computing ... The computer science stuff.

Speaker 2: Sometimes, yes, Now my computer science I'm kind of hitting from a different way. Key stage 3 we're kind of doing the Beiber's challenge. Lancaster is great because they do the girls in computing and stuff ... And anything that I can get kids out onto and is really positive for me. We're starting to do the stuff with the Vex robots. I don't know if you've seen them but we've got 2 in school and [inaudible 00:23:20] wants to go to that day the other day ...

Speaker 1: I haven't seen yours but I saw the ones in School C [crosstalk 00:23:25].

Speaker 2: Yeah. Yeah, we've got a couple in this cupboard here now. The kids come in before school, lunch times, after school and do lots of stuff.

Speaker 1: I've thinking about the Vex robots actually, recently and I was going to take some pictures of them because it's interesting that they are an extra curricular thing.

Speaker 2: Yeah.

Speaker 1: ... Not an in-curricular thing and I've been asked to write or I've been trying to write an opinion piece about what kids are and aren't learning and robots is a real area where kids and grown-ups see that they'll need them.

Speaker 2: I mean, in-curriculum is that. That's what we're doing in curriculum. Lego robots, because I have a lot of Lego robots and I can do that and I can programme them ... There's ... I haven't found this VB module for them yet, ut I'm told there's a VB module. There's a robot C that you can programme with. We do the blocks with them with year sevens and so on ... And then I've got this plan for robotics lab ...

Speaker 1: Yeah.

Speaker 2: ... That I want to build and you know with different style of them. I reckon, if I've got maybe 15 like that, that they can use in pairs and I've got all sorts of individual ones. [crosstalk 00:24:31]

I've got one that looks like a segway. There's all sorts of different ones we've got a set up, upstairs. We've got technicians building different scenarios for the kids and my plan is that A. We have this marsh landscape where they've got to make these robots go around. Have I shown the pictures of my marshland?

Speaker 1: Yes, Yeah, Yeah.

Speaker 2: ... And B. I'm very conscious that our big local employers like BNFL, they've got all these pawns and I'm being careful with my words here because I've been signed the official secrets act, I've got to be a bit careful. They've put all these pawns ...

Speaker 1: Only a teacher at [inaudible 00:25:03] could say that.

Speaker 2: ... With robotic arms and they ... you know they ...

Speaker 1: Yeah.

Speaker 2: ... Broke them and moved the canvases around.

Speaker 1: Yeah.

Speaker 2: Well, I had kids do that as a little project before where they had to programme the ...

Speaker 1: Yeah.

Speaker 2: ... Their movement of the canisters and the [inaudible 00:25:16] and how you would programme that and manage it with robotic arms.

Speaker 1: That much was covered in the PBC programme so ...

Speaker 2: Yeah, you're fine so far, but I'm thinking I could build things like that as scenarios and if the kids say, " Well. You know this is where you'll really use it in the industry. This is what you would be doing." ... And that's the sort of thing it's like ... It's what I had all those years ago at Harabie I had robotic arms that lifted and did things and moved. You know, we used to do video conferencing with a school in the south of England. Whereby we would make the conveyor belt and they would make the robotic arm and kids between the 2 schools had to plan their programmes and make the programmes work for each other's system and then eventually you built the other's model ... Put the two together to see what happened and I can't remember what the name of that school is. It's quite a famous school and it was one of those first technology colleges.

Speaker 1: Yeah.

Speaker 2: ...And we did that, and we also did a lot of video conferencing with schools in the states, actually, and we were supposed to do the first trans atlantic video conference between schools we had Disney corporation and Turner Learning, and all sorts of people at one end with their television cameras now [inaudible 00:26:19]. So it wasn't until we went offline ... and off television that the amount of [inaudible 00:26:25]. All right, okay, we'll do a lesson and but it wasn't actually online so we did actually do this first trans-atlantic school video conference. It was a case of, it didn't actually happen on TV because the man from BT, Mr. A. out of the Lumbar he wouldn't let anybody else press the button ...

Speaker 1: Press the button.

Speaker 2: ... To send it but ...

Speaker 1: That's not cool.

Speaker 2: So, yeah video for us the comeback to robotics. I'm very keen that we get more and more, what I describe as physical computing in there because ... Great you teach kids to programme, great that you know, they learn skills but I like the idea of them seeing application of that in the curriculum.

Speaker 1: ... But I also think there's something about physical computing that is actually more useful whereas if a piece of software breaks you can't take it apart and put it back together.

Speaker 2: Yeah.

Speaker 1: You know, you can't ... I was explaining this to somebody at our code club. You know, when something is compiled, it turned to machine code and the file you have on your ... The exe file on your machine you can't turn that back into ... You can't put it, in a visual way say you can't unfix it ...

Speaker 2: Yeah.

Speaker 1: You have to start from scratch and do it the other way. Whereas if something physically breaks sometimes, not always ...

Speaker 2: Yeah.

Speaker 1: ... You can go in and you can actually see what's going on ...

Speaker 2: And you build it again differently.

Speaker 1: Take it apart.

Speaker 2: Yeah.

Speaker 1: Put more memory in ...

Speaker 2: Yeah.

Speaker 1: And that sort of stuff and these skills are equally important and actually far more hands on and far more engaging.

Speaker 2: And that's why with my GCSE group, at the moment I'm doing flip learning with them. I'm saying go home write the resources on what the notes from the videos on what they're doing in class and then in lesson we'll get the [inaudible 00:28:02]. And we're literally spending our lessons writing little programmes and making jelly babies scream and all the different things that you want them to do ... But the idea being that they're actually getting their hands on something and they can see why that code is important, what it's doing because it takes that joined up engagement that, to me, is the important thing. You know ...

Speaker 1: Yeah, and the ... This, not actually thinking about physical computing and screen based computing but actually seeing the as one and the same.

Speaker 2: Yeah.

Speaker 1: To the effect that, when you do programming it's always changing something in the physical world and something that might just be on the screen.

Speaker 2: Yeah. That's right. Yeah.

Speaker 1: ... And everything that's programmable has a programme in it.

Speaker 2: Yeah.

Speaker 1: I'm going to switch back to questions though it seems quite abrupt.

Speaker 2: Okay.

Speaker 1: Just so you know.

Speaker 2: No, that's fine.

Speaker 1: How important do you think computation thinking is to the computer world?

Speaker 2: I do think it's quite important because ...

Speaker 1: ... And how would you define it as well [crosstalk 00:29:00]

Speaker 2: Well, computational thinking. It's bizarre because it's actually a module on the A level that I teach but I actually think there's an element of being able to see the stages in problems and problems solving and being able to come up with solutions and best fit solutions to scenarios. There a bit more to it than that but it's this not just doing things by chance or brute force, it's actually thinking through the stages of how you would solve something and coming up with methods of solution whether individually or group work or you know, planning the algorithms or you know, think about the best method of doing something. So, I do think computational thinking is quite important. It's a bit more than I'm saying there's bits I'm missing out but, yeah.

Speaker 1: That's what I found out. It's a mean question because there's lots of definitions and that's hard to come down to just one. But that's one of the reasons that I asked it.

Speaker 2: ... And that's one of the reasons we do the Beiber's challenge because that is about computational thinking. You know, setting a problem and looking at the methods that the kids used to try and solve things.

Speaker 1: What do you think the main purpose of the switch from ICT to computing has been?

Speaker 2: I think the main ...

Speaker 1: We kind of covered that but ...

Speaker 2: Yeah. The main purpose is, it's kind of ... It's to do with government's understanding and definitions. I think they see it as a more academic subject and I think I personally think it's a mistake, it needed both and I argued that quite strongly at the time. I do feel that there will be a switch back and really it needed both. It wasn't a case of they needed to be switched back. It's such a big important thing in the curriculum. The thought that in order to get any job in society you need english, you need maths, and you need to be digitally literate and the thought that there's only one lesson a week for digital literacy and seven lessons a week for maths on a school curriculum, there is something wrong there.

There should be more time to get kids digitally literate.

Speaker 1: Absolutely. I think that's coming up over and over again in these interviews.

Speaker 2: Yeah.

Speaker 1: ... And the recognition that computing and ICT are really fundamentally quite different.

Speaker 2: They are.

Speaker 1: ... And that the people who teach them are quite different kinds of people.

Speaker 2: Yeah.

Speaker 1: ... And that's not a criticism of either.

Speaker 2: No.

Speaker 1: ... But it's a recognition that it takes a different set of skills to teach word and excel well.

Speaker 2: It is.

Speaker 1: ... And other than to teach, programming well.

Speaker 2: ... And in school you turn to get hybrids. People who teach both.

Speaker 1: Yeah.

Speaker 2: ... Or people who teach IT, and occasionally we have people who just teach computing.

Speaker 1: Well, I think what the switch is really highlighted is the difference ...

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... Because there's the ICT teachers who either still try to fit in some ICT or teach programming in quite an ICT kind of way and I've seen that a couple of times. It's not that it's being taught badly but it's being taught as a tool.

Speaker 2: Yeah.

Speaker 1: In the same way you would teach Word.

Speaker 2: Yeah.

Speaker 1: ... Or you get people who are just so excited that they get to teach their subject again.

Speaker 2: Yeah.

Speaker 1: I don't really get too caught up in the language but they just teach them computing stuff and get excited about teaching different forms of search, sorting and ...

Speaker 2: It's that ... For those kids you've got to build structure in there because I'm very conscious that what they've done at GCSE ... Whoever's writing these exam papers has obviously not got to grips was it's physically feasible to teach kids and what their problem solving skill level is as a 15 year old

Speaker 1: Yeah.

Speaker 2: ... And they are setting tasks, which A level candidates are looking at and going, "How on earth would I solve that?" ... And an A level candidate is sitting there thinking, "How could I solve that?" It should not be a standard GCSE ...

Speaker 1: GCSE...

Speaker 2: ... A to G task. There's something gone wrong there with the person who is setting the tasks for GCSE and I think they'd just ... I think because computing has been a top down subject rather than a bottom up, it's lost something in translation.

Speaker 1: ... But the other thing I that think it's lost in translation thinking about it a lot recently is that it's been ... The way it's been taught, computer science has been top down from academics.

Speaker 2: Yeah.

Speaker 1: ... From a broader academy, but it's not been top down from the people from industry.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... And I entered this thinking that there'd have been too much influence from industry and what I find is that there's been not enough.

Speaker 2: Yeah.

Speaker 1: So, you've gone out and spoken to the industries around here but that's something you've done off your own back and it's not something that on a national strategic level and even on a regional strategic level has been really conducted.

Speaker 2: No.

Speaker 1: ... As a what computing and ICT skills do the people ... Do our companies really desperately want the kids to have?

Speaker 2: What do kids need to be able to get a job in this world and to get themselves into the marketplace?

Speaker 1: ... And it feels like, on a government level, it was enough that we both said, "Oh there aren't enough programmers." ... And so suddenly it was a push to get more programmers.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... Not ... We should be listening to the industry better.

Speaker 2: Yeah.

Speaker 1: It was one industry has said what they need ...

Speaker 2: Yeah.

Speaker 1: ... So we'll listen to them.

Speaker 2: Yeah.

Speaker 1: ... And that's something I'm definitely finding ... Not what I expected to find out.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... And how relevant do you think the computer curriculum is to the pupils?

Speaker 2: We adapt our computer curriculum. We've been adapting it now for about 5 years because when we first got the idea that it might be coming back in we started making a switch and we've kind of been adding more units in each year, so that it wasn't too painful ...

Speaker 1: Too painful ...

Speaker 2: As a change overall in one go. I'm hoping, it's relevant to the pupils from the point of view of taking the computer science GCSE but I still think there is a huge element of IT that we are not delivering that would be extremely relevant to pupils. I think children need, you know they need really good presentation skills, they need web design skills that we aren't teaching, they need effective spreadsheet modelling skills, and we do some database skills but we just feel that there was a whole element the curriculum was missing.

Speaker 1: Yeah.

Speaker 2: What we're doing I think is relevant, there's a lot of problem solving in there, there's the developing the understanding of robotics, there's the developing starting with block based languages and developing through to text based languages but we have adapted our curriculum to meet the needs of our particular students and where they are going at key stage 4.

Speaker 1: Yeah.

Speaker 2: That will probably need adapting again because of the IT GCSE it's coming back on timetable. However, the head has said to me that if I can find a place on timetable that I can get the time from he is open to suggestions on additional time for IT because he can see the value of what we're doing at key stage 3 for computer science. Where I'm to get that time from without offending other subjects too much, I don't know but ...

Speaker 1: Yeah, you know how ...

Speaker 2: He's said he is willing to come to it, and that to me is quite important.

Speaker 1: That's very important.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: ... And I think that, I mean it's one thing that comes up [inaudible 00:36:40]. There just isn't enough time to teach computer science and ICT or if you see it the way [inaudible 00:36:46] digital literacy and computer science and ICT.

Speaker 2: ... And ICT.

Speaker 1: As three subjects ...

Speaker 2: Yeah.

Speaker 1: ... And each one in terms of relevance to the future needs an hour a week, probably.

Speaker 2: Yeah, it does.

Speaker 1: ... And because there's so much that even the digital literacy area ...

Speaker 2: When you look at the national curriculum and what subjects have as time at key stage 3 we have this EBAC that we're all supposed to be delivering and from an equality point of view, computer is short changed. We get one lesson a week over the key stage, geography, history, the languages et cetera get 3 lessons [inaudible 00:37:29].

So over the course of key stage we have lost more than a year's worth of teaching at key stage 3.

Speaker 1: Mm-hmm (affirmative).

Speaker 2: ... But are expected to get grades on par with the other EBAC subjects at key stage 4 so we're not starting from a ;level playing field and that to me is a very big argument.

Speaker 1: Mm-hmm (affirmative).

Speaker 2: You know, never mind being with maths that get huge time. The other EBAC subjects ... We don't get the same time as the individual sciences at key stage 3. They get 2 lessons a week, we get 1.

Speaker 1: 1 a week.

Speaker 2: Mm-hmm (affirmative). 1 lesson a week. So, you know, there is an imbalance there that needs looking at.

Speaker 1: The other thing I wonder is, that in computing it seems like, at least at the moment, there's quite extremes in terms of I want to say innate ability. I don't know if we're allowed to say that in terms of education but some kids click with ICT and computing very quickly and some of that is contextual, what support they have at home and some it would be how they think, and some kids don't ...

Speaker 2: Yeah.

Speaker 1: ... And I wonder if that's different than, say geography where everybody's going to have a similar ability to grasp.

Speaker 2: I don't ... I wouldn't agree with that because I think ... Say you do something like English, kids are in tops at English and not necessarily at tops in maths. So it's a different knowledge, skillset, creativity that you're getting along the way. However, I think with computing there is a strong correlation between maths with IT there's a strong correlation with science and possibly English so there are different markets for different kids and different skillsets within the kids or different things the kids can do. So, the type of kid I might say to do a little IT would not be the same child that I would say do a level of computer science ... But you also see computer science ... But I do take on board what you're saying about key stage 3 and I do feel that there is a level of problem solving for what we are expected to deliver as a curricular key stage 3 and 4 that kids ... There are some kids who just cannot pick it up.

Speaker 1: Yeah.

Speaker 2: They have not got the mathematical skillset to be able to do the computer that goes with it, and I've heard Quintin Cooks stand up and say, "It's the teacher's teaching it wrong and everybody can teach ... can do computing. I'd like him to come in here with particular children and sit down and show me his method because there are some ..."

Speaker 1: I'd like you to meet, B–, D–, and D–. [crosstalk 00:40:10]

Speaker 2: Meet this child.

Speaker 1: If, you can teach them ... If you can do it, I will believe you.

Speaker 2: ... And ... But, I genuinely think that's the case you know, not everybody can learn everything.

Speaker 1: Yeah.

Speaker 2: Some people take longer to learn it. I genuinely think that's the case.

Speaker 1: ... And we separate out in something like English, we separate out the difference between creative ... Especially, later on, between technical writing and creative writing.

Speaker 2: Yup.

Speaker 1: We recognise that everybody knows how to write a letter, not everybody needs to write a poem.

Speaker 2: Yeah.

Speaker 1: ... We don't mind that, that's fairly ... But there are general English skills that everybody should have.

Speaker 2: Yeah.

Speaker 1: Even if they don't all want to write poetry, and everyone should be able to read a poem.

Speaker 2: Yeah.

Speaker 1: So, there's no reason why we shouldn't find the same way of breaking down this subject.

Speaker 2: No, exactly and when I first started here, the head and I talked ... That head was very enthusiastic talked a lot about what we set IT against and we tried setting it against different subjects and we found IT works best set against science because in science you've got to have a little bit of technical, but you've also got to be able to write and so science worked well with IT, but for computing it's very much maths. It's not ... If, you can't do the ...

Speaker 1: Do you think computing makes the kids, forces them to think in a different kind of way?

Speaker 2: Yeah. It's all for the type of problems that exam boards are setting with. Mathematical problems and if they don't understand the maths, they aren't going to understand computing.

Speaker 1: Yeah. That's interesting. So it's as much about the way that, that test [inaudible 00:41:44] is.

Speaker 2: Yeah. If, you're told, "Take this GTIN number, work out the remainder, multiply all the numbers by 3, even numbers by 1, divide by 10, produce your check digit, make it up, and then check that against the [inaudible 00:42:01] bit you've been given." If, you can't do that basic math ...

Speaker 1: If, you can't do the maths bit ...

Speaker 2: You're not going to make it there ...

Speaker 1: You won't be able to ...

Speaker 2: Yeah.

Speaker 1: Even though, you could easily set. I remember we did ... We were out of state. [inaudible 00:42:13].

Speaker 2: Oh yes, I enjoyed my students going to that.

Speaker 1: Oh did they?

Speaker 2: Yeah.

Speaker 1: Oh it was Bryan and me. Bryan ...

Speaker 2: Do you remember a boy called J. Pete?

Speaker 1: I ... Yes, J.

Speaker 2: Yes?

Speaker 1: He was great.

Speaker 2: He went ... Yeah.

Speaker 1: ... And I think it was him.

Speaker 2: They went off to the nationals, didn't they?

Speaker 1: Yeah, down in ... Was it ... Did they go to Burming- ...

Speaker 2: Yes they went to Birmingham.

Speaker 1: So, I never went to Birmingham because I was away and then ... That year I was in Plymouth.

Speaker 2: Yeah. I really like the [inaudible 00:42:36] states thing. I ...

Speaker 1: Yeah.

Speaker 2: ... Kind of wanted some[crosstalk 00:42:38] more of my kids going.

Speaker 1: Some of the youngest going again.

Speaker 2: Yeah.

Speaker 1: But one year, the kids did this great programme where it was like a story writing programme where you hid the last bit.

Speaker 2: Yeah.

Speaker 1: It was like you know, ... Pictures where you draw that and fold it up and you can only see a piece.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: So they tried to make a story ... No maths involved, all creative writing but completely programming ... Completely computer science tasks.

Speaker 2: Mm-hmm (affirmative).

Speaker 1: Where it's a different way of thinking about ... computing.

Speaker 2: Yeah, it's good.

Speaker 1: You can see how depending on which problems you see and apply computing to depends on which ... How you see it is for.

Speaker 2: The thing is it's such ... it covers such a wide of things, computing but needs ... Different people need different skillsets to do it.

Speaker 1: Yeah, absolutely. What do you think that the most important part ... the most important thing that you teach through the computing is? As opposed to that, what's the hardest thing you teach?

Speaker 2: In computing, for me, it's getting kids to problem solve for themselves. That's important and it's hard. It's getting them to the point where they're willing to have a go at things and be self-sufficient and get out there and look for problems ... Look for ways to solve problems themselves, and I am devastated that the exam boards for GCSE have taken that away from them from now on, because they're going to sit in an exam room in a walled garden where they don't have access to the internet.

They don't have access to anything else, all they've got is the problem in front of them and no resources to grab and sold it with and that's not what would happen in the real world. Of me, that is the biggest skill they need to learn. Now, here is the problem I've got, upon setting up my desk in the office. I've got to be able to solve this and I need to think, what tools have I got to be able to research find adapt and solve? ... And to me that's [crosstalk 00:44:40] Yeah, yeah, and have the stick ability to work through a problem to the solution ... And that's, for me, where we're trying to get kids to ... To be able to be self-sufficient problem solvers.

Speaker 1: ... But there's a tension between teaching them to be able to do that and teaching them to be able to achieve [inaudible 00:44:59].

Speaker 2: Yeah.

Speaker 1: Do you need to go?

Speaker 2: No, well hang on. Just let me check a second. I think ...

Speaker 1: I forgot to ask you how long you've actually had ...

Speaker 2: That's okay. It just depends on whether somebody's got this room, in which case we could go to the office but I think I'm free next lesson. I am.

Speaker 1: Really?

Speaker 2: So we can go up to my office and finish that there is that okay?

Speaker 1: Yeah, that's fine.

Speaker 2: ... Because, I suspect somebody might have booked this room.

…

Speaker 1: You were saying how the problem solving thing is the hardest thing to teach, and the most important thing.

Speaker 2: The independent, making them independent.

Speaker 1: Is it also the thing that takes up the most time? What takes up the most?

Speaker 2: What takes up the most curriculum time?

Speaker 1: Yes.

Speaker 2: Programming takes up most of the curriculum time.

Speaker 1: Is that because it's hardest for them to grasp?

Speaker 2: I's the need for reinforcement, because we've only got one lesson a week. You teach them something and they go away, and they do 25 other lessons in a week. They come back to you the following week. They probably need a bit more often, little and often. You talk about teaching a language, and language teachers say, half hour slots, but frequent half hour slots are good. We probably need more slots.

Speaker 1: It's not something they could do at home easily, is it?

Speaker 2: Well, we always choose languages where the software is free, so that they could go home and do it. Some kids will but some kids won't. That's the type of problem.

Speaker 1: If you could just teach one aspect, I'm assuming it would be the problem solving stuff?

Speaker 2: No, that's the difficulty, isn't it? Most people would go programming. You'd like teaching programming. You're teaching problem solving through programming. You give them a scenario and say, "Can you write a programme to solve this?"

Speaker 1: I'm not finding people who actually teach. I think people who talk about it say programming. I think people who actually teach and see how variable the ability for kids to programme is, don't say programming, because they find it's the one thing that is difficult to teach and is hardest to see the purpose.

Speaker 2: Yeah, but what you're doing all the time is, you're trying to ... You give them a scenario or a problem and then say, "How are you going to solve this?" If you're giving them a scenario and saying, write a programme to solve this, you hope that, if you've taught the programming skills well, then you will have more than one solution in the classroom.

Speaker 1: Yeah. That's one of those things that I think is sort of unique to computer science. At least as a science, is that there are multiple solutions. That also makes it difficult to mark and assess.

Speaker 2: To a certain extent. If they've got an elegant solution and the solution works and they understand the solution that they've created, and it matches whatever mark scheme you're working to, then that's great. My worry is where you have, you see classes where they seem to have one solution. You wonder, have they been spoon fed and led through that? I'm thinking, when you work as an examiner, and you see a set of schools' work and it all looks the same, you think, well how is this?

Speaker 1: How come they're all reaching the same solution that looks very, very similar?

Speaker 2: You would imagine that, at the end of the day, all kids will come up with slightly different methods and ways of doing stuff.

Speaker 1: Or at least within a classroom, you should have a range. You shouldn't have just one. Even if that range, even if there's only four or five in that range, and you see those four or five over and over again, you should probably see that range.

Speaker 2: If you're not getting that range, then you're not getting true problem solvers. You're getting kids that have learned a method of doing something.

Speaker 1: Definitely. What would you change? If you could change anything about the computing curriculum as its written?

Speaker 2: I would like time. Time to deliver. I would like IT back in there. I would like a different time slot for that. I don't want to take anything away from computing, I want a different time slot with IT.

Speaker 1: It's almost like you want IT and computing?

Speaker 2: Yes I do.

Speaker 1: They're both relevant and important.

Speaker 2: I think so, yes. The next set is kind of about evaluation. Some of it will be as you as head of department. How do you feel like you're assessed or judged on the delivery of computing?

Speaker 1: Key stage three, unfairly.

Speaker 2: How is that prioritised?

Speaker 1: Unfairly?

Speaker 2: Yeah, totally unfairly, because we are given a level. I know we're moving away from levels, but we aren't really moving away from levels. We're given a flight path for kids, and we're told, this child is coming in from key stage two. They have reached, at the school that they're coming in on is at this. You as a subject have got to get them to that. That isn't their ability in our subject.

Speaker 1: No, because computing isn't assessed.

Speaker 2: Exactly. We are being treated unfairly in that we are being assessed against a child's ability in something which is not computing.

Speaker 1: And is only a proxy.

Speaker 2: Yes. I would feel much happier if, at the end of key stage two, all children were made to do, say, Bebras Challenge or something that was a proper problem solving challenge, where you were looking at their problem solving skills, but were still in exam conditions. Not done as a teacher led assessment. That it was a genuine levelling before they came.

Speaker 1: I can hear the primary school teachers I know screaming, "Not more things to teach to."

Speaker 2: Exactly.

Speaker 1: I feel like computing, at its best, is one of the few subjects that, genuinely at its heart is about problem solving. That really prepares people who learn it to be able to problem solve in the future. I think that even the core subjects are about skills, and not about changing how you approach the world, or developing how you approach the world and figure things out. I would say that, because I study computing.

Speaker 2: No, I think you're probably right, actually.

Speaker 1: What do you think are the priorities in terms of off-stead, exam boards, your senior management team. When they think about computing, what do they want the kids to learn?

Speaker 2: Results. They want results. They want progression. They want children achieving above target.

Speaker 1: Do they have a sense of what skills that is, or is it, as long as you deliver results, testable results, that's what they're looking for?

Speaker 2: I think they are aware of the difficulty in computing of children who struggle with maths coping with computing. However, that doesn't stop those children for opting for computing, and then totally struggling with it.

Speaker 1: Yeah, because they like it.

Speaker 2: Or they think they're going to like it. Or, they know they like playing with a computer at home, and hope it's going to be the same in a computing lesson, even though they've done computing at key stage three, and it wasn't?

Speaker 1: Do you get a lot of that?

Speaker 2: You do get a little bit of that.

Speaker 1: I spend all ... I imagine, do you get parents saying, well, he spends all his time on a computer, he must be good at it.

Speaker 2: Yeah, you get that a lot. They don't ... It's this understanding of what they're actually doing on the computer. Are they doing something meaningful, or are they just reading social media?

Speaker 1: Well there's that question again, I think I already asked it about, how relevant is what they're learning? How much do they see the relevance of what they learn in computing to how they use computers? There does seem to be a distance, at least from my interviews with the kids.

Speaker 2: I would agree with that, because at the end of the day, what the average 14 year old wants to do with a computer or their personal social time is not what they're going to be required to do in four years' time, once they leave school. It's making that bridge in the understanding that is quite hard.

Speaker 1: What's interesting as well is they do see ... I don't know if they see that they see it, but they are connecting e-safety and digital literacy and how they use computers. A lot of them have internalised a lot of e-safety messages, very much so. It's not even like they were ever taught them, or they're aware of being taught them. They say, "When I talk to people, I don't give out my name. I have friends from around the world, but I'm just sensible. It's just common sense." You can see that they see the relevance of that to how they're using computers.

Speaker 2: They do get taught that.

Speaker 1: I forgot to ask this, actually. I think I know the answer, but if you were asked to observe another teacher's delivery of computing, what's the key thing you would look for?

Speaker 2: I'd be looking for kids being engaged in what they're doing. I would hope the teacher would be confident in what they were delivering.

Speaker 1: Is there anything that you would look for as kind of a red flag or a sign of confidence or a sign of engagement? Anything specific?

Speaker 2: That I would be concerned about?

Speaker 1: Or, just if you were watching. Things that you would have in your mind that, these are the things I definitely want to see, that would mean ...

Speaker 2: I would want to see kids that were engaged, that were involved, that understood what they were doing. That were happy and confident in their environment. That they understood the tasks that they have been set. Those are the key things for me. I would be looking for progression.

Speaker 1: Is there anything specific to computing, because those are quite general things. I'm not saying those are the wrong things.

Speaker 2: Good subject knowledge is a big factor in there.

Speaker 1: Okay.

Speaker 2: It being at the right level for the kids. I think one of the big problems with the computing curriculum is, we were given all these words. You teach A-level, and you look at them and you think, "Well I know what that is at A-level. I know what finite state machine is at A-level, but how do I teach that to a child in year eight? What have I got to do to bring that down to their level?" That has been one of the interesting challenges in computing, because you've been given these things, these titles. Deliver this a key stage three. Then you think, that's an interesting one.

Speaker 1: It's not ... What's interesting about what you've just said is that it's not, it's different from what we see at primary schools. A primary school, they were given all these words, and they didn't know what they were. It wasn't, how do I deliver these to this age? It was, what do you mean? What is this? What you're saying is different though, because you're saying, we've taught all that, we know what they are, we know what these things are, because they're all on the A-level curriculum. What we don't know is how to translate them down so that somebody who is not 15, but 12, can understand it. That's a big difference.

Speaker 2: Yes, it is.

Speaker 1: A lot happens in that two years.

Speaker 2: Yeah. Truthfully, I think one of the things they perhaps should have done is looked at the stuff that's in the Bebras Challenge, and look at the type of challenges that are in there that have been translated down, and think ...

Speaker 1: Why do you think that is? Why do you think it ended up the way it is?

Speaker 2: I think it was rushed. When we develop a response to the Dutch government on, as to what they were looking for, that was one of the things that we said. I think it's been done on a relatively small budget that maybe the priority should have been to get the content and the training in place before it went out to schools. I think there was a huge goodwill requirement on schools that staff report to be trained.

Speaker 1: There was no money for training.

Speaker 2: Exactly. But, staff would retrain themselves. I use the analogy of, it's like saying to somebody that teaches French, "From September, you will be doing Mandarin. Away you go." That is a huge difference. There's your paintbrush, get started.

Speaker 1: The other one I've heard which I quite like is, it's like saying to people who have been teaching French and Spanish, you're going to teach Latin. There's some overlap, and it's not unreasonable to say, they're similar, because they're Latin languages. Actually, to expect somebody who's only taught French to teach Latin is quite a big ask.

Speaker 2: Yeah, it's a huge difference. For some staff, it's too much. There a lot of staff across the country who have gone out of the subject area completely. It has been ... There are other schools who, if you went to them and spoke to them, they would say they're delivering it, but they're not at all.

Speaker 1: There's also schools, I think particularly academies or underfunded schools, that it's too much. That they're not delivering it. One of the schools in Carlisle, I think, isn't delivering computing. I always forget which one it is, so I won't try to remember.

Speaker 2: Right.øøøøøøøøøøøø should be, because D– head of department there. There's øøøøøø which is [inaudible 00:13:28], central. [inaudible 00:13:30] is. [inaudible 00:13:32] is.

Speaker 1: Yeah, I want to say one of them is.

Speaker 2: Then there's the Catholic [inaudible 00:13:36].

Speaker 1: [inaudible 00:13:37]. I think D– left from øøøøøøø.

Speaker 2: Is she gone?

Speaker 1: I think she's left. In fact, I think it's øøøøøøøø that now doesn't deliver any computing because she's gone.

Speaker 2: Really? Yet, there's a huge secondary school.

Speaker 1: We have a kid who comes with a code book. I think it's there, who wants to know about computing, but his basic knowledge is just missing. There's things about writing programmes, and it's hard. He's, I think, 15. It's hard to get him doing basic stuff that he's interested in, but that he can do, because he doesn't have some of the basic knowledge. Schools that have just opted out.

Speaker 2: Yeah, and that's a shame, because it's so unfair on the kids.

Speaker 1: What was I going to ask? What was the question? It was about change? It also seems like they're listened to people, enthusiasts, rather than, I want to say, generalists. The people engaged in CAS, and CAS as an organisation has had a huge amount of influence. The people who are heavily engaged in CAS are enthusiastic about the subject.

Speaker 2: And not necessarily heavily engaged in the curriculum.

Speaker 1: Yeah. Or the teaching of it.

Speaker 2: That is a factor. They probably needed to speak to more people who are heavily engaged in teaching of the curriculum.

Speaker 1: Yeah, and more businesses. I think like I was saying, I came into this research thinking that there had been this huge amount of influence from industry, because CAS is funded by BCS. Industry had funded a back door into getting kids to become future workers. What I'm finding is almost the reverse. Almost that the voice ... BCS has funded CAS and let it get on with its thing. Got people who would like being involved in that sort of thing involved in it. They've said what they think a computing curriculum should look like. Just because they're enthusiastic, they're the type of people that find this stuff really interesting. Actually, that's meant that industry, broadly, just hasn't had this input of, what skills do we really need young people to have as they come out?

Speaker 2: Whereas IT, I think, was done from the other point of view. There was a huge amount of resources at the start, literally lesson by lesson. This is what you will deliver, these are the key skills, these are the capabilities. You will attend training, somebody will stand at the front and deliver by rote what you have to learn. There was very little flexibility at the start, and then people built huge flexibility into it themselves, and went to the point that, actually, what they were teaching wasn't always as meaningful as it could have been. But, there was a huge amount of support at the start. That, I feel, was completely missing in computing, because I genuinely feel every single one of us has written everything ourselves.

Speaker 1: Absolutely. To such an extent that, I was speaking to Paul Tyson, actually, down in Saint Aiden's. He said they put together a huge amount of stuff, and they'd presented it at something, and a teacher from another school had come to them and said, "Can we buy that from you? We desperately want it." They didn't know what to do, because it's taken from all these different places. We can't sell it to you.

Speaker 2: We're all borrowing little bits off each other all over the place, because at the end of the day ...

Speaker 1: People, I would say the schools, the HTP schools particularly, you guys are probably producing very good lessons.

Speaker 2: I hope we are.

Speaker 1: I can say that with confidence. There's plenty of schools out there that don't have that level of skill, that are just doing the best they can and struggling. They don't know where even to start.

Speaker 2: What I think we lack is a vision for what they want children to have by the end of the key stage.

Speaker 1: Yes.

Speaker 2: I think we're all delivering very different things in very different ways. That overall vision of, this is where we would like kids to be at the end of the key stage isn't clearly there. We've had to take the vision of, where they're going at key stage four, and bring that down to where we want them to be at the end of key stage three to be able to do key stage four. The vision from outside of where they want us to be at the end of key stage three isn't there.

Speaker 1: Absolutely. That summed up exactly my process actually. I came in thinking that there had been a government top-down vision of what kids should look like learning computer science, and it was young entrepreneurs. What I've learned, through this, is that there is no vision. There's a huge vacuum of what ... There's these terms like computing and algorithm, which are quite kind of end-computational thinking. Which are kind of empty. People are filling them up with all the different things they think. There's a lot of overlap. It's by no means a uniform overlap. So that in schools, there's just a huge amount of variation between schools. It's working back from, they key stage four, but everybody does the key stage four a little bit differently. The key stage four computing is pretty general. The place where there's a huge amount of power is the GCSE exam boards, because they're the people who really are setting the milestones.

Speaker 2: Unfortunately, you wonder where their thinking is coming from, because they just seem to be looking through past A-level papers and moving it down to GCSE with no thought as to what the children's cognitive ability at key stage four is.

Speaker 1: Well, and their goal is about pass rates and about difficulty. Their goal is not about skill, impact and outcome. Literally, it's about output, not outcome. They want kids that will struggle enough so that it looks hard, but that people will pass, so that they're the exam board that people will go towards.

Speaker 2: I don't think they've got that balance quite right yet.

Speaker 1: No. It doesn't seem like, in their thinking, and this is me speaking from this side of the fence, from people like you, is, what skills? How do we prepare kids for working in industries or using ICT in their everyday lives? The comment about the Walled Garden exam setting, has come up. Not in those terms, but come up several times about how unrealistic that environment to do a computer science exam is. It doesn't reflect anything. To what extent do you think that the computing curriculum relates to how people use computers in their everyday lives?

Speaker 2: It doesn't, 100%. In everyday life, the student uses either a mobile phone or a tablet of some description.

Speaker 1: A computing curriculum doesn't touch on that?

Speaker 2: It doesn't really touch on that. I think most of what kids are doing on a mobile phone and a tablet is to do with social media. With the exception of the safety work that we do in school, the two don't really correlate. There are kids who programme at home, a lot. A lot of kids who programme at home a lot. For the majority, the two don't correlate.

Speaker 1: How do you describe the degree to which pupils find the curriculum? The first one is, how do they use it? How relevant do they find it? Looking at it from the other perspective.

Speaker 2: From the point of view of kids, the relevancy comes into play where we've maybe taught them skills. Simple things like creating folders in their user area, or how to use a spreadsheet that they can then use somewhere else. It's a range of the kind of skills that maybe should be IT-based skills that they can use across the curriculum. From the point of view of computing itself, there isn't ... They don't see it as something that's got a huge amount of transferrable skills to other subject areas.

Speaker 1: I think that's kind of the heart of the argument for keeping them both, but teaching ICT. Is, they clearly see ICT, IT as highly relevant to how they use computers now and in the future. There are aspects of computing that are probably relevant to how they'll use computers in the future, that could be tailored better. More or less, enough of them, especially in an area like this, anybody who stays in the area will probably use computers in a quite technical way.

Speaker 2: Yeah, some way.

Speaker 1: Not in a ICT way, but in a ...

Speaker 2: Technical way.

Speaker 1: There will be some sort of technical thing in there. They don't necessarily see that yet, whereas they definitely see the need for ICT. That comes up in the interviews I do with them. The kids say, either we want to learn this or we don't. What we're learning, we want to know more of it, but their need for ICT comes up. They are reflecting that. How do you think that learning about computing has changed or affected their decisions and choices about the future?

Speaker 2: It has affected it. We've gone from a situation where, one year, we had two children doing A-level computing, to the situation where we have 19 this year. It has affected it. There is an increase in the number of children who are taking computer science. I don't feel that it is a big enough increase yet. I think that is all to do with the ...

Speaker 1: Two to 19 isn't a big enough increase?

Speaker 2: No, because there were more at lower six, they ended up at, two at upper six. We hit problems like Cambridge University saying they would rather children hadn't done computer science at A-level. Which is a big downside. We also ...

Speaker 1: Where's that coming from?

Speaker 2: I could tell you the name of the lecturer, I've got his name written down on a bit of paper.

Speaker 1: On theory, where is it coming from? Is it because they think that the computing they're getting isn't good enough?

Speaker 2: We've looked at the Cambridge University first year of their degree. It's almost identical to the A-level.

Speaker 1: They'd rather teach it. They'd rather the kids learn there.

Speaker 2: Yeah. We've said to our kids, we've said, look. You pay for three year's degree at university. You've already been taught the first year at Cambridge in your A-level. You're paying them for three years, and you're getting two. Think about your choices.

Speaker 1: Yeah, absolutely. That sort of stuff has decreased the number. It sounds like, one of the things that I think must be happening here is, the kids feel inspired to ... They see the relevance of computing as a general subject.

Speaker 2: You would hope so, but we need to do more engaging things. More of the getting industry and seeing people in the real world. We used to do these conferences in the summer. We did them here as a model, and then CAS took them on. No, actually Computer Centre took them on and they ran them all over the place. After the first year, we did them here. We got Google in, and we got Microsoft in. All the A-level kids came, and they did various little lectures in problem solving stuff. It was really, really good. Then CAS said, or [inaudible 00:25:26] COmputing said they thought it was too late, and that needed something different and lower down. Actually, that was a kick start for kids in the sixth form, and you needed that. That's what persuaded those year 12s to go and apply for computer science, and not to apply for maths or physics or something else. That is where I feel they've missed a trick, because it's keeping those kids who are 15, 16, 17, or getting those kids who are 15, 16, 17, aware of their opportunities for the future. That's where I feel they're missing a trick. They've lost that unique extra element of focus that that gave kids in the sixth form.

Speaker 1: It's so popular in tech entrepreneur circles, and I think kids who are engaged will find this, to really downgrade the role of education. It's very popular to say, "I didn't need to go to university. I invented this app when I was 16." That sometimes I think we downplay the role that having a university degree in computer science can play, if you're good at it. If you're not going to invent the killer app, then actually you have a lot of options if you have a computer science degree.

Speaker 2: Yeah. It's being aware of all the different paths and routes and things that are out there.

Speaker 1: Definitely. If I were to ask the pupils in five years' time about learning computing at key stage three, four, what would have had the most impact? What do you hope ... ? If I asked them what had the most impact and what they remember, what do you think or hope they'll say?

Speaker 2: A very difficult one, that, because the curriculum changes so far and so fast, you don't know what you would say. You would hope that they would have a better understanding of the physical aspects of computing. That they would have stronger and better links with industry and understanding of opportunities and where they're going for the future. It's very hard to have a crystal ball at the moment, because changes are happening quite fast.

Speaker 1: It's hard to know with your current key stage three kids what the world will look like in five years for them?

Speaker 2: Yeah. You kind of hope hat they'll be the progression through. Things do change really, really quickly. Every year, we're changing units. We try not to change our curriculum too much, but we sit down and we evaluate it, and we are changing units all the time because software develops, new things come out, the focus moves slightly. You evaluate something, you decide it doesn't work as well. Examples have gone in a slightly different direction. It affects what you're doing.

Speaker 1: Brilliant.

Speaker 2: I'll have to see what [crosstalk 00:28:15].

Speaker 1: That is the last question as well.