High School Teacher

Audiodatei

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Transcript

Viviane Rehor

OK, perfect. Perfect. OK.

High School Teacher

OK.

Viviane Rehor

Yeah. Welcome. Nice to meet you. I don't know how much Quinton told you about this, but basically, this is my Masters project about the new version. Of Parsons puzzles. And yeah, and now I'm trying my application out and see how it goes with students and now also with teachers. So you're the first teacher.

High School Teacher

OK, sure. Right. OK. And I have I have, yeah, I have. Yeah, he's yeah, he's he's briefly outlined, but I think he he didn't want to say too much. So it you know, it was gonna come from you and it was there wasn't any preconceptions or blah blah blah. And so yeah.

Viviane Rehor

Yeah, yeah, that makes sense. Uh, can you just quickly, like, introduce yourself? So I know how to, like, put all the participants in my study in some categories like what they're doing in study.

High School Teacher

OK and. So yeah, so although I'm not currently teaching uh, up until kind of last year, I I I was a competing science teacher in in a high school in Scotland, a public school and and I've taught for nearly 40 years. So going quite a way back to when you know micro computers first came into schools and yeah, I mean Scotland had had courses quite early on, but it was more applications rather than kind of it it moved gradually. Towards much more you know about learning to code and different kinds of code, so database coding, web coding, software, general software development kind of thing. So I'm. I've I've I've taught a range of, you know, from in high school. So from age about 11-12 up to 1617 year olds kind of thing. So it courses all the way through. So introductory up to. Advanced courses for schools because I think, UM. And UM. Just very recently this in last two years. Then I joined a a project which is trying to come up with interventions because the number of young people doing computing in schools has dropped and the number of teachers is is dangerously low. At a time when. Everybody's saying we need more than people with more skills going and. Scotland's not unique. You know the this happens in the UK, Europe, you know almost worldwide kind of thing and but we kind of feel that we did have something at one point and we've kind of lost it. So it'd be nice to say look you know could we could but so so so now. I I'm not teaching at all and really kind of full time on trying to work with schools but also industry. Universities, colleges, other organisations and and directly with teachers. So UM the the main aim of what we're trying to do just now is is to. Is to is to bring teachers together. And encourage teachers to work together because we there is talent there, but we're we need to kind of connect, connect people together. They make things happen and at the moment that's that could be a lot better. So we say and so obviously kind

of you know being based in in Clinton's department in Glasgow. While we're doing our thing, Clinton speaking in the ear, saying, you know, remember that obviously that you know, they remember what the research is showing. So that's obviously that's part of the part of the jigsaw that possibly the kind of research that's done. Isn't coming into the classroom and as much as it should be, or it as it could be for lots of different reasons and and I guess you know, that's why it's interesting you. Know to. Kind of to kind of work with some of yourself kind of thing and saying like, how how it's another one of these like. To connect the wires together kind of thing, because teachers don't have a lot of time. So one of the things that we feel that we can do in our project is we we can choose how to spend our time in a way that teachers can't and maybe UM. Out of that could come making it easier for teachers to engage with some of the insights and some of the practises kind of things, you know, which are interesting, but they just have time to access and and include. In their practising thing.

Viviane Rehor

Yeah. So it's really about like, yeah, what you said, connecting both sides to get the ideas over.

High School Teacher

Yes. Yeah.

Viviane Rehor

Cool. That sounds cool. For how long have? You been in this project?

High School Teacher

UM, so the so in a formal way, just over a year. So it was, UM. Kind of early, early March, so in in the past year we're we're, I guess beginning time to get to know the the various organisations and people who. Who are important Connexions with? You know lots of teachers, so to do that we have set up a website and we made some resources for the websites that we thought teachers would like. So that was a kind of a little carrot, you know, to bring so a lot of teachers have signed up to that. So that means we know who they are. We they know who we are and and then we recently just finished an upskill. An online like a series of online sessions for teachers looking at part of the Advanced course and it was really a pilot to see like rather than teachers all go off to maybe get together amongst ourselves. And develop some materials and present it to each other, you know. And so it's it's an opportunity to network but also you know into kind of the what it is that we're teaching and how we teach it kind of thing.

Viviane Rehor

Right.

High School Teacher

So those those are two big things done lots of other things. You know just getting to know people going to conferences. UM going to workshops, meeting people, industry, meeting people. So I've looked at Saint Andrews University earlier this week, you know, see what they're doing kind of thing and just bit by bit, getting to know people, introducing people to other people. So trying to understand getting some data you. Know about like. How many? Which schools have got? How many kids doing computing studies? So there, there's a lot. There's a lot. So there's been lots of finding out this year, you know. Quite a bit of. Doing but so that you know the next step is to say, OK, how can? Given what we've done this year. What does it make sense to do now with no not achieved a huge amount, but we have achieved some important things and this things well, well, what does that tell us that we. Should be doing next. So it's it's a, it's a government backed thing. So

the the government have agreed that it's that it, I mean that's who's paying, you know for me and and for for my my colleague that's working alongside me and and provide our budget kind of thing and and that's a new thing and. Because the government does have official organisations who are supposed to do that.

Viviane Rehor
Yeah. Yeah, I thought so because someone has to come up with the like school curriculum for.

High School Teacher
Well, that that's right. But that's that's it's not working maybe as well as it ought to really and and so. That what we were trying to say is that the people who are always missing are the teachers that you don't involve the teachers often enough. They're the people who are teaching the young people and they're not complete experts on on what we're teaching and that that's difficult because we've got to be teachers and it's difficult to be. Keeping up to date with. A topic like competing science, which is not only yeah, it's growing and it's expanding. I mean it, it's a crazy thing and there isn't really another subject in the school that's like that, you know and and you can see the same thing for, for people who work in colleges and universities as well and industry, you know, and and I don't think people outside.

Viviane Rehor
Yeah, yeah.

High School Teacher
Quite the scale of change in, you know, just, you know, everybody's talking about AI just now, but they don't know what they're talking about, you know. Doing that and keeping up with a, you know, acquaintance thing is that it's it's fairly new for teaching. It's not like maths or. You know, chemistry or music or things. Who who? People have been teaching this for thousands of years and certainly a formal curriculum.

Viviane Rehor
Yeah, in the same way, yeah.

High School Teacher
For hundreds of years, and so when they go to teach it, they're they're pretty sure about what to teach, what order to teach, and how to teach it what to do if it's not working. But computing is not like that. There's, like, there's a huge.

Viviane Rehor
Yeah, yeah, that's true.

High School Teacher
Task for people involved in education with computing. Nobody you know has got a lot of experience. Of it really and. And and it's. You know, it's interesting. Stopping the actual teaching activity and stepping out of the classroom and then looking back at it, you know, from from the outside looking in at it thinking ohh right, OK, there's a lot to do here. There's a lot, a lot of things that really we should. Be trying to, you know, we need to. We need to try to convince you know, government people and and others to say look computing is different. You can't treat it just the same way as as other subjects isn't. And computing teachers don't have the same kind of challenge as other teachers. They've got a different kind of challenge and you need different ways of of doing it if it's gonna happen, probably change it just as another subject. You're. Not gonna work. And I think

governments are realising how important digital. Skills are, you know, strong. It's not not just kind of, you know, you know I can. You know, I know how to I know how to navigate social media. We're not talking about that kind of digital skills. We're talking people who could understand how it works and how to make new things and to, you know, make informed decisions about things, which is a different level. And that's really important for the economy. And they really have to start taking it seriously. But not a very good time economically for any country to try to grapple with that. We're saying we need more things are saying we don't have any.

Viviane Rehor
Yeah. Yeah, it there has to be.

High School Teacher
So so the little bit that we've got. Yeah, we're trying to do something with a little. Bit that we've got, yeah.

Viviane Rehor
Sounds really cool. I like I'm. I didn't have like a lot of time this project to discuss with my uh my professor from Germany, but he's kind of into like in Bavaria and like one of the biggest cities. Very involved in the like in stuff. What the teachers there do in schools, in computer science and I didn't have a lot of time to talk with. Him about it. But I hopefully will in the future. So I'm I'm interested. How, like Germany or especially this state is different? Or because in. Within Germany, that's the state where most things happen or like. At least they have an. Earlier there so they can. Like, yeah, so I'm. I'm excited how it's going there. Uh, But he's kind of doing the same as, like talking to all the teachers and putting up resources for them to get into topics and how to explain them to students and stuff so. Sounds ready.

High School Teacher
Yeah, yeah, it's it's good. There's there's a. There's a lot of people trying to solve the problems kind of thing, but they're they're quite difficult problems, I think.

Viviane Rehor
Yeah, yeah.

High School Teacher
Yeah. So that's good.

Viviane Rehor
Yeah, there's not a simple solution.

High School Teacher
No, no, it's not so.

Viviane Rehor
OK. Because, uh, I don't know how long you have, but uh, I'm my shining with the with my uh project.

High School Teacher
Yeah, fine.

Viviane Rehor

So as a first part, I want you to like just look at three or two like however you like. Small normal persons puzzles and then afterwards kind of say in which. Uh, like teaching level? You would put them. And in general, what you think what they help with? So I just put the Moodle link in the chat and maybe you can also. Like uh, share. The screen while you're solving them and kind of saying out loud, what do you think you think or students might think?

High School Teacher

Right. So. I'm going to click that link again because I've I had to log in to. Yeah, so it's it's posted in on Glasgow's Moodle, yeah.

Viviane Rehor

Uh, yes, yes. It's, uh, there's one like uh Parsons puzzle study in the CS education studies. Uh.

High School Teacher

Oh yeah, I see it. I see it. See it so.

Viviane Rehor

The teachers thing so the teachers, teacher P study.

High School Teacher

Yeah, I'm just going to put it on a a a browser window by itself. So and let me see if I can share. You want to share that to you, let's see if I can do that. So Google Chrome and I've got too many tabs and windows open.

Viviane Rehor

Yes, and I always have too many of those.

High School Teacher

Oh, that's number two. So for share desktop 2. Issues and preferences. OK so on. Ohh passwords right? Ohh gosh. So it's telling me that I need to quit. I might need to quit zoom and reopen it.

Viviane Rehor

Yeah, sometimes it does it because of some excess rights or something. But then.

High School Teacher

Yes, is that is that OK to?

Viviane Rehor

Just looking in a. Second, yeah, I think it's OK. I just. Yeah, I just have to start the recording again. Afterwards, but I think that's.

High School Teacher

And then I'll just follow the link again to to go back to the same zoom. Uhm, room with the same?

Viviane Rehor

I think it's the.

High School Teacher

ID and password and things. Yeah. OK, I'll. I'll do that just now then, OK.

Viviane Rehor
Yeah. Perfect.

High School Teacher
OK, so back online and let me see if I need to share that again. So yeah, there's that so share screen desktop to share.

Viviane Rehor
I do. Yeah, perfect. I see the Google website. Yeah. Yeah. So it's feature P study thing.

High School Teacher
Does that work? Good. OK, that's good.

Viviane Rehor
And it basically has three. I think 3 puzzles. To solve and just like speak out loud what you're thinking while you're doing them and yeah.

High School Teacher
So it's got. It just says a time to quiz now. Is that right?

Viviane Rehor
Yeah, I think it. I think that's right. Yeah, just I hope. Yeah. Yeah, yeah.

High School Teacher
And and then there will be three of them, right that right?

Viviane Rehor
Yeah, that's right. Yeah.

High School Teacher
Programme that reads in a list of billions and replaces all occurrences of false which. This can accord. Would most likely be in our in our kind of middle. So kids are in 3rd gear. They probably, you know, try this. We probably wouldn't have. So that would be like the the the kids third year in secondary. So about 14 something like that 14 age and. You you could give it to maybe younger ones, but they probably wouldn't have done enough coding with UM. Was just text. You know, they might have done like scratching block based stuff kind of.

Viviane Rehor
Yeah, the visual stuff, yeah.

High School Teacher
And but they probably wouldn't be and they wouldn't have had as much opportunity to read it. So I'm I'm, I'm I'm thinking and certainly it's it's the kind of. Because you're using an array. Because you're using, you know, like a like a counting thing. That that's that's typical in that type, of course or or or national 5 course.

Viviane Rehor
Mm-hmm. So how many years would be like, how many years of or semesters of programme would be before that? Or like, because I don't know when they start in Scotland like, at which age? So.

High School Teacher

That would be the. It's expected that that young people, you know, young learners, even from primary school, will will begin to look at computing science ideas. From primary, however, that's. That will be not very consistent across the whole of Scotland. You know. So in some primary schools, you might have a teacher who's who's got enough experience, you know, and. And has prepared lessons. You know, for them to do a bit in primary school, but in my experience, kids coming into our high school, you know, at the age of, you know, maybe 11 or 12. Kind of thing. It it wasn't unusual for them to haven't done any. You haven't done scratch. There will always be some who have UM, but UM. Probably not half of them. You know, so they're really beginning to kind of be just beginning to introduce be introduced. So they would maybe look at something like scratch or some maybe some microbits in first and second year and then it varies from school to school, how many hours a week they would get and at most the the lower going to get maybe an hour a week. And first year and 2nd year and so the. If then they they will, they would choose to do computing in in 3rd year. So after two years of of high school they would, UM and many of them would you know and and it. But again, it will vary from school to school. Some schools have quite a lot of uh children will choose to do computing as a as a sub, as a, as an optional subject kind of thing, and they would then. Spend, you know, maybe a couple of hours. Yeah, a couple of hours a week and they would really focus on. Getting to grips with data types and you know, conditional structures and loops and things like that and and ought to be able to solve some simple problems and they wouldn't. They would, they would probably wouldn't do this until later in 3rd year because they would certainly things like a raise. And and a kind of formal treatment of the raise would would would happen a wee bit later, kind of, you know, after they'd after they become comfortable with it because, you know, it was a little bit, a little bit can be a little bit trickier.

Viviane Rehor

Is it mandatory and 1st and 2nd year and then optional and 3rd or is it? Optional. The whole way through.

High School Teacher

UM so it's.

Viviane Rehor

Or depending on school.

High School Teacher

So Scott, sorry.

Viviane Rehor

Or is it dependent on the specific like high school like?

High School Teacher

It really, yes. So the, the the kind of the rationale of. Scotland's so the the the broad general education is the name of the. The curriculum, the kind of overall name for kids from. Pre primary up to the up to third year, so up up to the middle of high school kind of thing and the broad general education. One of the ideas of it is that the teachers can choose. They've got a reasonable amount of autonomy about what's the children and how they not so much what, but how they can. How they would do things, so there are. There are some. Generalised descriptions of what they should be able to do for computing science. So they're not, they're not. A larger number there are maybe only about a dozen statements. And they're reasonably the wording of the statements is reasonably

open. So that it's not too specific about exactly that you must do this and you must do that and you must do it this way. It's not like that and. So there will be, you know. Children can begin to explore simple games, coding for simple games that that's quite open, so you know, like it doesn't say how far you should go with that, but that that's the idea is that you know, for for younger people who might think it more challenging this they can get the start now for kids who. Who really taped it and and and are quick learners. The option for them to go a bit further. And and kind of. So the broad general education that says. It's supposed to be up to the end of third year, but the reality is that. The the children in fourth year, they are the ones who sit the first exams. You know, that's the first formal exams the national 5 typically is what they would be aimed for in fourth year. But to begin the the the syllabus for that in fourth year, there's not enough time. So it is much more typical that at some point in 3rd year a teacher. Yeah, and the kids will by then it's it's the schools usually gives them a choice about whether they want to study computing as a subject. They they really start preparing for that exam at the end of 4th year kind of thing because they're quite they're they're going, they're they have to be able to to pass assessments in. This can include software development and also for web and well, yeah in theory for database as well and a little bit of systems you know, you know some binary and you know machine models and things like that. So there's quite a lot to learn. And if if I'm real tough, ask to ask them to do that in just one year and it's not even a full year because they would begin in August. And say that their exams would be in in April. It's only a few months, really, you know, get practical work to do and. So, but that is very the the content of that is set so that the the they're very clear about. You must be able to, for example, you must be able to traverse. An array. You must be able to handle simple input and output. You must handle as a range of data types. You must know how to. UM. Count you know at a simple counting algorithm some input validation you know, so it it sets out what you what you need to be able to do and then it might say you know for web you must be able to use Cascading style sheets. You must be able to kind of know the difference you know. Sections in an HTML document for database you need to be able to do a simple join. You know you must be able to to, to, to sort and you know use. A UM so it it's quite it. It does say what you need to. Be able to. Do so in the lower school. Then teachers are thinking, OK, if that's what they need to be able to achieve. You know, most teachers will say, well, what? What can I buy be doing in first and second year? So you're you're, you know that you've you've got an end point, but you you also don't want to give the kids things that are. Quite tough and and because that that you could end up saying all right, OK, all we're gonna do is coding, you know, that's all we'll do. Code, code, code, code, code, more code. But it's not good for young kids. You know, you want to be, enjoy it and have fun and really think this is something for me. I like this. I like it because not because the teacher told me, but I actually do like it and and I I want to do this kind of thing. So there's a kind of balance then he wants to have. Engaging people with you know, the the motivated to want to be involved in this but appreciating. As well is. That this is about developing a skill, you know, and and so that there are certain things you need to do kind of the. Right way. It does matter how you approach it if if if you you can get it wrong. And yeah, you can end up going around in circles and not making any progress. So you're you're trying to kind of. And obviously there are different kinds of learners and different abilities and things like that. So and what you cover, how you cover it, especially in first and second year and the teachers can be constrained as, as I said earlier on by. Do you have the the children in your class for the whole here let's say for for one hour a week, or maybe you've only got them in your class for part. Of the year for one hour a week. Or maybe it's this week. I've got the children, but I won't see them for another two weeks because they've been other subject at that time and time. So the amount of time that you've got in first and second year is variable. So if you've got a lot of time, you can maybe spend more time doing fun things because you know you've got. A chance to catch up if you've got very little time, you

might concentrate on what you know are essentials. So that you get to the the middle years that you're you, you're not having to do an awful lot in a rush.

Viviane Rehor

Yeah. So so are, like, Parsons puzzles in general, something that they would do in 3rd year or just like this one because of its like level of difficulty.

High School Teacher

If that means anything.

Viviane Rehor

Or do do they start parsing puzzles in general? Maybe earlier if it's like easier ones.

High School Teacher

Well, well, they might. I mean, so I think. At one point I I certainly didn't do. It's a a parsing puzzle, but something like scratch. If you if you sign it into scratch, you can create a little. Lab or a little assignment for studio. I think they call it scratch a studio, so I might create a studio for the kids and I say I've given you. You, you know, six scratch blocks, but I haven't put them in the right order. You know, I want you. I would like you to try and make the cat do this. Or or I might say I've given you some scratch blocks and two of the pieces are not in place, or one of them's in the wrong place. And the the the cat's not moving the right way. Can you work out which blocks in the wrong place and can you move it so that it's the? Right place so. It's it's kind of the same. Idea. I don't know. I don't know if you'd agree. Is is, is part of puzzles kind of thing and so.

Viviane Rehor

Yeah, kind of the same idea.

High School Teacher

I I have. I have done things like that and for for younger I mean that that was that was quite good, you know or or you might. Say here are. Here are the same blocks in four different arrangements. Only one of these arrangements is going is going to get the cat to do what it's supposed to do. Which one of the four arrangements is going to be correct and what do you think the other ones? Do them so that they're they're looking at and they're making comparisons between one arrangement of the blocks and another arrangement of blocks and. And you're you're. You're as a teacher, you're choosing. You know what mistakes to make and and then ask them if they can. And it doesn't really, as long as. As long as they're beginning to kind of look at the code critically and and and looking at it and thinking what it what it might do and it it, it is a, it's a useful. It's a useful strategy. And but it depends. You've got to present it and you've got to kind of have the conversation with them. You know it's. It's the what you do before and what you do after if that makes sense. But when you're doing, is that what would they need?

Viviane Rehor

Yeah, no.

High School Teacher

To know before they could. I mean, obviously they could, they could just. Move the blocks and you know by trial and error try and see what what, what's and what. What doesn't work kind of thing, but you want them to take maybe only be allowed a certain number of.

Viviane Rehor
Yeah, yeah.

High School Teacher
Chances to try it. And then, importantly afterwards have a bit of a chat about, OK, so. You know, maybe the teacher. Making some mistakes and saying I think it's like this. Do you think I'm right? You know, you know. Who thinks? Who thinks this is what I've done is going to work? Who thinks what I've, you know, the teachers doing is is going and. Why do you think it's not right? How? And you kind of get that. That interaction kind of thing.

Viviane Rehor
Yeah. So so basically. Like like this. This level of patterns patterns with actual like. I think it's Python so coding bits in it is more like a higher level thing in high school and they they would start with the more scratch blocks style but they would do maybe something like pass and paddles in the scratch version.

High School Teacher
They they could do and I I I'll admit I I hadn't used Parsons puzzles a lot in we we taught Java at UM in our school. And in Scotland as well, so. Uh, obviously Parsons puzzles can. They could be in any kind of language, couldn't they really? Would you say?

Viviane Rehor
I mean you have the bracelets problem, I'd say with Java more than you just have like some lines that just have the closing bracelets and stuff, which is like maybe a little bit more, I don't know, annoying I guess when you solve them.

High School Teacher
Yeah. Uh-huh.

Viviane Rehor
It's possible.

High School Teacher
Yeah. We, I I have used a bit, but not a lot. I think we I think it's because you're you're if you can find some which are again it's it's the time thing because to do this you would want to have. A Parsons puzzle which. Focused on something. And so so, so be like perhaps counting because there's there's a few basic algorithms or an input validation where you know you say you've asked the user to type in of words, but the length of the word has got to be between 4 and characters. So. So look, what would. So obviously you gonna have a loop there. You're gonna have a, you know, a conditional. You're gonna have initialising an error message kind of thing. Or would that be?

Viviane Rehor
You can also Click to the next one here. I think the next one is maybe even like the next puzzle. Something that's closer to is it? Oh no, it's not OK I. I I thought back because I have one. That's the kind of guessing game where the student has. To, but this one might be even too difficult. For or like end of 4th year, maybe even. Because it's like.

High School Teacher
UM, because are you? So are you inserting into listed different positions here just or? And you get less typing, less numbers.

Viviane Rehor

I think I'm just inserting at the like always on the like. First position of the list.

High School Teacher

Yeah. Always. Yeah. Yeah, and.

Viviane Rehor

But that's even something. One could change to last position or whatever. It doesn't matter for the Union, but.

High School Teacher

UM. The the Scottish course. Although lists, although although people will use, people do use pythons, the Python is a very popular language in Scotland and a lot of teachers use it and Python doesn't have an array in the traditional sense of the word array. So. For understanding concepts, so this is like this. This is a kind of an awkward thing for for for Scottish teachers when the children do an assessment, do an exam, they are showing some code and because schools can choose. Different. So like our schools use Java. Lots of other schools use Python. Some schools use physical basic. There was an issue in like what language and how do you write code in an exam paper so that all the learners can read it. So in Scotland? There is what's called a reference. Well, it's it. Sqa is our exam organisation. They make the exams and they've got a reference language so it's good so. It's it's, it's. It's kind of like Java, but without, you know, like the the semicolons and things like that. But it is a statically typed language. And it it defines an array. And not a list. So when the children see it, they will need to understand. What? What you can do is again, what you can't do is an array so that they will only see traditional array type behaviours. In there, however. When they are learning code with a teacher and they're maybe doing some practical work. They can. They can use Python And they can use lists. But that means that then what any one young person may do depends on the way that the teacher presents Python. Because I don't teach Python, so I've I've not got a detailed knowledge of the language nor. Very much experience at all. And you, I have used it with children in the classroom kind of thing, but the just like this is what Python looks like and look, we can write programmes in Python, you know, it's nothing to be, it's it's not weird. You can do it kind of thing. Hmm. But speaking to other teachers in Scotland, different teachers. Use Python in different ways like so they they don't all use the same features in Python to. To to prepare an array or like record types and things like that. Even even printing, some people will will use like the commas you know in Python you know print item, one comma, item 2 comma item 3, whereas if they were going to be more. Faithful to what the reference language says, the reference language expects you to concatenate items. In the print statement and print them out because there is no comma type syntax in the reference language. So you have to say item 1. Concatenate item 2, concatenate item 3 so there's a there's a A mismatch. If you like between. How children and and this is a bit of an issue for. Us in our in our training.

Viviane Rehor

And then they. Actually have to learn 2 languages right? If they always have two, learn this reference language again like after whatever language they did before. So it's.

High School Teacher

Hmm, you know.

Viviane Rehor

And it's not. The language you use when you really do like. Develop software and stuff so. Yeah, I get this and it takes time.

High School Teacher

Yeah. So it it's it's it's been quite interesting and it's it's raised, it's an issue for us and and it's not. People know people know this. They know that, you know, on one hand they can use Python or whatever language to do practical work, and they know that in the exam the children will have to read code written in the reference language. But there's nobody really teasing out, you know, the fact, because this this came out in it and our training. Where upskilling course was aimed at. The advanced course in Scotland, so our so-called advanced higher course and it was aimed at the object oriented topic which is the hardest the hardest like set of lessons in the whole of computing you might do at school it mean it's it's it's beginning to be something you might meet. You know, in an under first years undergraduate course at university and. And so it was. It was interesting then, that the teachers who? Who? Who worked with Python And we were trying to say we're, we know you do Python, but what we're trying to do in our course is to make sure that you understand properly what's the reference language says. And for a lot of teachers then thinking, well, what? Why is it? Why are you writing this? Because the reference language is statically typed in Python, isn't. So there are things you do in Python that perhaps you don't realise what's going on, because Python's kind of permissive, you know, it lets you do things.

Viviane Rehor

Yeah, yeah, yeah.

High School Teacher

And yeah for. Having taught Java, the reference language is. Not difficult. Well, I don't. I didn't find it difficult and I didn't come across some of the issues, you know, and obviously it's it's a little bit harder to teach, but it's once everything's very clear in Java. It might take a long time to see it, but it's everything is spelled out. There's not so much hidden in Java. You can see it, you can demonstrate it. You can. You can. You can point to the words in the syntax and say this is what the syntax. This is why it says it cause this is what's happening. You can't do that so easily. In Python, yeah. So we, we we. So therefore if you're going to teach with Python the way that. You have to accept that the way that the the current setup for computing science courses in Scottish schools will require you to have an understanding of how a static type language operates and the kind of way you know content says the notional machine behaves. It is maybe not. Huge deal, but. You know, national 5:00, but when you come up towards higher and advanced higher, so things like you know the the way that you're inserting items there. That's that. That could potentially give you know, it's not quite the way that the reference language you're treated because you don't have that kind of operation in the reference language, shall we, shall we say, kind of thing so? Children's understanding of how something like a list like list behaviour as opposed to array behaviour, if that makes sense, it would be more important if you're going to use a list, you'd have to use a list in the manner of an array. Does that make sense?

Viviane Rehor

Yeah, yeah, I get it. Like the translating between the languages, kind of.

High School Teacher

Or if if the children are, I mean it doesn't. If the child were to do a project and they use something like that. They wouldn't necessarily lose marks, but they would need to know what they're doing.

And you know, they need to be aware of how it differs from. Because they they might be in an exam, they might be given a design for some code. Could you could you write? Could you write Python for this and make it work in your programme? But the design really has to be. Compliant with what the reference language says, because that's what we've all got in common. And if you want to implement that in in a in a language using a slightly different behaviours in in your language, then that's fine as long as. You know what you're doing? But that's that's hard, isn't you know, for for children who are who are still novice programmers, they're not experienced in most of.

Viviane Rehor

Yeah, like already learning different language like features or specifics, yeah.

High School Teacher

And teachers also, I mean we're we're not kind of immersed in. You know properly in the in the language and and one of the things that we don't know among Scottish teachers is, UM, how? You don't have to have a degree in computing science to teach computing at school. You could maybe have done a a couple of semesters or something like that. Let's say it's a maths degree or or some other science degree and you you have enough computing will that will allow you to. To do a postgraduate course in, in education for teaching computing science. But what if your experience was mostly web coding? Or maybe it was SQL coding. And you're gonna come, and you're gonna come and do this now. How much? How much below, you know, like how? Deep is your. Understanding of what is going on in the code so that. Like when you're when you're showing children code that works, say this is how you you you get like say a programme to add up the sum of of 6 numbers. That's fine, but what? What? What if the programme? What if there's a bug in the programme? How do you, how do you? How do you identify what the bug is doing? How do you fix it? Well, you need to know more than the correct way to solve that problem. There is. It's maybe not like maths where we'll learn how to differentiate, you know and and and an expression in maths. Well, that's the way you do it. And that's the way it's done and and learning lots of examples of of you know, how you say you. I think you maybe do an equation with some trigonometry and how you do an equation with some functions or some. And that that's when you do it. But programming is not like that. Yeah, it's, you know, you know, you need to have seen something that have gone wrong and how to fix them because when you do that, say ah, right. That's why I get it now. Yeah, and when you go to write good code, you'll be more inclined to write good code because you know. You know, I mean, because you've seen the counter example you, you can so.

Viviane Rehor

Yeah. So would you say that that's the problem of Parsons puzzles because you don't get the like the opportunity to to have something going wrong? You just have the model solution, you just have to you have to read every line and put them in order. That's what you need to understand. That you don't get the what would happen if I? Which this variable or something?

High School Teacher

So that's why like like what I was saying before, about what what should you be doing before you engaged in the party's puzzle and what should you be doing afterwards? So it's using it on its own isn't enough like? Well, it's not. It's not that it's that it doesn't do anything. Of course it does. It's it's it's it's it's allowing you to interact with the construct. And with the syntax to do something without like starting with a blank sheet of paper and starting to write. So that's good and it's, you know for. For rehearsing, you know, like how to how to find the biggest number in a list or or something like that. And and the kids higher. And I I would say that's where. Like when you've got some well known algorithms. Get the children to remember. You know, and something like an algorithm where there

are variations like, UM, I'm trying to think. Like like account occurrences. How many times does 0 appear but also how many times does 9 appear? I want you to to count them both. So how how do you count them both or how many times does 0 appear after one so that you've got a standard algorithm. But then you've got lots of variations. So I think that's where the strength of something that Parsons puzzles comes in is because the children will roughly what it's supposed to be like. They need to be able to experiment with it and and to do that with without the benefit of the compiler coming back and telling me you can't do that. But without before you get to the error message stage, you should be able to make good predictions about what your your code is going to do, and Parsons process is a good way to do that and to you know if you use it with them like having a conversation with your teacher or having a conversation with your with your partner. If you I think we do it this way. No, no, I think I think it's. I think it's this way. Why? You know that that kind of like and I have a set piece, you know, like where, you know, the the teacher might introduce a partly completed Parsons puzzle. And say, look, there's a mistake in. Here can you?

Viviane Rehor

Yeah, or the versions where you have this kind of distractor pairs where you always have the correct and the somehow like misspelt or something is wrong version and you have to decide which one you want to put in your final solution. And I think I would show you now the like the new version of puzzles, puzzles like the more scaffolded ones. So I did put another link.

Start of the Study

High School Teacher

OK. So when I go back to Parsons puzzle study.

Viviane Rehor

Oh, it's it's a different link and like it's. A different web page.

High School Teacher

Oh, different link. OK. All right. Yeah, we'll see that. OK.

Viviane Rehor

So it's. In the of the of the. Yeah. So maybe, uh, maybe try. Out the I think like what I had in mind was the logical end. So it's like the second one just like.

High School Teacher

OK.

Viviane Rehor

Try that one out in a. Yeah, and.

High School Teacher

OK. Ohh pen and paper. Yeah, some painted paper. Right, I've got some pen and. Paper and. Right, so a programme that logically evaluates and. For us to go in. If and only if all of ours are traded, programme pinstripe and so. Right. OK. So. I'm anticipating perhaps there's nesting or something going on, or perhaps? So So what should I write something down just now?

Viviane Rehor

And if you have it in your mind, that's perfectly fine, because the next step you kind of compare what you had in your mind and what the moral solution says. So if you if you know it, that's fine, but.

High School Teacher

Right. OK. Uh-huh, right? Uh-huh.

Viviane Rehor

Then can you can? Go to the second step and see.

High School Teacher

Right. So I've made we note myself and. I'll see. See what it says. And what is it 2? Yeah, I didn't think of it as. A as a you're just looking for the single false, so you're it it, it's it's a search you're doing. You just need to kind of search and any single false is is going to give you your your false result. Performing down to some of the pieces. So I I didn't break it down into steps. I kind of I kind of wrote down the like the requirements as in I I need to kind of think about like. I didn't know what the list might look like, so it's just couldn't like, so there will be a number of values and basically I'm searching for it. I'm searching for a false value. That's what. What I wrote down. And if I find one, the results false. I don't find any the results true, so it didn't. I didn't get cause I wasn't sure what was coming next, so I wasn't sure like how I was going to notate that kind of thing. But yeah, I mean.

Viviane Rehor

It's kind of like comparable to like. I mean the searching is kind of compared to the run through the list of the liens and the flag is kind of what you say, OK, if I find one that's false then then I set the flag false so. So I'd say.

High School Teacher

That's so that's that's. That would that would be good for hire, because that would be an example of UM, like I'm saying there are certain algorithms supposed to know so. Search is one of them and search is interesting because there's lots of variations. You know, like the loop could stop as soon as I find the first search, I could just stop and say that there's no point continuing. I'm just going. To stop and. And then this would be an example of, you know, a an efficient search would would just so like rather than using a A for loop to go through every element in your list, you would use. A A while. Loop so like you'd expect a good student to say. Umm this is this is an this. It would be appropriate to use a while loop here rather than a for loop and that that kind of thing.

Viviane Rehor

So then go to step. Three, because there's the actual buttons puzzle happening, so it's like the same headlines. Basically in the third step.

High School Teacher

So, bill. Oh, right. OK, it will be. Left to right. And then the other order. And then evaluate right use all the pieces. Yeah, so cool. Uh, so, uh, I I think this kind of thing is is good. So UM. Sub goals. Although I didn't know that technology with with, with kids I've seen. Remember, whenever. Whenever you're doing one of these algorithms. You're gonna have a look, aren't you? So I would. I would quite often say to them, start off with your loop, you know. Right, right down the loop. And then think, what do I need to do before the loop? What they need to do inside the loop. Do I need to do anything after the loop? Is there a condition? Inside the loop. OK. What's the condition? You know so like. Create your, create your structure starting in the middle, not from the top in the

middle, and then working out so it so that's that's the sub goal thing is is a nice way of kind of of formalising that.

Viviane Rehor
Yeah, yeah.

High School Teacher
Then you know that, you know, look through the list, will there? There's your loop kind of thing. You've got your. Interactive, so yeah. Oh, so that's just like how you. OK. So I'm going to put that that help thing. Away the UM. Yeah. So you've already got the the if nested inside the loop. Yeah. So. Yes, I'd hope that the the kids would, would you? I'd like if if they saw this, I would hope that they would say, OK, I'm looking for my loop first because I've I've got to kind of. So that's your sub goal labelling. Run through list of billions. UM and then is there a condition? Yes, there is so. Is the is the clip round the conditional there? Is that part of the structure or?

Viviane Rehor
It's it's basically something that that we like thought would be part of the structure as if you want to have it as a complete structure, but you are not supposed to use the white thing within your puzzle. So you can just put it on the side and. Just use the middle bit.

High School Teacher
So it's it's kind of like a placeholder kind of idea.

Viviane Rehor
Yeah, kind of like a placeholder. Yeah, so. You just use. A little bit and the rest can be left out. But for like setting and updating a flag, you kind of need something to happen to update the flag, so that's the placeholder. For that bit.

High School Teacher
So you going to type in the list. OK. So yeah, so you know, at the beginning, so.

Viviane Rehor
OK.

High School Teacher
Anyway, print the flag at the end. Of course, you've got two values, you've. Got to kind of run it OK. So I'm just going. I'm going to kind of. Quite like having the. The sub goal labels. Beside the code, because then that's me checking that I've. Got things in the right place. OK. And then and you just just click it to turn it, is it?

Viviane Rehor
Sometimes it takes a while for the first one. But hopefully at some point it says correct.

High School Teacher
Umm, no, I I like this. I like the sub goal labels and I think you know once once the learners have seen a few puzzles you know so they've got the expectation for that you know and and then you take some we'll labels away or you maybe take one of the sub goal. Labels away and. You say there's. A1 which ones missing? Kinda thing and because you. The kids find it real. It's for something they. Find really, really hard. For many kids to to so in higher, they said they'd counter currencies they had searched to do and they had minimum maximum to do. So trying to look, these are all the same.

You've got a list, so you've got a loop. And you've got a conditional, and the conditionals nested inside the loop, and then each one is just a variation of the other kind of thing. And and it's it's when there's variations, you know that that you need. You need to catch where the thinking comes in, but you shouldn't get stuck on like what you've got there. Sub goal labels like you know get get your list, set up, initialise account or initialise a flag. And then in your in your loop, work out how many times you've got to iterate. Is it a? Is it gonna be a while loop or is it gonna be forward? What's your conditions? What you going to do when you when you update? And what what result do you print at the end kind of thing? So that that that would be that would work. That example would would work really nicely for higher candidates.

Viviane Rehor

So would you say like compared to the like first bits of puzzles puzzles you did? I don't know why it's calculated and maybe I have to cheque. But in general like it just says it's correct. But would you say it's like on a on a more difficult or on a more like lower level of education like where you have to be to solve this compared to the other persons puzzles? Because, I mean, at least it's not a specific kind of or it it's a language, but it's a different language again here.

High School Teacher

No, I think that's that's useful because you're. You you don't get, you don't get sidetracked by like, what particular Python constructor are you using? Or have you forgotten a a tricky bit of syntax with Java or something like that and. UM. You're you're concentrating on the structure, you know? UM, what? What structures are you using? How do they connect together? And? And the subgoal labelling makes you think about what is. What's the purpose of each part part of your code doing? And that's because if you can remember that, then perhaps you'll remember your code. But the kids are doing practical coding. They're allowed to make yourself it's. It's open book so they can go and look at previous examples, but that only helps you. If you know what you're trying to do and it's a sub goal label labelling, that is what you need to remember. That's what you're. Trying to do is.

Viviane Rehor

Yeah, that kind of the the reusable part of programming that you have to get into your head. So you know next time, OK, this problem is similar and I used the similar. Like sub goal. I don't know something, yeah.

High School Teacher

That that's right. But what's nice about that is if you, if you don't have sub goal labelling, what the kids do is they go back and look at old programmes and they look for a bit of code. It looks like it might be useful. But they then copy the old code and paste it in and try and hack it until it does what they want instead of thinking is this the right piece of code and thinking about the the the edits that you need before you paste it in kind of thing and even writing a little bit of. Commentary or a bit of? Pseudo code you know or or writing. Yeah, writing comments and building some comments first in your editor and then adding the code under the comments and so that. You're actually what you want it to do and. Kids that know what they're doing, they copy and paste and re recycle code. They do that well. But kids that don't fully understand they they make a mess.

Viviane Rehor

Yeah, yeah.

High School Teacher

They they they copy bits of the old programme and they they put it together. They don't really. It worked before. Why is not working now and thinking but you've? Not put it together properly, you know. So I think something like this. Could and should help them.

Viviane Rehor

Because they know how to translate the code into what like logically happens, as in the like problem level of like in the real world level of. What the problems?

High School Teacher

Well, I think I think at this level. I mean it. Would be. You would use it diagnostically and you know you would be looking for kids who struggled to put this together properly and and be able to ask them why, you know. You've got more than one question to ask. You don't. It's not just like, why did you? Why did you put the print flag inside the loop? You know you don't need to ask them about the instruction. You can say in terms of your sub goal labelling, why did you put print results? I don't know, but the top or something like that kind of thing. You're you're asking them to think about. The chunking of the of of what they're trying to do before you get down to the kind of the. Line by line stage kind of thing. Because worrying about it. Because kids, some kids think the first thing you do is you write the first line and then they write the second line then. You write the third line thinking. That that's not how programmers do it.

Viviane Rehor

Yeah, we do think in sub goals and chunks of code that we together, yeah.

High School Teacher

That's that's not. Yes, the the people that can do it that that's that's what they do. But to to people who are still getting to that stage, they can't see that. They it's like writing a poem. You, you you. You write the first line and then you write a a line that that rhymes with the first line. Yeah. Just programmes don't work like that kind of thing and.

Viviane Rehor

So this should be kind of like a hub for maybe like weaker students who immediately get that system of how you code like in chunks so that they can.

High School Teacher

Right.

Viviane Rehor

Be pointed out to OK we do think in sub goals more, more like normal exercise where they have to write code or even normal persons puzzles.

High School Teacher

You know, I think that think that's. It's a, it's. And it's a nice bringing together of, you know, like the traditional partial puzzle persons puzzles, but introducing sub goal labelling in a a way that. It's a. Isn't a burden kind of thing? Like if, because what the kids will say is like, why am I writing down the sub goal label? Why they're why shouldn't I write down the code but? They're not having to write it. Down here it's there. So you're you're lessening the amount of, but certainly at this stage, I mean, I think it'd be nice to maybe. As the same. Have at some point maybe have one of the sub goals missing or something like that, or or what you're saying. Maybe have a distractor sub goal label that, that kind of thing so they're thinking at that chunking stage. At high level stage, before they get

down to the code, but the. They're you're guiding their thinking without being too. You know it's. It's it's a scaffolding thing. You're you're you're supporting the move towards and then you you you've got more options for UM.

Viviane Rehor

Yeah, yeah.

High School Teacher

Varying the challenge than just the codes or just just the kind of the blocks you've got, you've got the sub goal level which you could play with as well, which you can use, you know. To uncover their misconceptions or or whatever you know, I think that's that's a nice idea. And it's making it's like. It's it's it's making the the. Those kind of strategies manageable for the classroom teachers as well. Yeah. So if if you set this up or if it's if it's a UM, if it's a platform like this, if if teachers can contribute so that a group of teachers can can all contribute together and then share. You know amongst themselves, so that it's not one person making everything together. Yeah, I think it's it's it's really. Good. Yeah, I think. It's you've done something really good here.

Viviane Rehor

Well, I actually at the moment it seems to be broken for the one, but maybe we can do like one last like more difficult one. So just like uh, click on the little uh and small clothes, eggs and and just go back to exercises. I think just because I tried it out and also for me if it's correct it.

High School Teacher

This takes.

Viviane Rehor

Somehow doesn't show that it's correct, but if it's wrong, it does show why it's wrong. So maybe uh. Try out the guessing game for example, so it's the fourth one.

High School Teacher

So that's second row at the end. To the right hand side.

Viviane Rehor

Yeah, that's the. One, just like as the last bit of a little bit more difficult.

High School Teacher

I guess number like. OK. It raises the numbers and ends immediately when a negative number is read. That's correct. Then cheque. OK, so it's quite a. Lot going on here. And so let's just see we want. OK and.

Viviane Rehor

Right.

High School Teacher

Two conditions so negative. And we can Step 2. If you say I guess, right? So so these are not necessarily in order when we're looking at the sub goals?

Viviane Rehor

Yes, they are jumbled up, but just bits that.

High School Teacher
They're just things to do.

Viviane Rehor
You need to. Get the full.

High School Teacher
Yes, uh yeah, the the yeah. So this is again for higher this the the this is the harder solution higher because.

Viviane Rehor
Yeah. So first year university.

High School Teacher
UM. So they've got, they've got their find, find the biggest number, the smallest number. Yeah. Searching with lots of variations and UM. King kind of comes is is from from national 5. And and then they might be asked to blend these standard algorithms together. So so to to solve the puzzle. Part of this is like a search, but part of it's also like counting. And you still got the kind of, like, do something at the beginning, have a loop have a a, a conditional and carry out some kind of update and do something at the end. It's just, you know, there's more to it kind of thing.

Viviane Rehor
But it's basically all stuff that they already had, right? Just the combination of like that's a lot of code combined together to find the full solution. So that's the difficult part.

High School Teacher
And this is. So AM. So this is just an idea in case I forget to say this later on, one of the things I I try to say to and it's hard for them to do is to say what would the simplest. First version of your solution be like. Do that. OK, what would make it better? Slightly harder or or even. What would the hardest thing be? Right? Put that away to the side. Just. Now, don't try and do that. Don't try and do that. What would the easiest thing? The other thing to do is is to. Just to. To go through the numbers and maybe maybe stop when you get a negative right now, make it stop when you get the right number as well as the negative. OK, now make it say too high or too low and but. But you know to have a. Now the development plan has been.

Viviane Rehor
Yes, the process. Of putting in more sub goals basically.

High School Teacher
Yeah. Yeah, like high priority sub goals like D ones, which will get you your, your, your course structure, things that you're really sure going to work kind of thing because and this is this is more from the from the teacher point of view thinking about assessment because. The kids kind of get the idea. If my programme doesn't do everything, I've failed. No, don't think like that. Yeah, because in in, in the real exam, you can pass, you can get a good pass if you do. 70% and in fact, getting percent is easy. It's the last 10% that's really hard and and trying to say that to them and thinking. But so. But part of the problem with the courses is how much time do you get to practise doing that. You know because that that's a that's a strategy for saying, OK, it's kind of an exam strategy because in the real world your clients probably wouldn't be very happy if you only made the you know 70% requirements. Thing in an exam situation for people are novices. That's fine because you want them to become confident and you want them to believe that you know you know. OK, OK, you only got

some, but this time you're going to get to the next time. Kind of thing. So it it'd be nice and I don't, I don't know how you do that, but it's it's to have that. Approach when you come onto harder puzzles like this is to say OK. I don't know how how would that be? What would that be like? Would that, you know, in terms of think before you get down to thinking about your code, thinking about your your sub goal labelling and thinking, is there some kind of hierarchy there of of sub goal open to allow you to think about what?

Viviane Rehor

Yeah, do doing like one previous puzzle that only has like one of the properties of the whole. Like code explanation and maybe say OK, just don't think about all the other stuff, just solve this problem and then go to the. Next step and add. Like sub goals and the features they put in. Maybe in more steps, yeah, but that would be a way of even like having more difficult exercises for for. Students in lower levels by like helping them to scaffold it even more than, yeah, just putting it into some goals. But yeah.

High School Teacher

It's because it's. It's that it's the kind of thing that was experience you can do. UM, mean good kids will. The the best learners won't want to do that. They're gonna they say I know what I know what to do and and they just.

Viviane Rehor

Yeah, it would be annoying for them, but it's what they do in their mind anyways.

High School Teacher

Go and they do it. But for for. You're trying to make it make the coding more accessible for for for more learners and and those are the it's the learners that are. They want to try hard, but it's like it's almost like your programme works or it doesn't. Work and that's. That's hard for your kids. That takes longer to get there kind of thing because they're going to experience a lot of failure.

Viviane Rehor

Yeah, yeah.

High School Teacher

Which is not good for them, you know. So you you want to try and kind of. Make the stepping up easier for them kind of thing, you know. And that idea of like.

Viviane Rehor

And if there are steps in between that they've done correctly, then it's somehow like, OK, they feel OK. I did this. Now I can go to the higher level, but they have more steps of. Kind of like this feeling of success before they solve the whole thing, yeah.

High School Teacher

MHM, MHM. And so. Let me see where are we with? Was that's your case number? Alright, so yeah, I can move that. So I'm I'm going to move that away from the top, so I'll get. Space at the top. And so we want to set her guest number. And we want to set their. You know, setting the counter to 0 now. UM. That's, I guess, correct. Right. And you put this over here and it's over here.

Viviane Rehor

We can.

High School Teacher

If it's not correct so. Going to mess that in, you don't. Have we got an else in here so. Yeah. No, I'm. I'm looking for an else. Look, if it's not equal to, then I want to to. Nest if it's. Wolan can I can I edit the code at all or is it just clicking?

Viviane Rehor

It's it's just clicking it. It it. It's supposed to give the correct outputs with all the stuff you already have.

High School Teacher

Right and.

Viviane Rehor

That's also a disadvantage of passing puzzles in general, like you have to go with the solution somebody. Else thought of.

High School Teacher

OK, so you just stop, so that's OK. Is equal to.

Viviane Rehor

OK.

High School Teacher

Right. And it's just sitting on this piece. I'm really not sure how could have to. To my mind I've got. We've got a three-way split. You've got got the number. It's not. It's too big, it's too small. And feel I want to Ness.

Viviane Rehor

That's a bit mean. It's not the solution you normally would see for like guessing.

High School Teacher

So but but at have to.

Viviane Rehor

That's a good start because like where the if it was before, it would never be be true like within the loop, it would never. Never condition true. Well, that one. Would you have like right now?

High School Teacher

Yeah. Yeah, yeah, yeah, yeah. Yeah, yeah, yeah. Because you got you got to. You can stop. There's two conditions to stop. And that's what it is.

Viviane Rehor

Yeah. And one of the conditions is that. 1 So it's not being.

High School Teacher

Yeah. So that can go there. You could have stopped because it was negative, in which case you not really. Do anything. Right. That's it. That that's what I wasn't. Hadn't connected that. There's two reasons to stop. So you gonna add on? You're gonna start. You start with one, so you're only gonna add on one. Every time the ground loop that's got to that has to go in there. I guess I think, I think that's right now. OK.

Viviane Rehor
I think there's one line that's just one line that has to be somewhere else, but. I think just about the trice count. It's like. So it's, it's about the.

High School Teacher
Tries tries to.

Viviane Rehor
Yeah, yeah. Think like for.

High School Teacher
So 7, seven. You're counting one presuming that. Yeah, I have. You're you're pre counting your first guess.

Viviane Rehor
No, even even I'm sorry. It's not about the transcode. It's it's not too low. Too high. That was the problem. It's like. If you if you, uh, read in the first number, now you you never know if it's really too low or too high. You don't get the correct, too low too. High for the first. Correctly think? The first number is right outside of the loop, so if if it's not the correct one, but it's too low or too high you, you would never cheque if it's too low, too high for the. Just for the first one.

High School Teacher
Number is 205.

Viviane Rehor
It could.

High School Teacher
Of course. Oh, we're asking. Yeah, we're asking twice, so.

Viviane Rehor
At the moment, you're immediately read in the second number before you even cheque for the first number.

High School Teacher
I'm trying to know. What the code? Looked like before. Uh, so are you allowed to move? You know some of the blocks were originally connect connected together. Can you how much rearranging are you like to do or have you got to keep them in their original?

Viviane Rehor
If it's possible to rearrange them, it's it's, uh.

High School Teacher
You can.

Viviane Rehor
Close to to. Or I mean. It's if it's possible it's it could be part. Of the solution. Two just.

High School Teacher
Right, OK. And so?

Viviane Rehor
Original bids.

High School Teacher
Your first. Got it. Course so and. Think is it. To do this. Make a guess. Test it.

Viviane Rehor
Now you also for the first number, if it's too low or too high. If it's not correct.

High School Teacher
Of no.

Viviane Rehor
And now you also cheque for the first number if it's too low, too high. Otherwise you would have read in the second number before checking for the first number. It's too low to and now you I think it's now. Now it's correct.

High School Teacher
Yes. So yeah, because So what I hadn't paid attention to was there. Although I. Although I I'd read it and I knew it, I hadn't thought through the consequences of. There are two conditions to stop and you prompt twice for the number. So I mean, that's so yeah. So it's typically when you're when you're working. With the loop. It's. Is there something special to do? The first time. There's something special to do the second time because like when the roots loop is running, that's OK, but sometimes there's something special to do the first time round. Sometimes there's and. It's just a practise. I think that's right. It's only if I'm adding on one. Yes, cause I'm I immediately ask another question. So those two lines could go either way around it doesn't matter.

Viviane Rehor
Yeah. Yeah, no. Yeah, I think if it, yeah, if it just keeps on loading, it's correct. For some reason it just only stops the error at the moment, but yeah, that's on my. That's my red. That's something I have to stop.

High School Teacher
So yeah.

Viviane Rehor
But then I think it's correct since it's not saying it's not.

High School Teacher
Yeah, definitely, definitely higher. But it it's, yeah, so.

Viviane Rehor
Yeah, more university. Like first semester, second semester thing.

High School Teacher
You know, and there's nothing there that you that you couldn't ask a good kid in the in the middle of the school because there are no constructs that have not met. It's just about, you know, like. When you show them a pattern like that or you ask them to work on a on a pattern like that, what you want them to take away from it. Because just just doing something for the sake of doing it. It's kind of like, you know, like. It feels good for, you know, so people that like.

Viviane Rehor
Yes, that's one thing.

High School Teacher
Yeah, people like programming enjoy it when it works, but where does it lead? Where does it lead you? To what? Yeah, you know, so it's.

Viviane Rehor
Yeah, yeah.

High School Teacher
You've now got a. You've now got a new pattern of codes to work and what have you learned from that? So that to take with you to to the next thing that you've learned. So you know for something like that, it's the fact that. Compared to the previous ones that where the loop behaviour the first time you did the loop, second the 3rd and the 4th and the last time did. Loop were all basically the same but he. You're kind of what you'd. It's a bit more subtle about what you do just before you do the loop, you've you've now asked. You've got 2 lines asking you for the night for the number, and there's more than one reason for stopping. And that is what starts to build the complexity into kind of the ordering of the code to make it behave exactly the way you want it to behave.

Viviane Rehor
Yeah, I mean it's.

High School Teacher
We know that the.

Viviane Rehor
Reading like the blog language we have here, and I guess if someone would do like 20 of those puzzles, they would grow used to the pieces and maybe be a bit more like. Able to see. The small differences in more conditions or more ways. To stuff like that so. Just for practise.

High School Teacher
You get better, that's. No, but I I think that it's it's that kind of level of. Of carefully graded. Problems like that that that help kids with their problem solving and we don't have enough time. Or maybe or maybe or something? Something like this can help because you can. Approach this without. Having to kind of actually write it in Java or Python, you've got the assistance of the scaffolding kind of thing and and the the the sub. Sub goal labelling. And if these were created in a way. And having you know, so do do some simple versions of this. Now go to Java or Python And and have some problems where you you you apply that learning right now. Here's some more trickier ones, again with the sublevel scaffolding kind of thing to help you to do it. Now let's go back to Java. And Python And and. Yeah, yeah.

Viviane Rehor
Ohh I think I do have a meeting with with Quinton in 20 minutes and. Takes takes. Yeah, I don't know if you want to add anything. I'm. I'm happy to hear it. But what you already said is very helpful and seeing also the opinion from the side of someone who like, did school like school teaching in Scotland? Because before I only had tutors or students from university. So it's definitely a different point of view. That I didn't know about. So. It was already very helpful.

High School Teacher

Yeah. So, so yeah. So there's, there's, there's two things that the the the, the Python ones is is to be careful about the reference language exists. If so, for using something less in Scotland, you need to kind of keep that in in your in mind about and and and not just addressed. Scottish teachers, I don't think do it enough either. It's it's to think about when you go to write something and Python is be careful about how it sits alongside the reference language because you could end up confusing the learners if yeah, the behaviours in saying Python are very different from what they will be expected to be able to read in the reference language kind of thing. Most most of the things we've seen in this, this new one are are a very good fit for the for the higher and I think it'd be very effective for the the, say, the standard algorithms and higher. And I think that's what Parsons. So rather than just like. I mean, if it's a if, it's a. If it's a very simple problem and there's only like 4 or five blocks in it. Yeah. What? You know, what are you gaining from that? But this is more interesting because the more nesting the orderings is is important. And that's exactly what they they face in higher. But then they. Need to fluent in what are the basic simple find Max find men? A simple version of search and a simple count of currencies and then OK, what's a more sophisticated or a more, you know, tricky version of that? What would happen if you search and account? Currents coming together or finding Max, like many numbers, are bigger than the biggest number. That you're you're you're blending together to two algorithms or or or features of two algorithms together. I think that's where this can become useful. And the the. The sub goal labelling helps people to that and I think that if if it was possible to kind of also support heads that find it more challenging with some kind of hierarchy or prioritisation of of some goals to say, look because I know what you're saying about, you know, do an easy problem then. The harder problem, but the kids also need to look at something which starts off as a hard problem and they need to be able to see in that the core of that is actually a simple problem, right? So hard parts to the side, get the simple part working and by yourself, you know. You know, and and it's a it's a. It comes with experience and it's not and it's an easy thing to. Do but with. Some practise you could get good at that, you know. And if you if you'd be very good at being able to say, well, I can see that it there's bits that I don't understand, but in it I can see some parts which I do understand and I think I could build that. I'll do it.

Viviane Rehor

You know. Yeah. Yeah, because it's still. Correct. It's just like.

High School Teacher

Yeah, it's not complete. I'm just correct.

Viviane Rehor

But it's just the feature. For the one for the smaller problem, yeah. Yeah, cool.

High School Teacher

That that look looks really interesting and I think. Teachers would like it.

Viviane Rehor

Yeah, that's that's very cool. I'm. I will look into. This like scaffolding the problem description to start with the easier part of the problem description and the next part. That's a really good idea. No one had before so. That's really cool.

High School Teacher

And as I say, it's it's specifically aimed at the kids. Who need that extra support to kind of, you know, and who who might not get a perfect solution? Who? Who? Might and it's. It's like that puzzle there,

which obviously is a harder puzzle to do, is to let them have a go at it. Yeah. And say, look, it's all right for. You to maybe. Get it to to just. Find and forget about the negative number or something like that, or forget about counting how many. Just do a bit. Of it. And and that's OK.

Viviane Rehor

Yeah, not be overwhelmed by it. Like that's. A whole lot of. Stuff and I can do that. Like learn to break it down.

High School Teacher

Yeah, because because that's what they say and it's it's. It makes them feel bad in the classroom as well because everybody else is getting onto the hard problems and they're not even able to look at it kind of thing. Whereas no, you can take part in this, you know, and you can. You can take part in the conversations. You're still part of the class, you know, you're.

Viviane Rehor

Yeah, that's that's a. Really, really good thinking. OK, so.

High School Teacher

Right. I'll let you go on because you. Want to prepare for the?

Viviane Rehor

Yeah. Yeah, but yeah.

High School Teacher

Thank you very much for showing me. Yeah. Thank you. Thanks very much and good luck.

Viviane Rehor

Yeah. Thank you. Have a nice day.

High School Teacher

Right. OK. I'm just going to start with the day.