

Maria – Interview with Mr Kritzinger

Tape 110831_003

Maria (M): So today is the 1st September. I'd like to ask a couple of questions, Mr Kritzinger, one of the Maths teachers from Eden College.
First question is how many years teaching experience do you have?

Mr Kritzinger (K): Um, in high school mathematics I've got 5. And I taught in primary school for 18 months. Mostly I've been teaching 10-12 and then I've taught grade 9, um, once about 4 years ago, grade 8 last year and grade 9 this year.

M: And what is your feeling about the first lesson?

K: I was... I was pleasantly surprised by the way it went. Um, you gave me the worksheets to do and, um, I don't normally use those kind of group activities, so for me it was, um, it was a bit of an adventure. And it was a bit, um, it was something different, out of the ordinary to do. Um, and I was... I was glad the way it went. I think the, um, the children, um, they enjoyed doing it, they were more engaged and they were quite active, um, and, um, ja, and I think that they learned something by... They learned something from the end of the lesson.

M: So in your opinion, um, the lesson achieved its set goals?

K: Ja. I mean the lesson... we were looking at basically first of all we investigated the 2 different, just different shapes, putting them on top of each other and just understanding the concept of congruency in a very simple way which they all could understand by putting things on top of each other or not putting them on top of each other. And then, um, we looked at the square and we said for the square only one measurement is enough, we ought to have the same square if I give you the one side of the square everybody's going to have the same square. But then we find out that if we look at two measures with triangles, whether it's 2 angles, um, or 2 sides or an angle and a side, um, we're always going to have different kinds as well. We won't necessarily have the same kinds of triangles with just two measurements. So I think all the learners they all... most of them actually did manage to draw a triangle with given two specified measurements and most of them realised that though it was not a necessary... not a sufficient condition to actually ensure that they were all going to get the same congruent triangle. So I think that that was successfully from that point of view, ja.

M: So now in the first activity as an observer I see full learner autonomy, but is this possible in the second activity of the lesson?

K: Ja. Look, I think in the first... in the first part, um, there was... there was pretty much full learner autonomy, but even though I tried to explain it as clearly as possible, I still found people were not always sure what to do – whether it was... whether to cut the thing out exactly or just to look at them and see that they were congruent and then paste them into the right column. But certainly there was more autonomy there, you know pretty much... pretty much most, whereas in the second lesson, um, the learners were struggling to, to draw, um, triangles with the specified conditions. They weren't always sure how to go about

constructing a triangle with 2 sides or 2 angles or an angle and a side, so I needed to actually go around and assist. And eventually there was... it came to a point where there were so many people that needed assistance that I had to just go to the board and, and just try and get it across to everybody, you know, exactly what was required of them. But I think by the end of the lesson most of them actually did have, they had actually succeeded in doing something and then in doing, you know, in understanding what they were meant to do and doing it, and then understanding what we were trying to get across that 2 measurements weren't enough to guarantee congruency.

M: So the learners' previous knowledge affect the work in class?

K: Ja, I think... I mean they, they should know already by grade 9, um, how to construct triangles and, um, it doesn't seem that it's generally the case. Um, for whatever reason most of them are not comfortable drawing lines, drawing angles, measuring angles, measuring lines and constructing triangles. Um, so that would be a problem, um, for them obviously to then, um, understand that the 2 conditions are not enough, that they can't even draw the triangle in the first place.

M: So when I watched the video I observed that you keep an eye on your watch. My personal opinion that your time management was very good because you finished all activity on time, but what is your opinion in investigation activity?

K: I think that, um, I mean I'm a matric teacher and I prepare... At the end of the day I need to get my children to do as well as they can for matric. And the syllabus, um, is extremely full and you are constantly aware that you are under pressure to complete the syllabus. At the same time Maths is about understanding. You cannot be successful in Maths if you don't understand. So... And obviously understanding comes with thinking something through, finding it out, understanding, investigating it. That's all part of the understanding process. But also success... Part of success is also, besides the understanding part of it, is also learning relationships, memorising certain things, whether it's times tables or trig ratios, or whatever it is, formulas – because I believe that kids must memorise the formulas if they're really going to achieve well in their exam. Um, and then obviously it's about practise and drilling to actually pass that exam, because at the end of the day the matrics are going to write an exam to get them into university. Um, so the investigative skills are important, um, but they have to be balanced against the memorisation and the drilling and the practising skills. Um, and sometimes you are in a situation where, where the kids, their knowledge is so poor that you have to make up so much knowledge that they don't know from previous grades or for whatever reason that they don't know, you end up having very little time to actually do the kind of investigation that you would like to do because you are so busy, um, trying to get them up to scratch about where they should be, and then obviously so finishing the grade... so finishing the previous grade's work as well as now getting on to the current grade's work. Um, so you know it's... So you need to put in investigation where you can and... but it needs to be balanced because of your time constraints and other things that you need to do for your, for your success in Maths at the school.

When I was, when I was at school, I mean, we did very very little investigative type of work, right? Um, and the way I do now is there's very very little group work in my, in my classes like the one that we did in the first lesson. But to facilitate investigation and understanding, what I will often do is I will do the investigation, um, with myself kind of as the leader, as the lead investigator. And so, um, you know, I will do an overhead and they will have the sheets

in front of them and then, um, we will do it together and I will elicit the answers from them but just because... but I need to keep a central kind of focus, just to make sure that we're all on the right track because if I just said, "OK, now just do it" and I didn't do any kind of focussing on myself or on the overhead or wherever, you know, then people are going to start working at different paces, some people are maybe not going to get it, some people are slower, some people are quicker... So if I can say, "OK, we're doing this," and then just try and keep everyone on the same page so that we get through the work, we get through what we need to do in that particular lesson and we don't, you know, it doesn't sort of go onto another lesson or whatever because we need to actually get through the work by a certain week, before a certain test, or whatever it is that we need to do. So you're always under that knowledge that you need to complete this amount of work in a certain time. So if it's cent... If the investigation is more centralised, um, so the kids are understanding learning but the teacher is kind of focussing it and... focussing it, then that's the way I do sort of investigative-type activities.

M: And how do the... How do you feel in the new condition of learning, collaborative learning? What is your suggestion for a productive learning process?

K: OK, the new... Well, the new collaborative type of learning is something that I'm not familiar with. Um, I was involved with Maths Connect last year and, um, I mean I did experience some of the things that we did there and I can see some of the benefit possibly that it can happen, but I'm not trained in it, OK, I haven't experienced it myself when I was at school and, um, and so I don't practise it really. I mean we did this worksheet because you asked me to do it, OK, and as I said I mean I think that it was a... I enjoyed the lesson and I think the learners enjoyed the lesson. But, um, for me to do that, um, the whole year, you know, is, is not going to happen at the moment. I'm not... I'm not trained for it, I don't know if I've got the personality for it, um, and I don't have the resources for it. I mean you gave me the worksheet and said, "OK, let's do this." You designed the worksheet. But I mean the textbooks that we use, I mean my teaching is pretty much textbooks based, I mean I might add my own things and do my own things as well but I'm pretty much guided by the textbook and guided by the chapters there as well as the other ?, but, um... So the kind of collaborative type of learning is not, is not, is not happening in my classes at the moment. I think it takes... You need to be a certain kind of teacher that can actually maybe deal with kids in a certain way and motivate them and lead them in a certain way, um, and I don't know if I've got that ability. Um, also the kids are not always co-operative, so it's not always easy to do that. Um, so um...

M: So you actually mentioned two, three reasons: that it creates difficulty to, for collaborative learning. One of them is the lack of materials, of teaching materials.

K: Ja

M: And the second one it's the training - that the teacher doesn't have practical workshops that they can offer.

K: No

M: And as well the disciplinary policy that it's...

K: Ja

M: you are struggling and...

K: Ja, I mean I just think that... I mean the OBE system that we've had over the last 15 years, I mean I think it's been very idealistic, um, and if you look at what is happening on the ground or in the classrooms, it's been a disaster, OK. And it seems to me like there are people that are very idealistic that are designing policies which are practically not being implemented because they are so difficult or impossible to implement. Um, you know, um, I mean collaborative type of learning, you know, then how do you know learning is taking place? How do you know that the kids are not, um, messing around because you're all over the place now, you can't control everything from the front because now, you know... How are you going to design your assessment? Um, you know, what kind of assessment are you going to do? At the end of the day, end of matric, the kids are writing 6 hours of examinations. That's what you've got to prepare them for. So how does the collaborative learning process fit in with the exam that they write at the end of the year? I mean it's not a collaborative test that they write at the end of the year, it's a test on their own that they write for themselves. It's a merit... It's a merit thing. So I mean sure you can do some stuff, but you know. And I mean it's... So it's the material, also the assessment. I mean teachers are under... I mean oftentimes I'm up 3 or 4 o'clock in the morning designing stuff, OK? But I mean I was in a primary school where they were trying to implement some of this stuff. I mean you don't have a life. You don't have a life. There's no material, OK. They expect, I mean, rubrics and all kinds of stuff which are... which are virtually impossible, OK. Um, and I mean I've got a class of 25. If you're in a class of 40, you know, I mean it's ridiculous.

M: Is ?...

K: It's absolutely ridiculous.

M: ??

K: So unless... unless the whole thing is implemented and managed in a much much better way, you know, I think you know you're gonna have the same thing what you've had now for the last 15 years where South Africa is virtually the worst in the world in mathematics thanks to... and they had this wonderful new policy. So I think they need to do some serious soul searching about how, if they've got this wonderful policy, how come is South Africa is now virtually the worst in the world in mathematics – lower than most African countries – and we spent all this money on our education system. I mean ask, ask yourself that question. And don't blame just the teachers because the teachers work bloody hard.

M: Can this lesson become more interesting if you're using technology? Let's move to...

K: Which lesson are you talking about?

M: I'm talking about the first lesson and the second lesson as well. Can we use technology when we teach congruency?

K: Um, OK well the second lesson we used the overhead projector. I like to use the overhead projector quite a lot. I mean that's technology...

M: Ja

K: it's not, obviously, very advanced technology, but it's very useful technology, OK. Um, my problem... I had started using the geogebra programme just recently and, you know, I've started using it for trig and stuff but I haven't even thought about how I could use it. I don't know it well enough to use it for technology. Um, I mean just very very practical practical part of the technology is things like theft. I mean I don't want to bring my laptop to school because it will get stolen. It's... I mean it's that simple. It's that simple, you know. Um, so we do have smart boards and stuff here

M: So for practical reasons maybe technology...

K: But we do have things here. So I can for example arrange to take my class to another classroom where there's a smart board, where things are properly locked and stuff, but then I have to basically make a special arrangement to go there and then obviously I don't have all my stuff here in my classroom and the kids are now in a different environment, OK. So I mean I really haven't thought about, about how I would use technology there. I'm sure that it could be used nicely. I'm only kind of like just starting to discover more. I mean I've really been enjoying using geogebra for trig, for example, this year, drawing the graph and things like that. So I haven't sort of looked more at the geometry applications yet. So I don't know much more about that at the moment.

M: In the beginning of the second lesson you did summary. So is it possible actually the learners do the summary by themselves? Can you elicit this information from the learner, in other words?

K: Mmm. OK, look, the first lesson that we videoed we looked, we saw that two conditions were not enough for congruency. Then in the next 2 lessons which you didn't video we looked at the conditions that were sufficient for congruency – the side side side, and the side angle side, and the angle angle side. Um, now those lessons, um, they went OK and I think that the learners did investigate and I think they came to conclusions, but sometimes the investigations... you know you don't always know who is with you and who is not with you and... OK, so we did investigate the three sides – the side side side, the SAS and the angle angle side, um, but the investigations were a little bit kind of messy. They weren't as... They weren't as clear as the first lesson when you weren't there. And, um... But we did basically get the conditions, um, done. But ja,... So in the fourth lesson I felt that you wanted me to really focus on the formal proof of the lessons, OK. So that was the focus of my lesson and just to try and focus the kids quickly, um, you know I put them up a transparency because I find the kids are very visual, you know they're looking at phones and all things all the time so the transparency is nice to actually to focus them. So I put them up there and I decided to give it to them so that we could move as quickly as possible to the actual formal proof because that was the focus of the lesson. Um, so... And I don't think that they... Ja, so they weren't familiar for example with side side side. Um... So I mean I could have tried... I think I could have tried to, maybe to elicit some response, but then I wasn't sure how my order was going to work because somebody might have given me the third one and I had already, I had first, second and third. So, um, so maybe in some way it's something that I could have improved, I'm not sure. Um, but the point was... The point was now that we've done the investigation and the point was now to sort of, um, solidify basically, say these are the conditions now you've already investigated, now you must remember SSS, SAS, AAS and now you, and now I've got to show you how to go about

proving formally a triangle's congruent. That was the focus of the lesson. So it was moving away from investigation to, to basically procedure and routine. Um, and... Ja, so I didn't think it was going to make much of a difference whether I elicited it from them or whether I gave it to them because I felt afterwards in the lesson I was getting quite a good response when we were measuring the different dimensions, when we were measuring this side, measuring this side, measuring this side and then checking them. So there was... There was eliciting a response in the actual, in the actual proofs which was where I was focussed on as opposed to the actual three conditions that we, that we discussed.

M: I found now that the second lesson was more about the teacher-central.

K: Ja

M: So you don't think it's possible to become like learner-central?

K: Um, it's... Look...

M: And why you think the teachers should be in the centre of this lesson?

K: OK look I'm, I'm, I'm not a very strong disciplinarian. So I mean every teacher has their own personality. Um, and, um, I think, I mean I have good maths ability, I mean I got an A in matric so when I go into a class I know I know what I'm talking about and that's where a lot of my authority comes from – more... probably more from my knowledge than from my personality. Um, and... So what I find is that sometimes my classes can be, they can become a bit undisciplined, or a bit rowdy, OK, so I need to engage them with knowledge, with my knowledge and engaging my mind with their mind, that's generally how, how my lessons go, OK. Um, so you're asking if it's going to be more learner-centred? Is that what you're asking me?

M: Ja, ja.

K: Um...

M: Is it possible, especially in the second lesson...

K: Ja

M: when you need to teach them how to prove congruency

K: Ja. Um, I would find for example that in... in that particular class, um, and you see in most of the classes there would be a couple... there would be a couple of kids that you could do that with, OK. But more than half of the kids, um, they wouldn't cope. Um, I mean there are some extremely weak kids, especially in grade 9 because you've still got, you've got everybody still in grade 9. At least in grade 10 or 11 they start going to Maths Lit and then you get the strong kids. But even sometimes in grade 10 you still have some of the weak kids. So when you... Sometimes when you decentralise, um, when you start making things more learner-centred, um, you know you have a problem. I sometimes will try and put weaker people with stronger people so that I know at least there's one person that knows what's going on and he can help the others. But sometimes it's even not possible to do that. So sometimes if you leave things to be learner-centred – nothing happens – OK because...

And then they just play around, um, because they don't know what's going on and they're not particularly motivated anyway. Sometimes they're going to Maths Lit anyway so they think, "Why am I doing this anyway?" you know. And of course they're used to getting passed for no marks anyway because they get passed, they get passed... they know they're not going to fail. Um, so there's often... often there's not a very good incentive to work hard, so...

M: So they're not motivated to try their best?

K: No. I mean sometimes you have kids with all kinds of baggage. I mean they... they think they can't do Maths, um, they've got other things on their mind. They're 15 years old – they've got boys on their mind, they've got girls on their mind, they've got all kinds of things on their mind. Um and if, you know, and as I say, with me sometimes I can have discipline problems, so if I, um, you know maybe if it was a different teacher, if I had other material then I'd... So for me I think having too much decentralised or learner-focussed stuff is... there's too much of a risk of things not happening.

M: OK

K: And you're under too much pressure to make sure that things happen because they need to get marks, they need to pass things, they need to pass assignments, they need to know something and if you just...

M: So you need to cover the syllabus.

K: If you leave... If you leave... If you leave it too much nothing might happen, you know. And nothing often does happen, that's the problem.

M: I'd like to ask... maybe it's not very convenient, but is it clear for South African teacher how the new reform in the classroom should be implemented?

K: I've got a vague idea, um, of what people want, mostly from my 2 years at a primary school because the lady there, the principal there - Piet van Vuuren Primary in Brixton - she was doing her best to follow the departmental guidelines and policies and things like that. And um, I found... I found them very onerous and, um, impractical and virtually unworkable. And so you end up actually... you have a job to do and you end up just saying, OK, well how am I going to do this job because the policies and the things that I've been given are not helping me really, they're just...

M: Actually not reliable(?) to your work?

K: They're just adding on... adding on some burdens to me which are... which just seem to be not really helpful. And then when I got to high school I started teaching matric in my first year of high school and the principal just said to me, "Finish the syllabus by June." So I finished the syllabus by June. We worked very hard, I taught very hard but it was a teacher-centred approach and at the end of the year we got 4 distinctions and I felt I'd done my job. I did not... I did not even pay any attention to policies. I paid attention to LOs to say OK this is exactly what we must do, but the methodology was teacher-centred – this is the knowledge, this is the routines, this is how you do it – go and practise it. Um, obviously there was some investigation and understanding involved there. When I'm teaching I don't just say this is the rule. If I can... If I explain for example the, the rule for compound interest, the annuity

formulas based on the arithmetic... the geometric progressions, right, I won't just say, "Guys, this is the formula for compound interest." I will actually say, "OK, this is why we know the formula for GPs, OK, and now if you use the financial situation it works out into this." So I will actually explain the, um, the basis for formulas so people understand how we're doing it. But at the end of the day they need to know how to apply it and to get the answers out.

M: So in your teaching you emphasise on the context how the...

K: The content, you mean?

M: The content, ja.

K: Ja, well especially in the higher grades, but I mean even in the earlier grades you know there's work to get through. People have to have knowledge and with the collaborative learning situation, um, you know the knowledge it's not always, it's not always forthcoming or it's not always reliable, you're not always... you don't always know what's happening, you know. And it just takes some time...

M: So the learning process is not always productive?

K: No. And I think, um, and it can take up valuable time sometimes, which is why sometimes you tend to avoid it because you're under a lot of pressure to finish the syllabus. Um, and so I think if somebody can convince me that the new, the new methods, OK, will get you through the syllabus quicker with having the kids having a better understanding and with... with me actually being able to, um, also have a life, you know, that I mean I don't have to spend all my time just designing worksheets and marking rubrics and doing whatever. If somebody convinced me that and showed me how to do it I'd be more than open to do that. I mean, you know, I think that teaching should be a fun thing. It should be something that you can enjoy. So if... I mean if the new syllabus can say ja learning and teaching can be fun and this is how we do it and how we work together and if there can be an environment created that can allow that to happen, I think teachers would love it. But I don't think teachers enjoy being taken for granted, being just shoved with a whole lot of stuff that people actually don't understand the reality of what's happening in the classrooms and then getting beaten over the head for the marks that are coming out. So I think there's... I think there's... I definitely think there must be some possibilities. I mean as I say I'm not a totally teacher-centred teacher. I mean I always like for my kids to try and understand things and whether it's through me or through discussion I often, I often, I'm often a bit Socratic, I often ask, I often ask the questions when a child asks me a question I will ask them the question back, to get the answer out of them. OK, but it takes a lot of time. I normally only do that in extra classes when a kid comes to me and he doesn't understand something and he says, "Sir is this how I do that?" And then I'll ask him, "Well what do you think? What was the rule that we learned?" etc. But to do that in a classroom um, you know, um it's not easier, it's not possible if you've got 25 people. So I think... I think the important thing with the new collaborative learning, um, which I don't know, which I really know very little about, is that fine, maybe it's got a place, OK. It's certainly got a place in people's minds, in people in authority. At the moment it has very little place in the, in the classroom. That's the reality.

M: With the 40 students or in the class?

K: It's got... If you... If there are 1 million classes in South Africa I wonder how many classes are doing collaborative learning which is what the so-called authorities are intending. I'm sure less than 1% or 5%. So the people that want to do this must decide: How are we going to implement? How are we going to make it practical? OK, so how is it going to be practical for the teachers and for the pupils? OK. Because if it's not practical it's not worth anything. It's just a thing of... It's just a piece of paper. OK, so it's fine to have a piece of paper that looks very good, but at the end of the day we're sitting with results that are very poor even though we've got these wonderful theories, OK. So it needs to be saying: OK, ja, this is where we need to go. But I'm sure if teachers can see a benefit then they'll buy into it but they must be, they must be shown how to do it, there must be consideration for the teacher. The teacher's a human being – he's got a wife, a family, he's got a life to live. Um, you know, there must be material given. Um, you know there must... These things must happen.

M: Also you have to have practical workshops to show how to do it.

K: Ja, the workshops as well. I mean, there must be a proper implementation of this thing and not just saying, "There's the document, read the document. There's a five day workshop, now do it." That's not enough. It's not happening. I don't think even most of the department facilitators and stuff actually know how to do this, you know. There... But all I'm saying is I mean I don't know how many teachers are doing collaborative learning in the country. I really don't know. Maybe... I mean I'm 46 years old so maybe the ones that are coming up, the ones that are in their 30s or in their 20s, maybe they are doing it – I don't know. Um, I really don't know.

M: Ja

K: Um, you know teachers have been taught in a certain way and, OK, we were taught in the old school way, right. So now if, if there's a so-called new, um, approach which is wanting to be implemented, um, then obviously teachers don't know about that because it's a totally different approach, and it's a... it's different in so many respects. So you need to find people that actually know how to do it and it needs to then be disseminated properly. Now I mean most of the... most ways that people, that things get disseminated to teachers is through textbooks. Now I mean 4 years ago, 5 years ago textbooks were anathema. The department and... I mean I know this because I was in a primary school when I was there and they said they don't want us to use textbooks. You must go and find other material, you must go onto the internet, you must go wherever and that is how you must teach. You mustn't just teach from the textbook. Now that is very impractical. I mean you've got sport after school, you've got a wife and kid to go home to, now you've still got to spend a lot of time, for every single lesson trying to find...

M: material

K: material. You know you spend, you spend like hours you know finding material for like 5 minutes of a lesson. It's totally impractical, OK. It's just not going to happen. The other thing is is that you've got millions of teachers now all doing the same thing and not collaborating. You see you want pupils to collaborate in their learning environment but teachers aren't collaborating. I mean why don't teachers start collaborating? I mean teachers don't... I mean I've never shared a resource from you to me or you to... or vice versa, right. I mean if all the teachers in the whole country were collaborating, maybe we could start

working with the pupils. But maybe the teachers should start collaborating first before we start trying to get the learners to collaborate because the teachers are all working on their own. They are. I mean I was working on my own and I mean sleeping at 12 o'clock at night, finding stuff for physics or whatever that I was teaching in the primary school. Um, so that's the one thing – teachers are not collaborating. And there's lots of resources on the internet and stuff like that, there's teachers' groups that people should start joining.

And the other thing is now then they decided like 2 years ago, oh no, textbooks are now OK, you can use textbooks because they saw the results that they were getting from abandoning textbooks, so they said now, now we should use textbooks. But if you wanted to bring in collaborative learning, OK, then maybe you should get teachers that are, that know how to do it to write the textbooks, or to the design media. Textbooks, for example, that also have websites that have all other kinds of resources linked together, that have learner groups that... whatever, so that there can be proper collaboration. Um, the textbook can then be a tool for collaboration, OK. But currently the textbook, although there are investi... I mean we're using Laridon, but I mean there are investigative activities in Laridon, right, um, which you can use for a collaborative... you can use for collaborative. Um, but you know it's not that... I don't know if it's really on the level that they're actually talking about, you know. I think there's no... You know it's like people get buzzwords, like 'collaboration'. Now collaboration is the in thing and everything must be collaborative. And suddenly everything else is thrown out. Now people don't have to learn their multiplication tables anymore because we're not into rote learning. You know it's like people just... You know you just do things which are not right. I mean people must learn their multiplication tables. I mean I've got so many kids that don't know 7×5 in grade 12 because they said oh we don't do rote learning. Um, so I don't think that we must just say, "Oh, this is the new thing, the old thing was all bad and we're doing it new now." You know it's like... I think you must be wise in what... in the way you do things. Don't just say, "Oh everything, everything, everything was bad about the old system. Teacher-centred learning is just bad." You know what I mean? Because then teachers just get confused. You know they think they're trying to do a good job and now they're getting told they're not doing the right thing, you know. And then they just get discouraged anyway, you know. I mean like...

M: Actually they don't know how to do it the new way?

K: Ja. But I mean you can't...

M: At the same time they get confused...

K: Yes

M: because they don't know how to do it in the new way?

K: But you know I think it's better... If you're gonna get from A to B maybe you need to first go... If you want to get from A to F maybe you must first go to B, then to C, then to D, then to E, then to F, you see. I mean we've got a certain system. I mean the results, the school results I think – at least in the white schools – OK maybe I'm speaking wrong, but I mean there were, there were a lot of good schools getting good results 20, 30 years ago, using the old system, OK? And I mean those schools are probably still getting good results and they're probably still using the old system, you know. I mean... but a lot of the state schools that are trying to implement the new system have just got worse and worse, OK? So maybe

we should say OK we want to get to collaborative learning. We want to get there by 2025, OK. So let's see what we can do. Let's try and do a little bit of collaboration. Once a week or once every 2 weeks we do 1 or 2 lessons and we start doing that way. So we do what we're doing and we start bringing in new things, you see? And we start. But just to chuck something out totally like they did with OBE, right, and say, "OK, now the new system" and everything is new now and it becomes a big flop. And eventually they go back to textbooks and they go back to basically nothing has changed but they spent millions and millions and millions and billions of money, you know. For what?

M: Ja

K: And people have been confused, and people are discouraged and, um, people have spent so much hard work for nothing, you know. And paper's been printed and all kinds of stuff, you know.

M: Ja

K: Um, you know it's like things are just topped down, they just popped, topped down from the department

M: I think you have a very good idea that actually of course the teacher has to collaborate before we start to do collaboration in the class.

K: Ja, and collaboration... even with the department even. Currently it's like, you know it's like this kind of... there's... it's like these authority structures. It's a teacher in front and he's in charge of the class. And then above him is the principal and he's in charge. And then above them there's the department. You know what I mean?

M: Mmm

K: And you know it's all like this kind of authority and it's often based on fear and, um, and things like that, you know. And there's not a lot of trust anymore. Um and people, you know people don't trust each other and they don't respect each other a lot of the time, you know. And people are confused, you know, they don't work together and they blame each other like maybe I'm doing, you know. But if we're going to get people to work together or kids to work together, you know, maybe it must start happening with us first, you know. And that includes the department and includes all other kinds of people, you know. Um, but then you need to have people also that are competent, you know. If people in the department or people that are facilitators or, you know, if you want to do something new, so-called new collaboration, I mean are there people that know how to do... the people, you know?

Tape 110831_004

M: When you look at the second lesson, what can be done better? What actually constrains your implementation?

K: OK. OK, the second lesson you asked me to show formal proofs for 3 pairs of congruent triangles. OK, so I introduced quickly... So that was the one time constraint. OK,

as you say I could have elicited the test from the kids but I was also just a bit concerned with the, um, with the time and just the kids battled to settle down, so the focussing on the overhead saying these are the 3 conditions. And then we, we went through the 3 proofs, OK, and then at the end you gave, well you gave me the one question about the line going through the vertex and bisecting the other line, how would we make the 2 resulting triangles be congruent? So I think... I mean you're right, if I reflect on it it was extremely teacher-centred, OK. Um, which is OK but I think perhaps, um, I think... I mean I basically spoke virtually probably for 20, 25 minutes without stopping and I think that's a bit much. And the kids were getting restless, OK. It was a Friday as well. So perhaps what I could have done – but then maybe we wouldn't have finished – but if I had said OK... Let's say I had done one triangle and then I'd given them one to do. Um, let's say we did a triangle with the sides... with the 2..., the side side side. If I'd then had an example for them to do, so "OK, I'm just showing you how to do this one, now you do this one, how would you do this one?" So then it just breaks my speaking and, um, and they would have had time to write and to practise, because that lesson they were restless because they weren't... a lot of them they weren't doing anything. I told them to write down, but they weren't writing down, OK. And I wasn't... I just didn't... I wasn't up to disciplining them. It was a camera, it was a lesson. I just... If they weren't going to write down I wasn't going to make an issue out of it, you know. But if I'd said, "OK, I've done one now, here's your one – you do this", then I could have actually given them 5 minutes or more, so maybe 5 minutes or 10 minutes, then it was, "OK, let me see how you're doing it." And then we could have gone onto the second one. But then we probably wouldn't have finished all 3 triangles and I wasn't sure if you wanted me to finish all 3 or not, you see. So... and then we wouldn't... definitely wouldn't have got onto that other thing as well. So I thought OK, you wanted these 3 triangles done, so I wanted to do that. I mean the only way I could finish that was if I did it basically pretty much myself. So if it was maybe my own lesson and it wasn't something that you'd given me and it was going to be on camera maybe I would have said, "OK, here is one, now you do that one. Here's another one, now you do this one. And here's another one, now you do this one." And then we could have given them some homework and things like that. Then there definitely would have been more participation in, in, from their side.

M: Mmm

K: So that's I think something that I could have done, you know. But it wouldn't have been a group... I don't see any group activity there, it would have just been me doing one and then they could work in their pairs, but it wouldn't have been a group activity as such. It wouldn't have been an investigation. It was... It was a proof

M: Ja

K: It was a formal proof really. So it was basically practising the procedures of formal proofs of congruent triangles. But ja they didn't... There wasn't enough participation, definitely. I mean it was really about... It was all me.

M: And what about the last question, question number 2...

K: Ja

M: when they have to discuss. Actually they start to participate

K: Ja

M: Ja, 2...

K: I...

M: or 3 students actually suggest solutions.

K: Ja. I'm not... I don't think I'm very good at actually handling it, OK. I don't always know... because I'm so used to giving people answers, OK. So, um, and I know kind of, I know what the answer is already. And sometimes you're anxious that your kids must get the answers, they must know it, they must get it right. So um... So if somebody like gives an answer, half an answer, I'm not then sure how to say, "OK, no you're wrong" or "You're sort of right... what problem must we still do" or "You are right and that's end of discussion" or "Can we discuss more?" You see I'm, I'm not that comfortable doing that kind of thing. Um, also...

M: Why? Why?

K: Well firstly I hadn't looked at it much, you just gave it to me before the lesson

M: Mmm

K: So I hadn't actually thought about it much. You know, I hadn't maybe spent 10 or 15 minutes sort of thinking OK what, what kind of things could come up here? How would I handle this? How could I actually provoke more discussion, you know. Um, ja, so that's the one... that's the one thing. And then the other thing is just, um, maybe I'm just so used to... Maybe... I suppose I'm an anxious person basically. I am quite anxious. I mean you work under pressure as a teacher. Um, you're constantly aware of time and things like that, so um, especially in the classroom situation, um, I find myself, maybe my anxiety also just comes out also to the kids and, um, I struggle to... If it's an extra class it's different. I'm much more Socratic in extra classes. But um...

M: With a small group of...

K: Yes small groups. Ja, much better. I mean if it's one on one I'm very... Or even like I've got some very small classes down here where some of the classes are like 10. I'm extremely Socratic. I never give answers. I always ask and I ask and I ask and I ask and I ask, you know.

M: So you create this...

K: Also I teach Maths Literacy down there, so you're not under so much pressure to finish things, because it's basically doing the same stuff over and over again. It's basic arithmetic skills and reading questions and things like that. So you're basically saying, "Read the question, read the question, read the question, what does the question say? Answer the question, read the question," you know.

M: So you're creating this thinking, developing thinking of learners?

K: Ja, but now in the Maths, in the Maths class, um... Ja, in that particular situation, I mean I do do it in Maths, especially in after, after, after, extra classes, um, but I find like with um, with this class there's a lot of kids that are distracted so you find like if maybe one person or two, a couple of people are participating and trying to sort of, you know, engage their minds in basically the problem, but there's like maybe half that class that are not engaged, and so it's... it's a distraction for you because now you're trying to engage with the one person or the 2 or 3 people, but now the rest of the people you're losing them or they're, you know, they're not interested. So you just... it's just difficult to do that.

M: You have to balance...

K: It's just difficult to do that. Um, and some people... Some of the people just... they don't have the interest or the ability to engage themselves in that kind of a problem and so they just switch off, you see. And so then um... Ja, so... I mean if, if for example I mean some, um Jessica the one girl that was ? thing at the back and one or two others, if we were having a discussion with 5 of us and we're saying, OK, what can we do here, it would have been a totally different situation. I mean then we would have discussed it and, you know, we could have, um, you know we could have spent 15 minutes maybe talking about it, you know. And we would all, we would all be thinking, and we would all be on the same page. But in that situation it was... the class had been going for like about 25 minutes, they were restless, it was a Friday, um... and, um, I don't want to make excuses for myself, you know because like I say, I'm not always good at doing that, you know, and I don't know how, what I could have done better in terms of saying OK, um... I mean I did... She did for example if you make the two sides equal then you're gonna have, you're gonna have 2 congruent triangles because you're gonna have 3 sides equal. Um, now she saw that and maybe a couple of others saw that. I don't know how many others saw that and I wasn't sure how to illustrate that. And then I didn't really know where to take it from there, you know, to say OK what other situations can we do to, to make them equal? I mean I suggested the 90° ...

M: Ja

K: and make it SAS, you know. Maybe I could have asked for them from that, you know. I kind of just felt that they had had enough already, you know. So I just said, "OK guys...."

M: So did you allow them to give you one solution...

K: Ja

M: then you provide another one yourself?

K: Ja, because it was getting... it was getting... It was late in the period now and I think we were all a bit tired and, um...

M: And the period is finished after 2 minutes.

K: Ja. And, um... And I just felt that they were just getting tired and I wasn't going to get much more from them. I think that's basically, you know... you know I could see that they were kind of restless. But as I say, if it was a smaller group in a different situation I think I would have because I do often do that, um, especially in Maths Literacy where I've

got more time to do that kind of thing. And in Maths Literacy you really have to try and get kids to read and to try and think basically, you know. And you don't do that by giving them answers. You just don't do that.

Tape 110831_005

M: My next question is what enable your mediation become better?

K: You're talking specifically from a facilitation point of view?

M: Ja

K: Um... Ja, I think, um, you know I've heard of schools in China where you have like 100 or 200 students and you've got one lecturer in the front and he says, "Pens up" and everybody picks up their pen and they do the work and he says, "Pens down", everybody puts down their pen and they've got maybe some of the best Maths marks in the world, I don't know. But they do... they do teaching in a very disciplined and structured way and I mean they're apparently producing lots of engineers and whatever. OK, that's one way of doing it. It seems like there's quite a lot of discipline in the culture and, um, and they, they learn in that kind of way to, to learn the knowledge that they must learn and to process it.

Now in South Africa if you are looking to have much more, a much more rights conscious culture where, you know, people have much more rights and it's not so rigid and things like that, um, I think... I'm not saying it's impossible but I think it needs, it takes a very very special kind of teacher to have a class of 40 or 50 kids and to be able to in South Africa and in our culture, to be able to mediate effectively with a class of 40 or 50 kids in our culture. So I'm at a private school and some of our classes are limited to 15 kids. The ones that are here are not, but the ones down the ro..., down there are. Now in that situation, um, I can spend a lot of time with individuals, um seeking to, um, mediate. Um, I mean I like the, the, the term Socratic teaching because it's basically it's about, um, trying to draw the knowledge out from people, trying to tap into their understanding and development. And it's often done in a one-on-one context. If you've got a class of 10 people you'll go round the class all the time just trying to draw out from people, OK. Um, and even then I mean the kids are often lazy, they're often not really co-operative, you have to kind of like coax them and, you know, threaten them and say, "Come now, come now" because they just, you know, kids are not... You know, that's life, you know. Um, in a class of 27 people which are my grade 9s which is quite a difficult grade, um, I'm not that special teacher that can do it that well. Maybe there are people that can, but I don't think I'm one of them that can, um... I mean I can learn more...

M: So it's a... It depends from culture of the people and as well from the size of the class, if...

K: Ja. Ja. Look I mean we did mediate. I mean there was mediation in the first lesson, you know. Um, it went well. OK, the second lesson was too teacher-centred, um, so... um, you know it was OK, but it wasn't maybe as nice as the first lesson. Um... But, um...

M: What do you think wasn't as nice as the first lesson?

K: Well I think maybe just the kids were more restless. Um, I don't know if they... They weren't engaged...

M: And also the high level of the task. It wasn't like...

K: I don't know if it was that high a level. I mean a formal proof is not that much, is not that high. It's a procedural thing, isn't it?

M: Ja, but they don't know how to do it.

K: Ja

M: For the first time they start to do it. So they, they know how to cut and paste and compare...

K: Draw triangles

M: Ja, and to draw triangles, but to prove something...

K: Ja

M: in formal way for them was something that is quite new.

K: Ja. So...

M: It's a different type of learning, different level of learning. So the... they don't know how to structure this proof because they didn't practise before.

K: Ja

M: Maybe it's not difficult for the people with experience...

K: Ja

M: but from their point of view it was something new that they see for the... probably for the first time.

K: Mmm. Ja. Um...

M: And also the question number 2, it wasn't so easy to solve it...

K: Ja

M: to see... Ja, that's ? .

K: You know I think a lot depends upon the class. I mean I've got a class, for example the grade 10 class they're quite... they're quite a quiet class and the mediation is actually...

M: Very successful?

K: It's quite successful. Look, there are kids that probably shouldn't be there, I mean they're probably going to end up going to Maths Lit, you know. You know, they just can't do the algebra and whatever, whatever, you know. Um, but in general the class is quietish and they come in on time and, you know, they don't always challenge you and it's just... Sometimes... You know a class has a personality and the teacher has a personality. And this class, this grade 9 class and me we clash so much, you know, we really have clashed. That's why they said, "Oh, you're being nice to us today because the camera's here, you see." 'Cos, I mean, other times I'm not nice to them at all, you know. And they're not nice to me, you know. We can really spike. Um, now... So, you know, but it's part of life. It's part of being a teacher, you know, it's not just about the teaching anyway, it's about all the other things as well. It's about respect, it's about communication, you know.

Tape 110831_006

M: So there is the standard teaching actions like insert, elicit, clarify, confirm, give the facts. Which of them do you use most in your teaching practice?

K: Insert, elicit, clarify, time management, confirm, give facts, describe new concepts and summarise. OK, let me say I think the concept is important, right. Um, let's say you want to talk about a concept of, um, subtracting exponents when you're dividing like terms. So I think a... I think first of all I mean I did an investigation with them on this and we said OK 3 divided by 3 is 1. So 3 times 3 divided by 3, then the 3s cancel out, because 3 over 3 is 1, you're left with one 3 on the top. OK. And you move with that. You move with the number of factors on the top and the number of factors on the bottom of the line and then eventually you come to the conclusion that your... if you subtract the number of factors on the top you... If you say the number of factors on the top minus the number of factors on the bottom then you are going to get your answer. So basically we know the law, the law that says a to the power of m divided by a to the power of n is equal to a to the power of m minus n . Right? When you are dividing like bases you subtract the exponents.

Now you need to... you need to get them to understand it, describe the concept, and then there's a formula, there's a definition which they, they should now have a grounding, an understanding in which to ground the formula. Then they need to memorise that formula. Or they need to have it – whether they memorise it, they must know it. And then they need to spend a lot of time practising it because for example if you have more factors at the bottom of the number than at the top, um, you know, then it starts becoming more complicated. If you have a negative integral exponent at the bottom then you, then you're minusing a negative, it becomes a positive. So those are all things that require a lot of practise, OK, and I think, um, I say... I say to my kids you must understand the work, you must understand why we do things, you must then have those formulas and concepts in your head. You must memorise them so you know... You must know the sin ratios, the cos ratios. You must know them so you can apply them. And then after that, probably more than half of your time, must be spent practising and drilling so that you can, you can actually... you can apply them. It's... You can apply your knowledge to problems, OK. So a lot of my... um, a lot of my teaching is then demonstrating that, letting them do it. If I see they can't do it then saying, "OK guys, this is how you do it. Can you see now? Now do it again." So it is... I mean there must be practise. There must be practise in, um, applying the correct procedures correctly. I mean

there's a discipline, that's a discipline that's required. Um, and there's... And I think in South Africa at the moment, um, there is a lot of problems with discipline. A lot of kids don't have discipline, um, for whatever reason – whether it's the education system, whether it's their parents or whatever it is, but they come in and they struggle with discipline. And Maths, I think that Maths has, Maths has discipline. And I think that... that people who want to be successful in some Maths must have some discipline – knowing how to learn things and then knowing how to apply them to a problem that they're solving or whatever. I mean if you're going to write a matric paper, you know, you have to know what you're doing. You have to have practised the things. If you're going to answer a question on a function graph...

M: So only understanding is not enough for Maths....

K: No

M: to ah... If the students understand the concept it's not enough...

K: No

M: No

K: Because you see if they understand... Like I've seen this a couple of times. A guy will understand it and he will go home, he won't do his homework and he will lose it. If you don't use it you're gonna lose it. You know even you or me, if we don't do Maths for 5 years, you know, we're not going to remember our stuff. You know you're practising it. And um, I mean the guys who have been successful that I've taught are the guys that practise. Um, they understand it and then... But then, you know, there's... Even if you understand it it's not guaranteed that you're gonna just get it right. You have to go and practise it because you learn things in practising, you know, by yourself which you don't just learn from the teacher explaining to you. And you learn that by yourself when you're at home doing your homework. It's just between you and the question. And the book or the question or whatever. That's where a... That's where a lot of learning takes place and at the end of the day you...

M: So not... The learning is not only taking place in the discussion to clarify and to use ??

K: No, a lot of learning takes place with the child on his own. So that's another aspect of learning which is not even collaborative. And at the end of the day the child is writing an examination, OK. It's him alone and he has to have developed those skills of thinking by himself...

M: By... Without...

K: And practising... and practising the problem solving, practising whether it's factorising trying to... Whatever it is...

M: Without teacher

K: you know, by himself. He must have confidence when he goes into that paper: I know...

M: how to do it.

K: how to do this. I know how... And he's not going to do this without practise. I mean it's... I'm sure it's common sense – I mean a champion tennis player practises for hours to become a champion tennis player. He doesn't just sit and watch videos or whatever, he goes and he practises hitting the ball. I mean all sports will practise, OK. Surely Maths must involve practise? And the teacher also sometimes needs to demonstrate that. He needs to actually say, "OK guys..."

M: Not all... Sometimes actually you have to demonstrate.

K: Ja, demonstrate often, I mean as much as he can. I mean we take... Let's take a look. This is last year's grade 12 paper. Let's take a look at question 4, OK? Let's see now. I'm going to do it for you, OK? And then if they can see you doing it they say, "Ah ha, that's how he does it. Now I'm learning a little bit here. I'm seeing... Now I can imitate. Now let me see if I can do question 5, or let me go and do a similar question from the supplementary paper." Or whatever, you know. So that's an important part of, of the... And that, if you talk about developing mathematical thinking skills, I think it comes a lot with practising problem solving. So you start with the understanding and then memorising the concepts, or understanding and putting the concepts in your head, and then your mathematical skills come with applying – isn't it? I mean, you know, I mean an engineer, he's a brilliant guy because he knows how to apply his maths to problems. And he's done that by practising and applying, you know, doing those kinds of things. And that's a major part of the learning process which is done a lot by himself, you know a child doing their homework or whatever. I mean that just goes without saying. There must be at least as much Maths happening outside the class as Maths happening inside the class – especially in grade 11 and 12. You know you can't expect just to come to your Maths class and pass it, and pass well if you're not doing any homework at home. So a lot of learning takes place away from the teacher. So the teacher has to give the foundation or in the classroom give the motivation and give the inspiration or whatever, so the child will go back and get the examination aid book or whatever it is, and go and practise, you know.

M: So in relation with that, when you say the rest of the task was for homework and the kids complain, are these kids actually doing homework because, ja... because...

K: Ja

M: some of my students for example, they don't do homework.

K: Ja. Ja, look I mean it's really a problem with kids not doing homework, right? Um, and so again it boils down to the teacher. The teacher has to have a certain relationship or a certain disciplinary relationship with the kids that, um, they're gonna check homework or they have to have a method to check... for checking homework and disciplining the kids if they don't do it, OK. I mean I, I don't really do that much anymore, um, because basically at this stage of the game kids that are going to go to Maths Lit they must just go to Maths Lit, I'm not going to... I'm not going to bother with like really forcing them to do their homework, you know. Um, but certainly grade 11s, grade 11s want to stay there for matric I check their homework. And if they don't do their homework I write in their book, I'll phone their parents and I will say, "Look, either your child must drop because he's not interested,

he's not doing the work that's required of him, he's going to fail or he must do his homework." But grade 9s I don't do that.

M: OK

End of recording