Doing educational research with Vygotsky's theoretical framework (Transcript of Prof Steve Lerman's Public lecture)

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Abstract:
In this talk I will propose a set of principles that are consequences, in my view, of Vygotsky's cultural-historical approach for researching education. Vygotsky died aged just 38, too early for him to have elaborated his ideas. Those of us working within his framework are all, therefore, neo-Vygotskians, making sense for ourselves, with the help of a wide range of theorising and research in the literature. The intention will be to examine together perspectives such as situated theories, third generation activity theory, sociocultural theory and perhaps others to look for coherence and incoherence. I expect substantial participation from everyone.

Welcome by Mellony Graven:

Welcome to Professor Steve Lerman, a Professor in Emeritus am I right, is that your title now? of South Bank University. Steve and I go a long way back to when I was doing my PhD and Jill Adler brought Steve in to work with us and I must say when he first presented some of this theory stuff I thought aaaah, and I got into my panic mode. But we can always get through the panic you know. Climb on top of it. And Steve really helped me, more than so many people, to understand the importance of theory and how it frames the research that one does.

And he shared his office in South Bank which wasn't a very big office at South Bank University and allowed me to sit in a part of his office working on my Bernstinian analysis of the curriculum which was one of my key theoretical frameworks and he was just wonderful. So part of my welcoming him here is as this leading international maths educator, who has written such influential work like the "social turn" which we are going to be having the session at the PDC on tomorrow, so even if you are not one of our Masters students you are very welcome there at the PDC at 8:30am and Steve is going to make a guest appearance, where he will be discussing his paper anyway, and you can ask him questions about that.

So he is this internationally renowned person but really the reason we bring Steve to work with us is because he is so incredibly generous with his sharing of his knowledge with the students and hearing what it is that you want to do and then in working with you to get you further to where you want to go and a lot of people are really good at writing stuff but not always good at that and Steve we love that you are brilliant at both. So thank you so much for being here today. We love having you here. Over to you.

Steve Lerman:

Thank you Mel. I had to pay Mel to say that.

For those of you who don't know this is being watched and listened to by people at Wits at exactly the same time using that little laptop over there so you can say hello to people in Wits if you would like.

It is always wonderful to be invited here to South Africa. I have come many, many times and I love coming here. It is my second time here in Grahamstown and it's wonderful to be here and I am very grateful to Mel for inviting me, very grateful to Varonique for looking after me and to meeting all of you, especially Debbie, but lots of other's too. I really enjoy my time here.

Now if there is a popular call to switch over to the tennis just let me know (laughs) cause after all there is a South African playing an English guy, actually Scottish.

(Mel) Well maybe it will be like the rugby and we will wipe them clean like we did with the rugby.

Exactly. Let's make a start. Let me tell you what I am planning on doing today and tomorrow so that you get some kind of overall picture.

Today what I thought I would do in part one is to present, to itemize, what I think are the key concepts in Vygotsky's thinking. We'll go through them one by one.

And then after that we are going to look at some of the socio-cultural theories that people use in education in general but in particularly in mathematics education such as situated cognition, communities of practice, commocognition, activity theory and so on and see how they kind of draw on Vygotsky's ideas and consider to what extent they are developing them, bringing them forward.

Now I said in the little text that there was a little abstract for today but I do hope there will be a conversation so do please feel free to stop me and ask questions, you know there are going to be a series of concepts and I don't want to move on to the next concept and then half an hour later you say by the way in that first one I wanted to ask, or I wanted to say, so please do interrupt at any stage and ask or comment.

Similarly if you think I have missed something out, please do add that as well and I certainly hope for discussion when we look at the different socio-cultural perspectives that are based on Vygotskian work that are in use today.

So it is kind of just going to be a theoretical discussion today, although I can never just stick to theory, I will also be talking about examples from research here and there because I think that is important anyway and then I think tomorrow, in tomorrow's talk what I am planning to do is to present in quite some detail two research studies. One in a secondary mathematics classroom and the other in a preschool, a nursery, nature study classroom and they are examples of how I have worked in the first case the secondary maths classroom on my own and the second case in the nursery classroom with a Brazilian colleague, the work that we have done in drawing on Vygotskyian ideas in particular the zone of proximal development in order to analyse what is going on in those classrooms. So that is the programme.

Anything anyone wants to say at the moment?

Okay so let's start with this list of key concepts.

Marx

You have to start, I think with Karl Marx because Vygotsky began his entry into developmental psychology, and let's be clear about this, he was a developmental psychologist, in the early 1920's in Russia and Russia, the Russian revolution in 1918 of course, 1917 we are talking about, took over of course the whole country and what you saw for a period of years before there was a kind of clamp down particularly by Stalin and then as you all know th murder of 10's of millions of people by Stalin and everybody who spoke out didn't live for very long but before that period the first, I don't know how many years, 8/9 years perhaps there was a flowering of art, and of literature, and of political thinking and of sociological thinking and architecture but also in sciences. In sciences and that includes psychology and education and what people were trying to do was to be, having been inspired by Marx's ideas think about how they could apply Marx's ideas in their own field.

Vygotsky's first paper was in 1923 and he was drawing on Marx precisely to talk about how children develop from 0 right through, to the modern implications it has for education and that is the way he began. At the time the field of psychology was dominated by 2 particular perspectives. The very well-known one of behaviourism, Pavlov, in particular, Skinner, and others. And also by something called introspection which was the idea that you can uncover, you could answer questions about how children develop their thinking by you looking inwards and remembering what it was like for yourself. Those were the two dominant points of view.

At the conference at which Vygotsky presented his first paper there were others who were like him trying to draw on Marxist ideas in talking about child psychology, but very quickly it became clear to people that Vygotsky's thinking was far in advance of any of the ideas of the others and very soon he became the leader in this kind of area of work.

There were lots of political manoeuvrings between different centres of research in psychology. You should read some of the auto-biographical stuff, it is extremely interesting. A lot of rivalry between leaders of, heads of departments, university departments and so on but I think it is fair to say that Vygotsky's view very quickly became the most dominant one, most certainly the most elaborated. And I will be drawing, I will be talking about which aspects of Marx's theories have come into Vygotsky's work because of course Marxism in terms of economics, which is basically what his work was about, is an economic theory isn't relevant to us, nor is the talk about the dictatorship of the proletariat and all the things that lead into communist revolutions and behaviours and some of the monstrous stuff that developed later, that is not relevant to us too but there are aspects of his thinking that are essential to Vygotsky's.

So I am about to move on the next concept. Are there any questions or comments that anybody wants to make about that? Anybody over there in JHB no?

Nope. Not yet.

Materialism

So one of the most important elements that Marxist's thought can be summed up in this term materialism, dialectical materialism, you will find in his work but I am going to just focus on the notion materialism here and not so much on the dialectical.

This is an absolutely essential concept, well I think they all are, but I think this is an essential concept to get one's head around because it really is at the foundation of his thinking, but also of how we think about, drawing on Vygotskian theory, how we think about what happens in the classroom. By materialism what that means is that the human mind is that human consciousness is a product of material conditions and material circumstances so just as Marx said that people are have a different consciousness depending on whether they are the workers in the factory or whether they are the owners of a factory, whether they are the peasants on a farm or whether they are the owners of the farm, your consciousness depends on your relationships, your relationship to the means of production and for us that production is intellectual production, symbolic production, ideas, knowledge, thinking, so what he is saying that human consciousness is a product of material circumstances in which you live and grow up.

And so we are going to find differences if we look at children who are growing up in different circumstances. Let me just check, I was saying before we started that when you run a slide show on a Macintosh you can see what is coming up next, on the PC you can't so I am just going to take a quick look and see whether, okay, that is the next one.

So, that means both we can expect, so there are two important things here. The first one is that we can expect that children that grew up in different material circumstances from each other and are likely different consciousness, different relationship to knowledge, different knowledge's if you like.

Secondly that is not meant to be a fixed model, one of the ways Vygotsky and others have been misunderstood in the, I can see a question, let me just finish this little bit of explanation, other ways in which Vygotsky and other sociologists who have worked with similar kinds of ideas have been misunderstood, is that it seems to be suggesting that people are fixed and that is it. A kind of a deficit model, in the UK we look at it in terms of class, in South Africa you may have different kinds of ways of describing it, maybe social class as well. I think it probably is then you can expect the children coming from middle class and working class backgrounds will come to school with different knowledges but that the circumstances of that are material.

If you change the material circumstances in the school you chance the children's consciousness. So absolutely built into all this is that people develop, people develop with the right resources, with linguistic resources, conceptual resources, the shift from spontaneous to scientific which we will come back to later. Those kinds of ideas are available to everybody, what it depends on is teachers and knowledge and it depends on the resources. If you have a class of 60 children or even 30 children you can't give the time that children need in order to all reach the same kinds of access to symbolic power, access to knowledge.

So that's the first thing if you like in terms of the difference. The second thing is the way we analyse things in the classroom and when we look at what children are learning we look at the material circumstances that play into that. Which for example in the mathematics classroom are going to be how the teacher mediates the knowledge, mediation concept which of course we will come to soon. I mean one of the analyses that I will be doing tomorrow I will be showing precisely the material analysis of what appears to be children's ability based on what is given to them if you like, mediated for them, rather than looking to any kind of deep abilities, absence or presence. Sorry, a question, did you have a question?

Oh sorry I thought you had your hand waving.

Okay. I am going to move on from materialism, are there any questions people want to ask?

Is it clear what I am talking about. *(sound of mm mm coming from class in agreement)*

Actually there is one more thing I should say. Without a concept like materialism, we are stuck into universalist kinds of ideas about human consciousness. Unless you can connect human consciousness with changes in material circumstances how do we explain for instance children today who if I don't know how to use one of these things for the TV I ask a 5 year old. (laughs).

I have got a lovely video, it is actually on that laptop over there, of a 2 year old child, 2 years old, scarcely verbal, wizzing through the screen on an i-Pad, pressing you know icons and doing wonderful paintings and drawings and pasting in a

dinosaur from another package and putting it into the picture and putting in some letters and so on. How do we explain that unless we can say how material circumstances change, human consciousness changes. That is such a powerful idea that I think it is really rich for us to think about.

Differential access to symbolic power

Okay so I have touched on this and I have talked about differential access to symbolic power. This was something that wasn't, the forefront of Vygotsky's thinking, the application of materialism to this idea of differential access to symbolic power. Because after all remember that the communist revolution meant that through communism, the theory was, and this comes from Marx too, through Marx's ideas all prejudice, whether it be gender prejudice, whether it be racial prejudice or whatever it else it could be, or cultures in fact or cultural difference and including all religions, differences between them all would just disappear.

Everything would be replaced by the revolution of the proletariat; the dawn of history and in some senses the end of dialectical history, the dawn of free history for all of us and unfortunately it didn't work out that way but that was some of Marx's ideas. And so the idea with differential access to symbolic power was something that was going to be answered by socialism and so it wasn't something that he particularly paid an interest, had any interest in but people who have worked with the notion, with Marx's ideas and I am talking here about sociologists, so they won't have worked with Vygotsky's ideas, that is relevant to us and to psychologists, but sociologists like Basil Bernstein, like Pierre Bourdieu and others, Michael Apple who is very much alive and maybe Zeichner, they have worked with precisely this approach to Marxist ideas but that it overlaps with Vgotsky very much.

Indeed there is an author you should know Harry Daniels who has written a number of books, mostly collections, do look at the latest one, I have got a chapter in there (laughs), no look at his own work, in particular, I can't remember which it is, it might be called Vygotskian education, I can't remember, it was one of his earliest books, but the foreword was written by Basil Bernstein and Bernstein actually says that most people expect that I am going to identify myself with Piaget because I am a structuralist and so is Pierre Bourdieu a structuralist. On the contrary it is precisely Vygotsky's ideas, that materialist ideas and so on and so on that explains it all that resonates with my sociology.

And so let me refer here, let me just check again what is coming up next, okay I will come to mediation soon, let me just refer to some research that Vygotsky did during his lifetime, or actually he was already quite ill and Luria, one of his students and colleagues who carried out the research that illustrates the translation of that differential access to symbolic power that materialist ideas into an actual piece of research.

For those who have read Bernstein you will recognise the style of research because we are talking 1929 and it is exactly the same today. What Vygotsky and his colleagues argued was that if this materialism is right then Russia in a state of dramatic change through communism was a case study in differential access to symbolic power. What we would expect to find is that those people that have come from, who have grown up in rather, the peasant situation, and I don't know if you know your Russian history but peasants weren't quite slaves but they almost were. The land owners treated them all like slaves. They had almost no opportunity of any education of any kind. Really brutal regimes.

Children, people who had grown up in that system would have one kind of knowledge whereas people who had grown up going through schooling would have another kind of knowledge which would be more powerful and let's assume you know that that is what comes from the theory now let's go and test it and the way that he tested it was to send Luria because as I said he was too ill to do it himself, I don't know if you know, but he had tuberculosis and in fact died in 1934 at just the age of 38.

We were lucky, all of us in our field, to have Piaget alive, they were born in the same year 1896, but he lived until 1980 or 1981, much more time to develop his ideas, in fact, I will say this again tomorrow, Vygotsky I am sure had a sense that he wasn't going to live long and so many of these ideas came pouring out without any opportunity to research and develop them, that's for his followers to do and for us to do so it is up to us to continue to develop and to interpret Vygotsky's work just as it is with Piaget but in a sense Piaget, you know you look at the bookshelf in the library of Piaget and it's huge, masses of work, Vygotsky just wrote two books and a number of papers, several papers.

So the experiment that he planned was the following. It was to take a lump of wood, a hammer and a saw and show it first to the peasant people that is people who are quite elderly, Russia turned over to collective farms, I don't know if you know that, called Kolkhoz so all the little, so when the Barons were kicked out or whatever awful things happened to them, the land was turned over to people, but not to individuals. They came together as a collective, farmed the land together and so on, marketing the food together. So there were elderly people who had grown up as peasants and there were younger people who had also grown up as peasants but had taken over some of the management of the farm so they had some degree of education so they could do that and children who had started school, (funny noise wasn't it,

everything alright there, can you still hear us? (yes). Okay there was a bing or a bong and I thought that might have meant trouble). And the children had been to school and had learned things from school just like our schools too so Luria had taken these three objects and had asked the peasants, and you can find these data, I can give you reference to it or I can put it out for tomorrow if you wanted to see, he asked the peasants, the elderly people, what can you tell me, can you group these things, the hammer, the saw and the wood and they said there is no point in having wood if you can't do something with it and you have got a hammer and a saw and those are the things that go with it so they are all the same group, he asked the managers and they came out with the same answer, he asked the children, and the children said well the hammer and the saw are tools and the wood is something you can work on with tools. You see the difference, that is a scientific idea, that is the stuff we deal with in schools, things have different purposes and we group them together in categories and that is the sense in which we talk about differential access to symbolic power because of course those children are the ones who would be able to go to university and take over positions and so on. Of course to come to today we work with sociologists looking at in the UK for example children from working class backgrounds compared to children of middle class backgrounds and you get the same kind of thing.

I will give you another example of research that is much, much more recent than 1929, actually 1979, by a woman called Janet Holland who became the Professor of Sociology at my University, before that she did her PhD with Basil Bernstein and the study that she designed was for young children who were, she couldn't assume that they could read, so the task which she set was as follows, first she distinguished working class children from middle class children, she knew which backgrounds they were from, that is very difficult to do actually nowadays, it used to be easy, when the man went out to work and the woman stayed at home and so it was based on what job the man did. Nowadays of course it is vastly different, it is much harder for sociologists. But we will put that aside.

She had sorted them out and what she had did was to give children packs of cards which had pictures of food, and I am sorry for those people who know this, but it is useful to tell this story in this context, this research in this context and she said to the children, sort the cards out in whichever way you like, so the working class children sorted the cards out into these are the foods I like, these are the things I don't like, these are the things we have at home, these are the things we don't have at home, something like that.

Middle class children organised them according to these are vegetables, these are animal products, these are carbohydrates, these are fats, these are fresh foods, these are cooked foods, classifications like those.

She then told them to put the cards together again and sort them in a different way. The working class children didn't have another sorting strategy. The middle class children did. They could now sort them according to these are the things I like, these are the things I don't like and so on. So there are two things that are going on here, first of all somehow the middle class children have acquired scientific concepts, I doubt their parents taught them but I can imagine that they were sitting around the breakfast table and somebody was looking at the pack of cornflakes and saying ah it is has got so many carbohydrates, we must get something with less carbohydrates and it has much too much fat in it as well, probably not cornflakes but something else that has got too much fat in this and what about the salt.

So maybe it is just in the home talk and that is where Bernstein pinned it down to, elaborated or restricted language, somehow the children, the middle-class children had acquired some kind of theoretical or scientific if you like concepts.

The second thing is that was the first answer that the middle class children gave so the middle class children somehow knew what school expected. Is it then a surprise that middle class children do so much better in schools than working class children because what teachers, without the kind of knowledge of the things we are talking about here, would assume is that they are just not as bright? And just come to school with less and we will put them in the remedial class, we will put them around the table, the yellow table, I don't know about here but in the UK you don't label children, this is set 6 and set 5, and set 4, at least in primary schools, you put them on the yellow table and the blue table or it is the rabbits (laughs) but the children know, they know that one table is the dummies and that is the one they are on so we don't fool anybody except ourselves. But you can see what I mean by saying differential access to symbolic power and it is symbolic because it is about language, it is about knowledge that comes through, the way that we use language, abstract categories. There is some other research I could quote to you here but we really ought to press on.

But before I do, any questions? Any comments? Okay so it is to be said that there is much more in this that comes from our sociologists.

Mediation

As I say all of these are key concepts, the next is the notion of mediation. How does materialism work in practice right? How does the acquisition, different kinds of acquisition of knowledge according to social background or whatever it is

work when it comes to practice. And how it works of course is through mediation and I gave a trivial example there of parents sitting there with children at the breakfast table talking about the things that were in the packets.

That is the kind of ways that particular forms of consciousness are acquired by children, are appropriated by children, are acculturated into that form of consciousness, it is by that form of mediation.

So let's go back to Vygotsky himself or Vygotskian studies. There were some studies done I think by a philosopher called Rom Harré but I am not sure, it might have been him quoting the work of others, who have made studies of tiny babies and watched babies through their development to watch the process of mediation because if this theory is right then what we ought to be seeing is in children's development, we ought to be seeing the effects of mediation by parents.

Vygotsky was very interested in a phenomenon called the wolf child which you may well have heard of. It is these rare cases of children who have grown up with no human contact whatsoever. It is called the wolf child because Romulus and Remus were brought up, it's a myth, back more than a couple of thousand years ago were brought up by a wolf because their parents died or they were abandoned, I can't remember the full story, they were brought up by a wolf and they emerged, but the phenomenon about the wolf child is that there have been children, and there still are children, who emerge later in life, in teens or whatever, having had no human contact. And sadly that most of the time is because of maltreatment, children born, parents can't deal with them, whatever, lock them in a bedroom, lock them even in a cage, I am sure you have read some of these dreadful stories and they have never met up with any other, they have never spoken to any other human being, they live in their own mess and that is it.

And what Vygotsky is really interested in this because these children have had no mediation, they are human like the rest of us in their biology, but they have had no human mediation and what you find is it is too late, they are never able to acquire speech in any productive way, human manners or higher consciousness in any way whatsoever. And so for him that is what inspired him to think in terms of mediation as being the mechanism, and of course the zpd, this more sophisticated version, this mediation is the mechanism by which culture, knowledge, all kinds of human intellectual thinking developed in the child, mediation from parents and so in Rom Harré's experiments he watched children and he watched little children lying there and waving their arms around somewhat aimlessly except that what parents do is to say oh look, she is pointing at the teddy bear, let's give her the teddy bear.

And so the child gets the teddy bear just through aimless waving so suddenly the child connects this waving with receiving this nice teddy bear okay and so the child's behaviour changes slightly because they begin to point to the thing it is that they want because they know they are going to get it.

Later on you might find the child sitting in the high chair waiting for some food and kind of pushing up against the chair and going ah,ah,ah, well sometimes the parents say look she wants the food, and so the parents give the child food and so speech develops from that, the child knows that utterances result in food being produced and so it goes on, right from the very first day, this is what Vygotsky said, from the very first day of the child's life mediation takes place and development is all about that process of mediation which perhaps explains many of the aspects if not all of gender differences, of social class differences, of different periods in history, so the changes in culture over history, different cultures across the world, explains why children come out with different perceptions, I edited a book, a long time ago now, 20 years ago, 1994, it was called Cultural Perspectives on the Mathematics Classroom and there was a chapter there by Rik Pinxten who had studied Navajo Indian children's concepts of geometry.

Now Navajo Indian children grow up in a totally different culture to Western culture, totally different language and a totally different set of beliefs and religion and so on. It would actually be surprising from Vygotsky's point of view if they had the same concepts as space as we do and sure enough their concepts of space are quite different. Quite different and I will leave you to have a look at the Chapter to see.

Studies, current studies of aboriginal concepts of space are also similarly showing quite different, and it is almost beyond understanding Western minds, I say Western in the general sense but not Western here in South Africa but you know what I mean, developed countries.

It is almost inconceivable for us to get our heads into Navajo thinking of geometry or aboriginal thinking about geometry. It is going to be the same back the other way and so it is Australian education, US education and so on struggles for these things and so I am sure there are similar kinds of issues at other places in the world. Perhaps here too so it is scarcely surprising then that there are differences and it is the concept of mediation that is the mechanism through which all that happens.

Indeed just to make a contrast here for a moment, in Piaget's and Vygotsky's thinking, and it is fair enough to do that because if you read Vygotsky's work you will find that he draws on Piaget's work, praises Piaget's work where he agrees

with it and disagrees very clearly when he doesn't, when he thinks differently. Just as a side note it is interesting to note that Piaget it seems never encountered Vygotsky's work at all until much later in his life, indeed I was having a conversation with Gerard Vergnaud, a French researcher in the Maths ed community some years ago who had done his PhD with Piaget who was saying it is only late in his life that he read Vygotsky and said subsequently I wish I had come across this years ago because for example I have completely misunderstood the role of language. Wow, that is huge, a little too late for Piaget to change.

So just to draw a distinction here as I said Piaget and Vygotsky were both born in the same year and actually they first entered this developmental world of psychology at around the same time, in the early 1920's, very different backgrounds and I may say a word about that in a moment. But for both of them the dominant psychology around was behaviourism and you all know about behaviourism, stimulus and response. Right? You give a stimulus to a rat and it will run around the maze and if it goes the right way around the maze it will get a piece of food and if it doesn't it will get an electric shock that is the model for behaviourist theory. And behaviourists believed that humans too develop their knowledge in the same kind of ways, by parents establishing suitable response for a particular stimulus, 5 3's 15, there is an example of the stimulus response kind of idea if you like, more advanced idea.

Piaget like Vygotsky was not satisfied with the behaviourist notion between the direct link between stimulus and response. What Piaget said was what breaks the stimulus response direct mechanism is the individual's consciousness, the individual's knowledge, the individual never comes to a stimulus without some prior knowledge. And so it is the individual that breaks that immediate stimulus response, the individual encounters something new, they in turn interpret it according to their conceptual framework, the schemers, the schemata is the correct word, in their mind and the process of having encountered this new stimulus becomes absorbed into their knowledge either by assimilation or accommodation, you would probably be familiar with Piaget theories, we won't go into that any more really.

Perhaps I will just give you an example of what I mean by that, before I move off. I, when I was in my late teens, encountered a plantation, a banana plantation for the first time. Not in England, and I looked at these bananas and these things and of course they are trees, they have got a great trunk and they have got leaves and they have even got fruit on them and I encountered this new stimulus and assimilated it into my tree concept.

I have a concept of a tree up here and it fitted perfectly until the manager of the banana plantation said to me oh no they are not trees, they are plants, they are actually part of the grass plant family. So suddenly I can't assimilate this into my conscious thinking, nevertheless I have reacted to it, by drawing on the schema that I already had in my mind for tree. What I now have to do is accommodate which means change my conceptual understanding, now every time I see one of those with leaves and things I have to say, no, hang on a minute, is it a tree (laughs) or a grass.

So for both Piaget and Vygotsky there was something that interrupted the simple stimulus response. For Vygotsky it is mediation. I am going to move on so comments or questions?

Cognition

Okay, I have put down here Cognition. I am not going to say too much about it. What I want to say is that in so many studies that one reads probably in education in general but certainly in maths education you find people saying we have got socio-cultural theories, I am doing research in a class room and it has got its social context and so on but I am not going to look at the social context, I am not going to use socio-cultural theory because I am going to focus on individuals. And so I am going to look at cognitive studies and of course I need Piaget for that. I think every time somebody does that Vygotsky turns over in his grave.

Because he was at heart a cognitive psychologist, you can look at children's cognition from a Vygotskian point of view or from a Piagetian point of view, both of them give different explanatory systems on how children develop knowledge. What is the cognitive development of the child? For Vygotsky, for Piaget it is a constructivist process, children construct knowledge for themselves, they have to have the physical experiences that lead them to them being able to make reflective, to go through the process of reflective abstraction which brings them to a different level of knowledge. That is why Piaget was so powerful in classrooms, transforming classrooms certainly in the UK so that the walls came down.

And you have sandpits and you have the water barrel and all sorts of things so that children can experience volume and mass and all those kind of things themselves because the teacher can tell them but they won't learn. You only learn by constructing knowledge for yourself.

Vygotsky's idea is that the cognitive development is a social development. Knowledge is first of all on a social plane and only secondly does it get into the individual's plane and that is the process of ZPD , that is what is called intersubjectivity or rather from intersubjectivity to intrasubjectivity.

Shared knowledge that becomes something that is my knowledge isn't a simple process, not by any means. Our heads are, as in empiricist theories of the 17th century, our minds can be open and knowledge can be poured in.

On the contrary, the individual to appropriate the knowledge that is being mediated for them is not an easy process, but it is a social process, and a materialist process. So, if you are going to study individual children's cognition, if you don't want to look at social context issues by all means don't, but if you are going to look at children's cognitive development choose Vygotsky's approach, or choose Piaget's approach, but both of them supply perfectly rich and pure accounts for the process of cognitive development.

Now I have some backing here, and we can look up on the relevant paper I am going to mention. I have got backing here from somebody far more knowledgeable than me and that is Jerome Bruner. We talked about Vygotsky and Piaget as the two great child development thinkers of the 20th century. We must of course mention Bruner. Bruner of course is still alive, he is something like 98 or 99, just written his latest book, and just done his recent tour of Spanish universities giving talks, certainly if my government has its way you won't be able to retire until you are about that age, people who are in their 20's, but Bruner is perhaps an example for us all.

Now I mentioned to you that both Piaget and Vygotsky were born in 1896, in 1996 there was a centenary celebration of these two great thinkers. There have been Piagetian society meetings for decades and there have been, they are not called Vygotskian societies, they are called socio cultural and activity theory society meetings, international meetings for years. They came together for this particular event in Geneva which is right where Piaget's laboratory was and I was lucky enough to be at that conference.

Somebody had to go (laughs).

And the two conferences did their own thing for most of the time and one day they came together, huge audience, one of the visitors, I think it was that conference, one of the visitors was Vygotsky's daughter, she didn't speak, she wasn't a psychologist.

Anyway Bruner gave this wonderful talk to these two groups of people, people who knew Piaget's work inside out, and the people who knew Vygotsky's work inside out and what he did was to trace the intellectual origins, the philosophical origins of the constructivist point of view and of the Vygotskian materialist point of view and he showed these two people came from very different intellectual backgrounds and his conclusion was if you are a Piagetian scholar read Vygotsky's work to show you what a different point of view presents. Or be a Vygotskian and read Piaget to see what a different point of view presents but don't try and mix them together because it doesn't work.

And you know many in our community have tried to do precisely that, to find some way of bringing the two together. The most sophisticated effort at that was by Jere Confrey in *For the Learning of Mathematics* in the early 90's. There was a part 1 and a part 2, she is a wonderfully brilliant woman who had a lot to say and couldn't fit it in to one article and what she was saying was we need Vygotsky for the social but we need Piaget for the cognitive and so she was trying to find a way of mixing them together.

What Bruner said eventually was forget it. So I didn't want to say too much about that but I did want to make the point clear that you can do cognitive research in a Vygotskian perspective, in fact if you try to mix the two together it is not coherent.

Did Bruner have an idea of symbolic interaction or is it.....

No I don't think it was Bruner. Symbolic interaction. Can somebody supply the name of who introduced symbolic interaction? Somebody with access to google? (Blumer and Mead)

There is a strong link between Mead's work and Vygotsky's work. I don't think it was Bruner no. Rich ideas that he brought into the field. Okay any other questions about that or comments.

Maybe I could just say that in my PhD I have done exactly what Steve has said is that one of my research questions is very much on development of cognition in the learners, progression of mathematical proficiency and the other question is mediation so the two things side by side doing exactly what Steve has suggested within the Vygotskian perspective. So ja. It works.

And we have done a lot of work. Each perspective answers the question and they are different questions they are answering so you haven't had one question and chucked them both in.

Yes that is what Debbie was saying, perhaps you didn't pick up, but that is what she has done in her PhD, yip. Yes in fact if you are working from a Vygotskian perspective you can't do them separately.

My question Steve is on the appropriation. Because my issue with appropriation is when is appropriation, this is individual, and when, because the problem is appropriation and mediation it does not necessarily mean when it is mediated it will be appropriated. If it is mediated and not appropriated then what happens to knowledge? Because Vygotsky says we are enculturated through mediation now what happens if it is mediated and not appropriated?

Right. Okay.

I am going to ask you to hang on to that because appropriation is going to be coming up quite soon as one of the key concepts and also the relationship between teaching and learning so under one of those two we must address that question and then perhaps you can come back with further thoughts. Is that okay?

That's okay. Thanks.

Affect

Okay. Affect. Psychologists today study affect, things like motivation and so on in relation to our field, children's motivation and so on.

But still today they draw a distinction between affective studies and cognitive studies. They are different, except that Vygotsky said back in the 1920's the separation of affect from cognition is one of the major weaknesses in the field of psychology, they cannot be separated. And that's some, goes a small way to responding to the question just then which is sometimes we teach things and children don't learn it if you would like to put it in Vygotsky's language, we mediate a concept for children but they don't necessarily appropriate what's going on there and affect is a key part of that.

And if we ignore affect in all its ramifications and all its extent we are not doing justice to the business of cognition. And there are very nice studies by Jeff Evans. Jeff Evans who shows very nicely the role of affect in cognition and he draws on some studies by Walkerdine who does the same kind of thing.

Let me just give you an example, would this be a good example, yes, I think so, let me give you an example of Jeff's work perhaps. I was going to give you an example from Valerie Walkerdine but what Jeff Evans did was to interview university students who were not mathematicians. He is a university lecturer in statistics and so there is some mathematical knowledge there. And he did a series of interviews with some of his students, young adults, where he was asking them mathematical questions and do you know I don't know I can pin down exactly what the examples he gave but what he found was if he set the mathematical, basic mathematical questions in, oh yes, I know what it was, he would give them a menu with some prices and he would say would you choose some things that you would have if you were in a restaurant, and they would choose it, and he would say right, will you add up how much it costs, tell me what percentage tip you would give and work out the tip. What he found in some of the students was the kind of panic set in and he describes in particular one woman who said oh my father always used to get me to do this and I always got it wrong and whereas the mathematics questions he had asked before she answered very confidently and correctly, this she got it all wrong, she got the addition wrong and she got the percntage wrong and what she is trying to show is that knowledge is not simply you have it or you don't have it, particular situations that occur in which you have engaged with mathematics and everything else for that matter, the emotions that are connected with those experiences can be carried with you.

And now to come to the Valerie Walkerline example because it is a nice one. Young children just coming into school for the first time, teacher asks the question is 5 more than 2, okay, there is an assumption by the teacher that if a child can answer one thing is more than another they can obviously answer one thing is less than another. One of the things you might assume children have acquired in their home life from home experiences.

What she found was for a lot of children and this has nothing to do with the social class story before, for a lot of children more isn't contrasted against less it is contrasted against no more. Think when your children say can I have some more coke, no more, enough, you have had enough coke. Can I have something sweet, no more, so it is contrasting more against no more and not only that, children don't like to hear no more, they kick up a fuss. When they are little they cry, when they are older they stamp their feet or storm upstairs or whatever it is so when we in the class assume that more will be contrasted with less and find that sometimes it isn't what we don't know is that sometimes there is some negative emotion with children and we have to know about that and work with it as teachers otherwise the children are just not going to learn what it is you want them to learn so affect is always mixed in with cognition.***

And so when I read psychological studies look at whether children bring motivation with them to the classroom, as far as I am concerned with Vygotskian lens it isn't that way around. In fact Davydov, one of the great developers of Vygotskian theory in the 1970's and into the 1980's, I was lucky enough to meet him at a conference in Russia, once again, I had to go as someone did (laughs).

We couldn't speak to each other because I don't speak Russian, he didn't speak much English, that is not the point, Davydov did lots of research on where he called it was the learning activity elicits not only the ZPD and what not it also elicits the affect and motivation so it also comes to a learning situation rather than something that the children bring with them. The notion of the children bringing or not bringing motivation is this kind of traditional psychological notion that these two things are separate, on the contrary using Vygotsky's ideas, they are certainly not. Okay. So on to the next concept, that of language.

Language

There are some other things that we have got. First of all I said to you that Piaget late in his life admitted that he hadn't taken the issue of language seriously enough. For Piaget language is something that develops after thinking. Children develop thinking and they learn how to express their thinking in words. So language organizes cognition, language organizes knowledge.

Vygotsky's approach was quite different. It is not that there is not a biological development. It is not that children don't think before they have any language to express it just the behaviour of a baby in the experiment I was talking about before is a kind of simple example of that. But it is that language is, the process of mediation is through tools and signs and the signs is the language and so the language is carrying all the mediation process.

Now this is just a conjecture of mine, I would guess if you look at the social and historical background of Piaget and Vygotsky we might see some understanding for how they have different points of view. Piaget was born in Switzerland into a quite wealthy family. Switzerland you may know has various Canton's and in each Canton they speak a different language, either Italian or French or Swiss German is a version of German. Most people in each of those countries speak the other languages too and many of them English as well, quite daunting. Are there any of you here who speak 4 or 5 or more languages, we are much more limited than that, I speak just two.

Vygotsky, so there are language is important in Piaget's background but of course there are a lot of similarities between the European languages, there are differences, there are things you say in one language that don't quite translate into the other but largely there is an awful lot of similarities and why wouldn't there be, we are talking about Europe, European history, interactions between all these different countries, it is not surprising that there are all these similarities.

Vygotsky grew up in an educated, but poor family, in a Jewish family in Russia. Jews were discriminated against under the Tsarist regime and indeed his family and all the Jews in the area were shifted, (you okay there, alright) were moved into exile into a country that is now Belarus. Jews weren't allowed to occupy, many occupations and so on so there is quite a bit of discrimination. After the revolution for a while at least that changed and that disappeared. It was re-instated unfortunately by Stalin and others but still. So he would have grown up speaking Russian of course, the language of the country, but he would also have been brought up speaking Yiddish which is this strange sort of Jewish language that is a lot of German, some elements of biblical Hebrew thrown in there and even some other kinds of works that are specific to Yiddish. It is the language of suffering in fact because Jews were discriminated again across the world, but particularly in Europe and culminating in the Holocaust but many thousands, 10's of 1000's even millions of Jews had been murdered just because they were Jews just through history and Yiddish developed as a language of that pain and suffering.

So it kind of has a totally different purpose and meaning. He would have also learned Hebrew which was the language of prayer, which is the language of the bible. He would have learned at least those three languages and all of them quite different concepts and meanings and purposes and so I suspect that he would have from a child would have recognised how different languages express much more than just the way you describe an object and what it's history ought to be but also express culture in quite different ways, just a conjecture.

So language is very significant in that area.

Zone of Proximal Development (ZPD)

Let's talk about the zone of proximal development. I am sorry, I haven't come to the teaching, learning yet. It is coming soon. ZPD, zone of proximal development, sometimes called ZOPED, I think that is the influence of the US. Vygotsky developed this very late in life, 1933 I think, and he died in 1934, so he didn't have much opportunity to develop it. It is

much as he says himself in his writing, it is not entirely his own thinking, it has developed from things that other people have been, concepts that other people have developed around him, before him. It was defined by him as the zone, the space between what a child can do on his or her own or an adult. For that matter we are all in a zone of proximal development now to some extent in the thinking and learning that we are doing.

The gap between what you can do on your own in problem solving and what you can do with a knowledgeable other. It might be a more informed peer, friend or a teacher or whoever. That gap. It very quickly it became for him a whole metaphor for the process of learning. And we will be looking at that much more in the examples I will go through tomorrow.

So the whole process of learning is about developing in the ZPD. Now the zone is not something you know as a child walks in the classroom you can see a sort of bubble around them. You can see how big it is or how small it is. To go back to Davydov the zone of proximal development is produced in the learning activity. So an example I was given on that Russian trip I referred to a primary teacher gave an example of how they work with the notion of the zone of proximal development. She said that I say to the children there are three children and mommy gives them two oranges what shall they do. So a child puts up her hand and says we can cut them in half and give half back to mummy. Now that immediately motivates children to get engaged in this because they can see it almost in their heads and they know what it is like and that is a perfectly reasonable answer.

Teacher says does anybody have any other ideas? And then a child might say well let's take the bit we were going to give to mummy and try and cut that into three pieces as well and suddenly the children have been pulled into the zone of proximal development. Their learning is being pulled forward, ah, here is something else that we can do and of course teacher mediation, we get into thirds, and we get into a third of a quarter, a third of a half and so on and off we go into some mathematics. So that is the zone of proximal development.

So if the child had been left on his or her own that would have stopped. Cut the orange into half and give half to mummy and that is it and even if a group of children together they might not have reached the new knowledge but the zone has opened up for them ad what not. So it is a very sophisticated idea in the end.

I had a PhD student who took a class of children, 12-13 year olds, maybe they were a bit older, 13-14 year olds who were studying rate of change, taps being turned on, how fast does a bath get filled, car travelling a certain distance and so on. And he wanted to study how big is the zone of proximal development for each of his students. And what he did was to devise a series of clues, hints, of further questions starting with a simple one and going on to give more and more information and he measured how many clues each child needed before they could come out with the answer to the question that they were stuck on and that he used to calculate zones of proximal development, size, averages and all sorts of interesting stuff so it is a kind of rich and complex idea.

Before I move off any questions or comments? There is more to be said, tomorrow's two studies, look very deeply at the zone of proximal development but if there is anything burning that you want to ask, please do.

My daughter played with a calculator yesterday and we were travelling and she just pressed 1-5000 and mommy what is that, why is there a minus in front, what is that, and she is in Grade 1 at Kingswood and I just tried and I just thought how do I explain an integer to a Grade 1 learner.

And I am trying to say but the 1 is bigger than the 4999, and I couldn't and she was puzzling me and it was interesting to see what she came up with, the questioning all the time.

There is a lovely story about a child who's, I don't think her name is mentioned in the article by her name is Layla, we can say that, who had a similar kind of experience, she went rushing to her mummy called Mellony, (laughs), with a TV remote and said look I can count in three's, look 1,2 3, 4, 5, 6, 7, 8, 9, 3, 6, 9 it is written up in the learning of Mathematics that came out in the 100th issue, came out in January or February this year, do have a look, it will at least copy the story, it doesn't answer your question, what you could have said to the child.

I have got some ideas we can talk about that over tea perhaps but that wasn't the point of your question. I mean yes there you are, there, I mean the question that Mellony and I were engaging with was what is this in terms of a zone of proximal development. It is not a peer. It is not a teacher, it is not a parent nor an informed other, what is it?

Well there is a sense in which, and this was our argument, we have invited comment and let's see if there are further issues of the learning of mathematics, there is some comment on our argument. Our argument was that this carries culture. The 1 2 3 4 5 6 7 8 9. How is that framework developed? It is developed in a cultural way and so this is a cultural tool that carries ideas from our culture and that children can pick up, it created a zone of proximal development for her,

it didn't need to be a peer, it happened to be someone like this with an imaginative child who was getting a bit bored with the TV she was watching. So it is a similar kind of story.

Learning-teaching

Okay. So into your question, the word for learning and teaching is the same in Russian, *obuchenie*, I am sure I am not pronouncing it right but something like that. There are a number of languages around the world in which the word for learning and teaching is actually the same. I speak Hebrew, both biblical and modern Hebrew and similarly it is the same structured word.

For Vygotsky they are tied together and they are tied together in a way in which, we need to engage with the question why doesn't it always work? I think what, the next slide. Okay there is appropriation, tools and signs down there so we will try and take that together and then we will deal with the last two which are spontaneous scientific self-regulation in speech. For sure it is not the case and we all know it all the time with our children but particularly in our teaching we try to mediate some knowledge for our children, it is called teaching, we try to teach children something. Some children pick it up and some children don't.

The term appropriation is what we use, it is a word that carries with it that I am going to take it in for myself, from outside, from somewhere else. There is a lovely booked called Vygotsky: Revolutionary Scientist and it is by Newman and Holtzman. An example they give there of this business of appropriation and what appropriation, what is happening in appropriation is when you learn to deal with a hammer, when you learn to use a hammer, you appropriate all the history of that tool, it is has a handle, it has a particular shape at the top, it is weighted in a particular way, it is weighted in a way that makes it most productive. You have to learn how to use it, you have plenty of bangs on your fingers as you are learning of course, hold the nail and you hit your thumb first don't you but what happens when you appropriate and of course you can use the hammer in original ways, it is not the appropriation, it is not that creativity dies in a Vygotskian perspective which just taking in the purpose of the hammer and I have learned it. I can use a hammer to prop up this table or to use it as a door step or unfortunately people use it in all sorts of nasty ways too.

You know it is not the use of something ends with you appropriating what it is actually for. When you learn how to use a hammer you have changed and in some senses so has the world because before I couldn't put that up on the wall, actually there is blue tack I could (holds poster in hands). Without the blue tack I couldn't put that up on the wall. Now I can. So there are all sorts of things that I look around and I say a hammer must have been used so the world changes and my thinking about the world, and my engagement with the world changes because the purpose of this tool, what it was developed for, all of its history becomes mine. I appropriate it. It is a tool. Signs are the same things as tools except signs are language. There is a lot more to it than that and if you study semiotics you find that there are notions of signs that need thinking about and questioning but still a first pass at them. We could say that tools and signs form different purposes, we could call signs tools, they just, signs are just generally allocated to the linguistic area. If we are thinking in the mathematics classroom about compasses, protractors, those kinds of things they are certainly tools that are mediating things for us.

So a child doesn't learn what is going on and as I say I will be giving examples in some studies tomorrow but there is certainly something going on about the child's ZPD not being created, not emerging, ZPD hasn't emerged for the child, the child was thinking something else, not paying attention their affect wasn't stimulated by the example something else is a priority in their mind, the person next to them thumbling them feeling uncomfortable, feeling hungry, whatever it is. All kinds of things that we have to try and watch out for as teachers and try and pick up and deal with in some way by at another opportunity mediating that knowledge for them.

So we could say that there is a sense in which there is never any learning whether it is a baby of a day old or me at my advanced age, there is never any learning without some teaching taking place, that teaching might be the TV remote, or whatever remote this is, it might be the teacher, it might be a book, you know people learn on their own. You study mathematics on your own at University. It is the culture of the book that is, the culture that is embedded in the book that is carried by the book that is doing the teacher, you know the ZPD emerges because I want to pass the exam and so I am engaged in this book and so on.

Learning perhaps never takes place without teaching you could say but there certainly is teaching and mediation where learning doesn't take place, where appropriation doesn't take place and we experience it all the time as teachers. How does that address the concern you were raising?

Well it does address it because as you say it is mediation, I think that is (WORDS INAUDIBLE), I had it in my mind. There has to be someone mediating, so that would not be mediation as far as I am concerned. So if it says it is mediated even if

it is the culture in a book while I am reading then it makes sense. I wasn't thinking about the ZPD which I think I need more information on but I think I am happy with what you are saying.

Great okay. Any questions or comments here?

Spontaneous/scientific

So let's just talk briefly about spontaneous scientific, we have kind of talked briefly about it already when talking about Vygotsky and Holland's experiment of the Bernsteinen illustration of that and bringing it into the modern day in sociological terms.

There is one other element of this that troubles people when you read texts that I will try and unpack here because it is quite a difficult concept. What is it? Spontaneous is the things that I learn in my normal everyday life. And scientific just like the food categories there is nothing wrong at all, we are saying there are foods I like and foods I don't like, some things I will eat and some things I won't eat – nothing wrong with that at all. That is kind of spontaneous knowledge, it is the scientific knowledge that is what gives access to power, it's the knowledge that is the work of culture and of cultures and the work of schooling in particular.

So it is certainly not an issue, this is one thing that is easy to understand and another aspect of it isn't quite so easy, it is certainly not the case that the scientific wipes out the spontaneous. If I am in the playground as a little child and somebody says I am going to share my chocolate with you and breaks the chocolate into two pieces it is fair enough for me to say your half is bigger than my half. Not fair to say that in the classroom – in the mathematics classroom. It is only a half if it is exactly the same size as the other piece.

But that doesn't wipe out, you know the child can learn that and do very well with fractions and then go back into the playground and the other half is still smaller than somebody else's. We carry these languages together. It is just a question of learning the context of which they are appropriate.

The concept that is quite difficult to understand and this is again a Marxist concept, Davydov deals with it very well in particular and that is that he talks about the ascent from the scientific to the spontaneous. For Piaget it is exactly the other way around, we start off with everyday experiences that get abstracted stage by stage into higher theoretical levels so what is this about the ascent from the scientific to the spontaneous.

To go back to the PhD student I described before who was trying to measure the zone of proximal development what was the lesson about? I told you the lesson was about rates of change but drawing on some of Davydov's work and some of Davydov's colleagues and teachers, Galperin was one of them. What he did was to teach them, he gave them, I won't move this to the black board it is easier enough to show, he showed them a visual representation of the relationship between speed, distance and time as an example of rate of change and he did it in the most abstract scientific kind of way by putting speed here and putting distance over there so distance over time is equal to speed. So the most kind of abstract way and then the task for the children was to think of everyday examples of rates of change and make up questions that they give to each other making them eventually as hard as possible. Those everyday examples are from the spontaneous knowledge. Scientific knowledge only becomes real if we can ascend from the scientific into the everyday and see its applications.

So it is an ascent in the sense that it is going from the useless abstract into something that ties up with all the spontaneous everyday experiences that are fitted into that scientific. That is how the scientific gains its meaning.

It is not an easy concept, you come across the ascent from the scientific to the spontaneous and you think, what?. That is the meaning that is being implied there.

Self-regulation and inner speech

Okay the last point because the final one is appropriation which we have talked about, I just want to talk about self-regulation and inner speech. One of the things that Vygotsky said he disagreed upon in Piaget's work was inner speech. Piaget noticed, Vygotsky noticed, lots of psychologists have noticed that when children are young they would often speak out loud about the game that they are playing or the task they are engaged with and the speaking out loud kind of doesn't sound like them, so for instance if you have got a, your children would have done this, my children certainly did, you give them a book where there is a picture in outline, farm yard and there is a fence and there is a chicken and there is a cap and you have got a box of pencils, colouring in pencils and you have got to colour in and you will hear the child saying this has got to be blue, I mustn't go outside the lines, ooh I have gone over the line, that is no good. Exactly the kinds of things that parents say. Both Vygotsky and Piaget realized that at a certain age speech disappears and for Piaget it is an immature development process that just disappears. Vygotsky said no it doesn't, it becomes inner speech.

What happens is that the child not only internalizes through mediation the content of what the teacher or parent is actually saying but they also internalize the control of adults. The specificity of adult language is going to come into one of the examples that I show tomorrow.There are many psychological studies on self-regulation in particular related to education. When children work on a problem, a mathematical problem or any other kind of problem we get them to not only work on content of it but also to monitor their working. So in a mathematics question I have got all that information in this problem, have I used every bit of information, am I supposed to use every bit of information. I didn't use that bit. Maybe that is misleading, maybe I don't need it. Have I used everything. Do I understand what I have done. Let me check the answer and go back and see if it fits. All those are self-regulative, that is a self-regulation discourse. That is a language of self-regulation.

I had a PhD student who worked with primary children trying to develop their self-regulation through mediating processes and inner speech is the beginning of that. It is the internalization of the teaching, of the adult, and if the teacher and the adult, this is why, in the mathematics world John Mason has done a lot of lovely writing about the more specifically overt a teacher is about the ways you do things in mathematics the more chance there is that children develop. He said there is the other side of it and that is if you are too specific children don't learn it and just follow what the teacher has said and don't acquire the self-regulation so you have got to find that balance that enables children to say okay this question is one of those, I need to, this is an erratic equation, I need to solve in this particular way, that's the self-regulation, too often I am afraid when children, when you learn the next thing you have forgotten the thing before. Okay, self-regulation is getting the structure of things, the pattern of things, how you deal with different things, that kind of idea.

So that's for me the final key concept. I am sure I have missed some out and before we go on we will look at some aspects of socio-cultural theory of which we have only got a ¼ of an hour, are there any comments or questions that you want to say?

The self-regulation discourse, is it a similar thing to what people might call meta-cognition?

Yes. Meta-cognition, self-regulation I think we can think of as the same. Any psychologists here who will tell me no they are not, essentially at hear they are. Sorry just one second there is a question here and then I will come to you....

The spontaneous and scientific language you are saying that there is value-laden. Why do you think that it is still that the scientific is valued and honoured so much more and you know children are viewed if they don't have that scientific that they are incapable or that they are stupid or that they are or whatever reason, why has that sort of stayed with us.

Did you hear the question? (Skype – no) okay the question was essentially I suppose you could say to put it in slightly different terms but the same question what I say to people when talking about that Janet Holland example of the children and the cards what I say somewhat provocatively is the fact is that schools are middle class because the middle class stuff in Bernstein's terms, scientific, and theoretical is the stuff that we deal with in schools and the question is why should that knowledge be valued and not other knowledges. What about the value of street knowledge and so on and I think in principle my response would be that you know in terms of values you are quite right, why should middle class values be the ones that dominate in society and there have been many attempts, I mean, projects in Brazil for example, forgetting their football for a moment, projects in Brazil for example to try and you know break down the walls of the classroom and take the street knowledge of people and work with that and develop that in its own right without imposing on it the higher values of middle class society.

I think there are a couple of things I would say. First of all well I suppose it really is the same thing. The problem is that power comes with symbolic power, access to symbolic power. If you want to change society so that working class if you like street values are valued as much as middle class ones you have to gain access to power and the only way to do it is you are stuck, it is a conundrum if you like.

Gelsa Knijnik worked with Brazilian farming communities and in particular she did a study, it sticks in my mind because it was so vivid, she did a study with people who work in logging and she studied the way that they work out the value that a particular tree should earn them when they sell it.

They had their own ethno-mathematical procedures that they developed over many decades, 100's of years perhaps, in order to judge the size of this thing. So she studied them all and she wrote them all down and she was ready to go away and write her articles and get her professorship and so on back at University but the farmers actually said to her no, hang on a minute, we want you to teach us what are the really formal ways of working out the volume and the weight of these trees because we know that the people who are buying them from us are earning much more than we are and we want to get some access to power for us because we think they are cheating us. We want to know how they do it. So

you stay here and teach us. It is the same kind of story. If you want access to power, people need access to symbolic power. Depending on where you are in your values, wish it wasn't that way or that is the way it is? Ja.

You spoke about self-regulation and inner speech. I think when I was first introduced to this whole ZPD thing I mean I think we were introduced to it very superficially in our initial teacher training, I had always imagined it with a focus on content and you spoke now about how Vygotsky took it further than it is actually well you didn't actually mention ZPD, but I am wondering if in the ZPD if teaching children ways to think about knowledge, is that not also part of the ZPD, and almost more important than the knowledge and the content itself.

I read something about that and I thought maybe you could give me a bit more information on that.

I'll answer that just briefly and then there was a question coming from Johannesburg, I am sorry about that. So the question was can the ZPD be more than about content, can it also be about things like that we put under the heading of self-regulation and I will certainly give an example tomorrow of precisely that, where the interaction with a nursery child is not just about content but is also about the child learning how to be very specific about what they want to know. How to be specific and communicating with the teacher. So that is an example of precisely that. Question from over there in Joburg.

Oh it was a small one. The whole idea of spontaneous and scientific what was the background and the basis from Vygotsky about this? Why this process.

I think it goes back to that study of the wolf child idea. And that is that you know a real wolf child, a fiction-less, a real wolf child would have learned what things in the forest you can eat and which things you can't eat. Which animals you need to hide from and which you don't. So that is an example of the spontaneous knowledge. What they never acquire is the scientific knowledge so I think that is what drove him to make that kind of distinction.

Yes, I think that is it really but it is an important idea. Does that sound okay? (ja thank you).

Okay so let's just, we are only going to have time briefly to deal with this, I put the words socio cultural theory (strong) in brackets. If you have had a chance to read that social term that people have referred to saying to some people before I wrote it, it appeared in a book in 2000, which means I wrote it between 1998 and 1999, a long time ago, and I am sure I would write it in a different way, different things now but we publish in the state of our knowledge and then we learn new things.

In fact I know of at least two people in the maths ed community who are quite brilliant but you may not have come across them because they can't publish anything because as soon as the start writing their ideas develop and so they throw that away and they just never publish. You know one of them at least.

I am not as clever as them (laughs). When I write about (laughs) something that I think about (laughs).

So in that chapter I talk about a strong sociocultural theory. What I mean by that is let's take these Vygotskian principles properly and not substitute cognition is something that Vygotsky didn't deal with so let's take it another way. I am talking about the kind of strong programme that I have been setting out. I want to dispense, deal with this social constructivism, language.

Now, there is nothing wrong with the term social constructivism, a lot of people will describe Vygotsky's work as social constructivism, I think it is very dangerous because constructivism is (NAME INAUDIBLE) word.

It is a very nice metaphor actually.

The process of appropriation is quite a constructive process because I have got to do some work there appropriating ideas from the inter subjective to the intra subjective through my intra subjective play. But it sounds like let's take (NAME INAUDIBLE) constructivism and let's make it a bit social. And the article I wrote in JRME, the Journal for Research in Mathematics Education, kind of US based journal, meant to be international and there are some international articles but it is mostly US.

I was criticizing writers like him at the time, Paul Cobb, Joe Confree (sp), Paul Ernisten (sp) and others who were using the term social constructivism precisely to mean bringing together (NAME INAUDIBLE) and Vygotsky so for me, I prefer not talking about social constructivism, instead to use stronger terms like Vygotskian theory or whatever else it is so I just wanted to deal with that.

So let me just say a lot of you have read about these situated theories, communities of practice idea, coming from Jean Lave (sp) originally and then working with Etienne Wanger (sp). Jean Lave (sp) is an anthropologist who went to study different social practices actually here in Africa, in particular tailing apprentices for example.

How do apprentices acquire all the skills we need including mathematical ones. There was a focus initially on Mathematics, but of course communities of practice, situated theories have grown well beyond mathematic and really into the anthropological.

And they were, it was a team of people under Michael Cole (sp) who is a very well known, I think he is still alive, a very well know Vygotskian scholar. So they started their work with a Vygotskian basis to their work. Now let me ask you to what extent do you see situated theories, communities of practice coming from Vygotsky's ideas. Does it seem to you that people who know the field that it fits, that it works together with that.

I mean can you for example use the ZPD together with situated theories, communities of practice.

I think it goes back to that study of the wolf child idea. And that is that you know a real wolf child, a fiction-less, a real wolf child would have learned what things in the forest you can eat and which things you can't eat. Which animals you need to hide from and which you don't. So that is an example of the spontaneous knowledge. What they never acquire is the scientific knowledge so I think that is what drove him to make that kind of distinction.

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Social constructivism

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In fact I know of at least two people in the maths ed community who are quite brilliant but you may not have come across them because they can't publish anything because as soon as the start writing their ideas develop and so they throw that away and they just never publish. You know one of them at least.

So in that chapter I talk about a strong sociocultural theory. What I mean by that is let's take these Vygotskian principles properly and not substitute cognition as something that Vygotsky didn't deal with so let's take it another way. I am talking about the kind of strong programme that I have been setting out. I want to dispense, deal with this social constructivism, language.

Now, there is nothing wrong with the term social constructivism, a lot of people will describe Vygotsky's work as social constructivism, I think it is very dangerous because constructivism is Piaget's word. It is a very nice metaphor actually.

The process of appropriation is quite a constructive process because I have got to do some work there appropriating ideas from the inter subjective to the intra subjective through my intra subjective play. But it sounds like let's take Piaget's constructivism and let's make it a bit social. And the article I wrote in JRME, the Journal for Research in Mathematics Education, kind of US based journal, meant to be international and there are some international articles but it is mostly US. I was criticizing writers like him at the time, Paul Cobb, Jere Confrey, Paul Ernest and others who were using the term social constructivism precisely to mean bringing together Piaget and Vygotsky so for me, I prefer not talking about social constructivism, instead to use stronger terms like Vygotskian theory or whatever else it is so I just wanted to deal with that.

Situated theories, communities of practice

So let me just say a lot of you have read about these situated theories, communities of practice idea, coming from Jean Lave originally and then working with Etienne Wenger. Jean Lave is an anthropologist who went to study different social practices actually here in Africa, in particular tailoring apprentices for example.

How do apprentices acquire all the skills we need including mathematical ones? There was a focus initially on mathematics, but of course communities of practice, situated theories have grown well beyond mathematic and really into the anthropological.

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I mean can you for example use the ZPD together with situated theories, communities of practice.

I don't know much about it but I have read of people who do and I have read about criticisms of it so it would be lovely to have some more information.

My dilemma with it because I start with this in my proposal, my dilemma and my big question for myself was in the way I understood the situated learning is that the learning stays within the community and I didn't understand how does the learning become part of the person. And that for me was a big thing but I mean I didn't explore any further into the situated learning and so on.

But for me I was worried about how does one as an individual learn. So you might learn in the social context but it has to get inside somehow and I don't know, I didn't know whether these situated theories took that into account or not.

Ja, I think they probably do, I think what Jean Lave was trying to say was, and the kind of studies of Brazilian street children, rushing up to your car and trying to sell you packets of sweets and things, is a nice example of this that those street children were very sophisticated in their skills of going to the wholesaler in the morning and buying boxes of sweets, breaking them up into small sections, selling them during the day and having enough at the end of the day to take home some money to their parents, I suppose for them to spend for themselves as well and having enough to buy the sweets the next day which is often more expensive than they were the day before because those studies were done at a time of inflation, quite high inflation of money.

If you gave those children the same problems in the classroom they couldn't do them so knowledge in that way Jean Lave says is situated in particular social practices. So I think there is something, there certainly is something in that situated theories.

I think for me there are a couple of problems. I think for one of the problems that perhaps is answered by looking at Vygotsky's work more generally is the idea that in entering a practice it is not only that the knowledge, it is not only mind being in society, that is the name of one of Vygotsky's two books. It is not only that you enter into society and the things that you learn there are society specific as in the example that I gave just not about arithmetical skills.

But there is also a sense in which the society enters you and that is the kind of the ZPD, pulling people along. And there isn't a kind of mechanism in the situated theories and communities of practice literature that deals with that and I suppose that touches on your point Debbie as well I think.

So you know the mechanism of ZPD are still needed and somehow they've disappeared completely.

This is very briefly indeed because we run out of time in about 1 minute.

Third generation activity theory

Third generation activity theory, can't talk about that, it will take too long. First generation activity theory is actually the mediating triangle of Vygotsky's. Second generation activity theory is due to Leont'ev, third generation activity is worked developed by Yrje Engeström, a Finnish researcher.

There are connections and links between them all, but I don't think any of them, mediation or Leont'ev's idea of activity theory disappear, they have their own importance and implication even though we have a very rich third generation activity theory.

Commognition

Final point is commognition and we have run out of time I am afraid but clearly if you read work she roots it not just in Vygotsky but also in Wittgenstein. And I share her ideas there that Wittgenstein's thinking about knowledge and communities and the meaning of knowledge within communities and the learning process, because he writes quite a bit about that too, the learning process in schools, fits very neatly and nicely with Vygotsky.

Can I ask you a question? Do you think that Vygotsky (sp) used the term social in the same way as many of the activity theorists are using it nowadays? Are we looking at it from the same way using what he did...

I think I have to say no because 70, 80, 90 years have passed and if it hasn't where is the materialism. But to pin down what the differences are would be very interesting I think for us to spend our time on. I suppose a quick answer would be that you have to recognize that Vygotsky was working in Russia, the Soviet Union after the revolution where taking Marx's ideas didn't distinguish culture, didn't identify culture as being relevant to the social. Social is going to be all of us whereas today in the kinds of work that we all do we recognize differences between social groups whether it be class, whether it be race, whether it be religion, countries or whatever so that would certainly be a difference that we have. But it is a really interesting question.

So I am sorry we have to end there. By folks from Johannesburg (Bye. Thank you).