Video: opening of the London Knowledge Lab

Seymour Papert: Thank you and I owe you a debt too and I think the world does. I think it's a great thing that you're doing here. I'd like to pick on just one aspect of it which is to welcome the return of the K word, knowledge. It's about knowledge. I think this is something that I'm going to hesitate to say it's been forgotten by the education world because it's not clear that they ever knew it to forget it but they have been glimmerings. I would like to touch on a few of those encounters with the idea of knowledge. First of all I think we should remind ourselves how astonishing people of earlier generations might have found the phrase knowledge lab. Labs aren't about stuff like knowledge. Labs are about stuff like chemicals, and physiology, and physics. Study it mean they produce knowledge but they don't study knowledge. You might say all labs are knowledge labs in one sense but in the other sense they aren't any.

Who is responsible for the idea that the study of knowledge might be something like the study of physics appropriate to have a lab for it? I'm not enough of a historian to be sure but for me and I think for all the network of people I know it's Piaget. I think Piaget who was insistent all his life that what he's doing is not education period. It's not psychology. He resisted the idea of being called psychologist. It's epistemology and he coined this phrase epistemologie genetique which I suppose we should translate as developmental epistemol ... No. The epistemology is the emphasis. We're talking about the study of knowledge, and the scientific study of knowledge. I think that's something that really hasn't penetrated and especially when one thinks about all the discussions Piaget is refuted. He's all wrong. We now know that when he just didn't know what babies knew and so on, it's leaving aside what I think is his real big contribution and that is inserting into this discourse that this is epistemology.

Like one of our ex-presidents in America famously said, "It's the economy. It's knowledge stupid. That's what it's about." I think this fact has popped in and out of thinking about education, mainly out. It's popped in and out of thinking about computer science and about artificial intelligence. It's been very interesting to review the history of artificial intelligence where there's been a play between a number of points of you. One that it's really epistemology. The problem is really about knowledge but that's always been resisted in favor of ideas like it's about algorithms, or it's about making a powerful general purpose system, or it's about neurons. I think it's about knowledge. If it's not only about knowledge, that's a

theme that's been in and out of it.

What is there to study? What do are we going to do about knowledge? I think that first of all if you ask me what do I mean by that, I'd have to say I don't know. I'm the one I mean by it. You could say, "Well shut up then if you don't know how to ..." but that's exactly the point though because the view of knowledge that I think is emerging from all these Piaget and some others I'll mention in a moment is that knowledge is something that grows. It starts in some form. The idea of knowledge also is something that grows. The intuition that I think I got from, if I distill out, that I got from Piaget, and from the experience with AI and, playing with education ideas is there is something there that you could call knowledge is a good sort of nucleus, stem cell out which this thing is going to grow. Growing that, that's important.

What I would like to do here is touch on a few of the things, issues, the kind of problems. They are very different kinds. Since this is organization is part of the institute of education or related to, I'll start with an educational issue, directly educational describing what are we doing when we try to do this thing they talk about making new curriculum or new methodologies of teaching? I'd like to point to one salient fact that we lack a bit [inaudible 00:05:34] for talking about what we might do with knowledge and how to think about it. I'll use a couple of examples but the first one is very simple. Let's imagine that we lived in a society. It could have been ancient Rome but suppose we used Roman numerals. Of course with Roman numerals you can add, and subtract, and multiply, and do all these things but if you've ever tried, it's worth trying, it's pretty difficult.

It's conceivable although that's not quite the way it happened as far as I know. Somebody could have invented with an educational intent the Arabic system of numerals that we all use. It was actually, I think, invented for other intents. Maybe we shouldn't even make that distinction but let's consider that operation that suppose that we were faced with that and how would it enter into contemporary discourse about education? What kind of a thing is this that's happened? Is it a new curriculum? No. It's not really. It's true that the curriculum they have is about how to tell the difference between IX and XI and that sort of problems they deal with. This doesn't have anything to do with that. It's something different. It's not just a different formulism because what goes along with these two

ways of thinking about representing numbers is a whole culture of the kinds of things you talk about, the kinds of things you learn, and how you do them.

I just sort throw out. I don't know how to describe this kind of thing but I think that this kind of thing is closer to what should happen in the change in education that might be produced by the computer than anything I know in the contemporary discussion about curriculum and what the goals of education are in the way that shift from Roman numerals lot Arabic numerals, I think this is the kind of thing we want to do. Now looking back, I think that some of the things that I've been involved with, and Richard, and Timoshe there, and others here, and Sylvia Weir. What a wonderful thing to have brought together these people to that. Maybe enough to make it a great event.

I think that we're doing, what you can think of like total geometry, it's related to the traditional way of dealing with shapes, and figures, and forms of a certain piece of geometry that's comparable to that shift from Roman numerals to Arabic numerals. Then it's sad to think that maybe some educators in that world where I was imagining would use it in a way that totals have been used in our schools, namely they would say, "Well these Arabic numerals are wonderful. We can use them in order to motivate children to do the ... To do the real arithmetic which is IX and XI, and all that." This is rather what we've tended to see happen with shifts in doing things in our educational world rather like that.

I think part of the reason is we don't know how to describe. We don't have a language. We don't have an intellectual framework for talking about this shift. I think that the phenomenon that [inaudible 00:09:33] has written about about of regression about what is your term, [inaudible 00:09:41]? Whatever it is that powerful idea comes in the micro world for example and as [Tie-ahk 00:09:50] put it, the [inaudible 00:09:51] chain school but in the end school changes the reform and this new thing slips down a gentle slope into turning back into the old thing. It's partly because we haven't fixed it there because we don't have the conceptual framework for fixing it. That conceptual framework I believe has to be an epistemology. It has to be about knowledge. Has to be about how in the new context of having these digital technologies we can have a different kind of framework for representing thinking about knowledge. It's about knowledge in that sense.

Take another example. Think about totals. I hadn't realized until in fact just the last few weeks of thinking about the total in the following way, math for children, one of the a lot of concepts, angle is one of them. What is an angle? Ask all math teachers and angle is a thing like that. It's a kind of thing that you draw. One could call that a figure angle or a shape angle. It's got a shape but not all angles are like that at all for in the lives of children, children around where I live, an important kind of angle is that on the skateboards. That's a hundred and eighty or there is a three sixty. There is no shape there. It's an action angle. You say to the teacher, "Well which is ... How do you deal with that? It's not a shape." The teacher says, "Oh but we can draw the shape." It's clear that in some sense it's deeply embedded in that culture that the shape angle is the fundamental one and the other one is only ... You've got to reduce it to the shape angle and study it through this but why?

The reason why, it reflects a technology, the pencil and paper technology. If your technology for doing this is pencil and paper, yes indeed the shape angle is the right thing. Of course there's shape angles in the real world like that one, and your shape angle on paper. There are also action angles in the real world but there aren't action angles on paper. In the computer there are. If we're dealing with computers, our medium maybe the action angle as the one we might regard as fundamental. That is really what total is about. It's the action angle embodied in a form that we can manipulate. It stands for something different. It's not just a way of introducing kids into programming or understanding polynomials or whatever.

It's a good example of how when you shift from the paper and pencil medium to the dynamic digital medium there is a different kind of different ideal of what's fundamental and what isn't fundamental. That needs to be in the consciousness of educators and learners that it is a big shift. The big shift has to do with the nature of knowledge and it has to do with the way in which the medium that you used shapes and affects that knowledge.

What we're doing is fighting and battling against the influence of the paper and pencil technology, this grapho-centric version of knowledge that dominates our whole culture and especially our whole education system. It's amusing of that. Just review everything and especially in

math. Take math. How much of it has to do not with numbers but how you write numbers? Into add you do and you put this and this and you do this and it's about pencil and paper. It's about writing numbers. It's not about numbers. This is pervasive. It's impossible for one person. It will take a long time to work out of it but if we don't recognize that's what we're doing, we'll like Sisyphus. We'll just slip back every time we make an advance because we haven't mocked that advance as an advance. We haven't locked it as being towards some goal.

K word. K word is what we need in order to mock those goals. K word is what we're referring to what should be at the center, certainly at our center of our efforts in changing the way that learning happens and schools work. That's a different role of computers than what is being not only advocated in the official plans and official policies but I think even in the discourse amongst the more radical advocates. They don't like K word. They don't recognize it's importance. I'd like to raise one big issue is how to tint the development of this thing knowledge, and study of knowledge or epistemology.

Piaget did a contribution. It's interesting that, of course that may have just propped up in AI, in the 1980s there was a lot of talk about alternative epistemologies fueled a great deal by the feminist movements of the time. It's not an example. It was not a Sisyphus issue. They did a little advance and then it fell back because it wasn't connected to all these other things. I feel so excited about the fact that this place has the K word in its title because it can give that anchor so that you can make the changes in a purposeful way. It has a better chance of staying there instead of becoming assimilated back to the old. This might sound very kind of cognitive, and logical, and analytic but I'd like to just raise another kind of question about knowledge. A different kind of question.

In the piece that I wrote that has been most often quoted is the preface to Mindstorms about gears. In it I said I fell in love with gears. It's been interesting for me. Recently and again I'm saying this because the fact that I've only recent thought that I was going to formulate now says something about how far away it is from the general fashion of the culture live in. I said I fell in love with gears. I don't think when I said that I meant very much but since the last year or two I've been thinking a lot about, well what do you mean fell in love? Does that mean that I just love them or I thought about them a lot or is it possible that the analogy with

falling in love with a person is deeper than that? In fact is it possible that this is even physiologically, genetically deeper than that?

There have been recent studies about identifying brain structures that operate in monogamous relations unlike animals. A suggestion not very well formulated yet. I'm only suggesting this as saying there are more dimensions to this than are obvious that this is what's operated when we fall in love with a person and that's more than just liking that person. It has a lot to do with a particular kind of relationship and that person having a centralized role. Don't we do the same sort of thing, come to apply a lot of those descriptors to what happens to us when we really become involved with a subject matter, with an idea? We become passionate about it and we dedicate our lives to it like I'm doing now. Whenever you're asked to talk, that's what you want to talk about. Isn't it possible? I think this is the kind of whole area of the affectivity of knowledge, relationship to knowledge, which is again occasionally pops up.

It's not being given a central role. I don't think that we've really in the discussion on education, we talk about motivating child ... It's as if we want to motivate everybody to be in love with the same knowledge. That clearly is not what happens in our relationships with people. It relates with people is I could have known with this one or that tone. That goes very contrary to the idea that has somehow been propagated by educators, politicians. They have managed to confuse the idea of high standards with the idea of standardization. How can we personalize that? How can we personalize not by so much by finding out what this person knows or doesn't know, or interacts? That's all important but maybe we need to go and realize we're talking about a different kind of thing from understanding. Getting the concept right. We're talking about something warmer, deeper, a deeper relationship.

This isn't the time for a big lecture. I'm really happy tomorrow to be able to be at a seminar. We can talk about these things more seriously. I'd like to end with just one last remark which is not so directly about knowledge but about the role. What might happen to education? I used this as a talk a little while ago, what on earth happened to the computer revolution in education? Went away somewhere. We promised it often and often and often. It hasn't come. I think that the right concept is a tipping point. I think that we've pushed and it fell back. I really think we are at a tipping

point. I really think that you look around and you see what's happening with the technology. We fought in Maine. I suppose this might not be known here. It's got rather notoriety on the other side of the Atlantic.

Four years ago I persuaded the governor of Maine that the only ratio of computers to kids that matters is the one to one ratio because that's the ratio we have with books and pencils. We don't think that carrying a pencil in a classroom or even six pencils in a classroom has anything to do with the relationship that children have to writing and literacy. With computers somehow we think differently but it's beginning to penetrate. The governor of Maine accepted that and announced a policy that every kid from middle school upwards should have a personal computer. That precipitated a vicious, violent, negative reaction from the whole state. The newspapers article, editorials, "The governor is out of his mind. We are a poorer state. Exactly forty second in income level." It's a good reason for doing it over not doing it but that's another issue. Even the teachers organized as well. There weren't anybody. Maybe there were a dozen of us in the state.

I thought what was interesting was this, that the reaction seemed to confirm the accepted wisdom that this sort of proposal is too out of the box. People are too conservative. What we did is like an educator with a child who you'd like this child to understand some complex idea, you don't expect it to be accepted immediately. You don't say the child is too conservative when your first explanation doesn't lead to a deep understanding of relativity or physics or whatever it might be. You keep at it and we kept at it. Two years later that state had been educated. Two years later it was passed by the legislature that every kid from middle school upwards should have a computer. This has been implemented so far now the seventh grade, and the eighth grade, and fifty percent of the ninth grade students all have Apple iBooks personal.

It's not that it was impossible, too difficult, they were too conservative. It's that it needs a certain amount of effort, and campaigning, and education, and good thinking about education in order for it to happen. I don't think it will happen ten years over here. That's a question to reflect but I don't think that the fact that it could happen, it needed all those things reflects a wind that's blowing in the world and that within a much shorter two big areas in France including [inaudible 00:25:07] and including Marseilles have followed this as well as [inaudible 00:25:12] and

several big big school districts in the United States. Clearly a straw in a wind that's blowing.

I think it's clear that in two years time or four years time maybe we'll close to that tipping point. If we close to that tipping point we should really be thinking about the fact that any policy making or any research on education that explores what to do with [al-pa 00:25:46] technology is a waste of resources. Now should one hold one's breath coming with, "We've predicted before that education should change"? I think for the first time there really is a feel widespread that this idea that computer for everybody, at least that material basis, is moved within the time horizon of the practical education planner. They might not be ready to do it but they don't write it off as science fiction imaginary room. They talk about it and they think about it so I am holding my breath. I think that this lab is an extra reason for holding one's breath. It's going to come and I'm just delighted, delighted, delighted to part of this launching that might help it happen.