

## **Futurelab conference transcript**

### **Spaces, Places and Future Learning: Using innovative technology and practice to re-imagine learning spaces**

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*Rich Mix, London*

#### **A new learning landscape for rural schooling in Sub Saharan Africa**

Tom Power, DEEP

##### **Tom:**

I'm here on behalf of the Digital Education Enhancement Project which is run by myself and my colleague, Jenny Leach, at the Open University, and we've been looking at the potential for innovative ICTs to support the professional development and the professional practice of teachers in schools serving core rural communities in developing nations. The initial work was carried out in Egypt and South Africa; hopefully we will be extending it to Bangladesh, Tanzania and Sudan in the near future.

We come from a background of teaching professional development in the UK, having run quite large-scale teacher training initiatives for 160,000+ teachers, looking at how to use ICT to teach their curriculum more effectively. Knowing that when teachers have the chance and the opportunity to develop their skills with ICT tools, these tools can be both relevant and powerful in the context of developed nations, we wondered if they had any relevance to teachers in developing nations where the context is so different? We began exploring that question with partners that we'd been working with on other non-ICT projects in Egypt and South Africa.

I've got to say, whenever we talk about ICT, particularly in education and even more so in the context of developing nations, people tend to have a notion that we're sort of talking about ICT suites. The standard paradigm that people have in their minds are suites of desktop computers, largely orientated around office practices; you know, it's got Word and Excel and e-mail and the internet and all that sort of stuff. I think that paradigm is found across the world as the predominant paradigm for education in ICT, it's reinforced in developing nations because of perceptions of cost. There's a sense that you know, fancy laptops and handheld computers and the digital cameras and all that sort of stuff might be all well and funky and great, but they're just too expensive for developing nations. Part of the research that we've done over this period of time has been to debunk the argument that actually somehow a suite of desktop computers is cheaper than a handful of innovative mobile technologies.

(If this [the projector] ever works, I will show you some of the things that teachers have been doing in the rural communities.)

I'll tell you a little bit about the context. When we say rural communities, (I'll take South Africa as a case study throughout the presentation this morning), half of the schools that we worked with in South Africa have no electricity, two thirds of them didn't have a telephone. One of the project schools that I will use as a case study later on was very proud last year that it managed to get a stand pipe, which was the only flowing water within miles: that was a major achievement for the school. So we're talking about schools that have a very different infrastructure and toolset.

One of the issues that we're facing, the context that this is all in, there are various assessments about the number of teachers that are required to meet the Millennium Development Goal of universal primary education for all by 2015. Now at the moment, those estimates range from 100 million to 115 million additional teachers that are required within the next decade. You just can't produce that many teachers by conventional four-year teacher training programmes in bums on seats institutions, you couldn't even build the institutions in that timeframe, never mind train the teachers.

So one of our arguments is that we have to look at school-based teacher training, and there are lots of good distance education programmes that look at school-based training for teachers, but one of the missing links is that no one ever seems to think about tools of the professional practice.

You know, if you went to an architect, and they didn't have say, I don't know, a computer with 3D drawing software, or even a drawing board, the sort of tools of the trade, you'd be very concerned about their capability to develop the plans for your house. Similarly, if you went to a dentist and they didn't have the right sort of chair and the hydraulic drills and all that sort of stuff, if they came out with a hand drill, you'd be kind of worried about the level of professional practice that you were going to get. Yet somehow with teaching, it seems that the notion of professional tools being necessary for professional practice is something missed out of the equation.

So for example, in most of the schools that we have, the only tool that teachers had at the beginning of the project was a chalk board and a piece of chalk. They've spoken about the frustration, they'd covered an hour or two-hour journey on a crowded minibus taxi to the school, they'd arrive in the morning, they'd have to start putting their notes on the chalk board at the beginning of the day, at the end of the day, everything that they'd done, all their preparation, the lesson plans or ideas were wiped away and the next year they'd find themselves having to reinvent this process.

In terms of resources for the learners, what would be typical, most schools would have what they would call a school library, which I had hoped to show you photos of, but a typical example we've got, it's four shoeboxes full of books that have been donated by a publisher, they're all in English (the children all speak IsiXhosa) and there are some delightful examples as you flick through: you'll see things like, there's a book on marriage and it shows this woman in a beautiful white dress and the man with the top hat and tails and the wedding car - and it's just utterly culturally and linguistically irrelevant to the context of the learners.

So what we've realised is that digital tools provide professional tools for the teacher's learning, they provide them access to information, they provide them the ability to create resources that don't disappear when they rub them off at the end of each day, they can be adapted, reused and modified over time, allowing the teacher to develop a range of professional tools and resources to mend and develop their strategy over time, learning from experience, and they also provide them with classroom tools, because a laptop which serves as the teacher's own learning tool is also a tool that can be used with pupils in the classroom.

I'll just talk briefly about the tools that we used with the teachers. Because there's no electricity in most of the schools that we were working with, suites of desktops computers just weren't an option, we wouldn't have wanted them anyway, because we know that there's a lot of research that says actually pedagogically it's not the most appropriate thing, but we had to look at mobile technologies because there wasn't a powered option.

So the equipment that teachers had, we provided a multimedia laptop, digital camera, importantly a handheld computer. Why a handheld computer? They only had one laptop to share between two teachers in the school and we were very surprised that it didn't matter how remote you were, whether or not people were living in rondavels made out of mud and hay or whether they were living in breeze-block huts, or whether they were living with electricity or not, everybody, every adult, came out of their home bearing a mobile phone. We also know that there's plenty of research that shows that where people have sustained personal access to ICT, then they develop the confidence and competence to use it. I think as a teacher there's a very pragmatic thing about having a personal ICT: if this is my computer, I know that nobody's taken my stuff off it, and I know how it works and I can be reasonably confident, when I come to a group of people and actually try and use it, it will

actually do its stuff. Whereas when you are dependent on things like our projectors here [that is not working today], that are used by other users, that aren't looked after by you personally, you can't be confident that it's going to work on the day. So you turn up in the ICT suite as a teacher and if you're really lucky it will work. The idea with personal access to ICT is that it allows the teachers time to learn, confidence, but also they can be fairly sure that a) they'll have access to it when they want to use it, and b) it will probably still be there and probably work.

OK, so that's the sort of equipment set that teachers had. (I'll see if we can get anywhere at all with some piccies, I am really humongously embarrassed about this [the projector not working] but, thank you, that's so kind. Actually, this is not dissimilar to what our teachers do, they have one laptop, 60 pupils gather round, but you can just about do whole class teaching with this, provided you've designed it with that in mind and it's not full of small text and all that sort of thing).

We did a survey with the Mandela Foundation recently where we carried out interviews and quantitative surveys of the sort of problems that rural school teachers felt that they faced. Now, living conditions come right down at the bottom, only a quarter of them said living conditions, which given that they're being posted to places with no water, no electricity, no telephone line etc, is quite interesting. But that's not the foremost concern, what they've put at the top of the list is things like lack of resources, lack of tools, lack of things to teach with, poor infrastructure; the things that are bothering them are things that are preventing them from being effective teachers. I think that's very heartening that actually it's not a sort of selfish thing, the desire is that they want to be good teachers. That's a typical classroom [in the photo], you can see that there's 50 or 60 fairly lively kids in there and the teacher's got a piece of chalk, and they've got those kids every day, every week of the year, and that's why we think professional tools are so important, because without the professional tools, what else do you do other than didactic teaching?

Right, dominant paradigm, that's a typical sort of ICT, now that's an ICT centre for young people in Ghana, this is what Cawthera would describe as at the basic end, it's a couple of old PCs roped together. This is a more deluxe version, this is an ICT suite in a secondary school in South Africa again, again it's quite a rural town but a well-equipped secondary school, donors come in and go here's ten computers and a printer and expect you just to know what to do with them. I think the problem with the dominant paradigm is that it's all focused around ICT and there's an afterthought, a little thing called, oh, learning. Computers, computers, computers, and then afterwards, if you're lucky, they think about how people will learn with them.

The problem with the dominant paradigm is you rarely achieve anything, and it can be very destructive. Again, the work that we've done with the Mandela Foundation talks about how ICT inappropriately implemented can foster a culture of blame, because the reasoning goes like this: if you've got computers, you've got everything you need for a modern education and successful school, if you get computers and you don't have a modern education and a successful school, everyone wants to know why, and the principal blames lazy teachers and the teachers blame the rubbish pupils and the parents blame everybody, and it becomes problematic, you have this thing and it didn't work, it must be somebody's fault. So we think there's a need for a new paradigm that actually starts with learning, it starts with what we know about how people learn, about where people learn, about in and out of classroom learning, in and out of lesson learning, home learning, culturally appropriate learning, the language, the tools, resources, all of that sort of stuff, the things that Banks, Leach and Moon would call the pedagogic setting. Then when you've got your head around what it is you want people to learn and how you want people to learn, and what sort of things you want them to do to learn and where they're going to learn, you find what sort of ICT tools might be appropriate to support that learning. It sounds simple and obvious but it really is quite a turning upside down of common practice.

So, tools that we've used, I've mentioned some of them, the third one we will come back to

at the end, this is a mobile digital tool, it's a motorbike (I like motorbikes, and I'll explain about that later, I'm not going into that now). Handheld computers there, you can see a couple of pupils using them to photograph and record sounds from an event that we will talk to you about in a little while, groups of pupils using laptops for group work.

This is a little sketch that one of our teachers did in an evaluation last October when they were trying to tell us, basically we were asking them, how did you get on with the handheld computers? We had lots of things that they produced on them but they found it very hard to articulate, so one of the research instruments that we used, basically to get them talking, was to ask them each to draw three pictures, to summarise their experience of using the handheld computer and the digital camera, and then they had to put them all on the floor together as a group, there were 24 teachers, and group them into things that they felt were telling us the same sort of thing. This is one of the key images, there are about half a dozen of these that came out like this, you probably can't see, but it's the teacher stood on top of one of these minibus taxis on her way to work, it says, 'on the move' on the side of the minibus, and she's holding her handheld computer and down the side she's written, "experiences, images, exploring, discovering, permanently connected", and the thing they were trying to tell us was actually, I spend four hours a day in a cramped minibus, and this tool allows me to learn while I'm doing that, it allows me to engage with ideas from outside my classroom, it allows me to write lesson plans and save them and adapt them, it allows me to photograph things that I'm seeing, so it's turning the taxi into a learning space. The other thing they've said is, if they've got a little thing like this in their shirt pocket or their handbag, they feel very safe, because if it's in there, nobody knows it's in there, no one knows you're wandering around with a computer. If I'm carrying something around like a laptop, I'm flipping obviously carrying a computer around, and particularly in some of the rural poor areas of South Africa, I'm making myself a target, so this technology lends itself to really mobile learning, in a way that the laptops don't, and similarly when you're in a cramped minibus with 20 other people, they feel quite happy and confident to take this out and just look at it and read some stuff and maybe make some notes, whereas using something like that would be problematic. So what the teachers are telling us is that this was a very useful tool for their learning.

At the end of the research, one of the questions we asked them was, well, if you were buying this stuff with your own money, if it was affordable, and you had to make a choice between buying a laptop and buying a handheld, which would be the most useful for you professionally, for you and your learners? The vast majority of them - and we were quite surprised, because we originally thought this wasn't a classroom tool, this was just a personal tool - most of the teachers said, they were equally valuable, I couldn't really choose between them, and all the ones who expressed a preference said I'd rather have one of those [handhelds] - that's much more useful. So it's a really interesting finding, because we'd really only given them that, because we thought they all are familiar with the form factor of mobile phones. We know that they need personal sustained access to ICT which we can't give them because we haven't got a laptop for every teacher, this will just help the teacher get used to the ICT and bridge the gap for them to that. But actually that turned out to be a much more powerful tool for learning than the laptop was, in some ways. I think the drawback of these at the moment is you can't create mixed media, multimedia learning assets on it, so you can take photos, you can record sound, you can use text, but you can't yet put them all together.

One of the key things, we'd hoped to do it in the research that we finished last year but we just weren't able to sort out, was internet access. I think one of the most exciting things is where this has now merged with the mobile phone, and therefore you have your internet access and your e-mail access and your SMS, which is hugely useful. SMS was the main emergency calling system in this project, because teachers, you know, three hours' drive from the nearest road, would be sending us SMSs to the university in South Africa and the UK going, hey, this just froze up, what do I do, and it's fantastic, also being able to access the internet and e-mail is fantastic, and that's what we're hoping to explore in the next project. Interestingly, in Bangladesh particularly, where we're hoping to work next, the

landline infrastructure for telephones is almost non-existent, outside Dakar your chances of getting onto the internet through a landline are zero, but the mobile telephone network is better than it is in most places of the UK and it can be used for data access, so we're extremely keen to explore that with teachers in poor schools in Bangladesh and Tanzania and other areas.

OK, what sort of things were they doing? This is a group of teachers who are on a professional development ICT course. You might just about be able to make out that they're on a beach and the sea's over here, they're wandering round with bits of string, digital cameras over there, I can't see a handheld on that, but they're actually using the digital tools to capture the environment, because the classroom environment is very sparse, but the external environment is hugely rich, it's a massive learning resource. So one of the things that we're encouraging the teachers to do, both in science and literacy, is to use the digital tools to interact with the external environment to capture that and make it an object of learning and to draw in the sort of knowledge that we can put in e-books, things about scientific practice in fieldwork, about creative writing and poetry and literacy, and let those things interact with each other. So they're drawing on external knowledge and ideas and expertise, taking in their folk knowledge of herbal medicine, of animals, of folk stories, and they're adding the third dimension of the digital tools to capture these things and to create new artefacts.

The point that I'm making is that this is an ICT training course for teachers and it doesn't look like an ICT training course for teachers, and the same is true for learners: good learning with ICT doesn't necessarily happen in a computer suite. Of course the reason the teachers are doing this is to develop the skills and the confidence to then go back and do these things with their learners. There's one of the teachers who is using the tools for science, he's doing a line transect and he's recording the data on a spreadsheet on his handheld computer. He's using a digital camera to capture the plants that are growing in the area and try and identify those, and his partner - the teachers all work in two's so they can support each other - his partner's sat on the beach and she's using her handheld to record the sound of the sea to take back to her learners who live quite inland and she's doing some creative writing, she's doing a poem about the sound of the sea, and you get the impression of the sort of learning that's going on.

Another school, this is Dongwe I mentioned earlier, 2001, Dongwe was in trouble, the school inspectors were saying, this is a failing school, this school is at odds with the local community, they've got very lively - particularly the young boys, I hate to say it - but very lively young men who don't really have a great interest in being in the school, very poor relationships with the local community, and this is difficult.

One of the original things that we said from the beginning of the teaching, is that you're going to learn all these tools, make all these things, but at the end, you need to present an authentic audience. So when it came to be time to plan that, we sat down with all the teachers and we were sort of presuming they would do it at the university, where they had most of their training, and they all agreed unanimously that they didn't want to do it anywhere like that, they wanted the university and the Minister of Education and the press and all the other people who they were going to invite to come to one of the rural schools, because they said, that's where we actually learnt, we had training workshops and things at the university, but the real learning happens in the communities, and we want the people to come and see it there, not to think we just sort of turned up and did some university course. So they'd invited 500 people to Dongwe, which is a little school on top of a hill about three miles up a dirt track from the nearest village.

The eRanger company offered us use of this little mobile motorbike cinema that they'd developed, so there's a generator, a projector, a laptop, a PA system, speakers, amplifier, all that sort of thing, a 25-foot screen, all in the back of this motorbike, and in a marquee, it enabled the teachers and pupils to present their work to hundreds of people in a rural school in the middle of nowhere: out-of-classroom learning. So that's the thing in action. In

future we want to orientate it more around creativity: using it with a satellite video-conferencing system that can run off the motorbike, so that they can talk to pupils in other rural locations, they can talk to pupils in Cornwall, who are actually in quite a similar situation in some ways but a completely different situation in others. So we want to orientate it more around creating a film, doing video editing through the laptop that we've got here, rather than being shown stuff.

We think that these kinds of innovative technologies have enormous potential for providing powerful tools to people in very resource-challenged environments. I know the first question everyone is going to ask is about cost. It's not the focus today, but you'll have to take it that we've dealt with the cost question and this approach is actually cheaper than maintaining suites of refurbished computers, even if you're given them for free (the paper is on the project site).

What has been particularly interesting is the way that it has enabled teachers and pupils to develop entirely new working relationships, to develop new spaces for learning by the teacher and for the learning of the pupils, for them to engage in practice completely different and more engaging than things that they've previously been able to dream of. The final few slides that I wanted to show you that have disappeared in the melee somewhere for some reason, just to finish the story, at the end of the project, when they had this affirmation event, the fathers came up and painted the school because they wanted people to be proud of their school. The mothers came out with sickles and scythes - they cut the grass on the school field so there's a level site for the marquee to go up. I think it was the first ICT project to buy a cow, which was dinner for the guests, and using the mobile cinema setup, the ceremony was opened by an 11 year-old girl, who gave a fantastic speech. She was doing exactly what I am now while her friends sat behind her with a laptop showing their multimedia presentation that they'd made about the pupil's learning, and it was just such a transforming experience from the pedagogy that would have been possible without the use of such tools.

I'm going to stop rabbiting now, you've been incredibly gracious and I would love to hear any questions.

[Unclear question]

**Tom:**

I think that's really interesting, I think the Aboriginal context is very different, I know, in order to be allowed anywhere within earshot of an Aboriginal community, it's a much more protected sort of setup than it is in South Africa. We didn't experience any of those things in a negative way, there were things like, we had one of the teachers who was a science teacher, a biology teacher, and also a sangoma, a traditional healer. And it was very interesting the way she switched between these two domains and between her mother tongue and English, so she'd pick up a herb, and I can't remember the names of any of them, but she'd say, "this grows around the sunny side and it's really rich in such and such a mineral", then she'd switch into the healing mode and say, "and we use this for", and there was a lot of that sort of interplay between the different domains of knowledge if you like. For example, one of the stories that we've got up on the website, looking at endangered animals, as well as thinking about the causes of endangerment and the different animal characteristics and how they're related to their environment, it also incorporated things about African folk tale, about how the giraffe came to get its long neck and all this sort of thing, so there was a lot of interplay between those different sort of domains of knowledge and understanding, but it never came across to us in a way that seemed threatened or problematic.

[Unclear question]

**Tom:**

Sure, I've got to say, originally, as well as Egypt and South Africa, Albania was in the mix

because it was the same sort of GDP but a completely different thing. The main reason for the original study was because, as I said at the beginning, we had long-standing working relationships with those and we knew there were people who had similar sort of values and goals who we knew we could work successfully together with and we grew out of existing partnerships. That's true to a similar extent of the work we're doing in the future.

[Unclear question]

**Tom:**

In Egypt they were very pragmatic, they sort of went, look, we have these schools dotted around the poor suburbs of Cairo, they use English as a medium of instruction for maths, science and literacy, they have at least two computers and they told us they had a network connection, and they have a projector, they're going to be the project schools, and they sort of went round and said, you, you, you and you, you're on the project, go. So it was very pragmatic, it was driven by what they thought gave it the best chance of success.

In South Africa, it was very political, they went, look, the only schools that have got anything sort of vaguely like this are the ex-white schools, the ex-Model C schools, and we don't want to privilege the over-privileged schools, so we're going to not mention ICT, we're going to put a radio advert out, invite teachers who want to do something to improve their teaching, and select a representative sample of schools, and we then went through all those sort of things and we thought, how the heck are we going to do this, we have an ICT project running in schools, the majority of which have no electricity, no computers and no telephone. We thought about getting kids on bicycles attached to generators and all sorts of stuff. At the end of the day we came down to the mobile technologies.

The point about the communities you've mentioned is interesting, we had over 300 pieces of equipment in the project, two got stolen, one was from my car in the UK and the other was from one of the teachers, his house was burgled and again his computer went, it wasn't targeted, it just happened that that was taken with a whole lot of stuff. But generally, involving the community from the beginning, saying this is for your school and your children, how are you going to make sure it stays safe, how are you going to make sure it gets charged up, how are you going to make sure it gets used as widely as possible? And then the community found their own solutions, one of our most remote schools, they had no electricity or anything like that, but there was a hospital two miles down the road, and the teachers lived in the community in this one, and when they wanted to use the computer, the day before they'd walk down to the hospital, charge it up on the hospital's generator, bring it back up to the school, and they could do three or four hour's work with the laptop or a full day's work with the hand held. Other teachers, when they travelled in on the taxis, they'd charge it up at home, bring it into school, use it for the day, take it home again, sort of thing. You've got to resist the temptation to think, you have to be able to solve all the problems, I think actually, like you mentioned with [unclear] the people who live in these situations solve these problems on a daily basis and they're very good at finding solutions to them.