Redefining Classroom Boundaries: Learning To Teach Using New Technologies

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Abstract

This article reports on a longitudinal study that plots the development of a network of Teaching and Learning Observatory (TLO) sites in the United Kingdom. The TLO sites were used to enhance pre- and in-service teacher education. The research explores how classroom boundaries could be redefined through a technological innovation such as the TLO. The TLO linked a network of relatively remote schools with a university education department through video conferencing and interactive internet technology. Two years on, the TLO network emerged as an powerful tool for binding together school learners, student teachers, teachers, mentors, teacher educators and researchers. The technology facilitated interaction in a range of contexts in dynamic learning communities. The potential is illustrated in this article by a research study of student teacher subject knowledge enhancement resulting from use of the TLO.

The context

The original idea for the Teaching and Learning Observatory (TLO) grew from a pragmatic need for student teachers of modern languages and immersion/bilingual education (Geography, History and Science to be taught through the medium of French/German). These students needed a greater variety of school-based experiences not readily accessible in the immediate locality of the University of Nottingham. In the United Kingdom, the pre-service post-graduate certificate in education programme (PGCE)—the primary form of teacher training—has a statutory requirement for trainees to spend 24 weeks engaged in school-based work and 12 weeks at university during a 36-week training course.

However, even as the main national teacher training institution for Russian, Japanese and bilingual teaching, our local partnership of schools was not in a position to offer school-based training in all of these specialised areas. In addition, as teacher educators, we wanted our student teachers to observe and participate in classroom practice focussing on challenging issues related to their own subject specialism. We wanted, for example, for students learn how to communicate effectively with learners using the target language, while at the same time dealing with more general issues of teaching, such as classroom management and learner progression. As the partnership between schools and university strengthened, so too had the notion of developing a means to share experiences and observations which would allow mentors, student teachers and teacher educators to collectively discuss, analyse and deconstruct observed practice, without having to 'disrupt' lessons by a physical presence and spend time travelling great distances to do this. It soon became clear that information and communication technology (ICT) might provide the means to develop a deeper sharing and collaborative approach to teacher training. ICT, we felt, would not only bridge but 'fuse' the school-based and the university-based elements of the PGCE programme, whilst at the same time involving student teachers in developing their ICT skills for authentic purposes.

The ideal opportunity presented itself through the Training Schools Initiative, set up by the national Department of Education & Science (DfES) in September 2000. This provided the university and a beacon comprehensive school near London, with an ideal platform from which to launch the first two remote sites within the TLO network.

A Training School will demonstrate and develop excellent practice across the portfolio of training, including initial teacher training (ITT) and the continuing training of teachers in schools. It will, in partnership with ITT providers and other schools:

- *Try out new approaches to training and developing teachers;*
- *Carry out and use teacher research; and*
- *Will share and disseminate good practice more widely*

(www.standards.dfes.gov.uk/trainingschools)

The Training Schools programme, part of the government's national diversity agenda for raising standards, provided funding for two remote pilot sites, approximately 150 miles apart, to be equipped according to defined specifications in consultation with the Promethean Company, UK. (See Fisher, this issue, for a discussion of the link between education and commercial companies specialising in the develoment and sale of new technologies.) Each site had two large interactive wall screens. The first provided a video stream, or 'window' for sharing each others' classroom practice. This screen included pan/zoom cameras to facilitate video conferencing with individuals, groups of student teachers, and even an entire class. The second was an interactive whiteboard, which enabled different sites to actively and synchronously share digital materials, including internet resources, and to write synchronously on each others' white boards. 'Hot tables' (tables containing individual desk-top microphones) allowed microphones to be switched from whole-class to small groups in order to facilitate sharing and interacting in small group work between remote sites. However, each site had the power to control the particular interactive facilities used, as well as to decide who had permission to control the site's camera. Crucially from an ethical stance, in an age of CCTV and *Big Brother* voyeurism, it was impossible for one site to access another without mutual consent. In this way the technology allowed for genuinely negotiated interaction.

The vision

The initial TLO was based on a vision of building a 'learning community' between the first pilot school and the university, explicitly embedded in our shared values implicit in the learning process. This vision had grown through professional trust between teacher educators and the

teachers in the school, based on collaborative research and inquiry over a period of time—a similar stance to the one described in Serebrin and Ryz's article in this issue, though in a very different classroom context. According to the national College for School Leadership, networked learning communities consist of schools or professional communities "learning from each other…learning with each other." They exhibit a range of defined features:

- *A willingness to create space for staff to innovate;*
- *A high level communication, shared language, joint solutions and collaboration;*
- *A willingness to engage with and learn from theory and research;*
- *An openness to alternative ways of doing things;*

Good networks are in the knowledge-creating and teacher-learning business. They are motivated and bound together by the desire to improve our schools and the young people who travel through them.

(National College for School Leadership Networked Learning Communities, <http://www.ncsl.org.uk>)

However, whilst this rhetoric had some resonance with our vision, the ownership of the TLO lay within the community and that community perceived itself to be highly principled, ethical and professionally independent rather than 'buying into' the government-regulated 'business' of school improvement. At the core of our TLO community, lay opportunities for exploring creative and quality interaction between teachers, student teachers, teacher educators and learners, set within an ethos of learning at all levels. It was thus in this context that the pre-service teacher education programme was situated. Moreover, in working towards our vision of re-constructing 'learning', the research agenda was firmly rooted in an exploration of how an interactive training tool might be embedded into the joint praxis of teacher educators and their student teachers alongside teachers and their learners in a 'training' school. It thus became impossible to separate pre- from in-service teacher education since the more members worked collaboratively, the more traditional boundaries became blurred.

Exploring potential

During the initial phase of the project, the TLO was used to facilitate a wide range of collaborative activities which were carefully documented and evaluated. These included:

* non-intrusive lesson observations in real time of both 'expert' and 'novice' teachers in their classes by large groups of student teachers;

* individual remote support by tutors and observations of lessons taught by student teachers during their practicum based at the school site;

* sharing interactive whiteboard applications between the two sites eg student teachers creating and using digital teaching materials (especially using power point, web-quests and internet sites) with remote classes;

* student teachers experimenting with and carry out micro-teaching activities for school students based at the remote site;

* interactions between learners, teachers and student teachers to discuss lessons and issues;

* teachers at one site participating in mentor training taking place at the other site;

* virtual meetings between teachers, tutors and technicians;

* observation and longitudinal research into the development into classroom interaction focussing on spontaneous language in a class of beginning 11 year old French learners and a similar class for German;

* using edited video recorded lessons to create on-line training materials for student teachers;

* observation of lessons conducted in a foreign language that was not necessarily the observer's first foreign language. This allowed student teachers to update their skills – especially in terms of classroom language and giving instructions - in their third language in preparation for their practicum;

* teacher-student teacher experimentation with interactive whiteboard use in order to enhance learners' literacy awareness;

* newly qualified teacher (NQT) support with a challenging class of 14 year old learners;

* observation and analysis of the use of the TLO as a communication as well as a pedagogic tool by a team of researchers.

Adopting a theoretical framework for understanding TLO developments

Social constructivism provides a theoretical approach to learning in which students construct their own knowledge as a result of interacting with their environment and of mediating their understanding through meaningful cultural and social contexts contained within. Based on the contributions of theorists such as Vygotsky (1978) and Bruner (1990), social constructivism posits that learning and development is a social collaborative activity in which the community plays a central role in assisting learners to 'make meaning' in developmental zones. Working within the zone of actual development (ZAD) (Vygotsky op. cit), learners alone can only construct an individual and limited view of the world. In contrast, if they share ideas and understanding with knowledgeable others this will lead to further developments in understanding and 'knowledge construction' (Dwyer 1996) as learning in this case takes place within the zone of proximal development (ZPD), (Vygotsky op.cit). Social constructivism, therefore, supports a context-based communicative perspective on learning and teaching which foregrounds two crucial elements: firstly, learning through communicating in a meaningful context and secondly, the need for scaffolded environments to assist in co-constructing and negotiating meaning (McLoughlin & Oliver 1998).

Reviewing the guiding principles underpinning the TLO, suggests that building on our notion of collaborative learning and co-constructed understanding elevates the ZPD to a pivotal position. The ZPD implies that learning through, with and in the TLO is a co-ordinated activity with participants responsible for contributing to creating meaning. Moreover, according to Smith (1999) 'It is not so much that learners acquire structures or models to understand the world, but they participate in a community of practice.' In this sense, TLO activity aligns itself to the work of Lave and Wenger, where '[learning is an] evolving, continuously renewed set of relations', (Lave and Wenger 1991:50). This would suggest that collective learning situated within our TLO learning community, results in the construction of

practices that reflect both the pursuit of our enterprises and the attendant social relations. These practices are thus the property of a kind of community created over time by the sustained pursuit of a shared enterprise. It makes sense, therefore, to call these kinds of communities 'communities of practice'. (Wenger, E., 1998:45)

However, what is distinctive about the TLO 'community of practice' is that this community is both virtual and real since it is founded upon interaction and learning mediated in, with and through ICT. Certainly, the question as to whether the 'tool' or the participants define how the community functions in terms of affordances and constraints within virtually constructed zones of development, is a crucial one. The TLO is not technology-driven but technology-enhanced. The TLO is not technology- promoting but technology-using.

In order to make sense of the complex web of activity operating within the TLO during the initial phase, multiple 'scaffolded' and interactive zones emerged within our community of practice. The boundaries between zones are fluid, activity within the zones may overlap, or be independent, yet the synergy generated is likely to influence the extent and the quality of learning within the community. Therefore, there was a need from within to evaluate the efficacy of our practice in order to understand it better and to explore the potential for richer and deeper construction of knowledge. Within the overall social constructivist framework of the research, five threads began to interweave: these are identified in Figure 1 and focus on learning involving observing, teaching, reflecting, developing professionally and researching.

Multiple perspectives from within the community

Inquiry into the zones was centred around a variety of data collection methods depending on the nature of the activity. The data that emerged from multiple voices recounting their experiences, were 'rich' and the following extracts are presented in order to co-construct the TLO with the reader. [The underlining is my own.]

Extract One: Trainee Teacher Reflective Log

'Observing classes which are taking place far from where we are at the time is a less intrusive way of observing classes and being able then to discuss the lesson immediately afterwards. It is

clear that such technology will prove to be very useful for PGCE students in the future and any collaborative work which the School of Education wants to do with schools wanting to advance bilingual education'

Extract Two: University Tutor Report *(written after observing a lesson given by a trainee and one of his tutees)*

'An 'affordance' of the use of the TLO was that I could jointly observe the lesson with a colleague; we were able to discuss the unfolding lesson in a way that would not have been possible if we had been present in person…. I wondered if the debrief was rather more focused and business-like… It was certainly shorter than debriefs undertaken when present in person…. I also noted there were 'efficiency' gains in terms of avoiding the need for a 250-mile round trip.'

Extract three: Trainee Teacher Reflective Log

'The Teaching Observatory is a tremendous resource which has allowed me and other PGCE students who are interested in bilingual education to experiment with teaching classes at a distance and to analyse the associated strengths and weaknesses of this kind of teaching. Teaching lessons where we have used some of the new technologies such as shared Power Point and interactive whiteboards has made us familiar with what are the strengths and weaknesses of these teaching methods as well.'

Extract four: (School) Student Interviews

I = interviewer

L1, L2, L3 = student interviewees (i.e. 12-year-old learners
at end of first year of secondary school, having worked in
the TLO for one year).

I: *This year, you've been involved in helping to train teachers … they've been watching some of your lessons. What does that feel like to know that you're training teachers?*

L1: *It's <u>sort of weird</u>, because <u>you expect teachers to teach **you**</u> and then like 'Wow' <u>you can teach a teacher</u>. So, …*

I: *What's that felt like?*

L2: *Errr, a <u>bit nervous</u>, but then <u>you just get used to it</u>…because you feel like <u>you're helping someone</u>, but you're also very nervous, because you can see all the people on the thing [screen] watching you, but then when they turn it off, so it's like a normal lesson, it's alright. I'm not nervous anymore.*

I: *How do you think it's helped the training teachers?*

L2: *Errm, because … cause <u>they can see how we're being taught</u> and they can see what <u>they need to improve on</u> and improve on that. And then <u>the teachers can tell them while they're watching what they've done wrong </u>and they can improve on that as well.*

I: *What does it feel like to know that you're helping to train teachers?*

L3: *It's quite <u>a big responsibility</u>….. but it's good talking to them at the end and they ask us about what we've done and how well we learned stuff.…*

Extract five: post-lesson deconstruction

After conducting a lesson observed by a student teacher and researcher, the teacher engages in analysing her own practice with the others. Whilst the trainee was able to *'see how the strategies were unravelling in front of my very eyes, without needing teaching materials and other stuff-just the teacher's use of her own classroom language'*, the teacher was engaged in the process of articulating her own practice and reflecting on what she did explicitly and implicitly:

I think I respond to a set of principles which I have in my head which are a) you've got to get as much out of the kids as possible without giving it to them, b) you've got to encourage them and help them …they are quite simple principles and you kind of apply them to whatever situation…getting them to use what they've got, encouraging them - I think the scaffolding comes from the encouraging principle.

Thus, in listening to the different voices within the TLO community, an emerging discourse begins to take shape that has at its very core interaction and a sense of constructing 'shared meanings' within alternative boundaries. Certainly the theoretical framework adopted promotes 'learning' as an interactive and social activity which is substantiated by evidence based on TLO activity. Through facilitating interaction in and co-construction of the five different aspects of learning to teach, the technology enables and mediates professional activity so that the definition of learner, teacher, tutor and researcher roles becomes more fluid and responsive. The resulting narrative however lies outside the more traditional conceptualisation of teacher education. The study charting an experiment in subject knowledge enhancement for student teachers serves to illustrate this phenomenon.

Exploring student teacher subject knowledge enhancement (SKE)

Using Banks, Leach and Moon's (1999) work *New Understandings of Teachers' Pedagogic Knowledge*, a twelve-week study on enhancing student teachers' subject knowledge was set up using TLO lesson observations as the catalyst. The experiences of 48 foreign language student teachers were monitored through pre- and post- questionnaires, lesson transcripts and tutorial dialogues. Whilst Shulman (1987:18) advocates that the

key to distinguishing the knowledge base of teaching lies at the intersection of content and pedagogy, in the capacity of a teacher to transform the content knowledge he/she posses into forms that are pedagogical powerful,

Banks et al., distinguish between school knowledge (transformation of subject knowledge for schools), subject knowledge *per se*, personal subject construct and pedagogic knowledge. They propose that it is the interaction between these which constructs teacher professional knowledge.
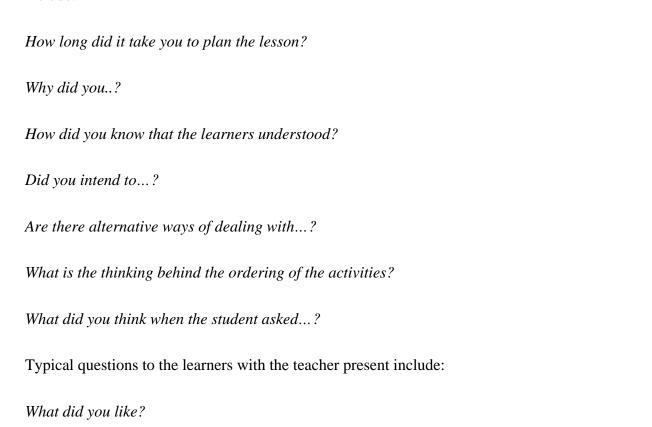
Lying at the heart of this dynamic process are the personal constructs of the teacher, a complex amalgam of past knowledge, experiences of learning, a personal view of what constitutes 'good' teaching and a belief in the purposes of the subject…. A student teacher needs to question his or her personal beliefs about his or her subject as he or she works out a rationale for classroom practice. But so must those teachers who, although more expert, have experienced profound changes… (cited in Lead & Moon 1999:95)

It was precisely student teacher and experienced teacher as well as learner involvement in constructing and reconstructing these interactions and questions which was captured through the use of interactive TLO lesson observations and pedagogic conversations. In collaboration with a group of foreign language teachers (some very experienced and others newly qualified), a series of interactive lesson observations was time-tabled between the university and school sites for student teachers. In particular, student teachers were encouraged to participate where the language of the lesson was perhaps their second or third language so as to assist them in developing their personal subject knowledge within the authentic context of the classroom and engage in pedagogic dialogue with learners and the teacher. The format of a 'lesson link' was as follows:

- o At the start of the lesson, student teachers, learners and their teacher greeted each other and exchanged lesson and observation objectives
- o The sound of the observers' site was then switched off to allow the lesson to proceed
- o During the lesson, the observers were able to discuss emerging issues with their tutor at the university site, whilst watching the lesson and preparing questions to ask at the end to the teacher and/or learners
- o The teacher might articulate practice to the observers during the lesson to 'narrate' and explain teaching and or learning objectives
- o At the end of the lesson, both sound systems are switched on and the student teachers are encouraged to interact and engage in pedagogic dialogue with both the teacher and the learners.

The SKE experience provided a dynamic context for student teachers to construct and reconstruct their *rationale,* to develop a deeper understanding of practice *in situ* and to be part of a community where learning and teaching are scrutinised for the benefit of all. The very core of TLO activity was transformed through extending the observation of lessons into highly participatory events and laying open classroom activity and interactivity to analysis, discussion and collaborative reflection by large groups of trainees based on genuinely communal experiences. Learners too involved in that process had their own awareness raised about what it is to learn to teach, and in so doing become more aware of their own learning. The articulation of

practice by the TLO teachers contributed to making more explicit and transparent classroom interaction as situated in a particular setting with a particular class. This is fundamentally different from a prescriptive *quick fix* approach to understanding teaching using broad brushstrokes, since the involvement of trainees, learners and their tutors in complementary discourse has led to shared understanding of the teaching, learning, training and research processes. The teachers' commentaries make the implicit explicit (eg teaching strategies which were deliberate and those which were intuitive) and involve the teachers in researching their own practice whilst trainees interpret and share this very practice synchronously with the learners and the teachers. Hence, the TLO provides the means for 'shared inquiries into practice' (Hargreaves 2002). Whilst a detailed report of the study is available (Coyle 2004), extracts from student teacher questions give the reader an idea of their engagement in understanding and evaluating a range of pedagogic experiences which are shared on a much larger scale than has previously been possible. This factor alone contributes to an enriched experienced as extracts from the data suggest. For example typical student teacher questions to the expert teacher with learners present include:

How long did it take you to plan the lesson?

Why did you..?

How did you know that the learners understood?

Did you intend to…?

Are there alternative ways of dealing with…?

What is the thinking behind the ordering of the activities?

What did you think when the student asked…?

Typical questions to the learners with the teacher present include:

What did you like?

What was easy?

What do you know now which you did not know at the start of the lesson?

What did you do when the teacher…?

What did you think when the teacher…?

How would you teach […] now to someone who was absent from this lesson?

Why was that a hard lesson?

What made it difficult to understand? So what would have helped?

Conclusion

Whilst 'new technologies give us opportunities to rethink educational relationships' (Pouts-Lajus and Riche-Magnier 2000) the 'rethinking' has not been nor will continue to be straightforward. Using technology in alternative ways has been complex, uncertain and challenging. Ultimately, according to Doolittle, Hicks and Lee (2002), those involved in the learning process acquire 'multiple perspectives' on issues when technology is used to enhance social interaction with other learners, learners in remote locations, and experts. They summarise their view as follows:

Technology must be used to create authentic experiences that link new knowledge to prior knowledge, in a socially interactive environment where questions being pursued are relevant to the student [learner – ie member of the TLO]

It could be argued that the evolving TLO activity described in this article adds an inclusive dimension to teacher education. Multiple perspectives are made available to student teachers that go far beyond observing experts at work. These outcomes appear to be in harmony with what Holmes (2001) terms 'communal constructivism' since many of the experiences offered are socially constructed and built on notions of sharing and collaborating in communities. The TLO has been fundamental in enabling these processes to evolve into real life contexts (Leask, Ramos and Younie 2001). The TLO has also been instrumental in changing practice of training, teaching

and learning through supporting quality interaction and collaboration (Jacobs & Rodgers 1997, Laurillard 1993) and in so doing has brought with it, using the words of the young learner, the '*responsibility'* of redefining classroom boundaries.

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