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David G. Cooper

University of Wolverhampton, d.cooper@wlv.ac.uk

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The Lesson Observation On-line (Evidence Portfolio) Platform

Dr David G. Cooper
University of Wolverhampton, England

Abstract: At a time when teacher training is being moved to school-based programmes it is important to engage in a research-informed dialogue about creating more distinctive, and cost-effective 21st century models of teacher training. Three years ago I began feasibility field testing the Lesson Observation On-line (Evidence Portfolio) Platform [LOOP] concept (Cooper, 2012). Student-teachers from a university in the Midlands of England were video recorded, with their schools' permissions, teaching mathematics' lessons during their second period of teaching experience. The video recorded lessons together with the trainees' lesson plans, accompanying lesson resources, lesson self-evaluations and snapshots of tangible, written pupil outputs captured from three representative pupils were subsequently collated in each individual teacher's evidence portfolio. The trainees' lesson observation feedback reports by their university tutors and school-based mentors were also included in the lesson evidence portfolios. These provided trainees with better, and richer, sources of detailed evidence about their teaching performances during their second periods of teaching experience than had previously been available. Since this paper was initially drafted a Lesson Observation On-line Platform [LOOP Australia] project has been developed and Seed funded by the Australian Office for Learning and Teaching in 2014/5.

The Lesson Observation On-Line (Evidence Portfolio) Platform [Loop]

Let's begin with something I have come to passionately believe over the last 28 years of teaching in secondary schools in England: "in order to become the best teacher you can possibly be throughout your career you need to study videos of your teaching performance and actively engage in reflective analyses of your teaching" (Cooper, 2012, p.1). In a conversation with a school-based subject mentor for one of my student teachers five years ago the mentor remarked that when he was a student teacher one of his lessons during his periods of teaching practice experience had been video-recorded and the impact on him was that he realised he "wasn't the teacher that he thought he was".

The scope of this paper is to outline a possible alternative to the traditional model of PGCE teaching-experience-lesson-observations conducted by university supervisors/ tutors on-site in schools and in real-time. At a time when (initial) teacher education and training are being increasingly moved to school-based programmes my proposal is that academically and technologically the time is now right for a 21st Century model of teaching-experience-lesson-observations conducted remotely, and not necessarily in real-time by university tutors/supervisors (Allen, Belfield, Greaves, Sharp and Walker, 2014).

In terms of cost benefits it may be possible for universities to save thousands of pounds, and more, particularly in travelling expenses whilst at the same time ‘do more’ lesson observations ‘with less’ funding available (Allen et al, 2014). At its heart the *Lesson Observation On-line (Evidence Portfolio) Platform* model is basically a proposal for replacing the current arrangement of four ‘face-to-face’ lesson observations with potentially eight high-definition digital video recordings of student-teachers/trainees.

A Traditional Model for Organising The Lesson Observations of Student-Teachers Whilst in Schools Doing Periods of Teaching Experience

The context to the traditional organisational arrangement of the lesson observations of student-teachers whilst in secondary schools in England doing periods of teaching experience (teaching practice, placements, attachments, practicums, field-experience, ...) is perhaps typically described by the following:

The context of my reflective practice and lesson study task for the student-teachers was as follows. By the end of February 2012 the PGCE Secondary mathematics cohort of 34 student-teachers had already completed a six-week period of teaching secondary school level mathematics and were about to begin three weeks of ‘serial attachment’ teaching experience prior to beginning their ten-week ‘second attachment’ period of ‘whole-class’ teaching spread over the months of March, April and May. In ‘attachment 1’ the student-teachers’ “solo teaching [is] limited to a maximum of between 8 and 9 hours per week” (University of Wolverhampton, 2012, p.12). In ‘attachment 2’ the student-teachers’ are “expected to teach between 15 and 16 hours per week” (University of Wolverhampton, 2012, p.42). (Cooper, 2013a, p.2).

During the student-teachers’ first period of teaching experience, typically in November and December for the secondary PGCE programme, a university tutor/supervisor travels out to schools and visits a student-teacher twice to observe a lesson on each visit, provide constructive feedback about the lesson and review how the period of teaching experience is going. The tutor/supervisor is expected to study the student-teacher’s Record of Professional Development (RPD) folder, particularly focusing on the records of the student-teacher’s weekly-review-meetings with their school-based subject mentors and the student-teacher’s use of the RPD ‘progression grids’. Typically in March, April and May the student-teachers are in different schools than they were in for ‘attachment 1’ and for a longer period of teaching experience. Again a university tutor/supervisor travels out to schools and visits a student-teacher twice to observe a lesson on each visit, provide constructive feedback about the lesson and review how the period of teaching experience is going.

The Loop Model for Organising the Lesson Observations of Student-Teachers Whilst in Schools Doing Periods of Teaching Experience

Using the latest high-definition digital video recording technologies we have reached a time when it may be possible for student-teachers, school-based mentors and university tutors/supervisors to collaborate effectively to produce eight recordings of the student-teachers’ lessons over the two periods of teaching experience. Based on the results of the feasibility field testing of the LOOP concept (Cooper, 2012 and appendix 1) I would suggest that for each student-teacher three video recordings be made in the first six-week duration period of teaching

experience (perhaps one every two weeks, typically during November and December) and five video recordings be made in the second ten-week duration period of teaching experience (perhaps one every two weeks, typically during March, April and May).

At a time when (initial) teacher education and training are being increasingly moved to school-based programmes the onus would be on the student-teacher and the school-based mentor to decide, most likely in collaboration with the university tutor/supervisor, which three, or five, lessons to video record. Thinking of the LOOP model in terms of a specification then what is envisaged is as follows. The three videoed lesson observations from the first period of teaching experience would be uploaded to the LOOP ready for tutors/supervisors to view them, perhaps annotate the videos with notes and write/type up the lesson evaluations.

Using the current academic year in England as an example, the student-teachers' first videoed lesson observations could have been uploaded between Monday 3rd November 2014 and no later than Wednesday 12th November (to give at least two days for tutors to view the latest uploads). The second round of observations could be uploaded between Monday 17th November and Wednesday 26th November and the third round of observations could be uploaded between Monday 1st December and Tuesday 9th December. Try to not get too distracted by the particular dates; it is the concept of student-teachers and mentors getting three lessons videoed and uploaded to the LOOP with reasonable intervals between lesson observations that is key.

The LOOP concept has been developed and refined over the last three years (Cooper, 2012). The LOOP processes for initial teacher education are conceptualized as follows. For each 'formal' videoed lesson observation the onus would be on the student-teacher and school-based subject mentor working together to decide on which lesson to video record within the identified/specified timeframe(s), set up the video camera, save the video file securely and upload it successfully to the LOOP. The video recording of a lesson should be a maximum of one hour duration to fit within reasonable expectations about student entitlement(s), mentor and tutor workloads and so on. In addition to the uploaded video recorded lesson the student-teacher would also upload their lesson plan with any accompanying lesson resources (PowerPoint presentation slides, differentiated resource/ work/consolidation-sheets, card-sorts, tarsia puzzle solutions ...). The student-teacher would also upload their lesson self-evaluation to the LOOP, soon after having taught the lesson. The University of Wolverhampton's Secondary ITE Moodle that began operating in September 2013 has already demonstrated that it is relatively straightforward for trainees to upload lesson plans, accompanying lesson resources and lesson self-evaluations to an online document repository. The LOOP model currently being developed at Monash University in Melbourne, Australia utilizes individual, secure, password protected Google Drive folders for student-teachers to upload all of the evidence, including videos, about their lessons.

Furthermore the student-teacher would also have to upload at least three of the tangible pupil outputs from the lesson they had taught that relate to that lesson's learning objective(s) and learning outcome(s)/success criteria. For example, in secondary mathematics' lessons these could be scanned copies of three pupils' exercise books showing what the pupils were able to produce in a particular lesson, or there may be accompanying written documents, snapshots of differentiated resource/worksheets, photographs of items or posters that pupils have created or video clips, for example, of pupil presentations. The performance of a pupil asked to participate in a speaking and listening task in an English, or Modern Foreign Languages, lesson might be best represented by a video clip.

If at least three of the tangible pupil outputs from a lesson were uploaded then one set could be from a pupil who might be considered to be within the third (0 to 33•3...%) of the class with the lowest levels of attainments, another pupil's output could be from the 'middle third' (33•4...% to 66•6...%) and the third pupil's output could be from the third of the class with the

highest levels of attainments (66.7...% to 100%). Hopefully three reasonably well chosen pupils' outputs from a lesson would be fairly representative of what tangible outputs pupils 'took away' from a particular lesson. To complete a student-teacher's specific lesson evidence for a particular lesson in their portfolio of their three 'first-period-of-teaching-experience' lesson observations the student-teacher would have to upload no more than one A4 page of reflective writing per lesson basically covering two headings: 'What Went Wells' and 'Even Better Ifs'.

To very briefly summarise then at this point in relation to their first period of teaching experience the onus would be on the student-teacher to:

- get three of their lessons successfully video recorded and uploaded to the LOOP.
- upload their lesson plan with any accompanying lesson resources (PowerPoint presentation slides, differentiated resource/work/consolidation-sheets sheets, card-sorts, tarsia puzzle solutions ...).
- upload at least three of the tangible pupil outputs from the lesson that relate to that lesson's learning objective(s) and learning outcome(s)/success criteria.
- upload no more than one A4 page of lesson self-evaluation in the form of reflective writing basically covering two headings: 'What Went Wells' and 'Even Better Ifs'.

Having three lessons video recorded from the student-teacher's first period of teaching experience would also enable tutors/supervisors to consider focusing the second video recorded lesson on a fairly 'uncomplicated'/straightforward 'Lesson Study' (Cooper, 2013a, p.2). If you are not familiar with 'Lesson Study' then there is an increasing amount of research available, and there is now a specific journal devoted to 'Lesson and Learning Studies' (Dudley, 2011; Dudley 2013). In relation to the possible incorporation of 'Lesson Study' into a secondary PGCE programme the sorts of activities envisioned are as follows:

I recently asked (in February 2012) my PGCE Secondary mathematics student-teachers to think about, talk to a 'pair-talk' partner about and do some small-group learning about how they would begin teaching Pythagoras' theorem to a class of mid-range to high attaining Year 8 or Year 9 pupils in a series of one hour duration lessons and to briefly note down the:

- sequence of activities/tasks they would use;
- 'mathematical-content-knowledge' purposes of why they would be using those particular activities/ tasks/resources;
- 'pedagogical-content-knowledge' purposes about why they would use that sequence of tasks/those particular activities to teach the concepts.

One of the key purposes of asking the student-teachers to think about, and reflect on, teaching about Pythagoras' theorem was to look at some of the key skills of reflective practice and 'lesson study' in the context of mathematical-knowledge-for-teaching (MKfT) and pedagogical-content-knowledge for teaching mathematics (PCK). Previously my PGCE student teachers had looked extensively at how lesson planning involves a sophisticated range of subject-content-knowledge skills and pedagogical-content-knowledge skills interconnected with ideas about anticipating how a well taught sequence of learning activities and teaching 'episodes' may translate into, hopefully, a good, very good or outstanding lesson. (Cooper, 2013a, p.2).

Given that the purpose of this article is about 'the LOOP' then I would recommend having a look at some of the emerging research about 'Lesson Study' and think about how it can be effectively integrated into a coherent and feasible programme designed to develop and improve student-teachers' (or serving teachers') teaching performance(s) in lessons. The concept of focusing a student-teacher's second video recorded lesson observation on a fairly 'uncomplicated'/ straightforward 'Lesson Study' would therefore reinforce the central importance

of developing and improving student-teachers' teaching performance(s). The fact that a wealth of professional evidence about a particular lesson, (or in the case for example of the first period of teaching experience, three lessons) is brought together in one secure repository means that designated mentors, university tutors/supervisors and external examiners would have comparatively easy access to more high-quality data about a student-teacher's performance than they have had previously.

Other Pieces of Student-Teachers' Evidence Worth Including in 'The Loop'

At this point it is worth mentioning a little more about what the school-based mentor/supervising teacher might potentially be able to upload onto 'the LOOP'. A fairly straightforward means of enabling the mentor to upload their lesson observation feedback reports about a student-teacher would be to collate the six expected reports (spanning the six weeks of the student-teachers' first period of teaching experience) onto 'the LOOP' as scanned pdf formatted documents. The University of Wolverhampton's Secondary ITE Moodle that began operating in September 2013 has already demonstrated that it should be relatively straightforward for mentors or trainees to upload the six formal lesson observation feedback reports.

Whether the mentors would be in the position of being able to write up lesson observation feedback reports in the same levels of detail as the university tutors/supervisors' evaluations from the video recorded lessons is clearly subject to a number of factors, not the least of which being the time involved/available. Initial experiences with the Secondary ITE Moodle suggest that trainees need reminders about uploading files and incentives/ consequences in place in order to ensure that the required documents and files do get uploaded to meet deadlines. The principal incentive for so doing is clearly to at least fulfil the submission conditions for the module.

The LOOP would also need to be of sufficiently high data storage capacity for mentors, or the student-teachers themselves perhaps, to upload scanned pdf formatted copies of the weekly review meetings between a mentor and a student-teacher. As the system became more sophisticated the platform would hopefully be able to accommodate easy to navigate menus that alert student-teachers, mentors and university tutors to approaching milestones and deadlines for uploading lesson observation reports, weekly review meeting scans and mid-point and end of teaching experience reports and subsequent action plans. At a time when (initial) teacher education and training are being increasingly moved to school-based programmes the robust, hi-tech, IT expertise and computing power environments provided by HE/university providers means that the creation and maintenance of 'the LOOP' is now practically and realistically achievable and viable, as initial experiences with the Secondary ITE Moodle are demonstrating.

To very briefly summarise then at this point in relation again to the first period of teaching experience the onus would be on the mentor (and student-teacher perhaps in some circumstances) to:

- upload their (or their team of other class teachers') six formal lesson observation reports about a student-teacher (spanning the six weeks of the student-teachers' first period of teaching experience).
- upload, for example, scanned pdf formatted copies of the weekly review meetings between a mentor and a student-teacher to specific deadlines.
- upload, for example, scanned pdf formatted copies of the mid-point, and end, of-teaching-experience reports and subsequent personal action plans focused on each student-teacher's subsequent continuing professional development and specific targets for improvement.

It is worth mentioning at this point that ‘the LOOP’ is envisaged to enable university tutors to watch lessons that clearly have already been recorded. It most probably would not be a ‘real-time’/‘live’ system for observing lessons and feeding back to student-teachers and mentors. Whether that would be a significant deficit remains to be seen. Given the scope of this article I will very briefly describe some of the developing literature about ‘real-time’/‘live’ systems (often called *synchronous* e-learning methods) for observing lessons and feeding back to student-teachers as compared to lesson observations *not* conducted in ‘real-time’/‘live’ (often termed *asynchronous* e-learning methods).

According to Hrastinski (2008):

Asynchronous e-learning makes it possible for learners to log on to an e-learning environment at any time and download documents or send messages to teachers or peers. Students may spend more time refining their contributions, which are generally considered more thoughtful compared to synchronous communication. (p.52).

The way it is envisioned that tutors/supervisors may work with ‘the LOOP’ is therefore asynchronous engagement with the pre-recorded videos of student-teachers’ lessons and the other documents that make up their portfolios of evidence. Because the tutors’ evaluations of the student-teachers’ teaching performances do not take place in real-time’/‘live’ then tutors may be able to spend time typing up and refining feedback. Traditionally the writing up of ‘face-to-face’ lesson observations takes place in ‘real-time’ and often means the lesson notes are hand-written. With the advent of i-pad and tablet technologies some tutors type, or hand-write ‘electronic notes’. Having asynchronous access to student-teachers’ digital video files may therefore actually improve the quality of written feedback, whilst at the same time making the video available for the student-teacher to view.

If the videos of student-teachers’ lessons were uploaded into video annotation software then tutors may be able to annotate a videoed lesson observation ‘tagging’ particularly important clips and writing notes about specific points of interest or ‘critical incidents’ (Fadde, 2012). Because the video file is available to be repeatedly viewed then the student-teachers may subsequently be able to watch themselves teaching whilst also seeing their tutors’ tagged/flagged comments and observations at specific points during the lesson. A feature of ‘the LOOP’ that would be important to include in its specification is automatic transcription of what the student-teacher said in a lesson; technologically this is now practically possible (Education Endowment Foundation, 2014).

In addition to the high quality video file (typically recorded from the back of a classroom) if the student-teacher were to wear an unobtrusive wireless microphone (typically worn on a lanyard in the way many professionals wear ID badges) then the audio recording of what they said in a lesson could be isolated from other speech and background sounds. If the student-teacher’s audio recording were of sufficiently high-quality then it could be uploaded into voice-recognition software and a transcript of what the student-teacher had said during the lesson could be rapidly created. Depending on the sophistication of the video annotation software it may then be possible to tag/flag up particular parts of a lesson where the student teacher used closed, or more open-ended questioning skills. Using descriptive (analytical) statistics a transcript could be studied to look, for example, at the relative proportions of ‘teacher-led’ time (explaining, telling, giving instructions, questioning, ...) versus ‘student-inquiry’ (pupils doing investigations, experiments, exploring meanings, writing creatively or factually, ...) time.

According to Hrastinski (2008):

Synchronous e-learning, commonly supported by media such as videoconferencing [e.g. Skype] and {social media}, [e.g. NCTL on-line seminars, OU First-class on-line tutorials, Vol 40, 1, January 2015

...] has the potential to support e-learners in the development of learning communities. Learners and teachers experience synchronous e-learning as more social and avoid frustration by asking and answering questions in real-time. (p.52).

In terms of video-recordings of teachers' lessons a form of synchronous approach might typically involve a digital video camera, wire-less microphones in the classroom as well as for the teacher being observed, and if the lesson were to be a 'coached' observation then the teacher being observed may wear a unobtrusive headset or small, discrete earpiece (optimally of a size similar to a hearing-aid or personal speaker earpiece such as some performers wear). The key point being that the lesson observation takes place 'live' in 'real-time'. During a 'coached' lesson observation the mentor, coach or tutor/supervisor would communicate with the teacher being observed by speaking into a microphone and their comments/observations/suggestions would be picked up by the observed-teacher's earpiece.

In the case of an existing digital video system designed for recording lesson observations, such as IRIS Connect, it can either operate synchronously or asynchronously depending on the purpose of the particular aspect of teacher-education which is the focus; i.e. if the purpose is to evaluate the performance of the teacher then the lesson can either be observed synchronously or asynchronously. If the purpose of the observation is about mentoring/coaching to help the teacher 'reflect-in-action' then in order for the teacher to be able to respond/react to an observer's comments/suggestions /observations the observation has to be done synchronously in real-time.

Conclusion

The purpose of this article was to outline a possible alternative to the traditional model of PGCE teaching-experience-lesson-observations conducted by university tutors/supervisors on-site in schools and in real-time. At its heart the *Lesson Observation On-line (Evidence Portfolio) Platform* model is basically a proposal for replacing the current arrangement of four 'face-to-face', 'in-situ' lesson observations with potentially eight high-definition digital video recordings of student-teachers/trainees together with accompanying documentation collected together in each trainee's portfolio. Some of the initial experiences with the University of Wolverhampton's Secondary ITE Moodle indicate that the LOOP concept is not only feasible but achievable. Observing lessons and trying to achieve consensus about the quality of teachers' lessons is currently a key element of our core business as teacher educators and a research-informed dialogue about the 'evolution or extinction' of school-university teacher training partnerships is particularly relevant today (Allen et al, 2014). In the U.S., for example, video recordings of pre-service teachers' lessons form a key part of the 'Education Teacher Performance Assessment' [edTPA] initiative developed by Stanford University and the American Association of Colleges for Teacher Education (AACTE) (ed TPA, 2014). According to Hannafin, Recesso, Polly, and Jung (2014, p.164) "Recently, nearly one-half of the U.S. states and the District of Columbia participated in the edTPA initiative, which requires, in part, the pre-service teachers submit a 15-20 minute video of their teaching for review". The edTPA focuses on the assessment of pre-service teachers using evidence from a range of sources aligned to U.S. state and national standards.

In November 2013 I e-mailed to over 200 professional mentors in schools in the Midlands region explaining some of the key aspects of the LOOP initiative and over 50 schools reported that they were prepared to allow the video-recording of teachers' lessons for the purposes of professional development. At this moment in time we are in something of a 'chicken-and-egg'

situation in which we want to find out more about which schools are interested in working with us to formalise the LOOP processes and procedures. At the same time we are developing a series of interesting, stimulating and professional-skills (and Department for Education [DfE] Teachers' Standards) based reflective practice activities based around student-teachers actively engaging with, and learning from, videos of their own lessons.

In a follow-up article to this LOOP proposal I will discuss some of the benefits and advantages of using high-definition video recordings of student-teachers' lessons. I will also look at some of the theory and practice about the use of video recordings of lessons to develop and improve teachers' teaching performances in lessons. For example, if we want to have a modern, cost effective, 21st century education provision for our pupils and teachers then we need to be encouraging our current and future generations of highly-skilled professional reflective practitioners to actively engage with videos of their own performances (Cooper, 2014). This is because having the competence and skill to identify issues from such videos is fundamental to highly effective, advanced reflective practice and self-awareness/ self-development/self-analysis/self-evaluation and self-improvement.

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Appendix 1.

The following extracts are taken from “*Developing and improving pre-service teachers’ teaching performances and reflective practice(s) using video recordings of lessons*” (Cooper, 2012).

5•1 Some potential benefits

1. the student-teachers may get to see themselves teach for up to four hours and across four different lessons with four different classes.
2. the video files can be transferred to DVD (or a ‘cloud’, secure, on-line high capacity file server) and the student-teachers can take away with them up to four hours of videoed lessons to keep.
3. the video files of the student-teachers’ two lessons from ‘school- attachment 1’ could form the basis of some new, creative and innovative university *taught time* spent looking at what the student-teachers thought went well in their videoed lessons and how they could go about improving their teaching.
4. the video files of the student-teachers’ two lessons from ‘school-attachment 1’ could form the basis of some new, creative and innovative university *assignments* about reflective practice, what the student-teachers think went well in their videoed lessons and about what performance targets they need to address during attachment 2.
5. combined with some of best/cost-effective video-analysis software that allows users to upload, tag and annotate segments of the videos student-teachers could closely scrutinize particular aspects of their teaching to the extent, for example, of looking at the time they spend talking to/at the whole class in ‘teacher-led’ episodes and the time pupils spend learning from ‘rich mathematical tasks’.
6. the potential would exist to ask school-based mentors to video examples of good/very good/outstanding lessons by *experienced* teachers, for example ‘Excellent teachers’/ ‘Advanced Skills Teachers’ to build up a video library of resources in relation to translating good/very good/outstanding lesson plans into good/very good/outstanding lessons.
7. the potential would exist to create effectively a whole new branch of CPD in relation to self-analysis (and possibly expert analysis in the future) reflective practice and performance coaching/rehearsals and so on using DVDs (or secure ‘cloud’ data e-portfolios) of ‘real-time’ lessons.
8. the feasibility trials suggest that for comparatively little outlay, compared, for example, to the potentially very high costs (and data-protection/company software restrictions) of a commercially available system, a great deal of very valuable, worthwhile, creative and innovative initial teacher preparation and research about initial teacher preparation can be done.
9. handled well the processes and procedures of the initial ‘Four DVD entitlement’ proposal could make the University’s PGCE and CPD course(s) distinctive and attractive to student teachers and experienced teachers.
10. handled well the concept and ‘operationalization’ of the many dimensions and aspects of the ‘videoing of teaching experience’ could be a ‘centre of expertise’ that the university could develop. Potential further areas, already discussed at the STEM-SIG could be the videoing of school-mentor-to-student-teacher feedback/debriefings about lesson observations as well as university tutor-to-student-teacher feedback/debriefings.

5•2 Some issues that need to be addressed

1. the key issue is about negotiating access to video recording the four lessons for each student-teacher. The encouraging thing is that lots of schools see the common sense of a '21st century' approach to looking at the performance of student-teachers. To be effective and to make a difference to the culture of CPD the initiative would have to be supported at each level. If we do not move forward then other universities, most probably from the Russell Group, will overtake us.
2. the feasibility field-trials have been conducted with no funding from the university, for example the author had to buy his own FLIP camera to be sure that the battery would last more than 50 minutes. The author suggests looking at the performance of his FLIP camera against, for example an affordable smart/mobile telephone that has High Definition video and audio capabilities. Some of the issues about 'portability' (i.e. transporting the equipment safely when travelling to, and whilst on school visits, setting up the videoing equipment in classrooms ...) and the design of a professional, yet easily to assemble video system need to be looked at.
3. issues about who may have access to the video recordings will need to be clarified. Some, probably many, teachers may well give their permission for their lessons to be used for the purposes of positive, constructive teacher preparation/continuing professional development/video clubs.
4. issues about training university tutors to safely transport and assemble the video system, record the video and then save it (and burn a copy to DVD) will need attention. If the tutors are asked to do more in the sense of videoing and saving video files then some other aspect of their roles will need to be decreased to compensate.
5. support-centred issues, particularly in relation to burning copies of DVDs for the student teachers (and perhaps the attachment schools) to have as well as keeping the video cameras well-charged and optimally operational are also important to maintain the systems.