# How does video analysis support student teachers in the very early stages of their initial teacher education?

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**Abstract**
This paper describes how video analysis can greatly enhance the learning resulting from student teachers' first experiences of lesson observation and classroom teaching. A group of nine undergraduate students studying Science and Mathematics education used video recordings of exemplar Science and Mathematics lessons to identify aspects of best practice before analysing recordings of their own teaching. Each pair of students used WIMBA Create to produce a multimedia account of their learning. Data obtained from questionnaires and semi-structured interviews indicate that this use of video technology developed the students' planning and teaching skills and, crucially, introduced them to the value and nature of reflective practice. Even this brief use of video was found to have a significant impact on students' future practice and disposition to reflection. The paper discusses how this use of video is ideally suited to adopting a constructivist approach to initial teacher education by facilitating active learning and collaboration.

**Keywords**
Video; reflection; constructivism; collaboration; placement.

## Introduction

This paper reports on the evaluation of a project where post-primary (pupils aged 12-18) student teachers used video technology to support their learning at the very beginning of their undergraduate programme. Rather than adopting a more behaviourist approach to initial teacher education, where 'strategies' and 'tools' to deal with likely teaching scenarios may dominate the discourse, we chose to get our students actually teaching as soon as possible. Our view of learning to teach is closely aligned to social constructivism where knowledge and understanding of practice is created by activity. This research sought to explore the particular nature of the affordances provided by the use of video technology in the process of what Lofthouse et al., (2007:86) describe as 'learning how to learn how to teach.' Hiebert (2007) recommends enabling student teachers to learn through their actual teaching and to develop an appreciation of the importance of reflective thinking. The importance of instilling a positive disposition is vital too, given the fact that the initial teacher education phase represents a relatively small proportion of a teaching career during which pedagogical approaches will need to be adjusted in keeping with changes in educational policy and curricula. Developing our students' reflective thinking and nurturing a positive disposition to the challenging concept of reflection was therefore our guiding principle. To allude to a popular metaphor, we chose to provide our students with fishing rods rather than merely fish.

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Whilst the development of student teachers' reflective thinking is a key objective within all initial education programmes, Hagan (2013) proposes that here in Northern Ireland the emphasis on reflective practice is particularly strong. The General Teaching Council for Northern Ireland publication 'Teaching: the Reflective Profession' states that 'one of the principles which underpin the Council's concept of competence is the centrality of reflective practice.... (and that) competence is developed through reflection on practice and through dialogue with others.'(GTCNI, 2007:13). Given this, we believe that from the very beginning of their initial teacher education, student teachers' engagement with reflection should be as meaningful and as positive as possible. Therefore, this study set out to explore how video technology might help make the process of reflection more accessible and attractive to student teachers. The researchers, who are university tutors, are of the opinion that often the initial teaching experience of student teachers is not always as supportive and student-centred as it could be. The research therefore sought to explore alternative approaches to school experience.

*Supporting Reflection*

From the various descriptions and notions regarding what actually constitutes reflection, the idea that 'reflection can help you to recognize more swiftly *what* is effective practice and *what* are the key characteristics of a successful teacher' (McGregor, 2011:2) is perhaps the most useful to student teachers. However, despite its 'allure... as something useful and informing' (Loughran, 2002:33), the absence of a clear understanding of what distinguishes reflection from other forms of thinking can restrict progress. A number of studies report on how guidance and support have indeed developed the reflective practice of pre and in-service teachers (Korthagen and Vasalos, 2005; Lee, 2005). However, it is also important to instil a positive disposition to reflection as 'reflection should not be imposed but nurtured, and that induction and facilitation are required to avert negative feelings and resentment.' (Bolton, 2010:5) This is particularly important as the extent to which teachers engage fully with the process of reflection beyond the early stages of their professional careers has been questioned (Alger, 2006; Hoath, 2012). Where student teachers genuinely see the merits and value of thinking reflectively they will be more likely to carry this on throughout their professional lives thereby, as Bolton (2010:8) puts it, 'making the difference between 20 years of experience and one year of experience repeated 20 times.'

*The use of video to support the reflective practice of pre-service teachers*

Advances in digital technology have led to an increase in the use of video as a mediating agent for learning and as an alternative media for communication within teacher education. Research studies report on the many benefits associated with pre-service teachers analysing recordings of expert teachers (Knight, Pedersen and Peters, 2004; Eilam and Poyas, 2009) or reflecting on the practice of themselves or their peers (Sherin and van Es, 2005; Rosaen, Lundeberg, Cooper, Fritzen and Terpstra, 2008). Studies report that video provides 'authentic representations' (Schwan and Riempp, 2004) of teacher-pupil interactions and bring about deep levels of engagement as the learner identifies with their own or other's practice (Goldman 2007). In our study we seek to shed some light on the nature of each of the individual learning opportunities which the use of video makes possible and consider how this may inform teacher education practices.

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**Background and Project Details**

The project focussed on using video to support post-primary student teachers during their first experiences of professional practice. The students were in the first year of their four year B.Ed. programme jointly specialising in Mathematics and Science. We worked closely with one of our partner schools, itself a specialist school for Science Education. Within the 'methods' module of the programme we wanted to introduce a school-based experience as soon as possible to provide a context for students to develop an understanding of the relevant theory. In short, we were keen to address the 'chicken and egg' conundrum regarding theory and practice by providing a supportive environment (partner school) and mediating tools (video) in which our students could create their own knowledge regarding practice and in doing so come to value the process of reflection.

The cohort of nine students visited the school on two occasions. During the first visit they met in two groups with their teacher mentors who discussed with them the lesson plan for the lesson they were about to observe and video-record. Each group then observed and video-recorded a science lesson taught by their mentor. Later in the day the mentor met up with the group again and shared their thoughts and reflections on the lesson and answered questions. Following this, the mentor outlined the topic which the students, working in pairs, were to teach when they next visited the school two weeks later, and assisted them in their initial planning. Back at College the students continued to plan and refine their lesson in consultation with their college tutors. They studied and discussed the video recording of the exemplar lesson with particular focus on the role of the teacher during the introduction of the lesson, the practical activity and the plenary.

The next visit began with a meeting with their mentor teacher where they outlined their plans and took on board any comments and suggestions regarding their lesson plans. Two of the pairs taught a Mathematics lesson and two pairs of students taught Science. During each lesson the students took it in turn to video record their partner's teaching. When both students were involved in teaching they mounted the video camera on a small tripod. Following the lesson the mentor, who had sat in on the lesson, provided feedback on their teaching and guided them through how they should go about evaluating their practice. During this session video clips were watched to enhance the discussion. The students then had the opportunity to share their experience with the entire group.

**Video task**

We designed the video task to gently introduce the students to both the process of reflecting on their teaching and the use of video. They began by directly observing and video recording an exemplar science lesson before recording and analysing the teaching of themselves and their peers. In this way they ironed out any technical difficulties and developed a sense of how best to use the camera to capture the most meaningful classroom incidents. We also used the video recording of the exemplar lesson to introduce students to the concept of post-lesson analysis as the lesson was well structured and rich in examples of best practice. These experiences would serve as a foundation for the challenging and, at times, less comfortable task of analysing their own teaching and introduce them to the process of editing video.

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The video task related to each of the two recorded lessons: the exemplar mentor's lesson and the students' own paired lesson. The students were required to use the Microsoft software 'Windows Live Moviemaker'and 'WIMBA Create' to produce a multi-media record of each lesson to include:

*WIMBA 1 (Exemplar Lesson)-*

- A brief situational analysis (class details, topic and related lessons).
- Lesson plan and any PowerPoint presentations or other resources used within the lesson.
- Three video clips which demonstrate good practice during each of the three stages of the lesson and explanatory text to support your choice.
- The post lesson reflections of the teacher (mentor).

*WIMBA 2 (Students' own teaching)*

- Lesson plan and any PowerPoint presentations or other resources used within the lesson.
- Three video clips which demonstrate good practice during each of the three stages of the lesson and explanatory text to support your choice.
- The post lesson reflections of the teacher (mentor)
- The students who taught a Mathematics lesson were required to use the ETI document (2010) 'Better Mathematics' to evaluate their practice.
- A further task required each of the students to study one of their peers' WIMBA's relating to the subject which they did not teach themselves (either Mathematics or Science) and submit an evaluation.
- A page from a typical student's WIMBA is shown in Figure 1 below. The text provides the student's own analysis of the video clip and what they have learned from this experience. Each page of the WIMBA contains a number of video clips of the students' teaching alongside explanatory text. The students were required to provide an analysis rather than a description of the video clip, a common error when beginning student teachers' are drafting a post-lesson evaluation.


Fig. 1. Screenshot of a page from a typical student's WIMBA.

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**Research questions and design**

The research questions were guided by our desire to explore how the students learned from each of the steps within the overall task. We wanted to find out exactly what and how our students were learning from each activity and therefore gain an insight into the pedagogical value of each learning experience. The sequence of activity was as follows:

- Analysing the video recording of the exemplar lesson.
- Analysing the video recording of their own teaching.
- Analysing the video recording of their partner and another peer's lesson.

At each of these stages the students were involved in editing video and combining the video clips with supporting text. This analysis framework would hopefully allow us to identify the particular affordances within each part of the overall task. Furthermore we looked for evidence of how even this brief exposure to video might influence the students' disposition to the process of reflection and inform their future practice during their school placement later in the year.

We wanted to report on the student experience so used questionnaires and an end of project semi-structured interview. The questionnaires were administered:

- After the students had completed their analysis of the exemplar lesson
- After the students had completed their analysis of their own lesson
- At the end of the academic year when the students had returned to College after completing their six week school placement (independent from this study).

The questions were free response and invited the students to comment on if and how they had learned from the various tasks and experiences. A series of questions was drafted independently by each researcher before agreeing a final version for each of the three questionnaires. Overall the quality of the students' response was very high. The process of completing the questionnaire was considered to be potentially a learning experience in its own right as the students were required to honestly reflect on their own learning. The issues and themes emerging from the questionnaires informed the protocol for the semi-structured interviews and allowed interesting themes to be more fully explored.

Semi-structured interviews were also carried out with each of the four student pairs. Data from each of the questionnaires was analysed independently by each of the researchers. Common and recurring themes were identified before the researchers met to compare and discuss their own interpretations and resolve any outstanding differences. The data therefore comprised of the thoughts and perceptions of the student teachers.

**Findings**

The data from the questionnaires describing the students' views on how learning was supported through each stage of the video task is summarised in Figure 2. The emergent themes were further explored during the semi-structured interviews. The figure shows that the use of video supported student learning at each stage of the overall task, and that by following this prescribed sequence of activities the students were smoothly introduced to more progressively challenging evaluation activities. Figure 2. places the watching of the exemplar video as the starting point in the learning process and

represents the lowest level of engagement as the learning process is predominantly passive and focuses on the activity of others. The next level increases engagement by focussing on their own teaching and that of their peers. Engagement increases when students are involved firstly in editing video and further still when they have to support video with explanatory text. This learning path acts as a scaffold to students' thinking as they move from thinking about the practice of others to analysing the practice of themselves. Although the overall programme proved very helpful to our students the data indicate that each stage in its own right could be used effectively as a stand alone activity.

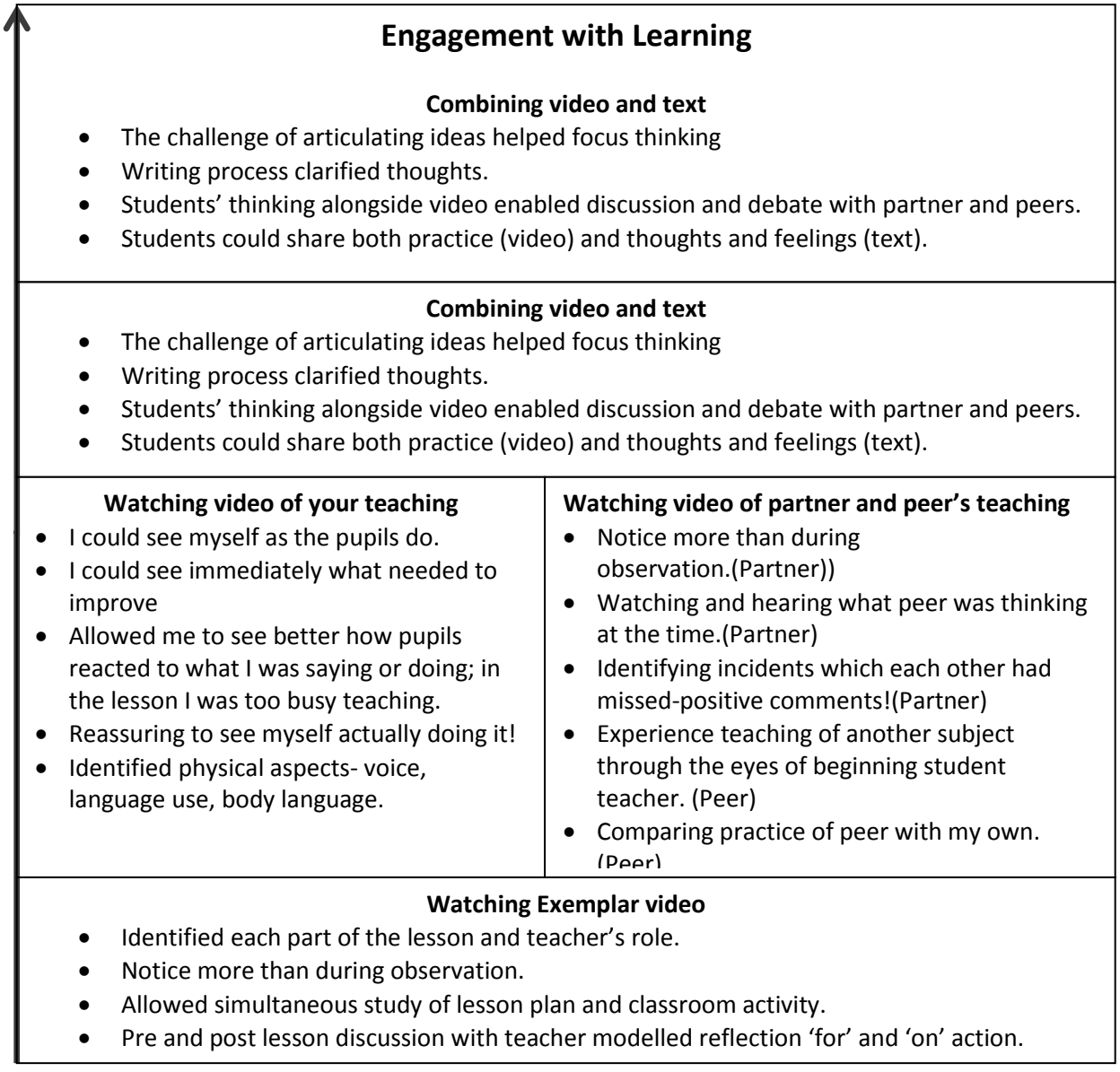


Figure 2. Students' views on how each stage of the WIMBA Task supported learning.

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***How did students learn from watching the exemplar video?***
The key aspects identified by students included:

- Video enables more to be 'noticed' than in real time observation
- Video facilitates the simultaneous comparison of written lesson plan to actual classroom activity

The opportunity to watch the lesson again and uncover previously unnoticed incidents was considered very useful as suggested by the comments.

> *'There was so much I saw on the video which I missed during the observation- I was busy trying to write things down; there was too much to look at!'*

> *'I couldn't remember how the teacher had connected up each part of the lesson. But as I watched the video I could see how one part flowed into the other and how she brought it together at the end.'*

The last comment also shows how re-watching the complete lesson via video can reveal more subtle aspects of practice a novice may miss within the blur of a busy learning activity. In addition to providing a visual demonstration of classroom teaching the video modelled the two other key aspects of practice, planning and evaluating. During the pre-lesson meeting with the students the teacher discussed their lesson plan with the students and shared the thinking behind each part of the lesson. One student described how the combination of the video recording of the lesson and the lesson plan had '*brought the lesson plan to life… I could see what the written plan looked like in action*.' Re-watching the exemplar lesson added significant value to the post-lesson evaluation which the teacher shared with the students. The issues which were discussed by the teacher (and written down by the student teachers) were brought more sharply into focus when the students watched the video recording back at College, as described by the comment:

> *'It was only when I watched the video again that I could see exactly what the teacher had been referring to in his evaluation.'*

A number of students mentioned their surprise at how much the teacher had to say about her lesson, and the number of things which she said she would reconsider before teaching it again, given the fact that the students themselves had considered the lesson to be extremely good. As well as modelling the process of reflection, the video recording gave students the chance to begin to align their thinking with those of a qualified teacher and showed that reflecting is something which even 'expert' teachers do. Our students felt that the opportunity to re-watch the lesson helped prepare them for their own teaching much more than a one-off classroom observation would have done; particularly as they could simultaneously look at the text of the lesson plan and the video. It is much easier to enact what is actually seen than what is merely read.

*How did the student teachers learn from watching the video recording of their own teaching?*
The key aspects identified by students included:

- The opportunity to see yourself as pupils do
- Observing how pupils reacted to the student teachers' activity

As student teachers were now clearer about what had worked and what had not, they were now better placed to progress their evaluation from description to analysis and to begin asking 'why?' No longer solely relying on their memory, there was less doubt or vagueness about their thinking. Not surprisingly the physical aspects of their presentation and body language were often discussed. As well as providing an insight into teaching, video enabled a greater focus on pupil learning as suggested by the following quote:

> *'I could now see better how the pupils were reacting, or not reacting to what I was saying or doing; during the lesson I was too busy thinking of what to say.'*

Equally important was the reassurance that the lesson was, as one student put it, '*not as bad as I thought.'* Perhaps, coming after the viewing of a video showing exemplary teaching, our students were all too aware of the short comings within their own practice. The opportunity to watch the lesson again when they were more composed and had got over the initial 'trauma' or 'high' of the their first teaching encounter, was considered really useful as suggested by the comment:

> *'After the lesson I felt it had been a disaster and to be honest felt very down. But when I watched the video I could see that it was better than I initially thought.'*

*How did student teachers learn from watching their partner's and their peer's video?*
The key aspects identified by students included:

- The opportunity to watch another student teach alongside a first-hand account of why they adopted a particular approach
- Peer support, encouragement and reassurance from someone in the same position.

At the heart of this learning were the enhanced quantity and quality of collaboration and the mutual support arising from working alongside another student on a specific task. Video enabled the two students to watch together, pause at any time and discuss, as the comment describes:

> *'It was so useful to watch the video together and hear what my partner was trying to do and see what was happening.'*

As well as providing an extra pair of eyes this type of collaboration resulted in students discussing each other's practice in both a critical and supportive way. Students can often focus only on negative aspects of practice and not realise the importance of reflecting on the more positive outcomes as suggested by the quote:

> *'We found it hard to find strengths in our lessons, but we could see them in each other's which was reassuring.'*

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As well as encouraging students, this balancing of strengths with weaknesses helps dispel the idea that reflective thinking only dwells on problems. The viewing of another student pair's WIMBA, based on the subject area (Maths or Science) which they did not get to teach, gave the students even more to discuss as emergent theories or learning from their own experiences could now be applied to a different context, as the quote describes:

> *'It was really great to see how the student coped with the Maths lesson where there was no activity; how she tried to make it interactive.'*

**How did the student teachers learn from the process of editing video?**
The key aspects identified by students included:

- Being required to watch video repeatedly results in closer observation and uncovers hidden detail.
- The process of editing models the task of deconstructing and sequencing when planning a lesson.
- The task of editing further enhanced the active nature of the learning as editing is a painstaking and, at times, 'painful 'exercise as suggested by the comment, *'I had to look at myself again and again; once I got over this I could see more new things.'*

A number of students described the task of identifying critical incidents and editing to '*deconstructing the lesson*'. Being able to examine each 'bitesize' scenario in turn made the search for meaning and the generation of understanding less daunting. One student described how the learning arising from the process of editing helped their overall observation and evaluative skills even when they were not actually editing; as she/he put it *'I was watching and always thinking 'what does this tell me?''*
Editing the video recording of the teacher's exemplar lesson was found useful in helping students appreciate the overall structure of the lesson and the evolving role of the teacher, as suggested by the quote:

> *'I became familiar with which part of the lesson it was; I could get a real sense of how she was moving the lesson on and how it joined together.'*

*How did the student teachers learn from combining video with text?*
The key aspects identified by students included:

- The task of writing focused thinking and reflecting.
- The text and video ensured that each WIMBA was a useful stand-alone learning resource.

This task was considered to introduce the students to the process of writing post-lesson evaluations. Reflective thinking had now to be articulated via text, challenging students *'to think what exactly happened in this clip and be accurate about what it has taught me.'* This helped clarify their ideas and set a mark for future development, as suggested by the comment:

> *'I think when you write something down it becomes more real and you are starting the process of improving on it.'*

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Sharing their thoughts acted as a catalyst for collaborative learning between both partners (other co-teaching student) and peers (the students featuring in the other WIMBA's) as the quote suggests:

> '*The text allowed me to get inside the mind of the student in the video. Without the text I would be thinking 'why has she chosen this clip?''*

*What were the longer term benefits of this video experience?*
The key aspects identified by students included:

- Greater confidence to cope with my first school placement.
- A greater insight into how I may be coming across to the pupils.

All the students reported that they felt much better prepared for their school placement with respect to planning lessons, classroom teaching, and evaluating their practice. This supportive initiation into teaching was most valued as indicated by these quotes:

> *'If I had gone straight into school based work I feel I would have been a bit lost and overwhelmed.'*
> *'I had confidence that I had already taught a lesson, had seen that it was ok (the video) and had received constructive feedback from an experienced teacher.'*

> *'Even this brief experience of teaching made a difference as the video allowed me to anticipate how I might be coming across and work to improve this.'*

A number of students described how they could really see the value of reflecting on their practice and had a clearer idea of how to go about it.

> *'I knew how to be more specific in my evaluation and try and pinpoint the problems in my lessons.'*

**Discussion**
We feel our findings clearly describe how video technology adds value to student learning at and across each individual step of this learning journey. The learning opportunities within practices commonly adopted throughout ITE, such as classroom observation of exemplar practice and providing written evaluations of teaching experiences, can be transformed by this use of video. What do these findings tell us about learning to be a teacher and how video may support this? We suggest that engagement with learning takes place when the learning process is accessible, collaborative and rewarding. Video technology helps to break down the cycle of reflection into a series of identifiable steps and facilitates activities which develop understanding. Furthermore, by engaging in activity (e.g. discussion with others, editing, annotating video clips) Dewey's (1933) requirement that reflection be rooted in action is attended to and the possible notion of reflection as merely 'mulling things over' becomes less convincing. Each of the popular models (Kolb, 1984;Gibbs, 1988; Atkins and Murphy, 1994; Korthagen and Wubbels, 1995; Korthagen and Vasalos, 2005: Pollard, 2005) used to represent the process of reflection generally involve a cycle of what can be approximately represented by the stages; planning, teaching, evidence collection, evaluation, refinement, and teaching. As students move through each stage of this cycle we propose that learning is enriched by video's potential to enhance two core activities; observation and collaboration.

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*Observation*

Lesson observation is a key skill which all student teachers need to develop as they progress along their teacher training programme and throughout their professional career. What distinguishes between how a novice and an experienced teacher 'see' a particular classroom incident may be described by the archaeologist Goodwin's (1994) notion of 'professional vision' as developed by McDonald and Kelly (2007) for science education. This comprises the dual mechanisms of 'highlighting' – identifying the component parts of an activity which are important in trying to derive meaning - and 'coding'- uncovering the values and cultural significance attached to the highlighted entity. During repeated viewing student teachers are best placed to see more and to pick up on patterns or sudden changes in behaviours.

In addition to revealing important external features which may have been missed, or not fully appreciated, video also allows us to see ourselves. Chak (2006) believes that we should be the focus of the observation as much as the teaching environment and pupils. She proposes (2006: 36) the concept of 'distancing' as a strategy for trying to 'see' oneself in the moment. This use of video enables students to see themselves teaching and, in addition, makes them all the more mindful during future practice of how they may be coming across to their class. In this way reflection 'on' action begins to converge with reflection 'in' action.

*Collaboration*

Our findings confirm that this use of video enhances the quantity and quality of collaboration across each stage of the overall task. Video provides a focus and a context for discussion with peers, mentors and tutors. Discussion and interpretation of video requires students to rationalise and justify their actions and enables them to consider alternative perspectives. Collaboration with peers also nurtures collegiality and reassurance enhancing the advantages of co-practice as identified by Bullough et al. (2002). The task of video recording each other requires greater awareness of the content of your partner's section of the lesson and requires a fuller understanding of your partner's role. Rogers (2002) points out that Dewey (1933) considered collaboration to be a key characteristic of reflective practice. It is this discussion between students (inter-psychological) as well as the inner 'discussion' of a student reflecting on their own (intra-psychological) which Dewey (1933) proposed leads to higher order thinking (Shepel, 1999). When tutor and student watch and discuss the video together we have found that learning is much richer. The role of the tutor is now to ask probing questions, facilitating practitioner enquiry which Lofthouse et al. (2007) contend is a much more effective form of feedback than evaluative judgements or 'witness statements'. Lofthouse et al. (2007) report students' dissatisfaction with the more traditional form of tutor feedback as it is often very subjective, may have missed key aspects of the lesson and can spend most of the available time retrospectively describing the various scenarios.

**Conclusion**

In summary, our findings suggest that video supports a more learner-centred constructivist approach to learning to be a teacher. It essentially captures a detailed and objective record of students' teaching and provides the time and the means for close examination, interpretation and discussion. In doing so it ensures that evaluations are considered, not rushed, accurate and less influenced by emotions (Hoath, 2013). We are greatly encouraged that even a limited use of video can greatly influence students' future

practice and convince them of the value in reflective thinking. In our future research we aim to look even closer at the affordances provided by this use of video and in particular how collaboration between students and between student and tutors is enhanced.

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