Using iPad video evidence as a tool for reflection in primary teacher education

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This paper is based on a study carried out with a group of students doing a one-year Post Graduate Certificate of Primary Education course. During this course, the students had use of an iPad, provided by the university. The students used these to collect and analyse video evidence from their taught mathematics sessions. The aim was that this process would nurture students' capacity to reflect upon teaching and learning in mathematics, in line with Mason's (2002) 'discipline of noticing'.

Keywords: reflection, analysis, noticing, video, technology

Introduction

Teacher training courses generally aim to produce reflective teachers, who are able to recognise and respond to the complexities of classroom life. The intention is that students build upon the ideas, introduced in university taught sessions, during the school based element of their training, considering both their own practice and that of the experienced teacher with whom they are working. Ultimately, this process is designed to enable them to articulate their own values and beliefs as professionals in the work place.

Within mathematics sessions, taught by university tutors, students engage in practical activities. Whilst doing so, they are asked to reflect upon the mathematics and pedagogy involved. However, it sometimes seems that they fail to do this, in any depth. They do not explore the mathematical concepts involved or make connections between themselves and their pupils as learners. In essence, they fail to notice or make sense of the key ideas. This lack of awareness and exploration may have an impact on their ability to teach so that their pupils are able to make sense of the mathematics that they are doing.

The purpose of this research is to identify whether the students' capacity to reflect on the mathematics and pedagogy would improve if they recorded elements of their own mathematical work in teaching sessions and, subsequently, discussed these clips together. It was hoped that, by going through this process of collecting and analysing the video records, their ability to notice detail and to reflect upon what they had noticed would improve.

Literature

Reflection

Schon (1987) identifies the place that reflection in action and upon action plays in the teacher's professional repertoire. Mason (2002) exhorts practitioners to 'notice' within the everyday, to pay attention to those things which may, in a busy workplace, fall 'below our radar'. Rosaen, Lundeberg, Cooper, Fritzen and Terpstra (2008) note that teacher change is made possible when practitioners do notice the unexpected and that the uncertainties and disruptions which may be generated offer a rich potential for

learning. However, Chamoso, Cáceres and Azcárate (2011) state that we only reflect upon what we already know and that students do not readily connect university and school, thus bringing into question the value of this process. Brown and McNamara (2011) criticise the emphasis on reflection, claiming that students only reflect at the descriptive level and question whether this ever connects theory to practice. They report that some students find such reflection a distraction and that this theorising is difficult for trainees and more productive for experienced practitioners. This resonates with Sherin and van Es (2005) who record that experienced practitioners are better at honing in on the important details in a discriminatory manner, whereas those less experienced accord every element the same attention. They also note that those with experience are able to connect what they notice with a depth of understanding of the specific subject area and the context. In order to enable less experienced teachers and those in training to develop their capacity to reflect, Van Es and Sherin (2002) indicate that providing a scaffold for the noticing may be beneficial.

The use of video to support reflection

Prosser (2007) notes that examination of video recordings can provoke questions about the significance of what is observed and invite observers to consider the connotations and assumptions that are sometimes made, albeit implicitly, about what is seen. However, as indicated above, this may depend on prior orientation through experience of the observer or on the degree of direction by others.

The use of video recording as an aide for teachers to reflect upon their own practice is an established precedent in teacher professional development. Teachers engaged in the 'Every Child Counts' project, Edgehill University (2011) recorded sections of their teaching, subsequently used for self and peer evaluation. Rowlands, Turner, Thwaites and Huckstep (2009) produced video materials for school-based mentors, designed to support them in offering targeted feedback on the mathematical components of the lessons taught by students. Rosaen et al (2008) report on the capacity of video recording to 'slow down' and review the action of teachers, providing permanent evidence.

Van Es and Sherin (2002) identify three elements in using video evidence to support reflection: noticing, evaluating and interpreting. Noticing requires an awareness of both the detail and the ability to distinguish what is important. Evaluating involves some sort of judgement about what is going on. This needs to go beyond the superficial. Interpreting requires a more analytical approach to what one is observing.

Seidel, Stúrmer, Blomberg, Kobarg and Schwindt (2011) considered whether watching video recordings featuring oneself is more beneficial than looking at recordings of others. There are issues with each. Reflecting upon one's own performance can be limited by one's own self-perceptions or by the viewer adopting a self-protective, defensive stance. Watching videos of one's peers may eliminate some of the subjectivity but, equally, one may want to avoid being critical of others, in order to spare their feelings.

Borko, Jacobs, Eiteljrg and Pitman (2008) claim that groups of teachers working together, over time, are able to progress beyond this apparently mutually supportive stage. Having become familiar with each other's contexts, they are able to focus in on the pupils, asking deep and significant questions about their learning, moving from the evaluative to the interpretive. Such teachers may be considered to have created a 'community of practice' in Wenger's (1998), a notion supported by

Doig and Groves (2011) in their review of 'lesson study' as a teacher professional development tool. However, the group of students involved in this research were new to the profession and had little time to get to know each other and this may have proved a limitation to the research.

Methodology

The question under investigation was whether reviewing video recordings of other students engaged in the same mathematical activities would improve students' ability to discuss and reflect collectively on their learning in mathematics. Merttens (1996) stresses the importance of talk in developing mathematical reasoning. Much of the value of the activities selected for the taught sessions is in their capacity to promote discussion and the sharing of ideas that may challenge previous thinking and develop understanding of the mathematical concepts. Previously, this discussion had lacked any depth of reflection and there had been little apparent change in understanding. Through reviewing the video clips together and by scaffolding the students' reflections, the tutor was hoping to stimulate more productive, exploratory talk, as defined by Mercer (1995).

As the students were engaged in reviewing the recorded actions of each other's mathematics, the tutor was simultaneously reflecting upon what they were doing and saying. The purpose of this for the tutor was to investigate whether this strategy would be useful in addressing the concerns previously identified. The tutor employed an action research model as defined and formalised by Stenhouse (1975), in which a practitioner is involved in analysing a situation, planning an alternative action and then evaluating the effects of that action.

To support the students in developing their capacity to reflect, a scaffold was provided, as suggested by van Es and Sherin (2002). This was based on the three elements identified by Sherin and van Es (2005): noticing, evaluating and interpreting. It was explained to the students that these elements would be focused on in turn during the course of the sessions and that the reflective activities selected for each one would mirror this emphasis, though the discussions that took place when reviewing the video evidence may encompass more than one aspect.

The study involved all members of the group in collecting and analysing the video evidence, the aim being that this would generate fresh perspectives for the participants. Masats and Dooly (2011) note that an analysis of video material can allow for teachers and students to co-construct knowledge. Thus, the methodology was based on a socio-constructivist paradigm, as defined by Vygotsky (1962). The study consisted of several cycles of collecting evidence from selected activities within single taught sessions, chosen because the tutor had identified these as key in terms of the underlying mathematical concepts. The students were asked to record elements that they deemed interesting, in terms of the mathematics going on. Analysis of the evidence by the tutor and students would determine the focus of the next session. Whilst students would be recording elements of their own choice during these activities, the subsequent discussions were intended to further the understanding and awareness of the whole group and to increase their capacity to notice and to question the significance of what they saw, in terms of mathematics, on the video recordings. However, in line with Sherin and van Es (2005) it was also important to consider that what the tutor deemed worthy of noticing, as an experienced practitioner, may have

differed from what the students had deemed important. Herein lay a tension in terms of how much the tutor, as researcher, was able to direct the students' attention to what was relevant and, in doing so, potentially, reduce their capacity to notice these things for themselves. This needed to be addressed both within the discussions with students and within the final analysis.

In carrying out this work, there were other ethical implications related to the expectations of the students and their perceptions of the tutor's role. The students need to develop the requisite range of knowledge, skills and understanding in order to achieve the professional standards for teachers. It was important that they were aware that this was a research project and that this research did not compromise their studies. It was hoped that the focus on reflection would enhance their learning in mathematics and that they would see themselves as co-researchers.

There was a need to acknowledge that some of the students may be anxious about seeing themselves on a video recording. This may be due to being self-conscious and 'camera shy' and it was important that they did have the right to withdraw from this element, or to ask that they were rendered anonymous when being filmed. However, there may be other factors to consider. Williams (2008) notes that mathematics can engender powerful emotions, including fear and this may have an impact on their willingness to engage with the process.

Similarly, there are ethical considerations in actively seeking in Rosaen et al (2008) terms, to 'disrupt' certainties. These students were at the beginning of an intensive course, designed to induct them into a challenging profession. As such, they may already be working outside their own comfort zone. Moreover, mathematics can be a subject area, which teachers in training have struggled with, in the past, and they may not have positive attitudes towards the subject, Hodgen and Askew (2007). Thus asking them to probe some of the issues around mathematics and their own learning may provoke anxiety. Gresham (2007) describes such anxiety as inducing feelings of panic in individuals who are asked to engage in mathematical activities. Brown and McNamara (2011) warn that reflection in action also has the potential to expose personal deficiencies and can be perceived as threatening. There is a sense in which tutors have a duty of care for the emotional wellbeing and resilience of their students and this can create tensions when planning such research. To minimise the potential anxiety, students were involved in a number of activities within each session before undertaking the activity during which recordings were made. The students chose what and how much they wished to record, the subsequent discussions focused on the mathematics, rather than the participants, and they could opt for their recordings not to be used, thus aiming to avoid the defensive stance identified by Seidel et al (2011). They had also had opportunities to discuss the emotional and affective responses to mathematics in their first session and attempts had been made to create a positive classroom ethos, where such things could be acknowledged. In terms of equity, it was important that students each had sufficient opportunities to be involved in the activities and to stand back and record these.

Data collection

The data collected included the video clips that were the stimuli for the reflections and discussions, though it is acknowledged that there are limitations around the subjectivity of the evidence when using video clips. The recorder chooses what to record, initially. During the initial discussion of the video, there may be a further degree of filtering, dependent on the viewpoint of the reviewers. Finally, any analysis

of such data may reflect bias. To offset this, the tutor's field notes, describing the actions and comments of the students as they engaged with the activities and the subsequent discussions, the students' notes and the tutor's journal entries following each session, were incorporated within the collective analysis. The students also completed a questionnaire, in which they were asked to evaluate the use of their video recordings, following their final session. It was felt important to give them the opportunity to reflect on the process and for the tutor to obtain the views of the participants once they had time to reflect on the entire process. This aligned with Mason's (2002) point that, whilst teaching takes place in time, learning takes place over time. The questionnaire was designed to allow opportunities for the participants to identify any practical benefits gained from reviewing the videos and an indication of whether they would consider using this strategy, once in school, in order to reflect upon their own actions or pupils' learning. They were asked to consider whether it had given them any deeper insights into their own learning in mathematics. In line with the framework and the focus on the three elements of reflection, noticing, evaluating and interpreting, the students were asked to consider how far they felt that their capacity to do each had developed because of this experience, using a five point Likert scale. It was acknowledged, though, that other experiences, both within these taught sessions and elsewhere, may have contributed to their responses. The responses were anonymous and were to be analysed as qualitative, rather than quantitative pieces of data, given the small sample size.

The action research cycles were planned and the data collected analysed with reference to the framework, based on the three elements of reflection identified by Sherin and van Es (2005). The analysis considered the extent to which the students demonstrated the capacity to note what was seen as relevant details though, as discussed earlier, there was a potential tension between what the tutor saw as relevant and what the students judged as relevant. In line with the scaffolding used, the analysis also looked at the students' capacity to evaluate what they had seen or done and to interpret the underlying mathematical concepts, which had been the intended focus of the selected activities. It was hoped that going through this process of data collection and analysis themselves may support the students, as teachers, to be clear about the underlying concepts when planning mathematical activities for their own classrooms. They may see the value in encouraging their own pupils to talk about and reflect upon what they have done, practically, in mathematics lessons. It may also enable them to focus on the details of what their pupils are doing and saying, whilst engaged in mathematical work, and by evaluating these, they may then assess and interpret the children's levels of conceptual understanding.

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