Learning about teaching and teaching about learning: Using video data for research and professional development

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Hilary Hollingsworth is an education consultant and researcher who works with schools, universities, and education organisations in Australia and the United States. Her current interests which focus on the use of video cases for teacher professional learning were generated through her work over the last several years at LessonLab in Los Angeles, California. While there, she was the representative for ACER working on the Third International Mathematics and Science Study (TIMSS) 1999 Video Study. As a Senior Researcher for that study, she shared responsibility for the development, implementation and analyses of the video data coding scheme, and the authoring of the international and Australian reports. In addition to her research role in the TIMSS 1999 Video Study, she worked with school systems, school districts, universities, professional development organisations, and textbook publishers across the United States, as a Director for the Teacher Learning Division of LessonLab. This work involved the design and implementation of video cases in a unique and powerful web-based technology platform. She has previously worked as a lecturer at the University of Melbourne, a mathematics consultant in Victorian schools, and a primary teacher in Victoria. She has published papers related to her research in mathematics education and teacher professional learning, as well as resource books for teachers and parents.

Although video technology has been available for several decades, the collection and use of classroom video data for supporting and improving teaching and learning can still be considered to be in its infancy. A variety of research and professional development projects have made use of video data, revealing promising initial outcomes and identifying many possibilities for its use. However, relatively little systematic research has been conducted on the feasibility and effectiveness of various types and uses of video in education (Brophy, 2004).

This paper outlines the nature and virtues of video data, and describes several Australian examples of research and professional development projects that utilise classroom video data. It reports some of the formative evaluations attesting to the positive outcomes of these projects, as well as some of the challenges associated with them. Finally, it anticipates possible future directions for the use of classroom video data for supporting and improving teaching and learning.

The nature and virtues of classroom video data

Research projects incorporating video data vary in scope and scale, from large international video surveys capturing single lesson snapshots of classroom activity (for example, the Third International Mathematics and Science Study (TIMSS) 1999 Video Study, involving the videotaping, coding, and analysis of over 1000 lessons in seven countries, see Hiebert et al., 2003), to studies that involve the videotaping of one classroom across extended periods (months or years), capturing developments in teaching and learning over time (for example, Lampert and Ball's mathematics teaching study, see Lampert & Ball, 1998).

Professional development projects incorporating video data also vary in scope and scale. For example, from projects designed by national and State education organisations, university faculties, and independent organisations, to projects initiated at the local school level.

In both research and professional development contexts, a variety of methodologies have been developed for collecting, storing, retrieving, coding, navigating, and analysing classroom video data. Over recent years technologies for storing and showing video have proliferated (for example, tape, laserdisc, CD Rom, DVD, and web streaming), and some sophisticated software/technology platforms have been designed to function purposefully as research tools (for example, *vPrism* and *Studiocode*), or as tools for practitioners to explore and work with video data (for example, LessonLab's Visibility platform).

Several authors have reported detailed descriptions of the virtues of video data (see for example, Brophy, 2004; Clarke & Hollingsworth, 2000; Stigler & Hiebert, 1999). Among these are the capacity of video to: preserve classroom activity so that it can be 'slowed down' to enable detailed examinations of teaching and learning from multiple perspectives; reveal alternatives through comparative analysis; and, stimulate discussions about choices related to teaching and learning. Brophy (2004) notes that video offers unique affordances especially powerful for supporting teaching and learning:

Videos show both teacher and student actions and thus can be viewed from both the teacher's and the student's perspective, allowing attention to both teaching and learning issues. (Brophy, 2004, p. 299)

Projects utilising video data

In what ways are classroom video data being used in efforts to support and improve teaching and learning in Australia? To illustrate some of the possibilities, descriptions of several projects that the author is associated with are presented below. The examples include research and professional development projects, conducted by national education organisations, universities, and schools. Each project uses different methodologies for data collection, analysis, and use, and while it is beyond the scope of this paper to include details about these, related references are provided where appropriate. The intent of this section is to provide a sense of the ways classroom video data are being used, and provoke thought about possibilities for their further use. Each of the projects included in this section exploit the technology's unique affordances, and tailor the use of the video – and in several cases the video itself – to their specific project goals.

Example 1 - Use of video data in research: Edith Cowan University

Classroom video data was an integral component of the research study, *In Teachers' Hands: Effective Literacy Teaching Practices in the Early Years of Schooling* conducted by Edith Cowan University and funded by the Australian Government Department of Education,

Science and Training under the Grants for National Literacy and Numeracy Strategies and Projects Programme. With the aim of 'identifying teaching practices that lead to improved literacy outcomes for children in the early years of schooling' (Louden et al., in press, p. iv), the study design included the collection, observation, and analyses of video of literacy teaching sessions in classrooms where students' literacy performance had been assessed the previous year as 'more than expected', 'as expected', or 'less than expected'. Using a Classroom Literacy Observation Schedule (CLOS) that was based on the project literature review, the classroom video data were analysed for the presence or absence of 33 literacy teaching practices considered important to effective literacy teaching. These teaching practices were grouped into six dimensions: participation, knowledge, orchestration, support, differentiation, and respect.

Quantitative and qualitative methods were used to analyse the video data in the study. Quantitative analysis, included a simple descriptive analysis by frequency to provide a picture of the teaching practices demonstrated by each teacher. For this purpose researchers used *vPrism*, a software package that enables detailed, time-linked coding of video. Further qualitative analysis of the video data provided 'a textured and nuanced account of the application of each of the 33 literacy teaching practices' by the teachers videotaped (Louden et al., in press, p.v).

In addition to the publication of a written report of the study findings a web site is being developed that includes video examples of the 33 literacy teaching practices. It is

anticipated that these video examples will be invaluable in communicating the results of the study.

A further research project building directly on the methodology developed in the *In Teachers' Hands* study has commenced in 2005. The *Student Growth Study, Effective Teaching: An Evidence Based Approach*, being conducted by Edith Cowan University, is an evidence-based enquiry into the characteristics of effective teaching in Western Australian Government Schools. This study will make use of video data in a similar way to *In Teachers' Hands*, and will focus on two areas: literacy in pre-school and Year 1, and mathematics in Year 8.

Example 2 - Use of research video data for teacher professional learning: Engaging in excellence in mathematics teaching, ACER and AAMT

Designed by ACER and AAMT, *Engaging in Excellence in Mathematics Teaching* is a pilot professional learning program in which teachers (1) conduct a self-evaluation against the AAMT Standards for Excellence in Teaching Mathematics, (2) design and undertake a customised, needs-based, workplace, professional learning program, and (3) present the outcomes of their program to fellow participants[1]. A key opportunity for participants of the program is to observe selected examples of public release classroom video data from the TIMSS 1999 Video Study, and interpret them in terms of the AAMT Standards.

The mathematics component of the TIMSS 1999 Video Study examined teaching practices in seven countries through in-depth analysis of 638 eighth-

[1] For details regarding the Engaging in Excellence program, see Peck, Hollingsworth & Morony, 2004.

grade mathematics lesson videotapes[2]. Public release video data from the Study is available on a set of CD ROMs using LessonLab's Visibility technology platform[3]. Each CD ROM contains video and related materials including time-linked transcripts in both English and the native language, time-linked indexes enabling efficient navigation around different segments in the lessons, lesson graphs displaying plans of the lessons, time-linked images of textbook and worksheet pages, and time-linked commentaries on the lessons. Teachers participating in the *Engaging in Excellence* pilot program had the opportunity to use LessonLab's cutting edge technology to observe and analyse teaching practices and learning environments from seven countries. This experience stimulated discussion about alternative practices and provoked teachers to reflect on their own practice.

Participants in the Engaging in Excellence program reported that the TIMSS video materials were an extremely useful part of the initial workshop. Participants 'valued the rare opportunity to look into the classrooms of teachers in other countries and observe their strategies and learning environments. They also valued the analysis of these videos against the [AAMT] Standards' (Peck, Hollingsworth & Morony, 2004, pp. 375-376). This evaluation is in accordance with the views of Clarke and Hollingsworth (2000):

> When teachers view videotapes of classrooms the familiarity of the classroom setting can reduce the power of the video clip to catalyse teacher reflection. However, if the videotaped lessons are taken from a very different culture, the

teacher's assumptions about accepted and expected practice no longer apply. In this situation, teachers are more inclined to interrogate the videotape and, by implication, their own practice. The unfamiliarity of what they are viewing challenges their assumptions about what is acceptable, competent teaching practice. (Clarke & Hollingsworth, 2000)

Example 3 - Use of video data in preservice education: Edith Cowan University

In 2003 and 2004, faculty in the School of Education at Edith Cowan University developed and trialed a preservice education unit, 'Becoming a Teacher', that made use of authentic classroom video data to create links between traditional face-to-face lecturing and tutorials, practicum experience, and online learning opportunities. The unit was designed for first year students to take in first semester of their teacher education course. A major goal of the initiative was for teachers entering the profession to understand the importance of developing sound professional practices – such as observation, analyses, and reflection – and to gain experience with these practices.

The 'Becoming a Teacher' unit was developed in LessonLab's Visibility technology platform. That platform enabled the design of a tailored, interactive 'Course' that could be directly authored by faculty members. As part of the course, student teachers were engaged in viewing classroom videos and completing 'Tasks' and 'Forums' associated with their observations, analyses, and

reflections. These activities were purposefully linked to the theoretical content of the lectures and tutorials student teachers attended, and to their school practicum experiences. Rather than having only one example of practice from which to draw professional insights at this stage of their course, student teachers had multiple examples to examine and compare through the use of the video data.

In a unit evaluation survey, student teachers nominated 'Becoming a Teacher' as the most satisfying unit in their first year education program. And, tutors of the unit reported increased quality and depth of understanding by student teachers generated through their observation and analysis of the classroom video data.

The success of this first unit led to the development of additional units using the Visibility platform across the second half of 2004, for implementation in the 2005 academic year. Professional learning workshops were conducted for academic staff in the School of Education to assist them to reconceptualise their pedagogy to effectively incorporate classroom video data into their education units. In 2005, four units are making use of classroom video data in the Visibility platform, and several more are currently under development for 2006.

Example 4 - Use of video data for teacher professional learning: Lesson study at Ballarat and Clarendon College, Victoria

Over the past four years, staff at Ballarat and Clarendon College in Victoria have engaged in whole-school

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[2]Details of the TIMSS 1999 Video Study are reported in Hiebert et al., 2003, and in Hollingsworth, Lokan & McCrae, 2003.

[3]For details regarding LessonLab's Visibility software, see: www.lessonlab.com

strategic professional development. Through this process a focus on literacy and numeracy has emerged, and one initiative that is currently being implemented to provide opportunities for teachers to work on improving their teaching in these areas is a local adaptation of the Japanese 'Lesson Study' model of teacher learning.

Lesson study is an ongoing professional learning experience involving small groups of teachers meeting regularly to engage in a collaborative process of lesson planning, implementation, evaluation and refinement. Key to their work is the hypothesising of anticipated student responses, the testing of those hypotheses, and the refinement of the lesson design. The groups typically meet weekly or bi-weekly for several hours and focus on only a few lessons over the year with the aim of perfecting them. Once the lessons have been refined to a point of 'readiness' where the group feels they can not perfect them any further – usually after several months or even years – they are shared with other teachers and other schools, complete with development and test information, and expected student responses to questions and problems. Skills gained through the detailed process of observation and analysis in lesson study transfer to teachers' work on other lessons. As Hiebert and Stigler (2000) suggest, 'lesson study reverses the relationship prevalent in the United States [and Australia] between improving teaching and improving teachers. Working on improving teaching yields teacher development, rather than vice versa.'[4]

At Ballarat and Clarendon College, two lesson study groups formed in Term 4 of 2004; one focused on literacy and

one focused on numeracy. These groups are continuing to work on the refinement of their lessons through 2005. Video data of their work are being collected and used in two ways. First, each of the collaborative group meetings is videotaped so that teachers can reflect on the group discussions. These videotapes also provide a record of the group's progress for evaluative and training purposes. Second, each of the group's research lessons is videotaped so that teachers can observe and analyse them, and refer to specific examples in them for discussion in the lesson study meetings.

Teachers who have been involved in the first two lesson study groups at the College have reported that the process they have engaged in has had a significant positive impact on their teaching of literacy and numeracy. In particular, they consider that the opportunities to reflect on their own and others' practice, become aware of new alternatives, engage in serious questions and discussions about content and pedagogy, and develop observational and analytical skills, have led to improvements in their teaching. A further lesson study group was formed recently, making a total of three groups active in the school during 2005.

Example 5 - Use of video data for teacher professional learning: Performance management at Ballarat and Clarendon College, Victoria

As part of the whole school strategic approach to professional development described in Example 4, Ballarat and Clarendon College staff also participate in a performance management program

utilising video data of their own classroom teaching. Each member of the academic staff is videotaped teaching a lesson at different stages in the year. The video is viewed by the teacher, and by a colleague who is a designated performance manager. The video is then used as a point of specific reference to discuss teacher performance, and to provide feedback focused on improvement. The use of each teacher's classroom video data in this way, provides real evidence of teaching performance and evidence of improvement in teaching performance over time. It also contextualises performance management as part of the ongoing learning process of teachers within the ongoing learning community of the school.

Promising initial outcomes, challenges, and future directions

In each of the projects described above, promising initial outcomes regarding the use of video data have been reported through formative evaluations. In the context of research, classroom video data are highly valued because they enable rich and detailed studies of the complex activities of teaching and learning, and their reusability allow for examination from different perspectives for different purposes. The report of the Negotiation of Meaning Project conducted through the University of Melbourne and edited by Clarke (2001), evidences the value of multi-perspective analysis of research video data.

Classroom video data also offer a plethora of opportunities for teacher's professional learning. Video data provide new avenues for teachers, schools,

universities, professional developers, and professional organisations, to engage in rigorous and serious observation and analyses of classroom activity to support and improve teaching and learning.

While positive outcomes of projects using classroom video data are being reported and celebrated, a number of challenges have also emerged. Elsewhere, authors have recorded details of practical and logistical challenges associated with the collection, analysis, and use of video data, including cost, time, quality of video production, ethics, copyright, and technology constraints (Brophy, 2004; Clarke & Hollingsworth, 2000; Jacobs et al., 2004). In the Australian context, each of these challenges exists; however, as evidenced by the number of projects already under way, none are insurmountable. Perhaps the most pertinent challenge associated with the use of video data in Australia relates to developing a culture among teachers and teacher educators that values and embraces the collection and use of video data.

The ideas and examples presented in this paper represent only some of the possibilities for using video data to support and improve teaching and learning. Other groups are working with video data in different ways, and knowledge and expertise in the area is growing. It is possible, and in some cases planned, that projects like the examples described earlier (as well as others not reported here) be scaled up to extend to schools, universities, and professional organisations across the country. As skill and efficiencies in video data capture, store, and use develop, and as the teaching profession embraces the collection and use of video data, even more options will open up. As the field expands, an

important issue to address will be the need for summative evaluation of projects. As Brophy (2004) contends:

> Along with continual developments in the state of the art of both the technology itself and its applications for teacher education purposes [and research], the field now needs systematic research designed to provide summative evaluation of the effectiveness of video-based programs and assessment of the trade-offs involved in alternative approaches. (Brophy, 2004, p. 304)

Video data offer tremendous opportunity for authentic learning about teaching and teaching about learning, and provide a rich resource for helping set future directions for improvement.

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