

A one-eyed look at classroom life: Using new technologies to enrich classroom-based research

Bruce Johnson, Anna M. Sullivan and David Williams

School of Education & Hawke Research Institute, University of South Australia

This paper is about examining life in classrooms. Authentic recording and interpretation of the complexities of classroom life have long been both fascinating and challenging for researchers. Typically, such research has been expensive, time-consuming and susceptible to claims that its intrusiveness pollutes the authenticity of the very context that it seeks to understand. Furthermore, it has usually been restricted to the visual focus selected for recording by the 'two eyes' of the researcher, the editor or the camera operator. However, developments in the 'one eye' of digital video technology and associated research software offer opportunities to look into classrooms in ways that are more cost and time-efficient, less intrusive, and more inclusive and representative of the totality of classroom life.

In this paper we report that, regardless of the limitations and challenges, we are convinced of the potential for research to be enriched through the incorporation of new technologies. Our experience in conducting research into life in six primary school classrooms supports the value of new technologies as methodological tools which are more manageable in practical terms, which increase and improve information-gathering, and which enhance the construction of datasets based upon the dynamism and complexities of classroom life. We recommend their use to explore, better understand and appreciate classroom life in fuller, richer ways.

Background

This paper reports on our experiences in using new technologies to enrich research into classroom life. However, it is important to contextualise this as the methodology underpinning a research project whose prime purpose was examining the classroom management practices of six first-year teachers working in primary schools.

Educational researchers have long been attracted to studying classroom life. Following the seminal work of Jackson (1968), successive generations of researchers have sought to understand the complexity of classroom life and thereby gain insights into why teaching is such a challenging and demanding enterprise. These researchers have developed ways to describe what goes on in classrooms; suggested how teachers can improve their students' learning and social development; identified historical and contemporary influences which influence what happens in classrooms; alerted teachers to their own classroom behaviour and its impact on students; and proposed theories and concepts that contribute to new understandings of classroom dynamics (Good & Brophy, 2003).

Traditional research into classroom life followed predictable lines of inquiry when investigating the relationship between sets of variables in process-product models of classroom teaching. The main data-gathering approach used various types of observational instruments to make systematic and highly-structured classroom observations (Hook,

1981). Typically, these instruments were prepared in advance and based on particular categorisations, taxonomies and schedules which directed the observation towards selected aspects of classroom life. Only in rare cases were emerging video technologies used to capture and examine classroom events and processes (c.f. Kounin, 1970). Even in these cases, in order to collect the data that was of most interest to them, researchers tended to direct or manipulate the events being recorded by focussing in or out to highlight specific items for coverage (Baker, Green & Skukauskaite, 2008). Using technology in such ways did not enrich the research process, but simply served to replicate the behaviour of non-participant observers making field notes.

The potential and value of technology's role in research were recognised, but the limitations were also apparent. In terms of gathering the information for dataset construction, these included the practical restrictions of standard lens cameras recording specific, selected samples of activity without necessarily contextualising these within the broader classroom dynamic. Despite the intrusiveness, expense and research issues, the fact that the use of video recording enabled researchers to "code more, and more subtle, aspects of both teacher and student behaviour" (Brophy, 2006, p. 28) promoted its inclusion in research to the extent that there are claims that "video analysis has become a dominant part of research in classrooms" (Baker & Green, 2007, p. 191).

Although researchers learned a great deal about classroom environments by using quantitative methods, they were also frustrated by the reductionist focus of much of their research on pre-specified sets of variables and statistical models. As Tobin (2006) declared, too much of what seemed to impact on classroom life was excluded from his analyses because it was not easily observable or quantifiable. He reported that

in many instances the most salient features of classroom life seemed outside of the statistical model and I found myself writing more and more about what I referred to in those days as context – the factors I had not identified *a priori* – that were surely shaping what happened in the classes in which I was an observer. (Tobin, 2006, p. 15)

Qualitative approaches to classroom research became more popular from the 1980s as researchers searched for better ways to understand not only classroom events, but also the "the world views, values, meanings, beliefs, thoughts and general characteristics" of those who taught and learned in classrooms (Leininger, 1985, p. 5). Good and Brophy (2003, p. 19) noted that

[i]n *qualitative approaches*, observers do not concentrate on assigning classroom events to categories but instead attempt to collect detailed descriptive information about them. These rich descriptive data are preserved and then analysed with emphasis on qualitative aspects of the events recorded (i.e., on the specifics of how they unfolded and how they were likely to have been experienced by the teacher and students).

In our research project, several features of qualitative research appealed to us as we sought to investigate classroom life in new ways, particularly the potential of using emergent digital technologies to provide rich authentic information about the project's focus on first-year teachers' approaches to classroom management.

What follows is an account of the ways in which we designed a qualitative research project that adhered to the principles of interpretive inquiry and used newly available technologies – high definition digital camcorders equipped with wide-angle lenses and Bluetooth wireless connectivity – to look into and record classroom life. The footage was imported into newly developed computer software for analysis. In identifying the potential of digital video in such research we believed, somewhat naïvely perhaps, that our optimistic aims would be implemented relatively easily and that any difficulties would be able to be addressed efficiently.

The first part of the following discussion reflects our commitment to linking qualitative research themes with new technologies and to establishing a research project without pre-conceived certainties about how it would develop, what challenges it would bring, and most importantly, what we would need to learn to complete it. The second part of the discussion considers the practicalities of using new digital technologies in classroom research and describes how unanticipated eventualities were handled.

Linking qualitative research themes with new technologies

In his influential portrayal of the essential characteristics of qualitative research approaches, Patton (2002, pp. 40–41) listed 10 themes of interpretive research. The six themes most relevant to this study are discussed briefly with reference to the use of new technologies in classroom research. This discussion provides the theoretical framework for the research and is juxtaposed later in the paper with the sometimes messy practicalities of conducting the research in real classrooms.

Theme 1: Naturalistic orientation – a real life focus

The focus of qualitative studies is frequently on naturally occurring, real-life situations as they unfold (Bennett & Watson, 2002; Patton, 2002). This reflects a growing research interest in everyday life, with all its complexity, messiness, and ambiguity (Watson, 2002). This kind of research relies on information-gathering methods that are unobtrusive, inconspicuous and subtle because, if they are not, they can dramatically alter the phenomenon under investigation. It also relies on information-gathering being as rich and as contextualised as possible.

Because of our project's focus on teachers orchestrating and navigating the demands of everyday classroom life, we wanted to see what happens on a regular basis in ordinary classrooms as teachers and students assume their usual roles, perform their work, and interact over extended periods of time. We wanted to ensure that our methods and the equipment supporting them were as unobtrusive as possible so that we could better capture the “authentic participation” of teachers and students in classroom life (Hickey & Schafer, 2006, p. 296). We also wanted to ‘see’ beyond the limitations of our ‘two eyes’. Like Hickey and Schafer (2006), we recognised the potential of the ‘one eye’ of new digital video with Bluetooth wireless connectivity to help us achieve this.

In his pioneering efforts using video technology to look inside classrooms, Kounin (1970) went to extraordinary lengths to disguise cumbersome, tape-fed video cameras supported by 180 cm tall tripods in purpose-built boxes. He also had to provide outside broadcast facilities; trucks containing essential recording equipment were parked in schoolyards and linked to the classrooms by thick, multi-core cables.

Subsequent research using developing technologies still had to grapple with practical drawbacks such as bulky, intrusive equipment; multiple cables; artificial lighting requirements; restricted recording spans; audio differentiation and acoustic quality issues; and the presence of ‘outsiders’ in the form of the researchers and technical personnel such as camera operators and audio technicians. In stark contrast, the micro-technology available to us enabled us to be in the position of the proverbial “fly on the wall”.

We purchased six Sony High Definition Handycam digital recorders with 30 GB hard drives. This hard disk capacity meant that several hours of classroom activity could be recorded with little or no need for intervention from researchers, technicians, or teachers. This also added to the cameras’ unobtrusiveness since their reduced maintenance demands meant that they were not the subject of regular attention. The cameras were also very small – approximately the size of a large fist – so they merged easily in to the classroom background, especially when placed in out-of-the-way locations. The camera tripods were equally unobtrusive both in size and appearance. Each tripod leg was a 25 cm long series of interconnected 2 cm black, white and grey plastic ball joints – a significant departure from the previous generation of large, rigid wooden or stark metal tripods. The use of Sony wide-angle lenses enabled the capture of most classroom activity from a static, elevated position (see Appendix A). Coverage which in previous times had, at best, entailed the use of several remote-control cameras with noisy movement motors, was now achievable through the wide-angle lens of a single fixed camera.

In order to record an audio track during videoing, the teachers were equipped with inconspicuous Sony Bluetooth wireless microphones. These were worn as pendants or attached to the teachers’ clothing by lapel/pocket clips. Such a mobile microphone system coupled with the benefit of Bluetooth interconnectivity ensured that recordings of high quality were acquired naturally and organically at the source of interaction.

Theme 2: Design flexibility

Consistent with our aim of capturing authentic classroom life as it transpired, we chose not to be overly prescriptive about the timing or duration of recording. These decisions were left to the discretion of the teachers, who had the flexibility to select and record at different times of the school day and during a variety of learning activities. The teachers used small, discreet, hand-held remote controls to start and stop recording.

In explaining our rationale for flexibility, we stressed the need for the research to reflect what normally happens in classrooms, rather than for the research to alter the natural ecology of the class. Our only stipulation was that the videoing was to take place early in the school year and again towards the end of Term 1. This was so that we could examine

the teachers' management of early classroom dynamics and note developments that ensued in the following weeks.

Theme 3: Purposeful sampling

In keeping with the project's main aim, our interest in this study was to develop a deeper understanding of first-year teachers' thinking and decision-making about managing classroom life. We decided to recruit recent graduates who were to be teaching junior primary or primary classes in school term 1. Given the qualitative focus of the study and the contextual realities of our request, we sought the involvement of six first-year teachers working in South Australian Catholic Education primary schools (as Catholic Education SA was our industry partner in this project). We also assumed that, being recent graduates, these participants would be more likely to have an appreciation of and supportive leaning towards our proposed use of contemporary technologies in classroom research.

Theme 4: Qualitative data

When we designed this study we were aware of debates within the qualitative research community about what constitutes data and whether researchers collect, make or construct it from information sources such as videotapes and written documents. According to Richards (2005), qualitative data are records of observations or interactions that are complex and contextualised, and that are not easily reduced to numbers. These records are made rather than collected. That is, they are purposefully constructed by the researcher from a diverse range of sources; data are not just "lying around, like autumn leaves, ready to be swept into heaps" (Richards, 2005, p. 37).

Erickson (2006; 2007) reinforced Richards' point by arguing that videotapes are better regarded as *sources* of data than as data in themselves. He wrote that

[j]ust as other primary documentary records in qualitative research are not data but are information sources out of which data can be constructed – field notes, interview transcripts, site documents – so audiovisual records of social interaction are information sources. From such records, data can be defined, analytically. But it seems to me that it is naïve realism to think of them as data themselves. (Erickson, 2007, p. 153)

The implications of such a view of data had a significant influence on our research approach. We knew that we would have to make datasets from the highly complex, unedited video footage recorded in classrooms and that this process would necessarily mean making selective decisions about what to consider or ignore in the videos. What we had not predicted accurately was the enormity of the mass of information captured and recorded by the new technologies. We experienced considerable shock when we viewed the initial footage and realised just how dynamic and complex was the classroom life that we witnessed. We already knew that 'seeing' was not going to be simply a passive matter involving the reception of sensory stimuli, but rather an active process of making sense of what we decided to pay attention to. What came as a surprise was the scale of information captured by the wide-angle cameras, to which

such decisions had to be applied. This realisation challenged us to embrace Patton's fifth theme of qualitative research.

Theme 5: Personal insight

Patton (2002, p.40) asserted that the "researcher's personal experiences and insights are an important part of the inquiry and critical to understanding the phenomenon". In a multi-member research team like ours, this presented challenges, particularly because we each had different backgrounds, experiences and roles and responsibilities that we knew would influence us to focus on different things in the unedited footage and even to see the same things very differently. We knew that we would think different things were significant and that we would have different priorities and different views of our roles. Such variations were exacerbated by the enormity and complexity of the activity captured by the 'one eye' of the new technology.

Theme 6: Empathic neutrality

We were acutely aware, even before we began the research, that video footage of first-year teachers in action could tempt us into micro-analysing particular incidents and the teachers' management of them. They were, after all, novice teachers, still in the early career phase of learning about the intricate art and science of teaching. However, we decided to accept Patton's advice and pursue *understanding* as our primary research goal.

Our focus for *understanding* was to be on an appreciation of the nature of classroom life – the contexts in which the teachers were working rather than on other agenda such as the relative qualities of beginning teachers or the extent and effectiveness of their teacher-education preparation. We agreed to adopt a neutral, non-judgemental stance toward the teachers, respecting their status and phase of professional development and freeing us from the inappropriateness of micro-analysing and evaluating everything they did from our "expert" perspectives. Our focus was well and truly on developing *verstehen* – an in-depth *understanding* of our teachers within the context of the life energy of their classrooms.

Using digital technologies in classroom research: The practicalities

Having made some crucial design decisions about the project and having attracted research funding, we set about implementing our plans. In this section we explore the practical implications of our theory-driven approach to using new technologies in classroom research. While not wanting to promote or deepen the theory–practice binary so often invoked in education, we nevertheless see value in discussing the insights that stem from the vigorous interrogation of practical action. While our thinking and decision-making were driven from a theoretical perspective, we still had to meet the day-to-day practical challenges associated with implementing our ideas in real life settings. In a sense, we were not unlike the participants of our research who had to do the same thing in their classes on a daily basis.

Gaining ethics approval

The implications for children's safety when researchers use video technologies, is a highly sensitive issue. Ethics committees, community groups and influential individuals express concerns about the real and perceived threats posed to children's safety and well-being by digital photography and video. These fears have their genesis in a high level of "risk anxiety" (Sachs & Mellor, 2005) about children in the post-modern world and, more particularly, in the concerns of parents over the misuse of visual images of children on the Internet. To allay such fears and to address our own concerns about ethical issues, we stressed that the research involved recording everyday life in the classroom without any direct or obtrusive intervention by outsiders, without any artificially-constructed or scripted activities, and without any focus on specific children. We restricted data access to researchers only (Derry, Hickey, & Koschmann, 2007), ensured full security of data storage, and promised not to use the video footage for any purpose other than research. Established processes were used to gain the informed consent of school principals, teachers and parents, and the informed assent of participating children.

Recruiting participants

This research project was ambitious in focusing on the core of the private realm of teachers' work – classroom life. Furthermore, it relied on the participation of first-year teachers who were at a stage of their careers that has long been recognised as particularly vulnerable (Otty, 1972; Howe, 2006). It would have been reasonable to expect that not many teachers, particularly those in the early stages of their careers, would be enthusiastic about exposing their management of classroom life to the scrutiny of university researchers. We were not surprised when some of our university and school-based colleagues openly doubted that we would be able to recruit *any* first-year teachers.

Despite such deterrents, we liaised closely with Catholic Education South Australia (CESA) to find first-year teachers who were to commence teaching in Term 1. CESA's Beginning Teacher Consultant promoted the research among school principals and the Director of Catholic Education also sent a circular to schools to inform them of the research. Despite the late appointment of some new teachers and the usual busyness of the new school year, six first-year teachers agreed to participate – all with the active support of their principals and some with the encouragement of family members and support networks. They regarded the project as an opportunity for them to reflect on their classroom work and their professional development. They also valued the importance of classroom-based research in education.

Gaining consent

Gaining timely consent from six principals, six teachers, all the students within each class and their parents or carers was a logistical challenge. This was particularly complex in one case involving a participant who co-taught in a combined two-class open space classroom. This meant that consent was also required from the co-teacher and all the students in the other class. Schools helped parents to understand the nature of the research by explaining

it personally, translating information and consent forms into appropriate languages and even offering to visit parents who expressed any concerns about the research. Ultimately, a very high rate of parental consent was achieved. The very few students who were unable or not allowed to participate in the project were seated outside of the camera's field of view or with their backs to the camera. In some cases, these children joined other classes during videoing. Without such strong, active support and commitment, the trialling of new technologies as research tools simply would not have been possible.

Using the video cameras

Once all the necessary preliminaries were completed, the video cameras were set up in the classrooms and their use was discussed with the teachers. Decisions about the location of the cameras were made in consultation with each teacher and bore in mind the research intention and the cameras' technical capacity. In several classrooms we were able to use tall storage cupboards or bookshelves that offered safe and unobtrusive mounting positions and which did not suffer unduly from light seepage from the classroom windows (see Appendix A). The main safety and functional concerns were camera stability, access to a power point and the demands placed on the teacher to connect and disconnect the camera at the beginning and end of each day. By their nature, storage cupboards and bookshelves are accessed many times during a day, often not particularly gently, and we therefore had to mount the cameras securely, resorting to various means such as strong adhesive tape. Similarly, extension cords connecting the camera to a power point (one not in regular use for other classroom activities) had to be safely located and supported. For security purposes, cameras were to be disconnected and taken to a safe place at the end of each day, so positioning had to allow for ease of access and retrieval.

When positioning the cameras we had to consider what sort of footage would be most valuable to us. We wanted to record as much as possible of the regular, everyday life of the classroom, so we needed to position the cameras to capture the areas of the classroom which best reflected this. Our assumptions about and experience in junior primary and primary classroom teaching methodology and teacher activity led us to expect that the teacher's desk would be less of a focus than the students' desks or 'the carpet'. The angle of view of the camera lenses and the tall cupboards or bookshelves meant that most of the classroom was in the frame (see Appendix B). In the double open-space classroom, the camera was positioned to limit its field of view to the immediate classroom area and the carpet and interactive whiteboard. This avoided recording the class that shared the open area space but which was not participating in the project. In another classroom, we had to be creative because there was no suitable high-level furniture or fitting. The size and weight benefits of miniaturised digital technology really came into their own as we found that the tripod and camera could be attached to a curtain rail (see Appendix C).

The teachers controlled recording. On our introductory visits, we explained the operation of the equipment. We also ensured that all equipment was functioning correctly and left instruction sheets with the teachers. As recording progressed, we had a significant, if temporary, problem that stemmed from that most basic piece of equipment, the battery. The manufacturer-supplied lapel microphone batteries lost their charge extremely quickly,

resulting in a loss of audio and disruption to the recording schedule whilst the problem was rectified. Lithium replacement batteries were installed and produced much better results. Spare batteries were left with the teachers. Probably the least technologically complex component temporarily stalled our research. However, once this matter had been resolved, the clarity of the audio recordings from all parts of the classroom was excellent and provided us with another enormous, high quality source of information from which we could construct datasets.

Recordings also suffered from several other unforeseen but critical events. For example, one teacher forgot to activate the camera-mounted Bluetooth receiver, so the microphone could not operate. Similarly, we had not anticipated that the school cleaners would disconnect an extension cord and forget to re-connect it. One frequent event that is now obvious but which we had not predicted was that of students from other classes who were not participating in the project entering the classroom while recording was in progress. A continuing part of the editorial process involves the deletion of this footage or use of pixellation and other techniques to disguise these students' identities.

The management and analysis of large volumes of video

Despite these minor technical problems, we secured many hours of unedited video footage by the end of the first round of recording. The number of hours in no way reflects that actual quantity of information captured by the 'one eye' of the digital cameras. We had previous experience with video footage described in terms of hours and minutes so we had preconceived notions about the task of analysis. However, that experience had been acquired using older technology to take a directed, specific-focus approach. We found that the new technologies presented us with information that was exponentially greater than we could possibly have imagined, graphically illustrating and confirming the complexity and dynamism of classroom life. The computer-based technology available to us also struggled with the volume of information.

To our consternation, the process of downloading from each camera's hard drive to the computer took many hours and demanded huge amounts of disk space. For example, one 3.5 hr video session produced a 9 GB video file (most laptops have hard drives of about 60 GB). In terms of the computer technology available to us in our workplace, we were under-resourced for such a demand. Initially, we overcame this storage problem by purchasing several 500 GB external drives and saving our video files on these and on a large-capacity remote server at our workplace.

As preparation for the research project, we had decided to use the innovative software program NVivo 8 (QSR, 2008) to help us manage the videos and analyse datasets made from them. NVivo 8 became available in late March 2008, part-way through our videoing. The publicity information about the program on QSR International's website was alluring:

Videos. Interview recordings. Documents. Photos. Media clips. Music. Podcasts.
Whatever your materials, whatever your project, whatever your background – Nvivo 8's superior technology lets you explore, analyse and glean insight from your information like never before.

If you need to handle very rich information, where deep levels of analysis on both small and large volumes of data are required, NVivo 8 is your solution. (QSR Website 18th July 2008 [1])

We purchased the software, completed the training and began importing some of the many video files we had accumulated. To our dismay, we found that most of the files could not be imported into the software. After days of frustration we discovered that NVivo 8 could only import video files that were smaller than 2 GB [2]. We overcame this problem by splitting the large files into a number of smaller sub-files that NVivo 8 could accommodate and by experimenting with other software to compress our large videos into smaller, more-manageable files [3]. Once this was done, we could use the impressive array of tools offered by NVivo 8 to select our data from the unedited videos, code them and develop an elaborate system of nodes in which we stored our video clips. Despite this breakthrough, the technological limitation of file size still proved to be an inconvenience in having to move between numerous files and in the associated breaks in coding continuity.

Reporting these technical difficulties illustrates that even skilled and experienced qualitative researchers need to learn new things very quickly if they are to harness and manage the potential of emerging technologies and associated software. All of our theoretically-driven good intentions propelled us into uncharted territory in which we had to learn “on the run” if we were to achieve our goals.

Conclusion

For decades, researchers have sought to identify the ingredients of classroom life so that teachers can be more knowledgeable and better-prepared in their core role of classroom leadership. Most of this research relied on fairly intrusive methods of observation and directed recording of specific, usually pre-determined aspects of classroom life. These approaches had a strong potential to influence the natural setting of the classroom. They also risked misrepresenting the authenticity of classroom life by reducing the capture and portrayal of highly complex interactions to a limited number of factors affecting particular outcomes. The ability to develop more authentic and organic insights into classroom life has been bolstered by developments in digital technologies and compatible software.

In this paper we have described the experiences of using digital video technology and associated software to create authentic, qualitative data gathered from six primary classrooms. In terms of our core research project, despite the challenges and hurdles that we have encountered, we are convinced that the use of such technologies offers researchers new tools to create authentic datasets on classroom management. We are also excited by the unanticipated bonus of realising just how much more information can be made available to researchers through the use of a technological ‘one eye’ that sees and records far beyond the limitations of two human eyes. The potential for digital technologies to enrich qualitative research and provide opportunities for researchers to contribute new knowledge has become clear.

Acknowledgements

This research was supported by grants from Catholic Education South Australia, the Hawke Research Institute, the Division of Education, Arts and Social Sciences, and the School of Education, University of South Australia. An earlier report on this project was presented at the Australian Teacher Education Association Conference, Mooloolaba, Queensland, Australia, July 2008.

Endnotes

- [1] http://www.qsrinternational.com//products_nvivo.aspx
- [2] This information was not available in any of the NVivo 8 manuals or in its otherwise comprehensive help system. We arrived at this conclusion by trial and error by attempting to import different sized files until we succeeded with files under 2 GB.
- [3] Video compression, like data compression, is a tradeoff between disk space, video quality and the cost of hardware required to decompress the video in a reasonable time. However, if the video is overcompressed in a lossy manner, visible (and sometimes distracting) artifacts can appear.' Retrieved 19 July 2008 from http://en.wikipedia.org/wiki/Video_compression

References

- Baker, W. D., & Green, J. L. (2007). Limits to certainty in interpreting video data: Interactional ethnography and disciplinary knowledge. *Pedagogies: An International Journal*, 2(3), 191-204.
- Baker, W. D., Green, J. L. & Skukauskaite, (2008). Video-enabled ethnographic research: A microethnographic perspective. In G. Walford (Ed.), *How do you do educational ethnography?* Tufnell Press: London (pp.76-114).
- Bennett, T., & Watson D. (Eds.). (2002). *Understanding everyday life*. Oxford: Blackwell Publishing.
- Brophy, J. (2006). History of research on classroom management. In C. M. Evertson & C. S. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary issues* (pp. 17-43). Mahwah, NJ: Lawrence Erlbaum Associates.
- Derry, S. J., Hickey, D., & Koschmann, T. (2007). Ethical concerns in video data collection. In S.J. Derry (Ed.), *Guidelines for video research in education: Recommendations from an expert panel*. Chicago: Data Research and Development Centre at the University of Chicago.
- Erickson, F. (2006). Going for the zone: The social and cognitive ecology of student-teacher interaction in classroom observations. In D. Hicks (Ed.), *Discourse, learning, and schooling*. New York: Cambridge University Press.
- Erickson, F. (2007). Ways of seeing video: Toward a phenomenology of viewing minimally edited footage. In R. Goldman, R. Rea, B. Barron & S. Derry (Eds.), *Video research in the learning sciences*. Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers.
- Good, T., & Brophy, J. (2003). *Looking in classrooms* (9th ed.). Boston: Pearson Education.

- Hickey, D., & Schafer, N. (2006). Design-based, participation-centered approaches to classroom management. In C. M. Evertson & C. S. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary issues* (pp. 17–43). Mahwah, NJ: Lawrence Erlbaum Associates.
- Hook, C. (1981). *Studying classrooms*. Burwood, Vic: Deakin University Press.
- Howe, E. R. (2006). Exemplary teacher induction: An international review. *Educational Philosophy & Theory*, 38(3), 287–297.
- Jackson, P. W. (1968). *Life in classrooms*. New York; Holt, Rinehart & Winston
- Kounin, J. S. (1970). *Discipline and group management in classrooms*. New York: Holt, Reinhart and Winston, Inc.
- Leininger, M. (1985). *Qualitative research methods in nursing*. Orlando, Florida: Grune & Stratton.
- Otty, N. (1972). *Learner-teacher*. Harmondsworth: Penguin.
- Patton, M. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.
- QSR (2008). NVivo 8 research software for analysis and insight. [viewed 18 July 2008, verified 29 April 2009] http://www.qsrinternational.com/products_nvivo.aspx
- Richards, L. (2005). *Handling qualitative data: A practical guide*. London: Sage Publications.
- Sachs, J., & Mellor, L. (2005). 'Child panic', risk and child protection: An examination of policies from New South Wales and Queensland. *Journal of Education Policy*, 20(2), 125–140.
- Tobin, K. (2006). Qualitative research in classrooms: Pushing the boundaries of theory and methodology. In K. Tobin & J. Kincheloe (Eds.), *Doing educational research*. Rotterdam: Sense Publishers.
- Watson, D. (2002). "Home from home": The pub and everyday life. In T. Bennett & D. Watson (Eds.), *Understanding everyday life*. Oxford: Blackwell Publishing.

Appendix A: typical camera location**Appendix B: typical view from a camera**

Appendix C: The size benefit of digital technology



Professor Bruce Johnson is a Professor of Education at the University of South Australia. His current research interests include human resilience, classroom management and school change.

Email: bruce.johnson@unisa.edu.au

Dr Anna Sullivan is an Adjunct Research Fellow at the University of South Australia. Her current research interests include early career teachers, pedagogy and classroom management.

Email: anna.sullivan@unisa.edu.au

David Williams is a Senior Lecturer in Education at the University of South Australia. His current research interests include classroom management, teachers' careers and teacher-education.

Email: david.williams@unisa.edu.au