

Can video with professional conversations improve teacher education?

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Abstract

Top of the Class, the recent House of Representatives Report of the Inquiry into Teacher Education has reinforced the importance of good practice and the value of the practical dimension of teaching as part of universities' higher education teacher education programs. At the same time, in Australia and in countries in which off-shore teacher education programs are conducted, there are three other concurrent concerns:

1. the shortage of science, maths and literacy teachers and teacher educators;
2. the integration of ICT into teaching and learning in schools and higher education; and
3. the availability of schools and high quality teachers in which pre-service teachers can undertake their practicum.

Underpinning quality teacher education in any subject is the ability of the lecturers to develop in their students, knowledge and understandings of the relationships that exist between curriculum, teaching and learning, assessment and reporting. Demonstrating the links between these respective activities however, is a complex classroom task. Being able to see the links in practice helps to understand the inter-relationships between these concepts. This paper outlines how video case studies of exemplary teaching practice linked with professional conversations could be used to improve the quality of university teacher education.

Introduction

It is my contention that in Australia, little use of easily available technologies such as digital video is incorporated into teacher education to provide students with examples of exemplary practice to support their practicum component. I also contend that in Australia, too little use is made of conversations by student teachers with beginning teachers, school leaders and teacher educators for the express purpose of ongoing professional growth and development. Yet as educators we promote the long-held view of the importance of modeling good practice (Perkins 1851/2007), and we know that people learn when they discuss the things they see and do, and clarify the issues that puzzle them (Denzin & Lincoln 2005; Ngeow & Yoon-San 2003). At the same time, the mantra of 'quality' has entered the Australian lexicon, and concurrently, developing countries, particularly Australia's near neighbours are looking here for the provision of teacher education courses to contribute to their developing productivity (cf AusAid 2007; United Nations Educational, Scientific and Cultural Organization (UNESCO) 2005).

I use this paper to address my contentions and to outline some strategies in pre-service teacher education that, with video case studies, could address and amplify the importance of good practice and the value of the practical dimension of teaching as part of teacher education programs. That is, this paper provides an overview of how video data of exemplary practitioners could be used to assist in pre-service teacher education and especially the practicum. It is argued that video case studies, both developed and used in conjunction with professional conversations could present structured opportunities for pre-service teachers to gain an understanding of what exemplary teaching 'looks like'; and to reflect on their own practices and beliefs about what they understand constitutes high quality educational practices.

The concept of quality

The concept of 'quality' in education has entered the language not only in Australia, but it is a phenomenon that has emerged globally. During the 32nd Session of UNESCO's General Conference in 2003 for example, Ministers of Education from over 100 countries participated in a roundtable discussion to reflect on and plan for strategies that would steer their education systems towards better quality (UNESCO 2005). But what do we mean by 'quality' in education?

The concept of 'quality' is problematic, but not something naturally argued against. UNESCO proposes that 'quality' in education ought to be seen in light of how a society defines the purposes of education (UNESCO 2005). In Australia, the purposes of school education are outlined in the Ministerial policy, the *Adelaide Declaration on National Goals of Schooling in the 21st Century*. This statement indicates that 'quality schools' are central to achieving the National Goals.

Australia's future depends upon each citizen having the necessary knowledge, understanding, skills and values for a productive and rewarding life in an educated, just and open society. High quality schooling is central to achieving this vision (Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) 1999: Preamble).

What both the UNESCO position and the Australian national school education policy demonstrate is that concepts of 'quality' are socially constructed. That is, people construct their own views of 'quality' based upon what they understand by that term. As such, what one person or group considers 'of quality' may not be matched by another person or group. But because concepts of 'quality' are socially constructed values and what is considered valuable are bounded up in notions of quality. Hence it is likely that what constitutes 'quality' in education is going to be contested. If concepts of 'quality' are viewed in the light of a society's articulated purposes of education however, we may be able to begin to establish some definitional mechanisms for making judgments about 'quality' in education. In other words, we may begin to establish when we know we are seeing 'quality' and therefore be able to show pre-service teachers what they are looking for, and perhaps to what they can aspire.

Views about what is intended by a 'quality education' are often debated in the media. One of the ways of identifying popular definitions of 'quality in education' is to read newspapers. Unfortunately though, too often binary, reductive and/or deficit views of quality in education are presented. And to simply rely on binary and deficit views of quality that show up in newspapers, suggesting that what is happening in schools and the work of teachers is 'no good', is not a satisfactory definitional approach. Nor are suggestions that nirvana would reign in schools if we just went back to the 1980's. What is an important capability however, is the ability to recognise when something is of quality and is worthwhile. And this brings us back full circle to the question 'but how do we know or recognise educational quality?'

Some government reports have addressed questions concerning 'what constitutes quality in education' (cf Committee for the Review of Teaching and Teacher Education 2003; The Allen Consulting Group 2004). Concepts of quality in education are often defined according to the characteristics that contribute to a quality education rather than having a definition of 'quality education' per se. As such, concepts of quality in education tend to be subjective rather than objective. Indeed, it would seem that definitions of 'quality' are dependent upon several factors: context, the criteria applied to 'quality' in that context; and whether it is possible to identify something as intrinsically 'of quality'. It is often argued for example, that quality teachers do make a difference to students' learning (Hattie 2003; Wenglinsky 2001). And we do know that the leadership of a school, particularly by the principal is fundamental to both teachers and students achieving high quality outcomes (Bennett, Newton, Wise, Woods & Economou 2003). That is, the 'components' of a quality education include teachers and school leaders.

In Australia, concepts of 'quality' are pervading the higher education sector. The Research Quality Framework (RQF) is being introduced to measure 'research quality'. It uses the concept of 'quality' as its central plank. For measurement purposes, judgments about the quality of a piece of research include judgments about 'research impact' (Australian Research Council (ARC) 2005). A challenge however, is to design and apply generic criteria that straddle the breadth of research activity and that measure the impact of that research. Over the past decade the concept of 'quality' has also underpinned a major national initiative aimed at improving the quality of teachers: the Australian Government Quality Teacher Programme (AGQTP) (Department of Education, Science and Training (DEST) 2007). This Programme also funds Teaching Australia: the Institute for Quality Teaching and School Leadership. Unfortunately neither the AGQTP website nor the Teaching Australia website provide an easily available, simply articulated statement about what is intended by 'quality': it is assumed we all know. But it would appear, judging by these government websites that while explicit statements about 'quality' are missing, implicitly, 'quality' teachers and school leaders in this Australian policy context, are considered as central to a high quality education system.

Given the complexities of interpreting the concepts of 'quality' and 'impact' of educational practices including research, of which neither concept is either arbitrary or objective, measurements of 'quality' and 'impact' of education activities are also going to be subjective, and for many, subjectivity is seen to be problematic. Visual images of 'quality' practices and outcomes linked to structured, professional conversations then may have the potential to assist in identifying and clarifying concepts of 'quality' and 'impact' not only among education researchers but among pre-service and practicing teachers and teacher educators.

Pre-service teacher education

Top of the class (2007), the report of the review into teacher education by the Australian Parliament's House of Representatives Standing Committee on Education and Training argues that the quality of teaching is the most important factor influencing student achievement (House of Representatives Standing Committee on Education and Training 2007). The Report reinforces the importance of good practice and the value of the practicum: the practical dimension of teaching. Indeed, the practicum is considered a major component of teacher education programs, and the experiences gained from it are regarded as central to preparing pre-service teachers for the world of the classroom (Keogh, Dole & Hudson 2006).

While highlighting the importance of the practicum in teacher education, *Top of the Class* identifies the following current flaws with Australian teacher education in relation

to the practicum. There is

- *a lack of investment in building the partnerships that would help bridge the gap between theory and practice, particularly for practicum; ... and*
- *inadequate funding of teacher education, particularly for practicum* (House of Representatives Standing Committee on Education and Training 2007: xxi).

Alongside of the report *Top of the Class*, Australian and overseas reports record both the importance of teachers, and a shortage in the supply of teachers, particularly in the key fields of science, maths and literacy education (cf Department of Education and Training (DET) Western Australia (WA) 2006; Organisation for Economic Co-operation and Development (OECD) 2006, 2005, 2002; UNESCO 2005). In the USA there is a reported 'crisis' in the lack of science and maths teachers, with newspaper headlines such as *Lack of math, science teachers prompts U.S. alarm*. This article in *USA Today* stated:

The lack of certified science and math teachers is a growing quandary for schools around the nation, particularly those in poor neighborhoods. Lawmakers in Washington are proposing to spend billions over the next several years to encourage more teachers to enter those subject fields (King 2006: 1).

Similarly, in the United Kingdom there is concern about the nature and quality of science education and the lack of specialist science teachers:

Britain is in danger of running out of scientists because of flaws in its secondary education system, business leaders warn today (Smithers 2006: 1).

While these claims are often contested, similar headlines and reports can be sourced around the world: in both developed and developing nations (cf UNESCO 2002). While the alarmist views sometimes reported in newspapers about the quality of teacher education do not justify in themselves, the rethinking of teacher education practices, the potential to use video case studies of exemplary teachers to assist in the education of teachers (both practising and pre-service) may have a place, particularly in building the partnerships between the education industry sector and universities, and may assist pre-service teachers if incorporated into units studied prior to going on practicum. Indeed, arguably one of the features of teacher education during the 20th century in Australia was the Demonstration School. These schools were usually staffed by excellent teachers. Pre-service teachers would attend the schools to observe quality teaching. Since the concept of Demonstration Schools is no longer a formalised approach in today's pre-service teacher education programs, there is value in using technologies to record, show and deconstruct quality education practices.

Characteristics of digital video materials

Digital video materials are constructed with video data. Here, video data is understood to mean visual information recorded on digital video that can be replayed on televisions and computers. Video data can include video case studies, where the case studies comprise video data that has been collected ethically and systematically to outline the narrative of the case study, and which is presented visually for analysis.

Video data offers education a number of characteristics that are of benefit to pre-service teacher education. Classrooms are complex places and video records complex data. Short video clips can allow for close examination of personal interactions. Video enables

'outsiders' to view the rich fabric of a classroom environment: the dialogue, actions, emotion, gestures, nuances and body language (Risko 1991). That is, the video case studies can be used by teacher educators for a guided, non-linear, and multi-dimensional analysis of classroom dynamics. Video case studies can be viewed multiple times from various perspectives, over and over again (Brophy 2004). They can be slowed down or stopped so that discussion around an issue can be developed, and they can be deconstructed and analysed with ease. Their format enables viewers to make detailed examinations of the processes of teaching and learning from multiple perspectives. The roles of the teachers and students and how the physical environment may impact on those roles, for example, can be examined.

Viewing video case studies may also reveal alternatives through comparative analysis and stimulate discussions about choices related to teaching and learning (Hollingworth 2006). They provide the potential for pre-service teachers to examine the same lesson from different teacher roles and perspectives and can be used to demonstrate how authentic learning activities may be built into classroom activities. Video case studies provide opportunities for pre-service teachers to identify the situations and contexts they are likely to or have encountered, and/or with which they have some affinity. Thoughtfully made, video case studies may also enhance the relationship between theory and practice for both lecturers and pre-service teachers.

Another imperative for including video case studies in Australian pre-service teacher education is that there is a considerable amount of self-directed digital video material for use with students and for teachers' ongoing professional development. Much of this material is freely available via the Internet. In Australia for example, many millions of dollars of government funding is being used to create multimedia resources for students' use. These materials are being developed by *The Le@rning Federation*, which is managed by the Curriculum Corporation (Curriculum Corporation 2007). Less emphasis is placed in Australia on the use of video data for teachers' professional learning where there is an emphasis on analysing the teaching and learning practices of classroom teachers, but materials are available from overseas via the Web.

In the United Kingdom (UK), the portal *CurriculumOnline*, funded by the UK Department for Education and Skills (DfES) provides a selection of video case studies about teaching and learning in the key areas of the curriculum from reception to Year 12. *CurriculumOnline* is considered by the UK government as central to the drive to change teaching and learning in schools (DfES 2007). The US-based repository *MERLOT* (Multimedia Online Resource for Learning and Online Teaching) provides a searchable collection of peer reviewed, higher education, online learning materials including video materials that are created by registered members. Educators and students from around the world share their materials via an online multimedia database. In New Zealand there is a focus on video case studies to highlight exemplary pedagogy. The New Zealand Ministry of Education includes 'digital stories' as part of its professional learning websites: *TKI – Online Learning Website* and *Leadspace*, the online learning space supporting school leaders in New Zealand. Learning how to use these materials in meaningful, self-directed ways once in the teaching workforce, is a capability in which beginning teachers require support.

A third imperative for including video case studies into pre-service teacher education relates to guiding pre-service teachers in critical analysis of teaching and learning: supporting them to be able to analyse video data of the processes of teaching; and enabling them to be able to critically examine the links between curriculum, teaching and learning, assessment and reporting. Video taping of classroom data was included into the international testing and reporting program: the 1999 Third International

Mathematics and Science Study (TIMSS). The video component called the *Teaching Mathematics in Seven Countries 1999 Video Study* (National Center for Educational Statistics (NCES) 2003) set out to investigate and describe teaching practices in year 8 mathematics and science in a variety of countries. It was a supplement to the TIMSS 1999 student assessment program (NCES 2003). The TIMSS 1999 video study involved the recording, coding and analysis of over 1000 mathematics lessons in seven countries (Hollingworth 2006). The video data collected through this program is unfortunately dating and it is time to revisit the concept of using video data to enrich testing regimes and to assist teachers in envisaging the standards their students are expected to achieve.

Given that in Australia, there is a policy emphasis on using technologies for the provision of professional learning by practising teachers, pre-service teachers require capacity building in strategies for undertaking ongoing professional learning, both with video case studies that focus on pedagogy and with the multimedia student materials being developed in Australia and overseas. Commencing the capacity-building with pre-service teachers prior to the practicum would foster the development of these capabilities.

Current research and practice

A variety of research and professional development projects have made use of video data, but relatively little systematic work has been undertaken concerning its applicability for assisting in the identification of quality educational practices for improving the effectiveness of teaching and learning in higher education. While video technology has been around for some decades, knowledge and understanding is still in its infancy about collecting and using video data (Hollingworth 2006) for improving teaching and learning. A few studies have used video case study methods in teacher preparation. These studies focused on topics including teaching reading (Risko 1991), classroom communication skills (Olson 1994), teaching science (George & Abell, 2002; Wallace, Loudon & Groves 2003), and teaching physical education (Tannehill, O'Sullivan, Stroot & Livingston 1991).

Video case studies were used in a research study at Edith Cowan University funded by DEST under the Grants for National Literacy and numeracy Strategies and Projects Program called *In teachers' hands: effective literacy teaching practices in the early years of schooling* (Loudon, Rohl, Meiers, Cairney, Rivalland & Barratt-Pugh 2005). In 2003-04 the Edith Cowan University School of Education used video in a pre-service teacher education unit to create links between face-to-face lecturing and tutorials; the practicum and online learning opportunities. And Professor David Clarke at Melbourne University is undertaking an international video case study research project called the *Learner's Perspective Study*: a study of well-taught mathematics classrooms, which is now being undertaken in over fifteen countries (Clarke 2007). The original project sought to document the practices in the classrooms of competent mathematics teachers; to identify the meanings the participants held for those practices; and the meanings that arose from these practices (Clarke nd).

It is apparent from this brief summary of current research, that the major studies in Australia to date have focused on video data in maths and literacy, with a lesser amount of work being undertaken in science. There is room though for more research and development about the use of video data in pre-service teacher education to assist in presenting models of exemplary practices in teaching across the full spectrum of curriculum areas and to address specific issues within the curriculum and in teaching and learning (eg classroom strategies for multi-age groups or the integration of

technologies into teaching and learning). Such approaches however, are dependent upon pre-service teachers developing and being able to articulate understandings about what constitutes exemplary teaching and learning in any given subject area. Thus the use of video data in pre-service teacher education has to be underpinned with processes linking theory with practice.

Including video data in pre-service teacher education

One of the main issues of pre-service teachers entering the practicum is to understand the expectations of them as practicing teachers (Keogh, Dole & Hudson 2006). Technologies such as video are easily available and can be incorporated into teacher education, for example, to support the practicum component. Structuring into pre-service teacher education the development and viewing of video case studies of exemplary teachers so that the use of these video case studies is accompanied with opportunities for conversations, could assist pre-service teachers learn their profession. These conversations could be constructed for the express purpose of fostering analysis and reflection of what constitutes 'good teaching', and could occur with student teachers discussing issues with beginning teachers, school leaders and teacher educators in order to facilitate the development of multiple perspectives to the processes of teaching and learning.

Conversation is a basic form of human interaction (Kvale 1996), and one of the ways in which learning can be encapsulated.

Language provides the means for objectifying new experiences, allowing their incorporation into the already existing stock of knowledge (Berger and Luckman 1979: 86).

Conversations are speech events where the purpose is focused upon the notion of transaction or exchange (cf Bruner, J. 1986; Mishler 1993). The phrase 'professional conversations' has been adopted from the work of Gadamar, where he defined conversations as the processes of people understanding each other (Gadamar 1975). Professional conversations can be considered as conversations where discussions occur on mutually agreed topics or themes, at predetermined times. Professional conversations have a purpose and go beyond the spontaneous interchange of views that characterise everyday conversations.

It is through conversations that those involved may develop new understandings or insights (Kvale 1996). Meaningful professional conversations between pre-service teachers, their lecturers and with the teachers who will supervise practica, offer opportunities for critical examination of practice and thoughtful investigation of theoretical models about pedagogy. To incorporate structured professional conversations into pre-service teacher education however, requires lecturers to construct circumstances and facilitate conversations that allow meaningful dialogue to occur between naive and experienced educators. Conversations that are aimed at interpreting video case studies, places an emphasis on lecturers, pre-service and practising teachers to listen to each other about how respectively, they construct and explain their classroom practices and their experiences of their worlds. Listening is an important skill for interpreting meaning from both the video case studies and the professional conversations, and is therefore also an important skill to develop for use in the classroom.

It is argued here then, that programs for pre-service teachers could be designed to include video case studies accompanied by structured professional conversations to

guide new and novice teachers through the process of examining methods for teaching in the 21st century. I have argued that this could be achieved by

- developing pre-service teachers' abilities in learning how to use these materials in meaningful, self-directed ways;
- developing their ability to analyse, and as a appropriate model exemplary classroom teaching practices; and
- fostering their ability to analyse classroom video data in order to examine the links between curriculum, teaching and learning, assessment and reporting.

Some issues

While video data offers considerable potential to pre-service teacher education there are policy, research and development and practice issues that have to be taken into account.

At a policy level, recognition by funding agencies that video data has a place in higher education teaching and learning is required. Australia is lagging behind other similar nations in its' use of video data to assist teaching and learning, including in the higher education sector. There is limited Australian research, or development and deployment of video case studies to assist pre-service teachers. Although, there is interest at state and territory government levels in Australia in video case studies and their role in teachers' professional learning, this is, for the most part, not matched in the higher education sector. Yet here is a place where collaboration between the 'education industry' and the university sector, consistent with the recommendations of *Top of the Class*, could occur. There is a role here too for organisations such as the Carrick Institute of Teaching and Learning in Higher Education and Teaching Australia to support the development and inclusion of video case studies into pre-service teacher education courses.

There are also practical and logistical challenges in developing video case studies for use in pre-service teacher education. Video case studies of a sufficient quality to engage professional conversations have to be produced technically to a level that allows them to be deconstructed and analysed. The technical challenges of producing high quality digital video recordings of exemplary classroom practices include the cost, time, quality of the video and sound, ethics, copyright release, and the choice of which technologies to use in developing them. Hollingworth (2006) argues that more research is required about the methodologies to be used to collect, store, retrieve, code, navigate and analyse classroom video data.

Research is also required to inform theory and practice about the nature and value of video case studies in pre-service teacher education. Types of research required include:

- What visual characteristics constitute an exemplary teacher?
- What are the design features of a instructional package that includes video case studies, targeted for use with pre-service teachers that focuses on supporting the practicum component of their study?
- How effective are video case studies in supporting improvements in teaching and learning of pre-service teachers?
- How can changes in perspectives related to the teacher's role, student's role, and learning environment of a classroom be revealed in video case studies?
- What are the nature of the observations made of video case studies about teaching and learning in school classrooms, and what do they tell us?

One way of addressing some of these research questions would be to establish action research projects around Australia in which video case studies are developed by the Universities involved in collaboration with their respective Departments of Education.

These video case studies could be developed in collaboration with the academics and local teachers, and developed for use in pre-service teacher education courses. Establishing projects in each state and territory would enable the rapid development of several authentic, curriculum specific video case studies that could then be shared across Australia. These projects could then be evaluated to determine whether the approach improves the quality of pre-service teacher education, especially in relation to the practical dimension of teaching. If such a project was done sensitively and well, it could also provide video case studies of exemplary teaching that could also be used in off-shore programs or in ongoing professional learning of teachers.

Conclusion

I commenced this paper making two contentions:

1. Too little use of easily available technologies such as video are incorporated into pre-service teacher education programs; and
2. Too little use of conversations between pre-service teachers, practising teachers and school leaders occurs as part of pre-service teacher education.

To address these contentions I have outlined a case for developing and including into pre-service teacher education, video case studies of exemplary classroom practices, explicitly linked with professional conversations about what constitutes 'exemplary teaching'. I have argued that linking video case studies with professional conversations has the potential to improve the quality of teacher education, particularly in relation to the practicum. I have therefore proposed the inclusion of an analysis of video case studies occur prior to students undertaking their practicum component of their study. Viewing and discussing such video case studies prior to undertaking their practicum, may mean that pre-service teachers gain an improved practicum experience.

I have also argued here that a deeper visual representation of exemplary practice by teachers, and a deeper level of understanding about teacher expertise is required. The place of conversations in achieving these deeper understandings and in learning to become a teacher cannot be over-estimated. Discussions about the things teachers do helps new teachers to clarify issues and to determine personal positions on perplexing issues. Furthermore, the importance of modelling good or high quality practices has been well established in teacher education. It follows then, that in addition to practical teaching opportunities, technologies such as digital video could enable the recording of 'quality practices' for pre-service teachers to analyse, and if appropriate, emulate. This approach is not to suggest that video case studies ought to be used as 'recipes' for teaching, but rather to argue that video case studies of exemplary teachers viewed critically and analytically by pre-service teachers, could provide concrete examples of what 'quality teaching' looks like.

There is however, also the necessity for systematic research to investigate how video case studies and professional conversations might improve teacher education. Such research requires making the links between the body of work already undertaken concerning exemplary teaching practices, with research about how video can be incorporated into pre-service teacher education pedagogies. Given that it was argued earlier that concepts of 'educational quality' are subjective rather objective, then it follows that such research would also be subjective. But that is the nature of 'quality in education'; it is a subjective topic and hence the necessity of using video images linked with professional conversations to assist educators to clarify 'what does exemplary teaching look like?'

References

AusAid (2007). *Better Education: A Policy for Australian Development Assistance in Education*, Ausaid

http://www.ausaid.gov.au/publications/pubout.cfm?Id=7331_3301_1176_5126_9027

[retrieved 30 May 2007]

Australian Research Council (ARC). (2005). *Assessing Research impact in the RQF*, ARC support paper, ARC,

http://www.arc.gov.au/pdf/Assessing_research_impact_in_the_RQF_ARC_web_version.pdf

[retrieved 30 May 2007]

Bennett, N., Newton, W., Wise, C., Woods, P. & Economou, A. (2003). *The role and purpose of middle leaders in school*, National College of School Leaders (NCSL)

<http://www.ncsl.org.uk/media/7B6/9B/role-and-purpose-of-middle-leaders-in-schools.pdf>

[retrieved 30 May 2007]

Berger, P. & Luckmann, T. (1979). *The social construction of reality. A treatise in the sociology of knowledge*. Great Britain: Peregrine Books

Brophy, J. (Ed.) (2004). *Using video in teacher education*. The Netherlands: Elsevier

Bruner, E. (1986). *The anthropology of experience*. Illinois: University of Illinois Press.

Clarke, D. (2007). *Professor David Clarke*, University of Melbourne,

<http://extranet.edfac.unimelb.edu.au/DSME/lps/DC/> [retrieved 30 May 2007]

Clarke, D. (nd). *International Perspectives on issues in Teacher Education, The Learner's Perspective*,

http://extranet.edfac.unimelb.edu.au/DSME/lps/assets/LPS_Static_Powerpoint.ppt [retrieved 30 May 2007]

Committee for the Review of Teaching and Teacher Education. (2003). *Australia's Teachers: Australia's Future – Advancing Innovation, Science, Technology and Mathematics*. Canberra Australia

http://www.dest.gov.au/schools/teachingreview/documents/Agenda_for_Action.pdf

[accessed 2005, May 16]

Curriculum Corporation (2007). *The Learning Federation*, Curriculum Corporation

<http://www.thelearningfederation.edu.au/tlf2/> [retrieved 30 May 2007]

Denzin, N. & Lincoln, Y. (2005). *The SAGE handbook of qualitative research*, SAGE Publications Thousand Oaks, USA

Department for Education and Skills (DfES) (2007). *CurriculumOnline*

<http://www.curriculumonline.gov.uk/CaseStudies/casestudygeneric.htm> [retrieved 30 May 2007]

Department of Education, Science and Training (DEST) (2007). Australian Government Quality Teacher Programme, DEST, <http://www.qualityteaching.dest.gov.au/> [retrieved 30 May 2007]

Department of Education and Training (DET) Western Australia (WA) (2006). Literacy and numeracy review, final report,

<http://www.literacyandnumeracyreview.det.wa.edu.au/final-report/> [retrieved 30 May 2007]

- Gadamer, H. (1975). *Truth and method*. London: Sheed & Ward.
- George, M., & Abell, S. (2002). 'Teaching science the right way', in D. J. Tippins, T.R. Koballa, Jr., and B. D. Payne (Eds.). *Learning from cases: Unraveling the complexities of elementary science teaching* (pp. 191-194). Boston: Allyn and Bacon.
- Hattie, J. (2003). 'Teachers Make a Difference: What is the research evidence?' *Building teacher quality*, Annual conference, Australian Council for Research in Education (ACER), October, http://www.visionschools.co.nz/assets/documents/john_hattie.PDF [retrieved 30 May 2007]
- Hollingworth, H. (2006). Learning about teaching – using video, *Professional educator*, Vol. 5, No 2, May pp30-34
- House of Representatives Standing Committee on Education and Training (2007). *Top of the class*, The Parliament of the Commonwealth of Australia, <http://www.aph.gov.au/house/committee/evt/teachereduc/report.htm> [retrieved 30 May 2007]
- Keogh, J., Dole, S., & Hudson, E. (2006). Supervisor or mentor? Questioning the quality of pre-service teacher practicum experiences, *Australian Association for Research in Education (AARE) Annual Conference*, November, AARE, <http://www.aare.edu.au/06pap/keo06101.pdf> [retrieved 31 May 2007]
- King, L. (2006). Lack of math, science teachers prompts U.S. alarm, *USA Today*, Gannett News Service, http://www.usatoday.com/tech/science/2006-01-29-teacher-shortage_x.htm [retrieved 30 May 2007]
- Kvale, S. (1996). *InterViews. An introduction to qualitative research interviewing*. Thousand Oaks, London & New Delhi: SAGE Publications.
- Louden, W., Rohl, M., Meiers, M., Cairney, T., Rivalland, J., & Barratt-Pugh, C. (2005). *In Teachers' Hands: Effective Literacy in the Early Years of Schooling*. Canberra: Department of Education, Science and Training.
- Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) (1999). *Adelaide Declaration on National Goals of Schooling in the 21st Century*, Curriculum Corporation, <http://www.mceetya.edu.au/mceetya/nationalgoals/natgoals.htm> [retrieved 30 May 2007]
- Mishler, E. (1993). *Research Interviewing. Context and narrative*. USA: Harvard University Press.
- National Center for Educational Statistics (NCES) (2003). *Teaching Mathematics in Seven Countries. Results from the TIMSS 1999 Video Study*, US Department of Education, Institute of Education Sciences, <http://nces.ed.gov/pubs2003/2003013.pdf> [retrieved 30 May 2007]
- Ngeow K. & Yoon-San, K. (2003). *Learning through Discussion: Designing Tasks for Critical Inquiry and Reflective Learning*. ERIC Digest, ED477611 2003-12-00
- Olson, J. S. (1994). 'Development of a videodisc simulation to teach communication skills', in J. Willis, B. Robin, & D.A. Willis (Eds). *Technology and teacher education annual, 1994*. Charlottesville, VT: Association for the Advancement of Computing in Education, pp. 314-316.
- Organisation for Economic Co-operation and Development (OECD) (2006). *Evolution of Student Interest in Science and Technology Studies, Policy Report*, Paris, OECD, <http://www.oecd.org/dataoecd/16/30/36645825.pdf> [retrieved 30 May 2007]

Organisation for Economic Cooperation and Development (OECD). (2005). *Teachers Matter: Attracting, developing and Retaining Effective Teachers*. Paris: OECD.

Organisation for Economic Cooperation and Development. (OECD). (2002). *Teacher Demand and Supply: Improving Teacher Quality and Addressing Teacher Shortages*, Paris, OECD <http://www.oecd.org> [retrieved 23 June 2007]

Perkins, D. (1851/2007). *Theory and Practice of Teaching*, A.S. Barnes, <http://books.google.com.au/books?id=2gQBAAAAYAAJ&dq=theory+and+practice+of+teaching+perkins&pg=PA9&ots=CnfGq4UBlq&sig=087si7DzczBGttceaVbMSoEevss&prev=http://www.google.com.au/search%3Fhl%3Den%26q%3Dtheory%2Band%2Bpractice%2Bof%2Bteaching%2Bperkins%26btnG%3DGoogle%2BSearch%26meta%3D&sa=X&oi=print&ct=title> [retrieved 30 May 2007]

Risko, V. (1991). 'Videodisc-based case methodology: A design for enhancing preservice teachers' problem-solving abilities', in B. Hayes & K. Camperell (Eds.), *Developing lifelong readers: Policies, procedures, and programs* (Vol. XI, pp. 121-136). Utah State University: American Reading Forum.

Smithers, R. (2006). Long-term threat to economy as UK runs out of scientists, CBI warns, *The Guardian*, <http://business.guardian.co.uk/story/0,,1844234,00.html> [retrieved 30 May 2007]

Tannehill, D., O'Sullivan, M., Stroot, S., & Livingston, M. (1991). 'Impact of interactive videodisc technology on preservice teachers' ability to analyze motor performance', in D. Carey, R. Carey, D. Willis, & J. Willis (Eds.), *Technology and Teacher Education Annual, 1991*(pp. 91-92). Charlottesville, VT: Association for the Advancement of Computing in Education.

The Allen Consulting Group. (2004). *National Institute for Quality Teaching and School Leadership Implementation Strategy Report*. Australia, www.allenconsult.com.au/NIQTASL [accessed 2004, September 23]

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2005). *Education for All (EFA) Monitoring Report 2005*, UNESCO, http://portal.unesco.org/education/en/ev.php-URL_ID=35313&URL_DO=DO_TOPIC&URL_SECTION=201.html [retrieved 30 May 2007]

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2002). Worldwide shortage of teachers, *Education for all by 2015*, http://portal.unesco.org/education/en/ev.php-URL_ID=8674&URL_DO=DO_TOPIC&URL_SECTION=201.html [retrieved 30 May 2007]

Wallace, J., Loudon, W. & Groves, R. (2003). *SEATS: Sharing Expertise About Teaching Science*. Perth: Curtin University of Technology.

Wenglinsky, H. (2001). *Teacher classroom practices and student performance: How schools can make a difference*. <http://www.ets.org/research/researcher/RR-01-19.html>. [retrieved 30 May 2007]