

# DIGITAL REVOLUTION OR DIGITAL DIVIDE: WILL RURAL TEACHERS GET A PIECE OF THE PROFESSIONAL DEVELOPMENT PIE?

Tania Broadley  
Curtin University, Perth, Western Australia  
[t.broadley@curtin.edu.au](mailto:t.broadley@curtin.edu.au)

*In order to sustain the rural education community, access to high quality professional development opportunities must become a priority. Teachers in rural areas face many challenges in order to access professional learning equitable to their city counterparts. In the current climate, the Federal government of Australia is committed to initiatives that support the use of ICT in education. These include initiatives such as the Digital Education Revolution, including the National Broadband Network. This “revolution” includes the committal of \$2.2 billion funding over six years from 2008 – 2013 which purports to bring substantial and meaningful change to teaching and learning in Australian schools. Of this funding, the Prime Minister (former Minister for Education), Julia Gillard, has committed \$40 million of the total budget to ICT related professional development for teachers. But how will rural teachers ensure they get a piece of the PD pie? Access to professional learning is critical and isolation from colleagues, professional associations and support structures can affect the retention of teachers and in turn affect the sustainability of rural communities. This research paper describes the findings of the first phase of a study that investigates access to professional learning from rural and remote areas of Western Australia, the efficiencies of this approach including teacher perceptions and possible opportunities for improvement through the application of technologies. A survey instrument was administered and the results from 104 principals and teachers within the Remote Teaching Service and the Country Teaching Program of the Department of Education and Training (WA) are discussed. Qualitative data was collected by semi-structured interviews and emailed questionnaires. Phase One findings highlight the principals and teachers’ perceptions of their access to professional development opportunities, professional learning communities and their use of information and communication technologies (ICT) to bridge the gap.*

## Introduction

Considerable change is occurring in secondary school classrooms in Australia, as the integration of technology aims for transformation to a ‘digital school’. The notion of an ‘education revolution’ inundated the Australian media in 2007. An ALP discussion paper in January 2007 revealed Australia’s national investment in education had fallen behind a number of our OECD counterparts (ALP, 2007). With the election of a new government in December 2007, the promise of an educational revolution aiming to invest in human capital through the education of the Australian people was presented. One initiative within the ‘education revolution’ was the National Secondary School Computer Fund, a promise to turn ‘every secondary school in Australia into a digital school within four years’ (ALP, 2007). As part of the ‘education revolution’ in a digital school a laptop would be provided for every child, along with the networking infrastructure to connect with the ‘information superhighway’ and online teaching materials relevant to the curriculum within each state. Since this initiative, Round 1 and Round 2 has occurred. In 2008, 896 schools received 116,820 computers improving the computer to student ration from 1:8 or worse to a target ratio of 1:2. In 2009, 1394 schools received 141,319 computers allowing those in the second round to also move to a ratio of 1:2.

Successful implementation of ICT and pedagogical change brings forth implications such as professional development (PD) for teachers, which must be considered. In McWilliam’s (2002) view,

the construct of professional development stems from three significant realms – health and safety, leadership and management, and information technology. These realms of professional development are recognised as a necessary process within the teaching profession, yet bring to the fore the question of implementation and sustainability, particularly in the context of rural and remote education. An extensive amount of literature suggests links between professional development and impact on pedagogy are not significant (Gore & Ladwig, 2006; Henderson, 2007; Landvog, 2005; McWilliam, 2002). Due to teacher time and access to resources, professional development is often presented within single or short sequence offerings, providing inspiration yet failing the challenge of implementation and sustained practice. McWilliam (2002) and more recently, Parr (2004) pose the argument against a bureaucratic approach to professional development where policy makers convey single-solutions to skill development. The approach from these top-down implementations included PD content closely aligned with student learning outcomes; a focus on practical skills for teachers and meeting the requirements of registration institutions (Parr, 2004). These approaches are often not truly reflective of the needs of teachers at the coalface and research shows that on return to the classroom have not informed teaching practice or improved student learning (Anderson & Henderson, 2004; Trinidad, 2004). Moving toward a model of professional learning that sustains pedagogical development will involve more than skills-based one-off ICT professional development.

The 2007 discussion paper suggested professional development would be addressed by working with state governments and universities to ensure teachers have ‘access to training that will allow them to use the technology’. This is now evident in the Digital Strategy for Teachers and School Leaders whereby “through this strategy, the Australia Government will commit \$40 million over the next two years for the professional development (PD) of teachers and school leaders in the use of ICT” (Department of Education, Employment and Workplace Relations, 2010a). Professional development is split between two phases including the ICT Proficiency Project and the ICT Innovation Fund. A limited amount of information is provided with regard to the ICT Proficiency Project, however a consultant will be employed to provide a ‘scoping study’ of self assessment and best practice to determine the steps toward ICT proficiency on a national level. The ICT Innovation Fund applications recently closed on 21<sup>st</sup> June. This will provide organisations with funding to undertake activities which “improve the capabilities of pre-service, enhance capacity of in-service teachers or drive innovation through leadership” (DEEWR, 2010b).

The literature on the DEEWR website does not offer any information about the logistics of delivering PD to the diverse geographical locations of schools and teachers in Australia. This is of great concern to those teaching professionals in rural and remote areas. It is imperative that teachers in these areas are considered within this initiative and funding is awarded on an equitable basis between metropolitan and regional based projects.

## **Background**

A plethora of literature identifies the challenges faced by teachers in rural, remote and regional areas of Australia. In 2006, the National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR) conducted a large national survey in order to understand the issues related to rural education. This survey interviewed 2940 teachers of whom 1576 were primary and 1364 were secondary science, mathematics and ICT teachers (Lyons, Cooksey, Panizzon, Parnell & Pegg, 2006). The teachers were from a wide range of geographical contexts within Australia ranging from metropolitan to regional, remote and very remote. Under the theme of professional connectedness and isolation, the findings revealed that primary school teachers reported a higher need for developing their ICT skills compared to those teaching in the secondary context. Further, those primary teachers who were more geographically isolated faced greater challenges finding relief from face-to-face teaching to access professional development and reported greater challenges with regard to financial support. This research generated a report to the Department of Education, Science and Training (DEST) from which the recommendation “that education authorities, in partnership with

schools and school communities, universities and professional organizations meet the continuing needs of teachers in rural and regional areas through a range of strategies that ensure equitable access to ongoing quality professional learning” (Lyons, Cooksey, Panizzon, Parnell & Pegg, 2006, p.xiii).

A number of states within Australia are committed to the delivery of quality public education and have engaged in significant individual and collaborative initiatives. The teacher shortage facing Western Australian schools in 2007, was the impetus for the Education Workforce Initiatives Report (2008). This report, more frequently known as the Twomey Report, stated the challenges of finding relief teachers for rural and remote locations and recommended a review of the flying squad be undertaken to cover replacements of less than four weeks in these locations. The respondents to this study largely agreed that regional schools were unique and required a different model; one submission stated: “It is inconceivable that in this day and age the participation and achievement rates for students in rural and remote Western Australia do not match that of their metropolitan counterparts. It is also inconceivable that a public strategy does not exist ... to address rural, regional and remote issues” (Education Workforce Initiatives Taskforce, 2008, p. 121). In 2010, the Department of Education and Training launched the Remote Teaching Service (RTS) Support Team. The aim of this team is to “re-invigorate” the status of the RTS, focus on sustainability through staffing interventions and support schools and staff through developing professional capacity and mentoring teacher programs. There is no direct evidence to indicate that the Twomey Report was the catalyst for this initiative, however it cannot be ruled out.

Much has been written about the use of technology to bridge the gap for regional and remote teachers (Boyd, Broadley & Terry, 2008; Broadley & Trinidad, 2009; Steketee & McNaught, 2007; Trinidad, 2007; Trinidad & Broadley, 2008). The notion of using technology to deliver professional development that is aimed to enhance the ICT capacity of in-service teachers has not been researched in depth and would need to be considered very seriously in the current context of a ‘digital education revolution’.

## **Research Context**

This study interviewed principals and surveyed teachers in regional and remote areas of Western Australia who were employed with the Department of Education and Training in 2009. The teachers were working in schools classified as part of the Country Teaching Program (CTP) and the Remote Teaching Service (RTS). Schools classified in the CTP must be located more than 35km outside the Perth metropolitan area, however many are in small, isolated and challenging communities. There are 118 schools within the CTP which employ 2491 teachers including administrators. The Remote Teaching Service (RTS) schools are some of the most isolated schools in the world. Some may be in small towns where as others are in community settings with predominantly Aboriginal populations. Most schools cater for pre-school children through to Year 10 (4-15 years of age), and some offer programs to Year 12. These schools often deliver a range of subjects through Schools of the Air and Schools of Isolated and Distance Education (SIDE). The RTS encompasses 43 schools in very remote locations and employs 341 teachers including administrators.

Both of these teaching programs offer teachers more rapid pathways to permanent employment and higher financial incentives. These programs are also marketed on their “opportunities for additional professional development”.

Due to the large expanse of the state, the Department of Education and Training has divided its schools into districts. Out of the fourteen education districts, there are seven districts employing teachers in the CTP and the RTS. Figure 1 indicates the district boundaries within the map of the state.



**FIGURE 1 – DETWA DISTRICT BOUNDARIES**

## Research Question

The study aimed to develop a framework to support professional development through the application of synchronous and asynchronous technologies. The research undertaken in Phase One investigated the current practices for teachers to access professional learning in regional and remote areas of Western Australia, the efficiencies of this approach including teacher perceptions and possible opportunities for improvement through the application of technologies.

It was anticipated that using technology could provide an environment that addresses many of the concerns identified by the literature review. As such, one of the research questions guiding the project was: *“In what ways might technology be used to support professional learning for regional and remote teachers in Western Australia?”*

In order to address this question the researcher explored the following research objectives by:

- 1) Examining the existing strategies in place to provide professional learning to regional and remote areas of Western Australia; and
- 2) Assessing regional and remote teachers’ perceptions of their access to professional learning in Western Australia.

The preliminary theoretical framework underpinning this question was community of practice theory. By applying Henderson’s (2006) Model of Community Cohesion to the blended environment of asynchronous and synchronous technologies there may be a way to gain better depth into the understanding of how teacher’s professional learning is delivered and sustained using these strategies.

## Methodology

This paper reports on the data collected using a mixed method research approach. The quantitative data reported in this paper has been analysed using SPSS. The responses for each item were described by reporting counts and percentages, and means and standard deviations where appropriate (Ho, 2007). Qualitative data collected through transcripts from interviews, observations and email

contact were coded for emerging concepts and content analysed according to the structure designed in the interview guide.

Data were collected between November 2008 and December 2009 through interviews, surveys, site visits and ongoing email contact.

Surveys (n=720) were mailed out to 50 schools in Western Australia. These schools included 37 within the Country Teaching Program (CTP) and 13 from the Remote Teaching Service (RTS). A stratified sample of these schools was selected to gain a balanced proportion of each teaching program. The survey was designed using a five point Likert scale, ranging from strongly disagree to strongly agree.

## **Results and Discussion**

Of the 720 surveys distributed to the schools, almost 15% (n=106) of teachers responded to the survey. Two of these respondents did not complete the survey, which meant 104 valid responses were received.

The respondents to the survey correlated with familiar statistics regarding gender divide in the teaching profession. The Western Australia College of Teachers (WACOT) is the registering board for all teachers in the state of Western Australia. WACOT figures showed that in 2009, 26% of its 45,000 members were male and 74 % female. The respondents from the survey in this study similarly reported 23 % male and 77% female. This exemplifies that the findings of this study were evenly reported with regard to population proportion.

In relation to rural and remote school participation, the rural respondents were employed with the CTP and the remote respondents were employed with the RTS. The data showed 67 % identified as being part of the CTP, 21 % were from the RTS and 12 % of respondents chose "Other". The choice of "Other" was of interest to the researcher, as all schools selected to be surveyed were chosen from within the two categories. Further investigation revealed that some teachers may not have been aware their employment was categorized into a program or some teachers may have been temporarily placed in the school at the time of the survey.

The respondents were employed within schools that ranged from a staff of two qualified teachers to sixty five qualified teachers, showing a large variance in staff numbers which could possibly impact on the responses of collegiality.

A large percentage of the teachers (44%) identified as being within their first five years of teaching. This data indicates that less experienced teachers working in rural and remote areas see value in professional development and are willing to provide input to the discussion in order to improve access.

Table 1 displays the participants' demographic information featuring gender, years of teaching experience and current teaching region. As can be seen from the table, all teaching regions were represented, with the largest percent (23%) being from the Pilbara district. This district is a considerable distance (1300 – 1900 kms from the metropolitan area) and the responses will be highly valuable to the data set.

Table 1:

*Demographic information detailing respondent numbers by gender, years of teaching and current teaching region.*

	Number of teachers	%
<b>Gender:</b>		
Male	24	23
Female	80	77
<b>Years of teaching:</b>		
0-5	46	44.2
6-10	12	11.5
11-15	14	12.9
16-20	14	12.9
20+	17	16.3
No response	1	
<b>Current teaching region:</b>		
Esperance District	3	2.9
Goldfields District	10	9.6
Kimberley District	9	8.7
Midlands District	20	19.2
Midwest District	17	16.3
Narrogin District	21	20.2
Pilbara District	24	23.1
N=104		

### ***Access to Professional Development (PD)***

The respondents were asked a series of questions relating to their perceptions of accessing PD from their current teaching region. These questions included themes relating to the awareness of PD available to them, impact of travelling to PD over large distances, relief teacher availability and access to funding.

As shown in Table 2, when asked if teachers believed they were provided with sufficient funding to access PD, 52.9% of respondents strongly agreed and agreed that their school provided sufficient funding. However if more funding were available, 62.5% of respondents would access more PD. The data revealed a comparative response in relation to teacher satisfaction of the amount of PD they could access, with 41.4 % responding they were satisfied and just over half of the respondents (51.6 %) that were not satisfied.

Table 2:  
*Descriptive Statistics of Access to PD*

Item	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Mean	SD
	%	%	%	%	%		
My school succeeds at notifying me of professional development that is available to me.	22.1	49.0	5.8	16.3	6.7	2.37	1.191
There are sufficient ways that I can access PD from my regional teaching location.	6.7	40.4	4.8	36.5	11.5	3.06	1.229
Travelling to face-to-face PD takes a significant amount of personal time.	62.5	30.8	1.9	4.8	0	1.49	.763
I am provided with sufficient funding from my school to access PD.	17.3	35.6	13.5	19.2	14.4	2.78	1.336
I am satisfied with the amount of PD that I can access.	8.7	32.7	6.7	40.4	11.5	3.13	1.239
The travel time to access PD face-to-face is insignificant.	5.8	3.9	5.8	31.1	53.4	4.22	1.111
There is sufficient access to relief teachers enable me to access PD.	1.9	20.2	10.6	30.8	36.5	3.80	1.194
If I had more funding I would access more PD.	30.8	31.7	26.9	7.7	2.9	2.20	1.056
An incentive based system would encourage me to access more PD.	12.6	35.0	24.3	20.4	7.8	2.76	1.150

N=104

Qualitative data collected from interviews with principals supported the respondents that were not satisfied with the amount of PD they could access:

*“Professional learning opportunities are very few and far between” (Principal U).*

*“Professional learning outside the metropolitan area is largely non-existent (Principal L).*

From the responses to this theme, it would appear that although teachers believe sufficient funding is available for PD, they would be prepared to access more PD if further funding was available.

The findings indicate that a large percentage (71.1%) of respondents were satisfied with their school’s process of notifying what PD was available, however the challenge of finding relief teachers within their regional locations impacted on their access to attend with 67.3 % indicating this. This is confirmed by the qualitative data from principal interviews:

*“We have to be selective as the cost is often huge from our budget, also we don’t have any teacher relief which has its own ramifications” (Principal U).*

Travel time to access face to face PD impacts significantly on the personal time of the teachers, as indicated by 93.3% of respondents. Further Principal U confirmed:

*“Staff will often attend professional learning during holidays if possible. I try not to encourage this too much as catching up with friends and family during breaks is essential to well being”. (Principal U)*

When asked about incentive based PD, almost half of the respondents (47.6%) agreed that they would access more PD if an incentive based system was involved. As Phase Two of this study is underway and results cannot yet be reported here, the researcher believes this could have been interpreted as financial benefit, however this is yet to be confirmed.

The value of PD being presented within their teaching regions was significant with 85.5% of respondents placing a very high or high value on this approach. This correlates with the plethora of literature reporting that every school has its own unique context, and that context needs to be considered carefully in professional development opportunities (Auh & Pegg, 2009). However, the challenge of providing PD within rural and remote locations can be the availability of quality presenters willing to travel significant distances. Interviews held with principals have highlighted the challenge of attracting quality presenters to these areas:

*“The choice of Presenter A was because I previously had some knowledge of him and he was available and willing to come outside the metropolitan area which is often a significant issue as well” (Principal E).*

This was reinforced by other principals who discussed the implications of fellow staff members and themselves providing the PD:

*“I find as principal I have provided much of the professional learning myself in my first few years here but my expertise isn’t always enough” (Principal U).*

*“In the present context, PD is quite restricted and is incumbent upon the school to PD and up skill its staff. In my context with a K-12 capacity this is a very broad ask, while I have support staff working with staff, they too need exposure and development to improve the overall school performance” (Principal L).*

### ***Professional Learning Communities and Sharing Practice***

Collegiality and sharing of practice is highly regarded by many within the teaching profession. Often teachers rely on professional development opportunities to network and create a culture of continuous professional learning. The survey data confirms this with 72.9% of respondents reporting they were part of the professional learning community within their school, 84.3 % valued PD that provided opportunities for them to share their own teaching practice with other teachers and 100% of teachers find it valuable to learn what other teachers are doing in their classroom. This data is depicted in the following table.

Table 3:  
*Descriptive Statistics of Professional Learning Communities*

Item	Strongly Agree %	Agree %	Uncertain %	Disagree %	Strongly Disagree %	Mean	SD
I am part of a professional learning community of teachers within my own school.	21.4	51.5	8.7	17.5	1.0	2.25	1.017
The PD I value includes opportunities for me to share my practice with other teachers.	25.5	58.8	6.9	7.8	1.0	2.00	.856
I find it valuable to learn what other teachers are doing in their classroom.	60.2	39.8	0	0	0	1.44	.554

N=104

The importance of attending PD with teachers from other schools was significant, with 100% of respondents selecting agree or strongly agree. 86.3% of teachers strongly agreed or agreed that attending PD outside of their school allowed them to engage in a more positive professional development experience. This challenges the literature that states professional development held within a school, based on issues to be solved within that school appear to be most beneficial (Auh & Pegg, 2009).

The qualitative data indicated that there was a concerted effort by some schools in the same town or in nearby towns to collaborate on many levels, including but not limited to professional development.

*“Obviously due to isolation it’s really important that as a principal I make sure we try and link as much as we can with the surrounding schools to look at what are the things that they are doing and how we might work together.” (Principal E2)*

*If we hadn’t had the commitment from the other two non-government schools then we wouldn’t have gone ahead with it. It would have been too big a risk. (Principal E)*

*“The three principals, we meet once a term and increasingly we’re trying to collaborate. For example the “unnamed” primary school and us have collaborated to have the training for mandatory reporting. So rather than have separate training sessions the two staff groups will come together for that training next month.” (Principal E2)*

From the data it was evident that collaborative learning and a community of learners was highly valued by principals, as a result of this the notion of an online “community of practice” was discussed:

*“I think there would be potential particularly for schools like ours that are small rural/remote schools.” (Principal E)*

*“I think that’s certainly something that I want to try and encourage through this program. Again the research says that’s how we are able to sustain good teaching and learning in our schools, through these communities of professional practice. I know that cathednet [an online discussion forum] has been a wonderful thing for people to tap into, you see many a time questions go up and then all these answers come through. it just brings everything close.” (Principal E2)*

### ***Technology to Access Professional Development***

Although many schools in the 21<sup>st</sup> century report a vision of embracing ICT into their teaching and learning practices, it is evident that many systems and sectors do not use ICT to access professional development at this time.

As depicted in Table 4, the data revealed that 70.8% of respondents reported confidence in using technology and believed they were capable of accessing online PD if required, however 73.7% also agreed that a blend of face to face and online PD is more effective than in isolation. This would indicate that the preference of most respondents was not to engage in online PD alone. As 75.8% of respondents reported they were uncertain of the effectiveness of web conferencing software such as Elluminate, Wimba, Webex or Centra7, the researcher interprets the responses to the online PD could be based on asynchronous course management systems (such as Blackboard, Moodle or Webct) or videoconferencing solutions.

Table 4:  
*Descriptive Statistics of Using Technology for PD*

Item	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Mean	SD
	%	%	%	%	%		
I am confident in using technology and am capable of accessing online PD if required.	29.1	41.7	10.7	15.5	2.9	2.21	1.117
A blend of face to face PD and online PD is more effective than in isolation.	18.4	55.3	19.4	3.9	2.9	2.17	.879
Web conferencing software (such as Elluminate, Wimba, Webex, Centra7, etc) is an effective way for teachers to access PD. *	4.0	7.1	75.8	7.1	6.1	3.04	.741

N=103 (\* N=99)

The qualitative data further implicated the ever-controversial bandwidth topic within rural and remote locations. This was a limitation to be considered as explained by Principal E:

*“Technology provides you the opportunity of doing that. If you were using technology it would want to be video conferencing at this point in time. I don’t think the online deliveries – you mentioned Elluminate before – and there’s a range of them – I don’t think that we in Australia have the bandwidth capacity to make them as good as they could be. They are used more in places like Canada that have the bandwidth asquillion times the bandwidth that we have and therefore they don’t have the issues” (Principal E).*

While Principal E2 discussed the challenge of implementing PD through a technological medium to staff who were from different generations:

*“I would say that if I had a staff of ‘y genners’ only, I would be happier to look at it being done via technology. The fact of the matter is that I don’t and I’ve got to try and get the x-ers and the boomers on board using this ICT.” (Principal E2).*

The importance of networking between teachers at professional development was highly regarded by Principal E and he was wary about how technology would replicate this:

*“I would always put a caveat on the technological delivery, about losing the human interaction, so even when technology gets better and better, I don’t think it should replace the human PD contact in all cases.”*

## Conclusion

The digital revolution is underway in schools around Australia. This paper outlines the challenges faced by teachers in regional areas with regard to accessing professional learning opportunities. It reports the findings of a study into teachers’ experiences of accessing PD, their value of learning communities and how technology might be utilised to bridge the tyranny of distance faced by many professionals living and working in rural and remote areas.

Teachers from the study believed sufficient funding is available for PD, however the challenges of accessing that PD with relation to travel and relief teachers is insurmountable. Majority of participants believed there was value in attending PD in their own region, however attending PD outside of their school allowed them to engage in a more positive professional development experience.

Many teachers indicated they were part of the professional learning community within their school, they valued PD that provided opportunities for them to share their own teaching practice with other teachers and found it valuable to share their practice between colleagues.

Although confidence in using technology to access PD was relatively high, it was evident that a blend of face to face and online PD was perceived to be more effective than using ICT in isolation.

As the federal government moves to provide \$40 million to ICT related professional development of teachers and leaders in the next two years, this study has highlighted the implications for those professionals working in rural and remote areas of Western Australia. It is time to ask the burning question of how the digital education revolution funding will enhance the ICT capacity of teachers outside of the metropolitan area.

## References

- Australian Labor Party (2007). Federal Labor's Education Revolution - A School Computer For Every Student in Years 9-12. *Media Statement 14 Nov 2007*. Retrieved 13 March, 2008 from <http://www.labor.com.au/media/1107/msloo140.php>.
- Auh, M. & Pegg, J. (2009). Improving professional learning in rural areas. Implications for teacher education practice from Australia and Korea. In *Innovation for Equity in Rural Education*. Proceedings of the International Symposium for Innovation in Rural Education ISFIRE (pp. 58-67). NSW: SIMERR, UNE.
- Boyd, D., Broadley, T. & Terry, E. (2008). Connecting with hot topics: streaming professional development to regional and remote Western Australia. In *The face of learning* (Proceedings of the annual conference of the Society for the Provision of Education in Rural Australia).
- Broadley, T. & Trinidad, S. (2009). Delivering PD in the digital present: Theory and practice. In *Education in a digital present: Enriching rural communities*. Proceedings of the annual conference of the Society for the Provision of Education in Rural Australia (pp. 59-64). Adelaide: SPERA.
- Department of Education, Employment and Workplace Relations (2010a). *Digital strategy for teachers and school leaders*. Retrieved 22 June, 2009 from <http://www.deewr.gov.au/schooling/digitaleducationrevolution/Pages/default.aspx>
- Department of Education, Employment and Workplace Relations (2010b). *ICT Innovation fund*. Retrieved 22 June, 2009 from <http://www.deewr.gov.au/Schooling/DigitalEducationRevolution/DigitalStrategyforTeachers/Pages/ICTInnovationFund.aspx>
- Department of Education and Training WA. *Education district boundaries map*. Retrieved February 1, 2010 from <http://www2.eddept.wa.edu.au/schoolprofile/district.do>
- Education Workforce Initiatives Taskforce. (2008). *Education Workforce Initiatives: Report "If you think education is expensive..."* Perth, Western Australia: Government of Western Australia.
- Henderson, M. (2007). *Sustaining online teacher professional development through community design*. *Campus-Wide Information Systems*, 24(3), 162-173.

- Henderson, M. (2006). Using community cohesion to sustain online professional development. Proceedings of the Australian Computers in Education Conference 2006. Cairns: Australian Council for Computers in Education.
- Ho, R. (2007). *Handbook of univariate and multivariate data analysis and interpretation with SPSS*. Boca Raton: Chapman and Hall.
- Landvogt J. (2005). Sharpening up PD : learning for teaching. *Teacher: The national education magazine*. (163), 6-9.
- Lyons, T., Cooksey, R., Panizzon, D., Parnell, A. & Pegg, J. (2006). *Science, ICT and Mathematics Education in Rural and Regional Australia: The SiMERR National Survey*. Canberra: DEST.
- McWilliam, E. (2002). Against professional development. *Educational Philosophy and Theory*, (34) 3, 289-299.
- Parr, G. (2004). *Teacher professionalism: Pessimism and/or possibilities?* Proceedings of the Australian Association for Research in Education (AARE) Conference. Melbourne: AARE. Retrieved April 4, 2008, from <http://www.aare.edu.au/01pap/her01711.htm>.
- Steketee, C. & McNaught, K. (2007). Videoconferencing as a professional learning environment. In *Collaboration for success*. Proceedings from the Society for the Provision of Education for Rural Australia 2007, (pp. 167-179). Perth: SPERA.
- Trinidad, S. (2007). Telecommunication systems closing the digital divide in Western Australia. In *Collaboration for success*. Proceedings from the Society for the Provision of Education for Rural Australia 2007, (pp. 181-187). Perth: SPERA.
- Trinidad, S. & Broadley, T. (2008). Connect and Collaborate: Professional learning within a web collaboration environment in remote WA. Proceedings from Australian Computers in Education Conference 2008. Canberra: ACCE.