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Editorial

This issue *Leading & Managing* is a little unusual in that it serves a dual function having both articles that stand alone and articles that focus around a core topic. There are themes, though, that emerge from both strands of this issue; including the importance of context, seen for example in the role of contextualised pedagogical leadership and creation of professional knowledge. The role of action research in improving teaching and learning is also a recurrent theme.

Frankling, Jarvis and Bell report on a study, carried out in a regional state secondary school, which explored teacher beliefs and classroom practices around differentiation. The study sought to discover how targeted and ongoing professional development, supported by the mentoring and coaching of the school principal, may facilitate improvement in teacher understanding and application of differentiation in their classrooms. Clearly, seeking to embed differentiation as a pedagogical approach, within the framework of the Australian curriculum, is a complex undertaking. The study used an action research methodology, instigated and facilitated by the principal. Working together in school-wide learning circles provided teachers with opportunities for pedagogical leadership as well as the means of sharing and deepening their knowledge about differentiation and its implementation in their context.

Contextualised leadership, of a somewhat different sort, is at the heart of the article written by Belmonte and Rymarz who report on a study which focuses on a very specific context – small rural Catholic schools where the principal has the additional role of Religious Education Coordinator (REC). Complexity is added to this role as many of the communities served by the small school no longer have a resident priest and the principal, as REC, often takes on a religious leadership role within the community. The principals participating in the study acknowledge the positives that come out of these additional responsibilities. The study highlights, however, the need for better support for principals acting as religious, school and community leaders. Several possible dimensions of appropriate support are identified.

The remaining five articles have a particular focus and, taken together, form the core of a special edition which consists of articles written by researcher practitioners – namely Master Teachers – who, as part of their Queensland Department of Education (DETE) Master Teacher role have engaged in action research within their school or cluster. It is valuable to read their accounts of and reflections on this research. While each article reports and reflects on a very specific action research project, the experience and learning reported will resonate with teachers seeking to use research in their very particular context to improve learning and teaching. The articles demonstrate the potential of creating contextualised professional knowledge in order to meet challenges commonly faced by teachers. The articles further serve to illustrate the importance of middle leadership in a school where legitimacy is afforded by the recognition of a Master Teacher as a skilful practitioner in a leadership role that relates specifically to the work of teachers in improving teaching and learning. Detailed information on this project are presented in the special edition editorial.

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Special Edition Editorial

The Teacher Education Ministerial Advisory Group (TEMAG) report *Action Now: Classroom ready teachers* (2014) clearly indicates the need for initial teacher education providers and employers to work in tandem to provide a quality learning and teaching environment for our future teachers so that theory and practice are more closely intertwined. The report highlights international evidence that the best performing education systems in international tests are those with teachers who are highly qualified and valued by society.

In 2015 the University of Southern Queensland (USQ) undertook to provide a staff professional development program for the Queensland Department of Education, Training and Employment (DETE). This professional development for master teachers has provided an opportunity for the State's recognised highly competent teachers to commence research studies and progress to further higher degree research. The program was aimed at the newly created cohort of Master Teachers to engage those teachers in action research based in their school environments. The staff development was entitled *Master Teachers to Master Researchers* and introduced participants to the foundations of research in education and its application through conduct of an action research project within their school or cluster. The teachers were required to identify a suitable research topic in liaison with their particular school management team. USQ worked closely with DETE to ensure that their preferred parameters for conduct of the action research were met. These included a focus on literacy and numeracy and the use of NAPLAN scores as a component of the methodology.

All of the action research projects involved the Master Teacher in designing and leading an action research project with other teachers within their school or cluster. McNiff (2007) considers action research '…a form of research that enables practitioner researchers to tell their stories of how they have taken action to improve their situations by improving their learning' (p. 308). The Master Teacher authors featured were encouraged to reflect on their practice as an integral part of their personal learning experience. As beginning researchers, it was important for them to chart their personal growth in this area and realise in what ways they had developed their knowledge and understanding of the research process. They were encouraged to reflect on the action taken in their research strategies. Schön (1983) argued that 'When someone reflects–in-action, he becomes a researcher in the practice context' (p. 68). The Professional Development that the Master Teachers undertook enabled them to become a researcher in their practice context.

The strength of such action research is threefold: firstly, it promotes professional learning and reflective practice through design and conduct of the research; secondly, akin to all research it creates new knowledge but in this case through a collaborative partnership with teacher colleagues; and thirdly, it changes and develops the roles of teachers, in particular the Master Teachers, and their relationship to higher education. This professional development for teacher leaders has assisted capacity building in schools through the purposeful collection and use of data for evidence-based decision making.

The action research project also fulfilled the need of Initial Teacher Education (ITE) providers and school-based practitioners working together to advance research-based practice in schools. The research expertise of ITE academics linked with the practical experience of school practitioners can lead to academics revisiting classroom practice and teachers being encouraged to be researchers. The professional development becomes a two-way process.

This issue will draw primarily on research conducted by this cohort of Master Teachers who were invited to share and showcase their research outcomes, learning journeys and growth as a teacher leader. It includes articles reflecting on the professional development program, its outcomes, and issues related to conduct of action research by teachers that arose

throughout the program. The issue will include authors who are research academics involved in provision of professional development of teachers in action research in addition to teachers who participated and undertook research in their school environments.

Our first two articles by Master Teachers are focused on numeracy, in particular, the difficulties that students encounter in solving worded problems. Both performed quasi-experimental studies each with two control groups and two experimental/test groups – those using the new tool. Sarah Mathews worked with teachers of students in early high school (Year 8, ages 12.5–13.5 years) in the metropolitan area. The tool adopted and tested was *Think Boards*, and her research found that this tool not only helped students, the students themselves recognised the value of the tool. Mark Hansen worked with teachers of students in a regional primary school (Year 5, average age 10 years). Mark's interest was in the value of mathematical warm-ups, in particular, using the *Four Square* tool to assist with solving worded problems. His results show that this tool was also useful and valued by students and teachers alike.

Zarah-Rae Budgen reflects on her lead role in a cluster Professional Learning Community (PLC). The cluster consisted of three schools spread across two regional centres, 17 km apart in regional Queensland. The two cluster schools which were closest together in distance were involved in the project. The article describes the first cycle of a three-year action research project. This first cycle involved the PLC establishing itself and the members learning how to work together to enhance the learning experiences of their respective students. Zarah's personal learning journey is an equally important element in the article.

Our final article written by a Master Teacher follows the theme of collaboration introduced by Zarah-Rae Budgen. However, Kylie Westlake adopts a metaphorical approach to the process of mastering action research – the metaphor being ripples on a pond. Kylie worked with teachers of early primary students (Year 2, aged 7 years) in a large metropolitan school, focusing on literacy, specifically writing, with an innovative and research-driven *Writing Framework* designed by the school. Her findings showed the use of the *Writing Framework* yielded positive outcomes and the teachers appreciated the value of the tool.

A common theme running through these articles is the unforeseen limitations and difficulties that arise from doing action research in a 'real school' environment. All of the Master Teachers learned a lot about the practicalities of research, how the best-laid plans can be foiled, but also about persistence and ways of overcoming barriers. These articles collectively offer a great deal of practical advice to other Master Teachers and classroom practitioners who wish to investigate practice in their school or classroom.

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Master Teachers as Leaders in School-Based Action Research

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ABSTRACT: This article contributes to the literature on Master Teachers from the perspective of an Australian regional university charged to provide support to a Master Teacher program under the control of the State Department of Education. The article provides an overview of the global trend towards the appointment of Master Teachers, a snapshot of the support the University provided, and the implications of the requirement, in this case, for the Master Teachers to engage with action research. A novel experience for most, and the articles in this special edition report this process and learning journey from four of the Master Teachers with whom we worked. It is hoped that this report of the experiences of university academics may be of use to other universities who may be tasked to take on a similar responsibility. As the program was not under our control, this is by no means intended to be a formal evaluation of the Master Teacher program as rolled out in Queensland, Australia.

Introduction

The 21st century education policy trends in westernised societies such as the United States of America, the United Kingdom and Australia reflect the common themes of accountability, managerialism and performativity (Brennan & Clarke, 2011). Teachers and teaching have become, and continue to be, under close scrutiny and critical comment, by politicians and the press in particular. Governments respond to international attainment data such as Programme for International Student Assessment (PISA) scores and look to see their own national data climbing up the ladder of success in literacy, mathematics and science. In 2016 in Australia, for example, there was wide reporting of the most recent PISA scores which showed that:

> On global comparisons, Australia performed equal 10th in science (down from 8th in 2012), 20th in maths (down from 17th) and 12th in reading (down from 10th). There is a steady decline in the results since 2000, both in terms of overly simple international comparisons and absolute mean scores. (http://www.abc.net.au/news/2016-12-07/pisa-australia-ranks-poorly-but-what-can-we-learn/8097546)

The political response to this apparent decline in attainment was that more funding was not the simple answer but more quality teachers were required. Simon Birmingham (Federal Education Minister) acknowledged that 'the single greatest in-school factor in terms of student

accomplishment is absolutely the teacher…' (http://www.abc.net.au/news/2016-12-07/education-minister-simon-birmingham-responds-to-damning-schools/8098842).

Further data on student attainment in Australia are gathered through the National Assessment Program in Literacy and Numeracy (NAPLAN) tests which are taken by school students in Years 3, 5, 7 and 9. These data are used to measure the effectiveness of learning and teaching nationally and are used to highlight areas of weakness in attainment in the prescribed subject areas. Individual school results are posted on the My School website and are therefore available for scrutiny by the whole community. Nationally, each state and territory has their average attainment results published and compared in a way which leads to education authorities pressuring schools to raise attainment levels. The implementation of state and national testing regimes can be seen as a means of 'identifying "incompetent" teachers and "failing" schools' (Brennan & Clarke, 2011, p. 175). The imposition of national curricula gives government departments control over what is taught.

In Queensland, one response to low NAPLAN scores in a number of schools was the appointment in 2015 of Master Teachers to 'improve literacy and numeracy outcomes in those schools where they can make the greatest difference' (Department of Education, Training and Employment (DETE), 2016c, para. 2). Their role has a 'focus on improving literacy and numeracy and also build capacity through action research, developing high yield strategies for improvement with a strong evidence base' (DETE, 2016b, para. 2). Just over 300 teachers were appointed to the role, which was intended to run for three years. The stated intention was to relieve Master Teachers from active teaching so they could undertake their research, coaching and mentoring activities.

Definitions of a Master Teacher

What does being a master teacher mean? Depending on context, there are several definitions of master teachers. In South Africa, they are equated with as many as 35 years of service (Education Labour Relations Council (ELRC), 2008); in other areas such as Kansas, USA, becoming a master teacher is seen as an award for which one is nominated by self or other (https://www.emporia.edu/teach/master/nomination-form.html) and may receive some kind of trophy (http://www.masterteacher.com/Online-Store/Service-Awards). Many educators define master teachers as particularly effective classroom teachers (e.g. DeBruyn & DeBruyn, 2009; Doyle, 1985; Johnson, 2011; Sanders, Wright & Horn, 1997; State Board of Education (SBE), Ohio, 2007) although there is no general consensus on what this means. Lists of qualities that master teachers should possess abound including from these just-cited authors, and comparing and coding these varied lists yielded general agreement on:

What master teachers can do:

- Create an environment that enhances student learning;
- Create a respectful classroom;
- Connect with and understand students;
- Have and communicate high expectations of students;
- Inspire and motivate students;
- Plan and deliver effective instruction; and
- Use effective assessment and feedback to promote learning.

Personal qualities of master teachers:

- Strong communication skills;
- Passion for teaching and their content area;
- Sense of responsibility for their own and students' achievements; and
- High personal expectations and desire for excellence, including embodying lifelong learning.

Additionally, Couros (2010) suggested teaching students first and curriculum second; ensuring the relevance of curriculum; and ensuring that 'character education' is an essential part of learning. DeBruyn & DeBruyn (2009) also added a belief that their teaching is affected by both their attitudes and skills, and that master teachers exemplify ethical standards. The Ministry of Education (MOE) in Singapore, on the other hand, focuses on the effect master teachers have on other teachers, as an in-school teacher educator and exemplary role model (MOE, 2009). The role as defined by DETE (2016c) for Queensland Master Teachers more closely resembles the Singaporean model in terms of working with other teachers and modelling quality teaching.

The Queensland Teachers' Union further perceives the role of Master Teacher as akin to a pedagogical coach, and on that basis, campaigned successfully for the removal of the requirement for a Masters qualification from the position so that it was equivalent to other coach roles (https://www.qtu.asn.au/issues/master-teacher-information-statement/). The Union signed a Memorandum of Understanding with the Education Queensland (DETE), confirming that Master Teachers were not to be utilised as a classroom teacher, but may be required to work across schools in a cluster. They should only be required to provide relief for absent teachers and non-contact duties such as bus and playground duty in emergent circumstances.

Opportunities for Master Teachers

It was suggested by Caldwell (1985) that if teachers were rewarded, recognised and reinforced for excellent performance, they would stay in the classroom. The appointment of master teachers may be a way to recognise the dedicated and deserving teachers who do not aspire to be promoted through the leadership track to become heads of department, principals or deputy principals. One of the participants in research on Singaporean teachers' voice on teacher and teaching quality (Mohamed, 2015) stated that the Ministry of Education had problems thinking of positions to upgrade the teachers so they thought of senior teachers, master teachers, principal master teachers, coordinators, heads of departments and senior heads of departments.

Although Singapore is recognising more master teachers (Ferreras, Olson & Sztein, 2010; Li, 2008; Lim, 2010), the appointment opportunities of master teachers are much fewer in comparison to the positions available for teachers who opt for the leadership track (Mohamed, 2015). It is a path created for teachers who wish to remain true to their profession of teaching and do not wish to become solely an administrator. The latest data show there is a total of only 4 master teachers in mathematics, 22 in languages, 13 in science, 3 in geography and 4 in history in Singapore (http://www.academyofsingaporeteachers.moe.gov.sg/cos/o.x?c=/ast/pagetree&func=view&rid=1068872), i.e. 46 out of the Singapore teaching force of about 30,000 trained teachers or 0.15 per cent of the workforce. The limited number means that master teachers are a rarity in Singapore. Yet in her article, Stewart (2016) claimed that master teachers mentor every new teacher for several years. In fact, the fourth author had the honour of meeting only one master teacher in her Singapore teaching career spanning 28 years, and that was during a couple of workshops on how to organise Science web quest lessons. This contrasts with Queensland's 300 Master Teachers out of a workforce of 56,290 full-time

equivalent teaching staff in 2015 (http://www.qgso.qld.gov.au/products/reports/schools-qld/schools-qld-2015.pdf), representing 0.53 per cent of the workforce.

Similarly, in China, the number of master teachers is low and is controlled at no more than 0.15 per cent of the teacher population (http://www.moe.edu.cn). For example, in two decades, only 609 teachers out of a total of 31,945 were awarded the title of master teachers in the city of Tianjin (Fan, Zhu & Tang, 2015).

In contrast to Singapore and China where the master teachers are selected solely on individual merit regardless of school placement, the 300 newly appointed Master Teachers in Queensland were initially selected so that there was only one positioned in each school or cluster (DETE, 2016a). According to the Queensland Department of Education and Training (DETE, 2016c), Master Teachers were appointed to ensure quality teachers were working where they could make the greatest difference. Master Teachers are responsible for leading activities and key tasks in their school and/or cluster. In Queensland the government policy responsible for the Master Teacher appointments was initially marketed as Great Teachers = Great Results (DETE, 2016d).

The Accountability Issue

Master teachers and teachers alike have been bombarded with numerous educational reforms that policy makers feel would produce the 'worker bees' of the society so that the countries' economies will be boosted. Teachers are held accountable to their students and parents, supervisors and employers and also to the tax payers and the policy makers of their countries; master teachers even more so as their position attracts extra funds. With accountability, there needs to be measurable deliverables and the most common and easiest model of accountability for classroom teachers is through standardised test scores. Although master teachers in some countries do not teach students directly, they are still responsible for guiding teachers to teach effectively and thus often face the same measure of effectiveness, i.e. through test scores. The validity and reliability of these tests scores in terms of the accountability of individual teachers is questionable.

How Master Teachers are Assessed and Appointed

According to Masters (2003) from the United States of America and Oracion (2014) from the Philippines, teachers who have been appointed to master teacher positions are those who respond positively to opportunities to improve teaching and learning. In other words, they are the teachers who have been identified as having very good content knowledge, 'mastered' the art of teaching, possess a strong sense of moral purpose and leadership competencies and are willing to share their expertise and knowledge with the broader learning community. Masters (2003) stated that master teachers do not keep their wealth of knowledge to themselves. Instead, they serve as leaders in their schools, sharing knowledge and skills with others, mentoring new teachers, and developing strong relationships with parents, families, and stakeholders in their communities. Based on the above attributes of master teachers, it is safe to assume that master teachers are the personification of what every teacher should aspire to be.

Caldwell (1985) discussed the use of a teaching performance instrument which included 36 indicators classified in seven areas for identifying master teachers. Most master teachers worldwide are assessed and appointed as a result of the performance management system and most of the selection processes depend on the principal's recommendation although methods of assessing and appointing a master teacher's performance differ slightly in different countries and states. As principals' recommendations play an important role in master

teachers' appointments, there have been concerns in countries such as the Philippines where principals are assigned to a school for a short time, even less than a year in many cases due to political factors (Oracion, 2014). This arrangement does not allow sufficient time for principals to get to know the teachers adequately and be able to properly assess whether teachers meet required performance criteria.

There were proposals in Wisconsin in 1987 that teachers aspiring to be appointed as master teachers should be evaluated by a performance assessment team consisting of an administrator from the district, a peer teacher from another district and a representative of the department of public instruction (Burke & Lind, 1987), which as a process appears more equitable and transparent. In Singapore, master teachers and principal master teachers are appointed by a panel of senior Ministry officials through an interview after assessing their professional portfolios (Morris & Patterson, 2013).

In Queensland Australia, Master Teachers are assessed through lesson observations, student performance data (including NAPLAN and school-based information that could show value added by particular teachers), parental feedback, teacher qualifications and professional development undertaken (Marshall, Cole & Zbar, 2012). Similarly in Jamaica, master teachers are assessed in four areas; (1) professional development (2) instructional planning (3) instructional management and (4) participation contribution (Master Teachers of Jamaica, n.d.).

Our fourth author's experience as a primary school teacher in Singapore indicated that whilst all teachers are assessed in similar ways, only the 'cream of the crop' will be appointed as master teachers. Teachers may possess the same attributes but what may set the master teachers apart is their specialised content knowledge. Master teachers in the United States of America are touted to be experts in their content areas (Masters, 2003) but the question arises as to how their expertise is assessed and by whom. Cole (2012) concluded that master teachers are recognised for their expertise in practice as they use research-based teaching methods to design, plan, and deliver effective lessons.

The Place of Research in the Role of Master Teachers

In Scotland, the Standards produced by the General Teaching Council, Scotland (GTCS), (2012, p. 18) for full registration consider that **all** registered teachers should:

- read, analyse and critically evaluate a range of appropriate educational and research literature; and
- systematically engage with research and literature to challenge and inform professional practice.

As part of on-going professional development, teachers are expected to engage in professional enquiry, an example of which is action research. Engaging in and with research are expected activities of a professional, registered teacher. There is not such emphasis on research in the Australian Institute for Teaching and School Leadership (AITSL) standards for teachers in Australia (AITSL, 2014). In Queensland, however, a major requirement of Master Teachers was that they engage in action research to improve pedagogy and improve student attainment levels. 'By linking enquiry into student learning to teacher learning, teachers can gain an understanding of what it is they need to learn to improve outcomes for students and have a compelling reason to engage in practitioner enquiry' (Timperley, Parr & Bertannes, 2009, p. 240).

Action Research

Action research is a disciplined process of inquiry conducted *by* and *for* those taking the action. The primary reason for engaging in action research is to assist the 'actor' in improving and/or refining his or her actions. (Sagor, 2000, p. 3). In the educational context, the concept of action research is not unitary and is often given different names to show innovation which is assumed to be the key to future economic success. Thus, there are different types of action research such as the work improvement team scheme (WITS), professional learning circles, lesson studies, teacher research, classroom enquiries and teachers' professional development (Soh, 2006). All these initiatives have the sole purpose of encouraging the concept of the professional learning community (PLC) that embraces the idea of getting teachers to work together in teams to enhance their effectiveness as professionals so as to benefit students' learning. As Beaulieu (2013) succinctly put it, action research is 'about improving the quality of human life, acquiring knowledge to become better practitioners, and developing strategies to address problems' (p. 33). This is in line with Singapore's current iteration of their education policy framework called *Thinking Schools, Learning Nation* that has been evolving for two decades (MOE, 2017). This has the explicit aim of developing creative, innovative and lifelong learners who can rise to the challenges of a global future where change is the only norm.

Somekh and Zeichner (2009) highlighted the use of action research in schools to serve a political agenda of greater accountability through schools meeting standardised test benchmarks. They observed that 'School-sponsored action research in these times has sometimes been used to serve the purposes of the reforms in very narrow ways (i.e. only aiming at higher standardised test scores)' (p. 15). Having a focus on improving test scores can prove detrimental when staff ownership of the research is ignored and professional development in new pedagogical practices is absent. Budgen's article later in this journal gives a counter to this problem by detailing the work done with teachers in the first cycle of her action research project as a preparation for the second cycle which will have a focus on improving attainment scores. Hynds (2008) reinforces the need for working collaboratively across the whole school community. She reports on an action research study in New Zealand where the school communities consisted of both Maori and non-Maori families. The aim of the research was to investigate 'influences on the acceptance and practice of culturally diverse teachers' collaborative partnership work' (p. 149). Hynds concluded that there was scope to further investigate how all school stakeholders could be supported to engage in and maintain 'open communication and critical inquiry' (p. 161) in order for any research project to enable change in classroom practice and in community perceptions of school practice. Somekh & Zeichner, Budgen and Hynds all emphasise the importance of collaborative practice in engaging in meaningful and affective action research within the school environment.

The Role of the University in the Development of Master Teachers

Seven lessons learned

Classroom teachers who have demonstrated the qualities of a master teacher may not have completed higher degree study involving research. Consequently, the expectation of them to perform action research may be an issue that prevents some from putting their names forward, or causes stress to those appointed. This was recognised by DETE as the Master Teacher initiative was announced, and a tender process was initiated to locate a suitable university partner to produce a year-long course to upskill master teachers in an understanding of

research processes and protocols. A mentoring role as the cohorts moved through their first action research project was also expected.

In early 2015 the University of Southern Queensland (USQ) was informed that their tender bid had been successful. An induction program to introduce the basic precepts of action research was designed and a resource booklet produced. Master Teachers from all over the state were brought to Brisbane in February for a two-day induction to the role as a whole, including three sessions from the first and second authors. These sessions covered:

Session 1:

- What is research?
- The action research cycle
- Identifying a problem and checking feasibility for research
- Developing research questions
- Reviewing the literature, academic writing and referencing
- Information management

Session 2:

- From epistemology to methods
- Beliefs and values
- Paradigms
- Approaches
- Ethics
- Confidentiality, privacy, anonymity, informed consent and permission for images

Session 3:

- Research methods
- Research designs
- Believability and burden of proof
- Sampling
- Types of data and data collection
- Data analysis – brief introduction to statistical analysis (quant) and coding (qual)
- Nature of discussion

Originally these three sessions were to be delivered across the two days but a late change to the DETE schedule saw these all being presented on the first day, *and* our time allowance reduced by 30 minutes. We recognised immediately that this would result in cognitive overload, and indeed, this was reflected in the evaluations. Comments such as 'too much too soon, overwhelming' were not at all surprising to us. It was more surprising that these came from only 41 of the 257 Master Teachers (i.e. 16 percent) who completed the evaluation form at the end of the two days. By far the majority of the evaluations described the sessions as helpful.

Lesson 1: Insist on a reasonable time period between induction sessions to avoid overload.

Swift analysis of the data and particularly the comments on these evaluations were particularly helpful in guiding our further development of the course. Topics suggested for more information that we could address included data analysis and academic writing. Topics that were not our brief as university academics, such as dealing with principals, clarification of role, were passed on to the Department for their attention.

Lesson 2: Asking participants what topics merited further attention was extremely helpful.

Although we could not change the cognitive overload of the day, our step-by-step approach and the booklets we provided proved very helpful as the course was implemented, and the Master Teachers could revise sections in 'bite-sized chunks'. Future topics, e.g. data analysis and statistics, were thus encountered at the time of need. We also took on board requests for exemplars and provided these wherever possible.

Lesson 3: Providing step-by-step information, instructions and advice was helpful and appreciated.

The original tender provided for all 300 Master Teachers to complete the year-long course with us, and we had planned our induction accordingly. However, widespread consternation amongst the Master Teachers concerning the requirement to complete university study saw DETE change this on day 1 of the induction to a voluntary process rather than a mandatory requirement. On day 2, the first and second authors made themselves available between sessions and fielded many inquiries from Master Teachers interested in taking up this opportunity. Successful completion of this course could be counted as academic standing for one unit of the Masters of Education should they wish to pursue their studies with the University.

Lesson 4: Although beyond the control of the University, it would be helpful to know exactly what information new Master Teachers had been given about their role.

Due to the compact timeline and the unexpected shift in numbers which had serious cost implications for the University, some administrative issues were experienced with commencing the course. In particular, as the Master Teachers were completing a Performance Development module rather than being formally enrolled in a program, provision of library access was problematic, though eventually resolved. However, in the interim the second author provided extensive email support to those Master Teachers wishing to make a start, some of whom are publishing articles within this issue.

Lesson 5: Have a back-up plan for access to resources such as the Library and Study Desks.

The decision had been taken that neither DETE's nor USQ's ethics committees could handle the influx of applications that would have resulted from 300 Master Teachers seeking to do research in their classrooms. It was agreed that research plans had to have the approval of the principal(s) of the school(s) involved, and the sign off from the University staff providing the support program. In a sense, we were 'standing in the ethical gap' and ensuring that no harm was done. Consequently, the support program provided two months for the Master Teachers to think through and produce a comprehensive research design plan, including a thorough review of the literature. Some of the Master Teachers did not value spending that length of time on planning and wanted to get started immediately. Some did in fact start collecting data prior to the design being signed off, which created some ethical issues and robust discussions. Teachers are apparently used to making changes and collecting data from their own classes without the need for ethical oversight, which became problematic for University personnel charged with upholding the research code of ethics. The importance of this process of signing off on the research design needed to be emphasised to DETE head office personnel as well as to the Master Teachers. However, these issues were eventually resolved with the benefit of significant learning to all parties.

Lesson 6: Discuss and agree on the need for ethical oversight of all projects and emphasise this in all interactions with the Department and with the Master Teachers from the start.

With some guidance, most Master Teachers were able to complete a satisfactory literature review, but describing research methods, particularly data analysis, was far more problematic. A prevailing attitude was 'How can I know what I'll do with the data until after I've collected

them?' which indicates a lack of realisation that planning for different types of data must be closely linked to the research questions that need to be answered. This was the section that most commonly needed to be rewritten before the design could be accepted.

Another issue that required some discussion was whether informed consent was required from parents for their children to participate in the proposed research. Again, the stance of the University was somewhat at odds with that of the Department, who allowed considerable freedom. A compromise was reached whereby if the research activities were no more than would be common in class activities, no special permission was needed, whereas if the activities were outside the norm (students being individually interviewed, or recorded or filmed) then parental consent was required.

Lesson 7: Discuss and agree on the need for informed parental consent for particular types of research projects ahead of time.

Outcomes of the Partnership

In all, two cohorts of volunteer Master Teachers completed the University course, 34 in all, representing 11 per cent of the 300 who were initially appointed. More initially enrolled, but some Master Teachers encountered personal circumstances such as health crises for them or their families, bereavements or moving to new jobs, which caused them to drop out of the course, and in some cases, out of the Master Teacher role. Others encountered institutional difficulties such as not being entirely released from teaching duties, major changes in school direction due to the results of audits or changes of principal, or being required to work in entirely new schools and needing time to form relationships before moving ahead with research.

All those who completed the course passed successfully, and produced a written report and a poster describing their research project. Although it had been a substantial challenge for many, most expressed deep satisfaction at having stayed the course and completed their research. Some made significant discoveries in terms of pedagogies and practices that were effective in building literacy and/or numeracy. So far, two have decided to pursue their studies and sought academic standing at USQ for the Masters degree on the basis of their completion of this course. At least one has used details about the course to apply for similar academic standing at a different University.

Outcomes may well have been very different if all 300 Master Teachers had been required to complete the course as originally envisaged. Economies of scale would have made the support of the teachers more efficient and the marking and mentoring load could have been more distributed. The Master Teachers would also have been in a better position to provide peer support for each other in neighbouring schools and clusters. As it was, the volunteers completing the course were generally working independently. However, when the opportunity arose to collaborate, as in the writing workshops that supported their production of the articles in this issue, they worked together very well, offering insightful and supportive critique to each other. From the perspective of a university that specialises in online education, we would have liked more freedom to foster this collaboration throughout.

This special edition of the Australian Council of Educational Leaders (ACEL) *Leading and Managing Journal* demonstrates one further outcome for both the academics who developed the action research course and the subgroup of Master Teachers who completed it. It aimed to provide an opportunity for participating Master Teachers to write up their research results and reflections on their research journey in a scholarly way. Simultaneously it highlights the role of Master Teachers in leading teachers and teaching in schools via action research.

The first, second and third authors were all involved in developing and delivering the action research course. We sought expressions of interest regarding contribution of a journal article from Master Teachers who had achieved highly in the research development program with USQ. Those who responded were interested in writing about the outcomes of the action research undertaken or their learning journey through the program. Master Teachers who have articles included participated in a writing workshop where they provided commentary and support for each other in the writing process which has added another dimension to their professional development as teacher leaders following on from their completion of the course. They were each mentored by one of these academics through the writing, review and revision phases of developing their final article.

The DETE perspective was also invited to provide insight and reflection on the objectives and outcomes of the Master Teacher initiative in enabling the provision of evidence-based curriculum and pedagogy in their schools and clusters. Whilst this was not possible, it is envisaged that in parallel to showcasing some of the action research and associated research journeys of the Master Teacher contributors, these articles can also provide insight and evidence on the Master Teacher initiative. Utilisation of research has been argued as an essential component for evidence-informed policy and evidence-based decision making by governments internationally (Brown, 2016; Normand, 2016). In regards to provision of such evidence for DETE who commissioned the contract for the course, the articles in this edition contribute to provision of evidence of effective policy outcomes related to professional development of teacher leaders and their impact on capacity building in schools through the purposeful collection and use of data via action research. In addition, promotion of scholarly discussion of the outcomes of the Master Teacher initiative in Queensland is a significant outcome in itself that can contribute to the literature on this topic more broadly.

Finally, at a broader level, a further outcome from the action research project is that such work meets the need recognised in the Australian Teacher Education Ministerial Advisory Group (TEMAG) report *Action Now: Classroom ready teachers* (2014). This report emphasised the desirability of closer working arrangements between Initial Teacher Education [ITE] providers and Education Authorities to better ensure clear links between research-informed theory and practice. Good examples of this are described in this report. Singapore is cited as one example: 'Teachers are supported to conduct action research on their teaching and to continually revise their teaching strategies in response to what they learn' (TEMAG, 2014, p. 20). This exactly mirrors the intent of the research projects reported in this issue in the articles by the Master Teachers. Another good example is found in the *Down South* initiative established by the Canberra campus of the Australian Catholic University which 'brings together university academics, school staff, pre-service teachers and secondary school students to create a dynamic community of practice for professional experience, teaching, learning and research' (TEMAG, 2014, p. 32). The Master Teacher initiative sought to create dynamic communities of practice in schools and clusters.

Also recognised in the TEMAG report was the need to have quality assurance around the capabilities of supervisory teachers of ITE students undertaking school experience placements. Close working arrangements between and across sectors 'should include arrangements for working together to deliver training for supervising teachers' (TEMAG, 2014, p. 33). To that end, New South Wales is working towards requiring supervisory teachers to undertake appropriate staff development in mentoring ITE students with such courses 'preferably providing credit towards university credentials' (TEMAG, 2014, p. 32). As already noted in this article, the Master Teachers who undertook the action research in the project reported here gained eligibility to apply for credit towards a Master of Education degree. It is also plausible to anticipate that Master Teachers would have a significant role to play in mentoring ITE

students that are placed in their school(s). In sum, this initiative provided a worthy response to several of the recommendations in this influential report.

Conclusions

With increased accountability and the standards agenda a focus of national government education policy in Australia, there has been a significant reliance on national and international test results to demonstrate quality schooling and identify quality teachers. The identification and promotion of Master Teachers in Queensland and internationally has been influenced by these trends. This article provides insight into the potential of developing teacher leaders with the knowledge and skills to conduct action research and utilise the outcomes and evidence to make decisions related to curriculum and pedagogy in their classrooms, schools and regions. Communication and dissemination of the results of such individual action research projects will garner outcomes greater than the sum of the individual parts when shared with teachers locally and nationally. By providing illustrations of what is working, what may work in some contexts, and also what has not worked with reflections on why, how and with which students, the research has the potential for greater impact in improving results across schools and groups of students. The reflections of the Master Teachers on their research journey may also provide inspiration and incentive for other teachers to undertake similar initiatives within their own classrooms and schools.

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Project *Think Board* Builds Evidence for a Problem Solving Instructional Strategy and Highlights the Importance of Leadership from the Middle

SARAH MATHEWS

ABSTRACT: Students find problem solving difficult and would benefit from an instructional strategy aimed at building the thinking process required for success. One strategy, think boards, provides a framework for problem solving that encourages students to see, plan, do and check. This article reports on a quasi-experimental study which measured the impact of using think boards, in conjunction with specific heuristic strategies, during the first algebra unit for a group of high school mathematics students (Year 8, aged 12.5 to 13.5 years). The results show a greater effect size for the test group compared to the control group which could be partially attributed to the use of think boards. This correlates with the significantly higher number of test group students than control group students who used think boards to solve word problems. Further, through purposeful interviews, students identified that think boards helped them solve challenging problems. Recommendations for implementing the use of think boards as an instructional strategy in a school are provided. The sections in italics throughout the article indicate a change in mode to allow inclusion of my reflective dialogue about leading learning by developing an evidence-based instructional strategy through enacting research in a high school. The importance of school-based research as a lever for leadership from the middle is briefly considered.

Introduction

This research project was conducted in a metropolitan State High School in Brisbane (Queensland, Australia) that has numeracy as a major focus of its strategic plan. The school has approximately 900 students in Years 7–12 (ages 11–17) and has slightly above expected senior schooling outcomes for its average level of socio-educational advantage. An analysis of student assessment, discussions with teachers and class observations indicated that many students have limited strategies to be successful when solving algebra and word problems. Further, a focused analysis of national numeracy diagnostic testing data (National Assessment Program – Literacy and Numeracy (NAPLAN)) identified that the school performs below the state and nation. The school was seeking an effective instructional strategy to build students' ability and confidence to solve word problems in mathematics and numeracy. *Think boards* were chosen because they provide a framework (see-plan-do-check) for students to build metacognition during problem solving. The study involved the explicit teaching of the *think board* phases with selected heuristic strategies to scaffold problem solving during the first Year 8 algebra mathematics unit.

Leader of Learning Reflections: Research in schools

At the commencement of this project, I wanted to know why action research was important to my role as a Master Teacher. Through my reading, I learned that action research is being embraced as a 'viable model for modifying, changing, and improving the teaching–learning process' (Efron & Ravid, 2013, p. 2). With this clarification, I understood the purpose of one of my key tasks as a Master Teacher in a Queensland State High School, 'to improve and enhance pedagogical practice for all staff by researching and modelling quality teaching' (Queensland Government, 2016, p. 1). I needed to conduct a classroom-based research project to build evidence about the effectiveness of an instructional practice in my school. Although only one cycle of research was planned, the research project had the elements of action research summarised by Efron and Ravid (2013). Through my continued reading I found out that having school staff conduct the research differs from traditional educational research, where university-based educators conduct the research. When you think about it, having the practitioners as researchers means that the instructional practices are contextualised for the specific students and teachers in the school. This really made sense to me. It was good to know my reflections align with a pioneer of research in schools, Lawrence Stenhouse (1975), who argued that teaching should be research-based. 'The 'teachers as researchers' movement has become a global phenomenon' (Elliott, 2012, p. 94) where improving pedagogy is at the heart of curriculum change (Elliott & Norris, 2012). Essentially, teachers are experimenters in their own classroom.

Having begun high school teaching after a 20 year career as a research scientist, I was really excited by the prospect of undertaking a research project within my school. For my instructional strategy, I chose to use think boards with the aim of building students' self-awareness and capability in numeracy. I had already been leading numeracy through mobilisation of a numeracy committee, modelling strategies and conducting workshops, and I knew it was vital to get students thinking about how they solved problems.

Literature Review

Problem solving has been recognised as a major goal of mathematics learning (Muir, Beswick & Williamson, 2008) since it develops the learners' conceptualisation and metacognition by making mathematics accessible and encouraging independent learning (Hensberry & Jacobbe, 2012; Van de Walle, 2003). The ability to solve problems independently and confidently is essential for students to meet the mathematical and numeracy demands of both the Australian Curriculum (2015) and the National Assessment Program (2013).

There is a need to improve Australian students' mathematics and problem solving ability. Analysis of both the Program for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) data identified that middle school students from Western countries have relatively low levels of mathematics achievement (Labuhn, Zimmerman & Hasselhorn, 2010). In Australia, 37 per cent of students failed to meet the international mathematics benchmark and only 9 per cent attained an advanced achievement (Thomson, Hillman & Wernert, 2012). Specific to this study, Queensland students performed poorly compared to the nation in NAPLAN numeracy tests (Australian Curriculum and Reporting Authority, 2014). Of particular note, problem solving was a particular area of weakness.

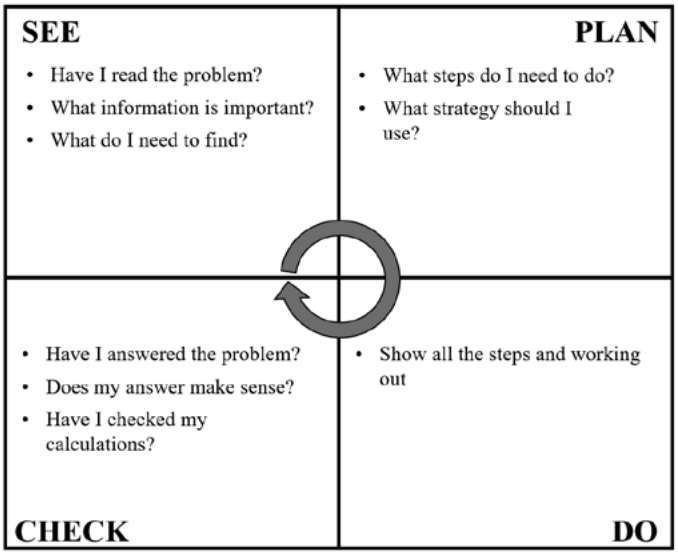
Students often find problems difficult to solve (Hiebert, 2003) since they do not necessarily have a clear solution or method (Van de Walle, 2003). They traditionally rush to solve problems (Leong et al., 2012) and tend to focus on the final solution without understanding the text and mathematical structures (Davis, 2013). As a result, students who

approach problem solving without breaking down the components often make little progress and have limited success (Schoenfeld, 2013) because they lack the necessary metacognitive strategies (Davis, 2013; Schurter, 2002).

Approaches to mathematical problem solving have been evolving since Polya first published his landmark text *How to Solve it* in 1945 (reviewed in Schoenfeld, 1987). The classic text outlines a heuristic four-phase model for problem solving: 1) understand the problem; 2) devise a plan; 3) carry out the plan; and 4) look back. The approach appears quite straightforward; however, it requires students to use metacognitive strategies. It is important that the phases are used as part of a dynamic process to allow students to develop the flexible thinking and skills that lead to understanding and success in problem solving (Hensberry & Jacobbe, 2012).

Think boards provide a structured application of Polya's four-phase approach to problem solving that allows heuristic training to be contextualised in conjunction with the building of metacognition through the explicit teaching of the phases. The *think board* (Figure 1) is composed of four quadrants, see-plan-do-check (drawn on a small whiteboard in a clockwise direction), which align to the four Polya phases. *Think boards* formed the basis of Project 600 (Watt et al., 2014), used in the National Partnerships numeracy intervention program (Australian Government, 2014) and have been recommended by Education Queensland to improve numeracy outcomes (Queensland Curriculum and Assessment Authority, 2013).

FIGURE 1: REPRESENTATION OF THE *THINK BOARD* WITH BASIC STEPS OUTLINED



Students need problem solving instruction (Elia, den Huevel-Panhuizen & Kolovou, 2009). The building of familiarity with heuristic strategies, such as make-a-table and draw-a-pattern, has been shown to improve problem solving (Cai, 2003). Improvement is enhanced through teachers modelling each stage of problem solving by thinking out-loud, and supporting self-regulation and reflection during group and individual tasks (Hensberry & Jacobbe, 2012). Students must be encouraged to 'stop and think' before attempting to solve a problem, to allow them to make connections to the mathematical concepts (Schurter, 2002). This type of metacognitive training, even if administered for a short time, has been shown to improve performance considerably (Cubukcu, 2009). Of specific relevance to this study, the

approach of modelling the thinking for each stage of a problem has been successful with algebra (Ferrucci, Yeap & Carter, 2003). *Think boards* provide a framework to develop metacognition.

For optimal metacognition, problems should be targeted to the zone of proximal development (ZPD) (Vygotsky, 1978). Metacognition emerges when more difficult problems are offered in a collaborative setting (Iiskala et al., 2011) with scaffolding (Goos, Galbraith & Renshaw, 2002). This 'collaborative ZPD' approach (Goos, Galbraith & Renshaw, 2002, p. 196) has informed this study, with a gradual release model (Fisher & Frey, 2008) being applied to establish the problem solving learning environment using *think boards*.

The aim of this study was to measure the effectiveness of using *think boards* as a framework to build students' confidence and metacognition when solving word problems in mathematics. The study targeted two aspects of mathematics (problem solving and algebra) that students often show reduced confidence with, and lack strategies to be successful in, yet underpin achievement.

Leader of Learning Reflections: Problem solving and research in schools

The literature consolidates my thinking about what students needed to solve problems. Before I started this project, I had observed many students struggling with problem solving. Was this because they were not given enough opportunity in a full curriculum, or was it because they simply didn't have the thinking resources? Most maths teachers teach a concept, set a list of questions and move on to the next concept. With this model, the only students who regularly solve worded problems are those who easily understand the maths, and thus complete the procedural questions with time to solve the worded problems set (usually found at the end of each section). As a result, students who struggle with maths have limited opportunity to build the mental resources to be successful at solving worded problems – leading to them falling further behind. I had observed that students of all mathematics ability levels enjoyed using whiteboards when problem solving (because you can easily erase mistakes, an important part of problem solving) and worked more effectively when given a structure to support problem solving. I had seen primary school students (aged 5–12) using think boards and experiencing success.

I wanted to test think boards as an instructional strategy in my own school. However, before doing this I needed to know the evidence base for problem solving. My reading about how students solve problems provided a theoretical basis for using think boards. Of course, I was looking for evidence to use think boards! As a result, I may have been operating from my underlying assumptions, and if I had been searching for an instructional strategy from scratch, I may have chosen something quite different. Nevertheless, as a result of my literature review, I really started understanding the importance of students working collaboratively and in their ZPD when problem solving.

What did the literature teach me? All students need the opportunity to solve worded problems, they need a framework to help them solve problems, they need an opportunity to share their thinking, and they need problems that have 'the right amount of challenge', so they build confidence, develop thinking strategies and experience success. I was confident that think boards were the way to proceed. I refined my plan further. The literature also taught me that teachers should be researchers because improvements in educational practice requires teachers. As an educational leader, it was imperative that I model the way in my school.

Methodology

A mixed methods approach was applied for this intervention-based research since it allows meaningful integration of both quantitative and qualitative results (Creswell, 2014) and allows

the student voice and teacher observations to inform recommendations. As required for mixed-methods, the data were treated distinctly and conclusions generated from integration of both strands (Creswell & Tashakkori, 2007).

The research project utilised a pre-test and post-test control group design (Scott & Usher, 2011) with the use of tests and a survey (Lodico, Spaulding & Voegtle, 2010). The study is quasi-experimental since groups were allocated based on pre-formed mathematics classes, thus removing the capacity for randomisation or matching (Lodico, Spaulding & Voegtle, 2010).

Leader of Learning Reflections: Finding my values and beliefs in educational research

As a scientific researcher who became a teacher, my foray into educational research challenged my thinking. The adoption of a purely scientific approach was not possible, thus my learning curve was steep. My reading was equally divided between how students solve problems, and research paradigms and methodologies. I did a lot of unlearning and relearning. The greatest unlearning was my strict scientific method. My greatest learning was that awareness of my own values and beliefs identified the research paradigm which heavily influenced my methodology and method. It turns out that I am a pragmatist since I chose to use a mixed-methods based quasi-experimental intervention-based approach to answer my research question. This means, my project had test and control groups (quite scientific), the students in each group were not selected randomly (not scientific), and I used both quantitative (very scientific) and qualitative (not purely scientific) data to measure the outcomes.

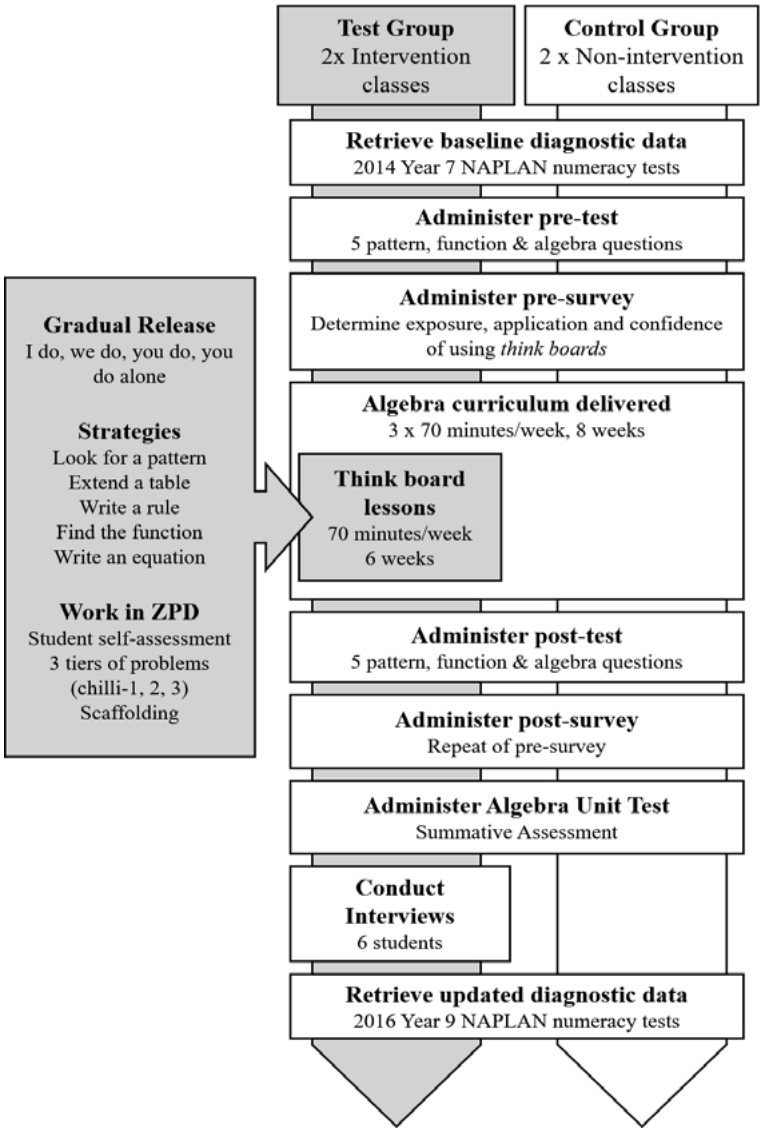
Research design and study participants

The study participants were 68 students from four Year 8 (aged 12.5 years to 13.5 years) mathematics classes, their teachers and the Master Teacher. Two classes (29 students: 18 male and 11 female) were the test (intervention) group and two classes (39 students: 23 male and 16 female) were the control (non-intervention) group. The mathematics classes were assigned to the test and control groups based on the decision to include the class pre-exposed to *think boards* to the intervention group; and, exclude the extension class (high achieving students) from the intervention group. Participant numbers were lower than the actual class sizes since students were excluded from the study if they had less than 70 per cent attendance, enrolled at the school or left the school during the study.

Design process

The research design process (Figure 2) involved collecting baseline data, delivery of *think board* lessons to test group classes and collection of post-intervention data. The baseline data included: analysis of individual student Year 7 NAPLAN algebra responses; a five question pre-test of pattern and algebra problems; and, a survey to determine familiarity with *think boards* and confidence with solving algebra and worded problems. The mathematics algebra curriculum was the same for all classes, except in the test group classes; one 70-minute *think board* lesson replaced a regular mathematics lesson each week for 6 weeks. The *think board* lessons involved explicit teaching of selected heuristic strategies through gradual release, cooperative learning and the use of three tiers of problems (where 1-chilli problems were simplified with scaffolding, 2-chilli problems were appropriate for year level and 3-chilli problems had added complexity). *Think boards* were not used in the control group classes.

FIGURE 2: SCHEMATIC REPRESENTATION OF THE DESIGN FOR THE RESEARCH PROJECT



The post-intervention data collected 1–2 weeks after the intervention was a post-test that matched the scope and complexity of the pre-test, a repeat of the student survey, and a *think board* based interview of six students. Students were purposefully chosen for interview based on their baseline numeracy ability to ensure a range from very low to high achievement. The semi-structured interviews were conducted by the Master Teacher and required students to use a *think board* to respond to an algebra problem and provide comments about the problem difficulty and helpfulness of using *think boards*. The 15–25 minute interviews were conducted using a sequence of steps as outlined by Tomal (2010) which involved stating the purpose of the interview, developing rapport, obtaining consent, asking the set questions, paraphrasing and using expanders (as necessary) to elicit a response, recording responses and behaviour,

summarising the next step of the study and thanking the interviewee. Making notes throughout the interviews, rather than videoing, was unobtrusive (Scott & Usher, 2011). Whilst it is understood that this intervention was just one possible impact on results, the 2016 diagnostic data (NAPLAN test taken nine months after the intervention) was retrieved to compare to the baseline data. Improvements or otherwise are taken with caution.

Data analysis

Effect sizes were calculated separately for both the study-specific test scores (pre- and post-tests) and NAPLAN mean scale scores (2014 Year 7 test and 2016 Year 9 test). The effect size for both the intervention and non-intervention groups was calculated using the mean and the mean of the standard deviations for the pre- and post-data (Hattie, 2012). As the group was small, the t-test was applied, using the online calculator (Stangroom, 2015), to determine any significant difference in the number of affirmative survey responses between the intervention and non-intervention groups.

Students interviewed were assigned an alias with the first initial (A–F) directly related to their baseline data (A for very high, F for very low). Interview transcripts were typed verbatim and coded to find central themes (Creswell & Tashakkori, 2007) which were graduated by possible extremes to provide a continuum to rank students.

Leader of Learning Reflections: Enacting a research project in a high school – not everything goes to plan

Organising the research plan within my familiar school setting was relatively straightforward. The Principal was keen to have a definitive problem solving strategy, and the intervention class teachers were grateful to be released from some planning and have the use of think boards modelled in their classrooms. Enacting the research project was not as straightforward. You cannot control a school like a science experiment!

During the teaching phase, there were the expected interruptions due to school activities and teachers needing more time for core curriculum. As a result, the originally proposed eight intervention lessons became six. In addition, one of the intervention classes had significant behavioural issues and high absenteeism, which led to an adapted program of instruction depending on the students present each lesson. With respect to using think boards, students were reluctant to use the structure if the problem was too easy, and I have to admit, I agree with them! As a result, the students were instrumental in a major shift in the project. The chilli-strategy emerged to allow for differentiated instruction. The premise being, you are all hot at numeracy, just how hot? 1-chilli (simpler questions), 2-chilli (middling questions) or 3-chilli (complex questions)? I sourced and created problems at different levels and had students self-rate before choosing a set of problems to solve. This was way more successful in getting students to use think boards.

In the post-intervention phase, selected students were more than happy to be interviewed but chose not to be videoed, thus, I had to modify my original plan and transcribe what they did and said throughout the interview. It turns out, this was a good strategy because I was so busy making notes I had little opportunity to intervene. This allowed the students' voice to really be heard. For each interview, I explained the purpose and process of the interview to the students, watched them solve the given problem using a think board and, if needed, prompted their next step. I was able to gauge student confidence throughout. The questions I asked all students allowed me to determine their perception about the problem level before and after solving the problem, and their feeling about the helpfulness of think boards.

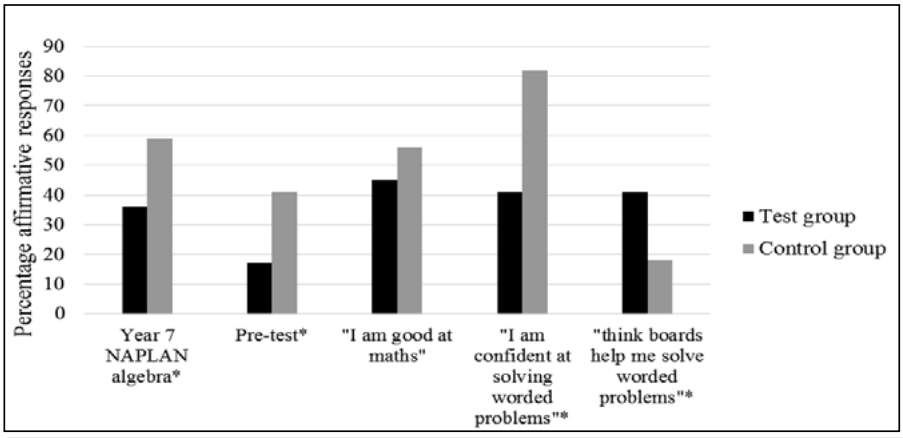
On reflection, I found it is critical to be flexible when undertaking research in the school. You need to have a clear picture of the direction without being too ambitious.

You can finalise the specifics as you go, making sure you involve the teachers and students in some of the decision making.

Results

The baseline data (Figure 3) show that the test and control groups were not randomised. The control group had significantly higher scores for both Year 7 NAPLAN and study specific pre-test algebra questions, and this group also had more students identifying they were confident at answering mathematics word problems. There was a significantly higher number of test group students who responded that *think boards* help them to solve worded problems, which reflects one class teacher having used *think boards* prior to intervention.

FIGURE 3: BASELINE DATA FOR TEST AND CONTROL GROUPS. DATA ARE SUMMARISED FROM THE 2014 YEAR 7 NAPLAN TESTS, STUDY SPECIFIC PRE-TEST, AND PRE-SURVEY



* Indicates a significant difference ($p < 0.05$) between the test (intervention) and control (non-intervention) groups.

The impact of the intervention with respect to algebra improvement was determined by comparing the effect size for both the study-specific pre- and post-test results, and the independent diagnostic tests (2014 Year 7 and 2016 Year 9 NAPLAN tests) (Table 1). Due to the disparity between the baseline data for the test and control groups, the students who scored greater than 10 (out of 12) for the algebra questions in their 2014 Year 7 NAPLAN test, or greater than 3 (out of 5) in the pre-test were eliminated. This was done to minimise the ceiling effect (Ary et al., 2013) which would skew the results in favour of the test group because the top students in the control group had little or no scope to improve. The effect size for both measures was greater for the test group compared to the control group.

As a matter of interest, the 2016 Year 9 NAPLAN test had 11 algebra questions which were compared. The results appear in Table 2. This could reflect the continuing use and emphasis on problem solving since the initial intervention.

TABLE 1: EFFECT SIZE FOR INTERVENTION AND NON-INTERVENTION GROUPS FOR THE STUDY-SPECIFIC TESTS

	Study specific pre- and post-tests			
Group	N	Pre-test mean	Post-test mean	Effect Size[2]
Intervention (Test)	29	0.86	1.71	1.14
Non-intervention[1] (Control)	35	1.76	2.44	0.61

[1] The number of students is reduced due to students leaving the school after Year 8 or not having matched NAPLAN tests.

[2] Students scoring greater than 3/5 in the pre-test 10/12 for the Year 7 NAPLAN algebra questions were removed from the data set.

TABLE 2. PERCENTAGE NAPLAN ALGEBRA QUESTIONS[1] CORRECT FOR INTERVENTION AND NON-INTERVENTION GROUPS

Group	N	Year 7 NAPLAN	Year 9 NAPLAN	Improvement
Intervention (Test)	16	35%	40%	+5%
Non-intervention[2] (Control)	27	49%	50%	+1%

[1] The 2014 Year 7 NAPLAN test had 12 algebra questions and the 2016 Year 9 NAPLAN test had 11 algebra questions.

The student surveys conducted before and after the intervention revealed the impact of using *think boards* to solve worded problems. The percentage difference between the pre- and post-survey showed a significant increase in the number of test group students who have used think boards in high school, and who used *think boards* to solve word problems. There was also a 17.2 per cent increase of test group students who indicated that *think boards* helped them to solve word problems, however there was no difference in the number of test group students identifying they were confident answering word problems.

Student interviews

The themes that emerged from the interview transcripts included students' perceptions about the difficulty of the problem and using *think boards* to solve problems, familiarity and confidence with using *think boards*, and application of a specific heuristic strategy (Table 3). Apart from Anna and Bryce (aliases assigned for the higher achieving students), there was a notable positive change in the perception about the difficulty of the assigned problem after using the *think board* to find a solution. The students who initially perceived the problem was hard (Florence, Delilah and Charles) indicated *think boards* were helpful to solve problems. In contrast, Anna and Eric, whose initial perception was the problem was easy, found the *think boards* less helpful. The familiarity with using the *think boards* correlated with confidence when solving the problem. The six students applied four different heuristic strategies ranging from concrete to abstract (draw the pattern, add-on the numbers, extend the table, and write an equation) to solve the problem.

TABLE 3. STUDENTS' ATTITUDES TO PROBLEM SOLVING AND USE OF STRATEGIES ALIGNED TO THEMES IDENTIFIED FROM CODED INTERVIEWS

Perception prior to solving	Perception after solving	Familiarity with using *think board*	Confidence when solving the problem	Application of heuristic strategy	Type of heuristic strategy applied	Feeling about *using think boards*
Very easy	Very easy	Effortless (no prompting)	Very high	Independent (no prompting)	Abstract (equation)	Really helpful
Anna	Anna Eric	Anna	Anna	Anna	Anna	Florence
Eric	Florence, Delilah	Delilah	Delilah	Delilah		Delilah, Bryce
	Charles	Florence	Florence	Bryce, Eric	Florence, Delilah	Charles
Bryce	Bryce	Charles	Charles	Florence	Eric, Charles	Anna
Florence, Delilah		Bryce Eric	Bryce Eric	Charles	Bryce	
Charles						Eric
Very hard	Very hard	Not familiar (even with prompting)	Very low	Scaffolding (prompting each step)	Concrete (draw pattern)	Not helpful

Student comments (Table 4) reveal that students acknowledged that *think boards* provided useful steps to help them plan and work out solutions to problems. Anna, a self-motivated independent thinker, was the only student not to struggle with 'check'. The two students, Anna and Eric, who had the greatest understanding of how to solve the problem initially, were the only students with negative comments about using *think boards.*

TABLE 4: SUMMARY OF TRANSCRIPTS FROM STUDENT INTERVIEWS

Think board responses	Anna	Bryce	Charles	Delilah	Eric	Florence
Initial perception about the problem set	*Easy. Can I do the optional part after?*	*Moderate.* Copies table.	*I don't get it.* Copies table.	*It's hard. Do I draw it up?*	*Not that hard.*	*Boring. ...probably can't do it.*
PLAN	Writes formula for pattern.	*I'm not sure what to do in plan. Can I move onto do?*	Prompting needed. *....it's plus 3.*	Draws a table.	*I know what to do.* Writes strategy.	*I don't know what to do.* Prompting needed. *It's going up in threes ...*
DO heuristic strategy used	Substitutes.	Copies table and extends it. Counts the sides.	*It's too hard.* Needed scaffolding. Adds with 3's to continue pattern.	Extends table from the first number. Misses the gaps.	*Clueless!* Prompting given. Works out by multiplying additional steps by 3.	Adds with 3's to continue pattern. *I don't know if it's right.*

CHECK	*Backtracks. That was a bit too easy!* Worded answer given.	Worded answer given.	*Count the squares in the diagram.* No worded answer given.	Worded answer given.	*What do I check? I don't know how to do it.*	*Do I have to write it here?* Worded answer given. *Did I get it wrong?*
Answer	Correct	Correct	Correct	Incorrect	Correct	Correct
Feedback on using *think boards* to solve worded problems	*Sometimes handy, sometimes annoying. They can make you over-think and stuff it up. Makes you think about harder questions. You can see where you messed up. Makes me re-check for a harder question.*	*At first it was difficult but when I looked more it was easy. They make it easier but it is more time consuming. The structure helps you to solve.*	*... too many steps in them.. The sections help you….*	[Think boards] *are pretty helpful. You think of a plan and work it out. It gets me to think and visualise.*	*Solving it was easy. The hardest part is checking. I hate think boards. It takes too much time and too many things. The two things you really need are plan and do.*	*I find check hard. They help you…… I wouldn't have known to draw a table. Nothing bad.*

Selected interviewer and student (*italics*) comments

<u>*Leader of Learning Reflections: Students' and teachers' thinking about problem solving*</u>

When I initially commenced using think boards in class, most students were very reluctant to follow the process and rushed to the 'do' section, something they were familiar with. Not surprisingly, these students were often unsuccessful at solving the problem. It takes significant time, effort and redirection to get students to slow down the problem solving process and to start to think about what they are doing and why. In doing so, teachers need to think about how they can support the process. Firstly, teachers definitely need to model the process by thinking aloud. Some classroom strategies that I have used (or observed) that helped students start thinking about each think board step include: a challenge point system (each section has equal value); the collaborative solution (each group member has a section to complete); and, blind-solving (where one student sees the written problem, and the other student has to generate a solution on the think board by listening to the thinking of their partner). Once students are following the think board process to solve worded problems they are actively engaged and you can almost hear them think. You can also feel the pride as they become more successful at problem solving.

<u>*Changing my thinking about data*</u>

I was lucky that my strong science background meant I could analyse the quantitative data easily. However, I needed to undertake significant research in order to make meaning from the qualitative data, decoding the six student interviews. To my surprise, I found the qualitative data were more informative to me than the quantitative data. As a past scientist, this really challenged me. Nevertheless, as a reflective leader, it is great to know the students' own thoughts and feelings are having an impact on the instructional strategies being implemented in their classrooms. As I shared my reflections, it allowed me to influence the thoughts and actions of teachers I was working with.

It was disappointing that there was such a large disparity in maths ability between the test and control groups. The streaming of one maths class was a major influence; however, the two classes chosen for intervention had the lowest ability. From a research perspective, I should have analysed the baseline data more diligently before choosing the classes for intervention. Yet, from a social-justice perspective, having such a large impact on the lower achieving students is gratifying. Another disappointment was the limitation of the tests. Many students in the control group had maximum (or near) scores on the pre-assessments which was likely to create a ceiling effect, leading to an apparent bigger impact in the test group (I did the analysis and found this to be true). To minimise the bias, I removed the top scoring students from the data set. Luckily, the control group was larger than the test group. If I were to repeat the study, I would need to validate the testing regime before starting.

Discussion

The aim of using *think boards* in this study was to build problem solving proficiency through scaffolded metacognitive instruction. The quantitative results showed that incorporating the gradual release model to teach specific heuristic strategies with the use of *think boards* led to gains in solving algebra worded problems. This was evidenced by the greater effect sizes in the intervention test for the test group (1.14) compared to the control group (0.61). The effect sizes for both groups fall within the desired zone (Hattie, 2009); however, the effect is greater for the test group and is consistent with those observed following the use of specific techniques (Lipsey et al., 2012). The good effect size for the control group is most likely the result of the algebra curriculum taught in the regular mathematics lessons. The effect size for the test group is a measure of both the *think board* and the regular mathematics lessons.

Some care must be taken in comparing the groups since there was a sampling bias (Lodico, Spaulding & Voegtle, 2010) due to one of the control group classes being an extension class. Some of the difference could be the impact of statistical regression (Lodico, Spaulding & Voegtle, 2010) due to the higher baseline data for the control group. To counter this, data for the highest performing students in the control group were removed before calculating the effect size. The risk of a testing threat (Lodico, Spaulding & Voegtle, 2010) was eliminated since both the test and control groups underwent the same testing regime. The post-intervention survey data showed an increase in the number of students in the test group classes who used *think boards* to solve word problems and who thought they were helpful.

The student interviews support the quantitative data and provide additional evidence about the effectiveness of using *think boards* for metacognitive instruction. Students who were challenged by the worded interview problem found the *think board* helpful, and ultimately changed their perception about the challenge-level after using the steps to solve the problem. This is likely the result of the *think board* making the student 'stop and think' before attempting to solve the problem, which builds connections to the mathematical concepts (Schurter, 2002) and strategies taught. The students who were not challenged by the problem found the *think board* less helpful, as highlighted by Anna's comment: 'They can make you over-think it and stuff it up'. However, Anna stated she would use *think boards* for challenging questions, since 'it makes you think about harder questions'. The level of difficulty of a task determines the point at which a person regulates their cognitive activities (Iiskala et al., 2011), thus challenging students with problems targeted to their ZPD will lead to improved metacognition.

In this study, building independent and successful problem solvers was done through gradual release of responsibility, through modelling and cooperative learning, and the provision of problems in the students' ZPD (Goos, Galbraith & Renshaw, 2002). Although not

measured directly as part of this study, problems set at different complexity levels (1-, 2- and 3-chilli) during the group and individual tasks allowed students to work in their ZPD. Students were actively engaged at problem solving during these lessons.

At an individual level, Florence highlights the success of the problem solving instruction. Her baseline data were very low. She lacked confidence and was really challenged by the worded problem set for the interview. Nevertheless, she was able to use the scaffold of the see-plan-do-check *think board* steps and apply a specific heuristic strategy taught in class to solve the problem successfully. Furthermore, her individual numeracy gains (effect size of 1.57 for NAPLAN) support the success of the intervention.

Although this study has emphasised the success of problem solving instruction using *think boards*, most students interviewed struggled with the self-reflection phase 'check'. Eric discounted this phase with his comment: 'The two things you really need are *plan* and *do*'. Traditionally, students are not taught to reflect on the strategies they use to solve problems and rush in to find an answer (Hensberry & Jacobbe, 2012). Although the current study aimed to change this practice, there was limited time to build proficiency and allow students to share their thoughts during 'check'. It is therefore important that students have the time to practise regularly (Passmore, 2007) and explain their thinking by discussing how they found their solutions (Hiebert, 2003) in order to develop the self-regulation and reflection required for independent problem solving (Hensberry & Jacobbe, 2012).

This preliminary study reported in this article provides evidence that the application of *think boards* with the Year 8 classes in a Brisbane metropolitan High School led to an improvement in problem solving within the context of algebra. Further application of using *think boards* for problem solving within the curriculum is warranted. From this study, several recommendations have emerged that will support our schools in implementing *think boards* in their classrooms (Table 5). The main themes are that teachers must provide time for direct problem solving instruction, and students must be given the opportunity to share their thinking and work in their ZPD. To support this, leaders must provide time and resources to allow teachers to experiment with practice and share their experiences.

TABLE 5: RECOMMENDATIONS FOR USING *THINK BOARDS* IN SCHOOLS

	Recommendation
Teachers	• Allocate time weekly for problem solving • Develop problems with tiers of complexity • Have a class set of *think boards* • Explicitly teach the heuristic strategies • Model each phase of the *think board* (think aloud) • Ensure multiple exposure to *think boards* and heuristic strategies • Establish collaborative activities • Encourage different ways to solve problems • Allow time for student self-reflection with 'check'
Students	• Work cooperatively and share their thinking • Self-rate to determine their challenge level • Check their own and other students' solutions

Leader of Learning Reflection: Action research informs school wide instructional practices

Action research has a role in the school setting. There is a definite need for evidence-based instructional strategies that fit the context of the school. My understanding of the

study participants, through data analysis and observations (including listening to their needs), led to the differentiation of the problems used with think boards as part of this project. This in turn, led to its success. Similarly, in leading the implementation of using think boards as an instructional strategy for problem solving across the school, I have had to make observations and listen to the teacher's needs. I engaged teachers through sharing the success of the project, and providing support in the form of resources, modelling practice and coaching. Through my role as a Master Teacher, working with teachers and principals, I have formed some recommendations for school leaders to manage the implementation of using think boards for problem solving instruction in their school (Table 6).

TABLE 6. RECOMMENDATIONS FOR LEADERS TO IMPLEMENT THINK BOARDS FOR PROBLEM SOLVING IN THEIR SCHOOL

- *Appoint a lead teacher for numeracy to develop resources, model and coach*
- *Build time for problem solving into the timetable and establish expectations*
- *Map heuristic strategies to the mathematics curriculum to build consistency*
- *Buddy teachers for shared lesson planning and mentoring for collaborative learning*
- *Provide teacher release time for professional learning to engage with think boards*
- *Prioritise time at faculty meetings for feedback, sharing and co-planning*

Leader of Learning Reflections: Leadership from the middle is instrumental to change management

By conducting 'project think board' in my school I have learnt so much more than how to conduct educational research, and, how students solve problems. I have developed a critical awareness of how school-based research can effect change in a school. This change is effected by leading from the middle.

A new book by Michael Fullan (2017) highlights the importance of 'leadership from the middle (LftM)' (p. 49). Fullan says 'neither the top-down nor bottom-up approach works, and it asks the question, "where is the glue?" for possible system coherence. We find the glue in the middle' (p. 49). I believe, that through my role as a Master Teacher, generating an evidence-base through action research, I have been part of the 'glue'. I have used the outcomes of my school-based research to leverage both teachers and school leaders. As a result of 'project think board': think boards form a large part of my school's numeracy plan, teachers are changing their practice by handing the thinking to the students through think boards, students are successfully solving problems using think boards, and, other schools have made contact to find out about using think boards as a problem solving strategy. Furthermore, the research findings have recently been panel calibrated as part of Education Queensland's Evidence Hub (Department of Education and Training, 2016) to allow other schools to use the research as an evidence-base to inform their numeracy plans. Stemming from these outcomes, I have generated my model of LftM (Figure 6) where school-based research is the 'glue'.

Fullan (2017) says you need to 'invest in LftM' (p. 57). The Queensland Government's investment in Master Teachers and my school's investment in 'project think board' provide evidence that LftM can work.

FIGURE 6: LEADERSHIP FROM THE MIDDLE

The school-based research forms the middle and the arrows indicate the levels of influence.

Conclusions

Problem solving and algebra are two barriers to success in mathematics for the students at the project school. The current intervention-based study aimed to improve students' algebra and problem solving ability through scaffolded instruction using *think boards* and specific heuristic strategies. Both the quantitative and qualitative data provide evidence that the problem solving instruction led to improved algebra performance in Year 8 students. Teacher observations and student comments indicated the intervention was greatest when students were challenged by the problems, highlighting the need for students to work in their ZPD. Furthermore, students who were familiar with using *think boards* appeared more confident, and could draw on heuristic strategies, when faced with a challenging problem. It is recommended that, during problem solving instruction, students need time to 'stop and think' in order to develop the metacognitive techniques required for ongoing success.

Leader of Learning Reflection

The outcomes of 'project think board' also highlight the importance of school-based research, conducted by teachers and middle leaders, in shaping school leadership and management.

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Making an Impact Where It Matters: Reflections of a Master Teacher Leading Learning with a Numeracy Focus

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ABSTRACT: This article reports on a Master Teacher's reflections on leading the first cycle of an Action Research (AR) project undertaken in a regional Queensland primary school. Standardised tests indicated room for further growth in Numeracy for our Year 5 students who were having difficulty converting word problems to algebraic equations. Literature suggests that engaging mathematical warm-ups targeting the link between word problems and equations may be beneficial. 'Four Square' was identified as one such warm-up tool, with reportedly potential benefit to students and teachers. This 10-week AR project involved four groups of Year 5 students, and this article uses responses of both teachers and students concerning the use of this tool for solving word problems along with the Master Teacher's reflections, to explore the engagement and impact of the project. The process of researching and implementing this tool in a controlled way also assisted our deep reflection into our pedagogical practices as mathematics teachers.

Introduction

In my work as a primary classroom teacher and now Master Teacher, I have generally witnessed a strong correlation between a student's mathematics disposition and their aptitude for the subject. As implied in a quote from Dr Dan Meyer (2010), a high school mathematics teacher who has advocated widely for better mathematics instruction, 'I sell a product to a market that doesn't want it, but it is forced by law to buy it', oftentimes students struggle during Numeracy lessons because they see no sense in it, and educators are faced with dual concerns: rectifying misconceptions students may have, and improving student disposition to enable them to utilise this mathematical knowledge to solve problems in real-life contexts (Askew, 2012). In this article, I report on my search as a newly appointed Master Teacher for a high-yield numeracy tool to assist students in solving word problems, and reflect on my professional development throughout the process of conducting my first action research project.

With nine years of experience teaching children aged 5–13 years, in 2015, I became a Master Teacher in a co-educational government primary school (Prep, age 5 – Year 6, age 11) in regional Queensland (referred to here by the pseudonym of Seagull Primary School), with an enrolment of approximately 650 students. I worked with the administration team to prioritise the teaching of Numeracy. Central to my Master Teacher role is to 'support all staff in the analysis of, and response to, systemic and student data' (Department of Education & Training (DET), n.d., para. 3). Ultimately, this leadership role entails assisting all teachers to build their capacity, thus providing better outcomes for all students.

This article begins by describing my school's challenge, which became mine as a new Master Teacher. Responding to this challenge involved planning and conducting the action research project reported here, with my reflections on my own professional progression.

Master Teacher as leader of change

The role of the Master Teacher has been defined by DET as being: Master Teachers are responsible for leading activities and key tasks in their school and/or cluster. These include:

- working with instructional leaders to prioritise the teaching of literacy and numeracy within the school's curriculum and teaching framework
- improving and enhancing teaching practice for all staff by researching and modelling quality teaching across all year levels
- providing coaching and guidance to teachers and other staff in delivering quality teaching
- improving the capacity of school teams to use evidence-based assessment to inform teaching and learning
- supporting all staff in the analysis of, and response to, systemic and student data.

(http://www.education.qld.gov.au/staff/development/pdfs/master-teachers-fact-sheet.pdf)

In the role of Master Teacher, I consider myself to be both a teacher and a school leader. Conway and Andrews (2016), in an article on school leadership stated that, 'Of significant interest is the capacity for teachers as leaders to commit to whole school improvement in their context' (p. 2). I remember thinking I was a little apprehensive to leave the comfort of my classroom to take on a role requiring new learning on my behalf to become an inspiring leader in our school. I felt confident in my pedagogy, curriculum knowledge and my relationship with the staff. However, I recognised that a foundational area to develop was my ability to handle data more effectively, moving from being 'data-rich' to 'data-informed', and ensuring that this flowed through the school. Fortunately, in early 2015, the opportunity arose to participate in the research skills course through the University of Southern Queensland, affording mentoring as I sought to learn more about conducting research and analysing data.

The AR challenge

Using the AR cycle, the first task was to identify the problem and articulate this problem clearly as the AR challenge. Our school serves a diverse community in regional Queensland. In 2015, five percent of our students had a diagnosed disability and 12 percent of students identified as Aboriginal or Torres Strait Islander descent. In this context, the standardised testing regime common to all Years 3 and 5 students in Australian primary schools, National Assessment Program – Literacy and Numeracy (NAPLAN), can be challenging[1]. The placement of Master Teachers in schools directly related to schools' 2014 NAPLAN results (DET, n.d. a); and with their mandated focus on literacy and numeracy, an expected outcome of the appointment was an improvement in NAPLAN results (DET n.d. b).

Seagull Primary School's NAPLAN data for Year 5 Numeracy was the most concerning, as from 2010–2014 it showed:

- higher than the National average percentage of students in the bottom two bands of achievement

[1] NAPLAN (https://www.nap.edu.au/) measures whether students have the literacy and numeracy skills essential for future learning and participation in the community (Australian Curriculum Assessment and Reporting Authority (ACARA), 2013).

- fewer than the National average percentage of students in the top two bands of achievement, and furthermore
- the percentage of students in the top two bands was declining rapidly from a high of 15 percent in 2011 to 6.5 percent in 2014.

Consequently, a clear objective of my action research project was to find ways to decrease the number of Year 5 students in the bottom two bands of Numeracy, while increasing the number of students in the top two bands of Numeracy.

The problem

My first task was to diagnose reasons for our students' poor Numeracy performance. Investigation of error patterns of the Year 5 students in both upper and lower bands for Numeracy revealed that word problems were a recurrent difficulty, particularly for students in the lower bands. Word problems are stories, verbal or written, which have underlying mathematics, generally requiring algebraic thinking to be solved efficiently. Many discussions with students who struggle with word problems revealed they do not see connections between the clues within the problem and find it difficult to interpret the problem into an algebraic equation to solve. This issue is not about reading comprehension but to looking behind the words to understand the actual mathematical problem to be solved. Word problems feature in NAPLAN Numeracy tests, so approaches to assist students to solve word problems became a suitable target for the action research project.

The 2015 Grattan Report researchers, Goss and Hunter, found that while schools are not short of data, teachers might not be gathering these at the right time nor making the best use of the information. They have suggested that rather than ineffective, procedural, mandated data collection methods (whose results may be misunderstood or underused), teachers should assess what each student knows and target teaching to what they need to learn next; all the while tracking their progress. Certainly, our school collected a great deal of data and part of my role required that I assist teachers to make the best use of them.

Sharratt & Harild (2015) found that while good systems collect data and expect change, great systems use data to set positive targets, and innovative systems communicate their results, both good and bad, with all key personnel. These authors also suggested that innovative systems go deeper by uncompromised questioning in pursuit of these targets. Our school was looking to become more innovative, and the Numeracy piece of the puzzle became my responsibility: I was tasked with ensuring our students were becoming 'confident, creative users and communicators of Mathematics' (Queensland Studies Authority (QSA), 2015, p. 2).

Literature Review: A search for a tool

I already knew of some tools that purported to be useful for improving Numeracy skills and was keen to get started right away. However, I was cautioned by my University mentor to slow down, and take the time to delve into the literature and reflect with teachers about what could inform our action. I needed to find the theory behind instituting such changes and guidance as to which tool to choose. So I embarked on a new adventure, exploring the research literature in mathematics teaching. What a wealth I was to find!

Developing higher order thinking skills in mathematics

In 2012, an Education Queensland presentation charged teachers with the task of developing higher order thinking skills in mathematics moving from closed to open questions. These types of problems require a higher order of thinking when compared to a typical textbook

example of a word problem involving animals, which Schwartz (2016) deconstructs and finds was 'contrived' and 'neither compelling nor engaging' (p. 1). In his review on teaching mathematics, Sullivan (2011) notes that the wording should be meaningful to students in their everyday context. This links with Meyer's (2012) talk which contends that real mathematics involves solving problems from the students' real worlds, proving that mathematics can be 'a powerful force in your own life to get things done' (Audio time 1.00). This research drew our attention to the need to pose contextually appropriate and engaging real-world word problems, to address this particular area of difficulty for our students, to help them develop higher order skills.

A close look at our pedagogy was an essential part of my action research. Ashcraft (2002) found it 'almost unbelievable that tests on such fundamental topics can be so upsetting; knowing that 15 - 8 = 7 ought to be as basic as knowing how to spell "cat"' (p. 181). He ascertained that some classroom methods such as high demand for correctness, public displays of embarrassment, and holding the student accountable for their lack of understanding might be risk factors for negative dispositions towards mathematics. Boaler (2015) also described the negative impact stress has on the mathematical brain, in tune with Cabane (2012) who found that through the fight-or-flight response 'superfluous' functions such as cognitive reasoning and intelligent thinking are shut down when internal attacks are perceived. At our school, we needed to find positive, non-confronting ways to engage our students with problem solving in mathematics.

A focus on group discussions rather than individuals struggling alone with problems has been suggested (Lester, 2013), but what might promote such discussions? Askew et al. (1997), working from the definition that numeracy 'is the ability to process, communicate and interpret numerical information in a variety of contexts' (p. 1), identified a connectionist approach as most effective for numeracy. This means an emphasis on establishing connections within mathematics – particularly between types of representations such as words, images, and symbols, and encouraging students to select from strategies they have been taught rather than following a procedural model. Askew et al. (1997) also asserted that connectionist approaches facilitated classroom discussions of mathematics.

Wright, Martland and Stafford (2006) stated that becoming numerate takes time to grasp varied facts, language, abstract concepts, and complex mental activities, affirming the need to reinforce knowledge and skills. Teachers at Seagull Primary School questioned whether our current pedagogies provided sufficient time both in terms of rushing through curriculum content, but also for students to think and respond and for teachers to follow their thinking strategies. Reinforcement not only aids student learning, it allows time for teachers to observe each child to see how they tackle maths problems (Wright, Martland & Stafford, 2006). Only by becoming aware of the strategies children are using is it possible to identify and challenge misconceptions and teach missing strategies.

Teachers at our school therefore chose to adopt 'slow maths' (Aungst, 2015, para. 4) to facilitate connections, discussions, reinforcement, and observation. Specific pedagogical changes included group work, increasing wait time, not allowing students to 'steal' each other's answers, and persisting with a student when a wrong answer has been given for formative assessment and to encourage student understanding (Boogren, n.d.). Our reasoning was that students who feel less pressured are more likely to present positive dispositions towards learning mathematics. Boaler (2015) also found students progress more when they are participating in mathematics they enjoy, and argued students gained greater familiarity of mathematical ideas when they used them regularly in a variety of contexts, particularly connecting visual and symbolic reasoning.

In addition, we were already involved in a regional initiative called Success School (Numeracy) so I was familiar with various mathematical warm-up activities. Researchers

(Attard, 2012; Eison, 2010) claim warm-up activities provide an engaging start to a lesson, enable students to practice earlier content, probe misconceptions, help students to settle as their purpose is to 'switch on' mathematical thinking, and enable teachers to gain insight about students' thinking whilst being fun to do. Regular use of warm-ups could afford the positive reinforcement that students need and opportunities for teachers to observe students in the act of problem solving.

It was clear from research that these activities would be useful to implement. Attard's (2012) paper on engagement in primary mathematics showed that students appreciated lessons that had physical activity, active learning situations with concrete materials, and/or games, all aspects that warm-ups can provide. Further, Swan (2004) claimed when using maths games, '[t]he game needs to have a clear purpose and the mathematics behind the game needs to be clearly defined' (p. 7). Therefore, warm-ups, with mathematical explanations, had potential. Eison (2010) found that concept warm-ups not only contributed to conceptual learning but also helped to overcome social barriers such as shyness and embarrassment that impeded classroom discussions of mathematical ideas. These references provided helpful advice about using warm-ups and a benefit of breaking down barriers to discussion that we had not considered.

Lester (2013) clarifies that mathematical problem-solving requires many convergent factors: the learner's prior relevant experience of solving problems, content knowledge, proficiency in using a variety of representations, intuition and an ability to recognise patterns of inference. By using warm-ups of gradually increasing difficulty, we could build their experience of problem solving, enhance and consolidate their content knowledge, and promote practice in using different representations (visual and symbolic), all of which could combine to strengthen their confidence in their intuition and inferences. Lester (2013) concludes by describing seven principles for improving problem-solving capabilities, while two principles were considered as the most important. These are, prolonged engagement, i.e. engaging in these tasks regularly; and task variety. Thus, the theoretical framework derived from the literature was that the use of mathematical warm-ups and games would enable us to provide regular and varied experiences, with flexible use of visual and symbolic representations, which would improve their capacity and confidence with problem-solving tasks and afford teachers the chance to observe their students as they work.

Which warm-up?

Johnson (1992) asserted that word problems pose the biggest difficulty in algebra, matching the finding for our students, guiding us towards a warm-up tool targeting word problems. Lester (2013) emphasised the requirement for solvers to move flexibly back and forth between visual and word representations to algebraic representations, so a warm-up tool needed to offer this flexibility. Several tools purportedly assist students to solve word problems. These include 'think boards' as described elsewhere in this issue (Mathews, 2017) which follow Polya's (2008) four-phase framework of 'see, plan, do and check', and the 'STAR method' (Angala, 2016). Both of these tools teach students a particular process to follow – they are procedural models involving the application of algorithms. I was looking for a more flexible tool, one that would allow students to move backwards and forwards between steps and encourage them to better use any information provided thus developing their multi-literacy skills. I encountered *Four Square* through the DET during the Success Schools Numeracy Project in 2014. We modified it a little for use at the school to suit our context. The *Four Square* pencil and paper task allows students to reveal their capacity to connect real-world mathematical word problems to algebraic understanding. They do this through looking more deeply at the word problem and exploring the basic facts, related facts, extended facts, number lines, and other mathematical processes such as part-part-whole, and diagrams. They can work

back and forth between the words and the numbers and introduce different ways of visualising the problem. Teachers can have materials on hand for students to manipulate to assist the students further.

It is well recognised in the literature that the language in which the word problems are written impacts students' success with solving these problems (for example, Fuchs & Fuchs, 2002; Gifford & Gore, 2008; Miller & Koesling, 2009; Whitin & Whitin, 2000). At times, vocabulary unfamiliar to students can prevent them from engaging with the problem (Edwards, Maloy & Anderson, 2009). However, if students are taught to try a strategy of ignoring unfamiliar vocabulary and seeing if they can solve the problem from the rest of the clues, they may be able to successfully solve the problem. Students unfamiliar with such a strategy may simply freeze and not attempt the problem or they might get the right answer for the wrong reasons.

A key literacy issue occurs when common words have different meanings in everyday language compared with maths language. Explicitly teaching maths vocabulary and pointing out the various meanings that the same word can hold can be a breakthrough moment for some students (Gifford & Gore, 2008). As mathematics teachers, reading this section of the literature gave us some of our own breakthrough moments as we realised we were guilty of assuming understandings of language that may not be shared by our students. The warm-ups were opportunities to explain unfamiliar English and maths vocabulary to our students. The *Four Square* tool assists students to navigate the literacy aspect of word problems.

As *Four Square* is a recently developed tool, my search revealed only one article where *Four Square* was used in a special education context with sixth grade children to good effect (Gerrard, 2013). This encouraged our team to try using it with the Year 5 students in this project. Using the *Four Square* tool to work through misconceptions, asking students for multiple solutions and requiring that they connect ideas in a variety of ways without reprimand in a safe environment weds the thinking, as reported here, of both Ashcraft (2002) and Boaler (2015). Encouragement to select an appropriate problem-solving strategy from a range that have been taught adheres to the connectionist approach urged by Askew et al. (1997) and Sullivan et al. (2013). Consequently, this synthesis of the literature review led us to choose *Four Square* as the first tool to be trialled for helping our students engage with and successfully solve word problems connected to their real worlds. However, thanks to my parallel research into the nature of action research, as a team we now understood that action research is a cyclical and iterative process, and we expected to trial other solutions in future action research cycles. By now we were all keen to get started.

Our Research Question

As we decided to adopt a particular approach (*Four Square* warm ups), we wanted to know if it did have an impact on student learning outcomes. Therefore our research question was:

> Did doing the *Four Square* warm-up four times a week for 10 weeks make a difference to Year 5 students' abilities to solve word problems sufficient to be observable on the school diagnostics?

It took some time to arrive at this narrow, precise question. As I now understand, such precision might yield significant findings, useful to me in my context, but also to other people. I also realised from the literature that *Four Square* was not the only possible strategy to use and that action research is intended to occur in cycles. When the time came to interpret results, I needed to keep an open mind as to which strategy to trial in future cycles of my action research.

Research Approach

The Queensland Education Department required Master Teachers to adopt an action research approach. Ferrance (2000) suggests the existence of a variety of definitions of action research; some broad, encompassing many different types of workplace-based research, whereas older sources (such as Hult & Lennung, 1980) offer lengthy, prescriptive definitions. However, general agreement suggests it is a cyclic, participative, qualitative, and reflective process focused on teachers finding ways to improve their practice in the classroom.

I needed to be cognisant of my own position in this process. The University of Southern Queensland had introduced terms such as epistemology, ontology, and philosophy and challenged us, as new Master Teachers, to identify our own beliefs. My initial foray into the epistemology and ontology of mathematics opened up bewildering discussions of Plato with various rebuttals of his thinking. However, Ernest's (1999) clear review aligning epistemology with education clarified my belief that tacit know *how* is as important as propositional (knowing *that*) understanding in mathematics. I agree with Kuhn (1970) that continued experience of working problems and seeing solutions builds tacit knowledge of problem types and strategic choices. I realised this is central to our students' difficulties with word problems – they may actually understand the underlying propositions and operations, but are only just beginning to build their tacit *know how* to see through the words to select appropriate propositions and operations. Similarly, I expect students to use ontological maths (where numbers and operations reflect reality) as well as abstract, hypothetical maths, yet they are just beginning to develop that capacity.

As I had engaged in the University course, the completion of the design brief for the action research was primarily my responsibility. However, as I was meeting with my colleagues regularly, I naturally sought their ideas and input into the plan. It was important that they feel ownership of the project they were about to undertake together.

The design would utilise a sequential mixed method research approach (Creswell, 2009). Quantitative data in this mixed method approach (not reported in this article) were collected from several sources including diagnostic tests and NAPLAN data. Qualitative data for the project included student and teacher surveys, which probed how they utilised the *Four Square*, and whether they deemed the tool valuable and sustainable. Qualitative data initially underwent content analysis (Krippendorff, 2004) to ascertain overall levels of agreement, and then thematic coding (Creswell, 2009).

Participants

The teachers

The pedagogical shift pursued by our school, i.e. adopting new warm-ups, would only be possible due to what Hargreaves (2001) terms the 'social capital' of the school, with effective change requiring high levels of trust between its members. To build this trust and their capacity to acknowledge and explore new ways of addressing student needs, I began meeting with year level teams of classroom teachers of mathematics every second Monday to discuss their mathematics curriculum and pedagogy, with a focus on students engaging with the curriculum. Jensen (2012) found that learning groups initiated more improvement in student learning when teachers were from the same subject area, so these discussions helped all teachers to move more confidently into the area of teaching mathematics. Levine and Smyre (2012) also found that members would maintain their traditional beliefs unless they saw a need for change, so another function of these meetings was to expose teachers to data so they might see the need for change. In this way, by linking successful practice and our aims with

current data and research, as well as celebrating successes, I helped teachers to pursue this pedagogical shift.

The students

The below par performance of previous Year 5 cohorts on the standardised NAPLAN Numeracy tests pointed us towards this age group as a target group for research. However, we were interested in theoretical reasons for the difficulties encountered by these students. Vygotsky claimed that children need experiences within their zones of proximal development (ZPD); that is, experiences they cannot do without guidance, but can do with guidance (Berk & Winsler, 1995). This aligns with the Piagetian stages of learning, which state that children in Year 5 are beginning to solve problems in a more logical fashion but hypothetical thinking has not yet developed.

Willis et al. (2013) found Year 5 students are typically moving from the Partitioning to the Factoring phase of learning. Aspects which students find challenging and which likely stop them moving to this phase are an inability to use inverse operations for multiplication and division, an inability to use grouping to solve problems, and misconceptions around multiplication commutative laws. Sullivan et al. (2013) recognised that key milestones in the development of mathematical reasoning for Year 4 and Year 5 students include being able to choose and apply strategies for unfamiliar tasks and reflecting upon which strategies were the most efficient. These are aspects targeted by using the *Four Square* tool.

Attempting to capture the reality of what our Year 5 students can and cannot do meant maximising my sample size and adopting a quasi-experimental design for this action research. Thus we agreed that all four Year 5 classes in 2015 were utilised (see table 1). Two classes would adopt the *four square approach* and two groups would use *four square* as well as a combination of other mathematical warm-ups, aimed at teaching a range of ideas with respect to Number and Algebra, but unlike *Four Square*, not specifically targeting word problems.

TABLE 1: PARTICIPANTS GROUPS AT SEAGULL PRIMARY SCHOOL

Group mode	Class	Number	Baseline performance	Class	Number	Baseline performance	Totals
Four Square Group	5A	n=24	Higher-performing	5D	n=25	Moderately-performing	N=49
Mixed Approach Group	5B	n=25	Higher-performing	5C	n=26	Moderately-performing	N=51

The four square groups (5A and 5D) enacted the *Four Square* warm-up four times a week.

Findings

Analysis of the initial surveys found that all teachers and 93.5 per cent of students stated that they found *Four Square* to be a useful tool for improving word problem understandings. Captured in Table 2 are some of the teachers' comments.

Teachers used a mixed approach and were encouraged to give feedback on the *Four Square* tool based on their experience of Professional Development about the tool, but they had not used it with their current class during the Action Research project.

Table 3 provides the student feedback to the qualitative questions, showing how the data extracts were coded, the themes that emerged, and how these could be collapsed into overarching concepts.

TABLE 2: TEACHER QUALITATIVE FEEDBACK

Teacher	What do you know about the *Four-Square*?	How did it help your students?	What aspects are they still having trouble with?	In what ways could the *Four Square* be improved?
Four Square Group Teachers	Has multiple usage for many concepts, particularly the 4 operations It is a tool for students to demonstrate their understanding	Making question relevant because students mostly wrote their own problems (linking) It helped them to look more deeply at the problem to identify the operation used, then gain greater understanding of the different aspects of the process	Most coping very well. Some slow due to their inability to completely understand the problem. The story and what else do you know	None- I like it because it provides me with a great understanding of each students' thinking.
Mixed Approach Teachers	A tool for teaching problem solving Applying	Inverse operations The concept of the operation, sharing	Division Creativity of writing word problems	Good as is

TABLE 3: STUDENT QUALITATIVE FEEDBACK

Data Extract	Initial Codes	Broad Themes	Overarching Concepts
'it helps me by slowing it down **'slow down with my work'**	Slowing Down	Solving the word problem by slowing down and using facts	Understanding word problems
'helped me with my division, times tables and part-part whole' **'helps with division'** **'it helped with my division'** **'times tables'** **'times'** **'it helped me with my times tables'**	Facts and link between multiplication and division		
'drawing the picture so you could see it' **'drawing a picture and turn around to division'** **'with strategies'** **'it helped me to work out the story strategies to use'**	How to Solve the problem		
'writing a word sentence' **'how to write word problems'** **'it helped me with the story section'** **'it helped because I didn't know what to write'** **'it helps me write stories that match word problems'** **'to know how to write a new way'**	Writing the word problem	Writing word problem	

The numerical data (not included in this article) and comments from both teachers and students in Tables 2 and 3 indicate that using the *Four Square* tool was having a generally positive effect. There was a noticeable improvement in the capacity of the students to solve

word problems, and students appreciated the tool for encouraging them to slow down and think through the problems more carefully.

Reflections on Findings

Information that we obtained from the quantitative data relevant to the interpretation of the qualitative data was that some students in all classes were still having trouble with word problems, so *Four Square* is not a short-term solution for all. There was some evidence that *Four Square* is a more effective tool with moderately-performing groups, as opposed to higher-performing groups, and it would be worthwhile researching this further to see if students at different levels experience different types of difficulties with word problems.

Also, differences between two groups, as well as between the higher performing and moderately performing groups led us to wonder about the pedagogy operating in the different classes, beyond the difference in the warm-ups. In future, we might use observation techniques, such as video footage of the classes in progress, so we can more effectively share successful practice and pinpoint possible reasons for differences noted in results. We recognised that keeping the two groups completely segregated within the same school is inherently difficult, as is assigning impact when there are multiple variables at play, as is often the case in schools. Appropriate caution is thus applied to the interpretation of all results.

Teachers identified different strengths of the *Four Square* tool. The mixed approach group teachers felt it was a tool for teaching problem solving and applying, whereas the four square class teachers perceived greater capability for the tool. This deeper understanding of the tool is also apparent in the teacher responses around how the tool helped students. However, some unexpected outcomes emerged. A teacher of a mixed group whose class showed improved performance stated, 'students mostly wrote their own problems'. It is possible that writing their own questions made the mathematics real in *their* world, and as Askew (2012) noted, 'students had improved disposition and therefore application'. Also, writing their own problems is a recognised way to avoid problems with unfamiliar language (Edwards, Maloy & Anderson, 2009). In addition, a number of students also mentioned that drawing the picture assisted them with strategies and this calibrates with the findings of Boaler (2015) who found that connecting visual and symbolic reasoning resulted in increased mathematical familiarity. These techniques provide other ways of helping students work with word problems, aside from the use of a specific warm-up tool such as *Four Square*.

Reflections on Leading the Learning Using AR

There is no doubt that this action research brought about a lot of cognitive dissonance within myself and, sometimes, with the staff involved. Pitfalls included the fluid, ever-changing landscape of the school, student absenteeism, other demands placed on teachers as well as their disposition on any given day. In terms of experimental research, attempting to control as many variables as possible was extremely difficult given that teacher pedagogy and student–teacher relationships are inherently unique and play a role in the success of any class.

However, the outcomes were overall positive. There was a collective sense of achievement in having successfully negotiated our first action research cycle. We all now value time spent in planning and consulting the literature, recognising that in the past we may have leapt into action prematurely. We still felt positive about *Four Square* as a specific strategy, and were confident in the use of warm-ups providing many benefits for teachers and students. We had seen clear signs, both anecdotally and in the data, that we were in the process of building confident, communicative, creative mathematics students and teachers.

As a group of mathematics teachers, we had become more of a team, rather than just colleagues, with open communication happening daily. We all agreed this had been a very worthwhile exercise and were keen to continue.

I experienced considerable personal growth, both in terms of learning about research, and in my leadership role in the school. I very much appreciated the mentoring received from lecturers at the University of Southern Queensland, which facilitated my improved understanding of research, data collection, and analysis. I also appreciated the mentorship of my Principal and the administrative team in upholding and supporting my growth as a leader, the knowledge and direction of my DET Region Mathematics team, but most of all, I thank the team of teachers with whom I worked. They were willing to engage in the process, to be open and frank in discussions, and to implement the warm-ups in their classrooms. I believe that my own growth mindset at the time and my willingness to learn provided a valuable model for their learning. I could see why this action research was of benefit to students, teachers, and the whole school.

Conclusion

In their creation of the Master Teacher role, DET modelled distributed leadership in schools, raising another group of teacher-leaders to pursue specific goals. In my school, this was well received, both from those in traditional leadership positions, and from the teachers with whom I worked. I attempted to continue this model in that I encouraged teachers to speak up and share their expertise with others, rather than claiming to be the resident expert. I believe this approach and my own growth mindset contributed considerably to the success of the action research project. I can envisage situations where existing leaders could feel threatened, or where teachers lack respect for the person in this type of role. I was indeed fortunate not to experience such negativity, and I credit my former role as numeracy coach and the processes we had in place, which helped pave the way for my new position. This enabled my growing confidence and self-belief as I engaged with the new process of research**.**

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Professional Learning Community: A Cluster School Approach

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ABSTRACT: This article reports on the first cycle of an Action Research Project which aimed to improve student performance in writing through the development of a Cluster Professional Learning Community (PLC). The PLC's primary purpose was to ensure high levels of learning for all students in Year Five with a specific focus on writing as identified as a weakness in the National Assessment Program – Literacy and Numeracy (NAPLAN) writing test. The Project required teachers to work together within and across the organisational and geographical boundaries of two Primary school sites and support collaborative professional learning and sharing using a continuous improvement cycle. The project implementation is detailed and includes reflections on its level of effectiveness in building individual and collective professional practice for effective writing instruction. Within the limitations of the project, it demonstrates how a continuous improvement process is an effective and systematic approach to improving and building individual and collective professional practice and creating a change in the ways of working within schools and between schools.

Introduction

The Professional Learning Community (PLC) project focusing on 'Improving Writing across the Cluster' was an Action Research (AR) project using Timperley et al.'s (2007) Cycle of Inquiry. This project was designed and implemented through the Department of Education and Training (DET) Master Teacher Action Research Project and supported by the University of Southern Queensland (USQ) Master Teacher Action Research Program. The Master Teacher initiative is a key component of the *Great Teachers = Great Results: A direct action plan for Queensland schools* which is a commitment by the Queensland Government to build professional excellence in teaching and ensure the best educational outcomes for students. Using 2014 National Assessment Program – Literacy and Numeracy (NAPLAN) scores to identify eligibility, Queensland schools provided with the Master Teacher position were considered to be the schools where Master Teachers could make the greatest difference to literacy and numeracy outcomes (DET, 2015). This article reports on the experience of the PLC over the first implementation cycle.

NAPLAN is Australia's annual national Literacy and Numeracy test for all students in Year 3, 5, 7 and 9, corresponding to age 8, 10, 12 and 14 years old respectively. Since its introduction in 2008, NAPLAN has been used by policymakers as a tool to measure school performance and student attainment in Literacy and Numeracy core skills with testing covering four domains; Reading, Writing, Language Conventions (spelling, grammar and punctuation) and Numeracy. It provides a standardised measure of student attainment levels around the country and provides data on the progress students make as they move through school (Goss et al., 2016).

I was appointed as a Master Teacher for a cluster of three schools. This cluster is spread across two primary residential centres in regional Queensland. Geographically, 17km separate these two regional centres; however, distance is not the only measurable difference between

the three schools. Each school within the cluster is unique and caters for students from diverse socio-educational and cultural backgrounds. To enable meaningful and fair comparisons of NAPLAN test attainment by students in schools across Australia, the Australian Curriculum, Assessment and Reporting Authority (ACARA) has developed the Index of Community Socio-Educational Advantage (ICSEA) scale to give each school a weighted value based on the level of educational advantage/disadvantage, remoteness, and the presence of groups with specific needs (ACARA, 2015)[1]. Within the cluster, the ICSEA values range from Primary School A at 869 and Primary School B at 1002 to School C, the region's only secondary school, placed at 961.

Prior to the Cluster Master Teacher position being created, the schools worked largely in isolation. In the past, a small number of local and national initiatives had attempted to stimulate cooperative arrangements. However, many of the initiatives had not typically been based on a clear understanding and definition of what was meant by networking or collaboration and devoid of any focus. However, in the reported initiative, a key task of each Master Teacher was to design and implement an action research project that addressed a key area of literacy or numeracy requiring improvement using an evidence-based strategy. School and Student Performance in the NAPLAN Writing Domain had been identified by my cluster of school principals as an area requiring significant improvement.

The PLC project was conducted across the two Primary School campuses, School A and School B. School C did not participate in this project. It was intended that the PLC would function as an inter-school collegial group to foster team responsibility for all student learning whilst supporting and building teachers' individual and collective professional practice for effective writing instruction. This was to be achieved by participating in moderated writing tasks; engagement in cluster professional learning team meetings; focusing on data indicating student abilities or skills; sharing and reflecting on teaching practices through a cycle of inquiry; applying research-based practices; and developing teamwork and collaboration skills.

Literature Review

Teaching students to become effective and fluent writers is one of the most important and challenging aspects of every teacher's work. Writing is an essential skill for effective communication, it is the primary means by which students demonstrate their knowledge in today's classrooms and it is fundamental to students' success both in and outside of school life (Graham, Gillespie & McKeown, 2013).

A national study of primary grade writing instruction (Graham et al., 2003) found that there is considerable variability in teachers' instructional practices. This is because skilled writing is a complex process requiring extensive self-regulation of a flexible, goal directed, problem solving activity requiring many components for effective writing instruction (Harris, Graham, Friedlander & Laud, 2013). In every year level and every subject area, teachers must know how to teach the knowledge, processes, strategies and skills students need to write effectively, and how to engage and inspire students to write, and write well. The General Capabilities in the Australian Curriculum state that to be successful in any learning area, students must be 'able to use the significant, identifiable and distinctive literacy that is important for learning and representative of the content of that learning area' (ACARA, 2017, Literacy, para. 2). It is also vitally important that teachers know how to monitor their own teaching of writing (Zumbrunn & Krause, 2012).

[1] Calculated on a scale which has a median of 1000 and a standard deviation of 100, ICSEA values typically range from approximately 500 (representing extremely educationally disadvantaged backgrounds) to about 1300 (representing schools with students with high levels of educational advantage). < http://docs.acara.edu.au/resources/Guide_to_understanding_icsea_values.pdf>, p. 1.

The Grattan Institute Report (Goss et al., 2015) recognised that the huge spread of attainment in Australian classrooms makes it hard for teachers to target their teaching to the needs of every individual student. Individual teachers struggle to meet the intervention and enrichment needs of their struggling and most able learners. Goss et al. (2015) commented, 'Australian research shows that achievement can be spread over five to eight year levels within a single class: a Year 7 class may have students working at a Year 1 level, while others have mastered concepts from Year 8' (p. 1). Nine recommendations were made (Goss et al., 2015) to help close the gap between theory, policy and practice and embed targeted teaching in every classroom. Goss et al. also claim that teachers and schools can lift all students' performance by developing their ability to use evidence of individual student learning to inform teaching and target their teaching to what the student is ready to learn next. Teachers should then analyse their own impact, preserve what works and change what does not (Black & Wiliam, 1998; Goss et al., 2015; Hattie, 2009).

In *The Shared Work of Learning*, Bentley and Cazaly (2015) highlighted evidence that an over-reliance on individual school performance, and competition to enrol high-status students, is worsening the societal problems of inequality and fragmentation. After the detailed analysis of case study findings from three Australian school systems and syntheses of international literature and research evidence, the report highlights that collaboration is poised to provide the next big wave of gains in education. Collaboration, it is argued, 'can lead to connections that are more authentic, more sustainable and better adapted to the needs of participants than more hierarchical or instrumental structures on which education systems traditionally rely' (p. 55).

Education researchers agree that improvement efforts need to focus on building the collective capacity of educators within schools to meet the challenges they face (DuFour & Marzano, 2011; Masters, 2016). Hattie (2015) believes that harnessing the expertise within schools and leading successful transformations is a major role of school leaders, claiming, 'that the greatest influence on student progression in learning is having highly expert, inspired and passionate teachers and school leaders working together to maximise the effect of their teaching on all students in their care' (p. 2).

Cohen and Hill's (2000) research has indicated that professional learning is more likely to improve student learning outcomes if it increases teachers' understanding of the content they teach, how students learn that content and how to represent and convey that content in meaningful ways. Lieberman and Pointer Mace (2009) highlight the importance of starting with what teachers know first in the exploration of practice, claiming that starting with this knowledge dignifies the 'wisdom of practice' and helps open teachers' classrooms to inquiry, breaking the isolation that keeps teachers from becoming colleagues and forming the basis for a professional learning community.

Professional Learning Communities (PLCs) have been promoted as a way for schools to reduce isolation and learn together, as well as build capacity for creating and sustaining change and whole school improvement efforts (Hord, 1997; Lujan & Day 2009; Stoll et al., 2006; Tam, 2015). Specifically, it is the impact of PLCs on whole school improvement, teaching practices and student learning that has been the major focus of research and there is strong evidence that the implementation of data-driven PLCs has positive effects for both staff and student learning outcomes (Griffin et al., 2010). As DuFour and DuFour (2012) wrote, 'The PLC process is specifically intended to create the conditions that help educators become more skilful in teaching because great teaching and high levels of learning go hand in hand' (p. 6).

The term PLC was created to denote the activity of 'a group of people sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented, growth-promoting way' (Stoll et al., 2006, p. 223). While the term

has become widespread throughout the education sphere, the core underlying practices and processes have not and as a result there are many different definitions and constructions of PLCs (DuFour & Marzano, 2011). Typically, a PLC refers to the larger school organisation and not the individual teams that comprise it. DuFour et al. (2010) define a PLC as being 'composed of collaborative teams whose members work inter-dependently to achieve common goals for members that are mutually accountable' (p. 11). Inspired and informed by this research, Queensland schools have been encouraged to use PLCs led by Master Teachers. It is this initiative that this article reports.

Research problem and research questions

The primary purpose of this project was to ensure high levels of learning for all students in Years 5 with a focus on writing. This need was identified as a priority area for these Primary schools using NAPLAN data. The approach was driven by the belief that helping all students learn requires a collaborative and collective effort to meet the needs of each student, and to assess our effectiveness in helping all students learn we must focus on results – evidence of student learning – and use results to inform and improve our professional practice and respond to students requiring intervention or enrichment.

The Research Questions drew on the work of DuFour and Marzano (2011). Four critical questions were used to clarify the work of our PLC:

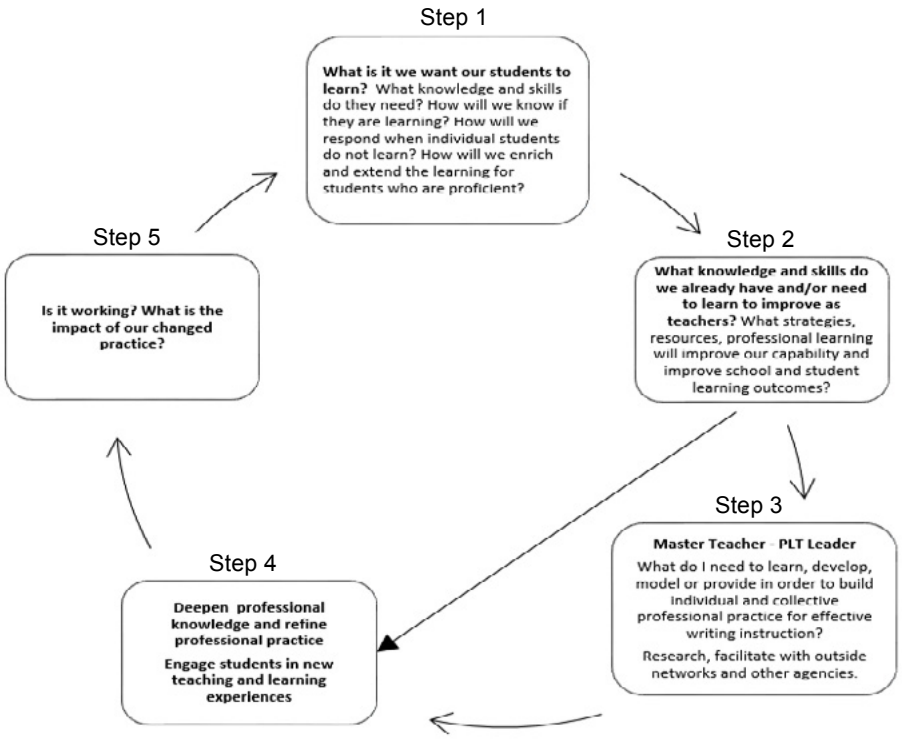
1. What do we want our students to learn and know?
2. How will we know if they are learning?
3. How will we respond when students do not learn?
4. How will we enrich and extend the learning for students who are proficient?

Research process

The Action Research project used the cycle of inquiry and knowledge-building derived from research undertaken by Timperley et al. (2007) (refer figure 1). Timperley et al.'s research indicated the greatest effects for professional learning occurred when teachers' thinking and conceptions about student learning were challenged. By engaging in a process of identifying their own professional learning needs based on an analysis of those for their students, and taking control of setting goals and monitoring progress towards them, leaders and teachers become more motivated which in turn drives them to develop their knowledge and skills in ways that improved student outcomes (Timperley, 2011).

The project model involved five-weekly whole cluster PLC meetings, a weekly PLC meeting and professional learning session, and a minimum of one-hour Master Teacher classroom support per participating Classroom Teacher. The nature of classroom support and mentoring provided was negotiated using the Cluster Cycle of Inquiry and Knowledge – an adaptation of the Teacher Inquiry and Knowledge-Building Cycle (Timperley et al., 2007).

FIGURE 1: THE CLUSTER CYCLE OF INQUIRY AND KNOWLEDGE-BUILDING



Adapted from the Teacher inquiry and knowledge-building cycle to promote valued student outcomes (Timperley et al., 2007, p. xliii)

Participants

The 40-week period that this article reports upon had a two school semester timeframe split between the 2015 and 2016 school years. This resulted in some staff and student participant turnover throughout the project and variation in the length of time teachers participated in the project.

For ethical reasons and to preserve anonymity, the teachers are identified as T.A who teaches at School A and T.B who teaches at School B. Followed by this is the participant number e.g. T.B1. Participants were chosen because they were, or currently are, the classroom teachers for the Year 4 and 5 students in 2015 and/or 2016. School A had four teacher participants, two of whom were in the project for the entire 40-week period (T.A1 and T.A2). School B had five and only one participant was in the project for the entire 40-week period T.B1). Experience levels were mixed, ranging from less than one year of teaching to over 21 years.

Implementation of the knowledge-building cycle

There were four steps in the first cycle:

Step 1 – Identifying what it is we want the students to learn

This cycle began with the teachers and Master Teacher engaging in collaborative group discussion using student writing samples and performance data identifying what writing skills

students needed to have to improve their writing ability and performance in the NAPLAN tests according to the Writing Marking Guide and Year level achievement standards.

With Master Teacher support, individual teachers completed a Pre-Assessment writing task with their class, marking and moderating it using the appropriate NAPLAN Writing Guide criteria or GTMJ. The Master Teacher and teachers then engaged in a collaborative group discussion using student writing data to identify school-wide and individual student learning needs. Evidence of student learning was used to inform each teacher which individual students required intervention/extension; and inform students of the next steps for learning through goal setting and feedback.

Step 2 – Identify what knowledge and skills do we need to learn/ improve as teachers?

What strategies, resources, professional learning will improve our capability and improve school and student learning outcomes? Teachers examined their students' writing in relation to what it revealed about their own professional practice and knowledge of writing. Evidence of student learning was used to inform each teacher of individual professional strengths and weaknesses in teaching aspects of writing skills/genre, so that each member could provide or solicit help from collaborative partners. It was also used to inform the team of the areas in which many students were struggling so that they could develop and implement more effective strategies for teaching those skills. Teachers identified next steps in their own and students' learning, setting goals for both themselves and their students.

Step 3 – How can I, as the Master Teacher, build teacher capacity for effective writing instruction?

A key task of the Master Teacher was to build teacher knowledge and improve and enhance pedagogical practice for all by researching and modelling quality teaching and effective writing instruction and strategies specific to class, individual student, and teacher need. To support teacher and student learning, the Master Teacher supplied resources, professional readings, and research literature to support teachers' knowledge about writing purposes, genre, and evidence-based pedagogical practices. Professional Learning sessions were designed for teachers by the Master Teacher using the information gained from application of the Cluster Cycle of Improvement, giving them the opportunity to learn about specific and effective evidence-based approaches to writing instruction, including strategies and resources, while observing them in practice.

Step 4 – Developing professional knowledge and refining professional practice. Engage students in new teaching and learning experiences.

Professional Learning for teachers was embedded into the classroom context as teachers engaged in Master Teacher classroom support and mentoring processes e.g. co-planning, modelled lessons, co-teaching, etc. Because of this professional learning, teachers then engaged students in new learning experiences as they developed and refined teaching and learning practices.

Step 5 – Is it working? Where to next?

In this stage, the PLC collects evidence of learning through student writing samples, self-reflection and classroom observation. Key questions during this stage included: Where are we going?; How effective is what we have learned and done been in promoting our students' learning and writing ability?; Where to next? The PLC celebrated what was working, what gains had been made, and reflected on what didn't work and what improvements were needed. Further cycles of inquiry were then engaged in with the next focus being developed through analysing the evidence of student learning and the next Cluster Cycle of Inquiry and Knowledge Building.

Data Collection and Analysis

Data reported in this article have been drawn from reflections of participating teachers and myself collected at the end of the knowledge-building cycle. Teachers completed a non-identifiable survey which had closed (Likert scale) and open ended questions. These data were collated and grouped according to the themes that emerged from the teacher reflections.

Findings

Several themes emerged from the teacher participants' written reflections about how their knowledge and skills around effectively teaching writing had improved because of the work done in the project. These themes are bolded in the teacher reflections reported in this article.

Teachers were asked 'how' their **professional practice** could be supported to ensure that all students achieved at high levels instead of being forced to justify why they were not.

> The most valuable aspect is being able to talk with other teachers to gain ideas and brainstorm what may or may not work better in the classroom and gaining expert help from the Master Teacher, including one on one coaching and resources. (T.B2)

> Working collaboratively with teachers from [School B], as well as teachers from [School A], has provided me with an opportunity to not only share ideas and resources but to also form stronger professional bonds between the two schools. I see this as a big step in strengthening my own pedagogy and ultimately positively influencing student learning. (T.B1)

Teachers reported **changes to pedagogy**, including targeted teaching, writing moderation, use of data to inform teaching and learning, and increased awareness and use of evidence-based practices and effective writing strategies. All teacher participants provided several examples of how their knowledge and skills around effectively teaching writing had improved because of their participation in the project and all believed that the new knowledge and skills they had learnt through the project made a positive difference in their professional practice.

> My knowledge and skills around effectively teaching writing has improved greatly due to my involvement in the Cluster PLC. My skills I have learnt through [the Master Teacher's] mentoring in the classroom, through observation and modelling writing strategies, have developed my writing teaching. With our Cluster PLC moderation, we are able to identify needs of schools and individual writing goals. From this, we are able to set targets with individual students and support their endeavours in becoming a stronger writer. (T.A1)

> This project has helped me understand the key components of writing, therefore enabling me to teach them effectively. Assessing the students moderated writing tasks and reviewing the NAPLAN results for writing in detail has enabled me to identify strengths and weaknesses and establish effective learning goals. Before this project I was unaware of the appropriate structure for a variety of texts. I now feel like I understand the structure of texts better and know how to effectively teach students to structure their texts appropriately. (T.B4)

Not only has teachers' **confidence in their pedagogical knowledge** of effective writing instruction increased, but this knowledge has had a positive impact on student achievement. All teachers reported that the PLC project had positive impact on students' writing performance and students' attitudes towards writing as demonstrated in ongoing classwork in the last 12 months, and provided anecdotal evidence of this.

> Our students' attitudes have changed dramatically, they are excited and enthusiastic about what they write and are keen to share. This has built confidence with writing strategies that support individual targets that both teacher and students identified. (T.A1)

> At the beginning of the year my students were never enthusiastic about writing. They never knew how to start their writing and were unaware of appropriate text structure, specifically for persuasive texts. Now, my students can confidently write a variety of text types and structure them correctly with correct paragraphing. The data showed this was a significant weakness for my students, and I can now confidently say that this has improved. (T. B4)
>
> The students have a deeper understanding of sentence starters, and now use noun groups, verb groups and text connectives with more confidence. (T.B3)
>
> They are not scared of writing anymore and not scared to make mistakes. They see mistakes as learning opportunities. (T.B5)
>
> Since the start of the PLC the students have developed a love for writing. They are more engaged and results have been outstanding. The success that the students have had relate directly to the project and seeing the enthusiasm around writing develop has been mind-blowing. The students are so much more confident. They have been exposed to more sophisticated levels of writing and developed accordingly. One struggling kid in my class even writes persuasive texts to his parents at home. His dad shows me. All my students love the success they have achieved and they are extremely keen to share their work. (T.A2)

All teachers reported that they used at least one of the t**eaching strategies learnt through the project** on a weekly basis and could provide examples of this. All teacher participants strongly agreed that engagement in the project developed their ability to use evidence-based assessment to inform teaching and learning and agreed that they were a better teacher because of their participation in the PLC. There was also moderate to strong positive agreement from participants that their students' academic achievement in English and Writing Assessment tasks had improved because they were using PLC strategies in their teaching practice.

> With help from the PLC, I have been able to effectively implement a range of evidence-based writing practices within my classroom. PLC has given me the confidence to try new teaching strategies based around teaching writing effectively. One of these strategies has been including writing in my guided reading groups. Turning the students into being able to read as writers. This is proving to be a very successful strategy in my classroom practice. (T.B5)
>
> The students' writing has improved in C2C Assessments. They are more willing to take risks. (T.A4)
>
> The achievement has been fantastic. We have been able to focus on one aspect of writing for e.g., paragraphing or vocab as we identified areas of weakness and have seen all the students improve their scores. Some students have achieved 3 or 4 extra marks per criteria which directly relates to the PLC areas of focus. The school NAPLAN results have been the highest ever and directly relate to the quality work achieved in our PLC. Our A-E student data has also improved, as the work we do is directed related to the Australian Curriculum thus increasing our curriculum achievement and student performance results. (T.A2)
>
> I have enjoyed being part of the Cluster PLC and have developed professionally as a result. Through discussions and the sharing of resources I have found that I am better equipped to deliver effective writing lessons. An example is the vocabulary lessons which had previously been a focus of the PLC group. Using simple strategies such as the 2A sentence strategy has assisted all of my students in their descriptive writing skills. It is an easy strategy to remember and they can use it while they write or during the review stage. (T.B1)

Responses to the questions about **organisational support and change** were strongly positive and all agreed that implementation of the project was advocated, facilitated and supported by their school organisation. Some participants wrote that they would like to have more time to collaborate with other teachers during their school day however they all agreed that their schools had provided structured opportunities to collaborate with other teachers including the Master Teacher.

> The PLC project has enabled me to better collaborate with other teachers at my school. The PLC project has opened up new opportunities for me to work with teachers outside my school. (T.A4)

Through the cycle of continuous improvement, and a focus on growth rather than just test scores, teachers were provided **with targeted support which helped them to work collaboratively and build their collective capacity** and improve student achievement.

> Being part of the PLC has given me the ability to successfully use data to drive my students' improvements in writing. This has greatly improved my professional practice in AITSL standard 3: Plan for and implement effective teaching and learning. (T.B5)

> This project has affirmed the importance of collecting data to inform teaching practice. By collaboratively collecting and assessing NAPLAN and moderated writing tasks, I have been able to establish SMART goals. By watching the Master Teacher demonstrate writing lessons, I have developed a number of ideas for teaching writing, especially how to develop creative writing ideas. (T.B4)

> Thank you for letting me be a part of it – great way to improve as a team. It is a great idea so that we can have a chance to moderate together across a couple of schools in the district – as we are all sending our students to the same high school/same direction. It was nice to know that we all have similar struggles and a range of techniques/teaching styles to cater and overcome the weaknesses that the students may experience – also to expand on the strengths. (T.A3)

The impact of the project can best be described in the participants' own words.

> I believe that this program has benefited both student and teacher endeavours in writing. The project brought schools together to collaborate and moderate, which built a team outcome and shared vision for individual student writing. Without this program of identifying both teacher and students' writing and teaching targets, there would be less growth and success in our schools. I was able to share teaching strategies, activities and resources with other teachers. The PLC project was a meaningful professional development experience for me. I would recommend the PLC project to other teachers. (T.A1)

> I feel privileged to be able to work in this way. My teaching has improved greatly. My knowledge has improved greatly. I am a much more confident teacher and thus my students are achieving fantastic results. Being part of the PLC has improved my job satisfaction and I am more happy teaching and am much more engaged in my job. I am looking forward to continuing with the project. (T.A2)

In summary, there were three organising themes:

1. Teacher work life and professional culture, such as teacher collaboration, collaborative conversation, collective responsibility, teacher confidence and empowerment increased enthusiasm, shared vision, knowledge of the curriculum, collaborative planning and sharing, collaborative inquiry and saved time.
2. The implementation of the PLC alleviated isolation by providing an opportunity for teachers to meet on a regular basis, promoting collaboration, and helping teachers build relationships.
3. All teachers also reported that the Improving Writing PLC provided a more supportive environment for teachers. It provided a structured model for breaking down the 'cycle of blame' for student underachievement or failure and, instead, acknowledged up front that it takes coordinated effort, resources and time on the part of both teachers and school leaders.

All reported improvement in student performance.

Discussion

The literature reviewed for this project indicated that PLCs produce positive outcomes for both staff and students. They have been promoted as a way for schools to reduce isolation and learn together, as well as build capacity for creating and sustaining change and whole school improvement efforts. The findings from this research project support these findings as well as the further benefits to staff, reducing in teacher isolation, increased commitment to the mission and goals of the school, increased peer support, shared responsibility for students, enhanced understanding of curriculum content and increased professional knowledge about student learning and effective instructional practice (Hord, 1997; Lujan & Day, 2009; Stoll et al., 2006; Tam, 2015). In addition, participants' written reflections clearly show that they all experienced significant benefits because of their time in the PLC project and, through their participation in this project, teachers' individual and collective professional practice was enhanced.

As teachers examine various sources of data about improvements in student learning, co-assess student work and debate its quality, learn from each other and adopt new innovative practices with ongoing support within their teams, their professional practice grows which in turn benefits the students in their classes. The project provided teachers with opportunities to better understand, and therefore improve, their professional practice.

While there is further analysis to be undertaken and the small-scale nature of the research is acknowledged, the results of this project show the PLC model, as used in this project, gives schools a framework to build teacher capacity to work as members of collaborative teams that focus on improving student learning while also building their individual and collective professional practice. It is also clear through the feedback and experiences of the project's participants that the PLC model with the addition of Team Leader support is an effective teaching and learning process by which teachers grow professionally in the conditions that support and promote growth.

The use of a PLC to improve teaching practice and student achievement is a move that educators support and value, as indicated by teachers' perceptions of impact cited in this project. The development of the PLC helped dissolve long standing traditions of privacy, and closed and isolated workplace and inter-cluster school conditions. Bringing teachers together helped establish bonds and facilitate reflective dialogue which would not have otherwise occurred.

Concluding Personal Reflections

This article only reports on the first 40-week cycle of a PLC project which extended over a three year period. Since the first cycle, the project has undergone further refinements and further data have been collected. Writing is a complex and challenging skill to both master and teach. I did not appreciate how complex until this project began. As a team, we wanted to foster a love of writing in students and teach writing in a way that does not simply teach to a test but promotes critical and creative thinkers, when writing and learning. As the Master Teacher, I also wanted to build teachers' individual and collective efficacy towards writing and develop teachers' knowledge and understanding of themselves as writers. The creation of new knowledge has been vital to my Master Teacher role. Teacher participants had diverse starting points for not only the effective teaching of writing, but also in their confidence and understanding of the Australian Curriculum, pedagogy and assessment. The use of assessment data to make instructional or evidence-based decisions is an increasingly important part of the teaching and learning process. Strengthening teachers' capacity to assess student performance against the Australian Curriculum and building teachers' competence to use student

assessment data including the individual NAPLAN writing criteria have been fundamental to the project's success. At the school level, student assessment plays the key role in informing schools and teachers about students' individual achievement through teacher-based summative and formative assessments. For student achievement to improve, standards and NAPLAN writing criteria must be matched with formative assessments and with teaching strategies designed to achieve the desired outcome.

With a focus on improving student learning, participating teachers have enhanced their leadership capacity as they have worked as members of an ongoing collaborative PLC. My initial research project design did not sufficiently account for this. Key aspects of this project include the development of a collaborative culture, the use of high quality, school-based professional development and learning in context to improve teacher practices, and strong parallel leadership (Crowther, Ferguson & Hann, 2009) for school and student improvement activities by the teachers, Master Teacher, principal and other school leaders. The extent to which a school's infrastructure is designed to meet student and teacher needs is a key element for building capacity and engendering change in teachers' work lives and professional culture. Some of the school organisational components required for the implementation of the PLC project have included professional roles and responsibilities, materials and resources, scheduling, and time for collaboration. Without these components in place, it is extremely difficult to enact change.

Developing a greater understanding of school-based educational research has provided me with the tools to embed and enact change in my local school contexts – specific to our Professional Learning needs and student cohorts. It has provided me with an alternative way of viewing and approaching educational questions, providing me with a new way of examining my own and others' practice. This project has enabled me to work in a collaborative way to identify school-based teaching and learning issues and develop processes for improvement. It has empowered both myself and participating teachers to thoughtfully examine and analyse classroom practices in order to improve teaching and learning and encourage innovation and self-identified learning.

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Mastering Action Research in a Year Two Classroom to Improve the Quality of Specific Genre Writing: Creating an Effective Ripple!

KYLIE WESTLAKE

ABSTRACT: If you throw a stone into a pond perfectly, the ripples spin slowly out to the edges in almost continuous circles. It touches all areas of the pond, though not at the same time. If you throw the rock too hard or the rock is too large you create a larger wave that rocks the boat and unsettles the fish in the pond. On the other hand if the pebble has no weight its impact is not felt. Creating a change in a large school is like creating the perfect ripple.

As a newly appointed Master Teacher it was important to improve my strategic skills in order to create a perfect ripple. This article follows one school taking action designed to improve the quality of Year Two students' writing through the implementation of a school-designed Writing Framework (WF), integrating process and genre approaches to writing. In addition, included are my reflections as a new Master Teacher leading this learning through action research.

Introduction

This article follows one school as they embarked on improving the quality of student writing. The school designed an innovative and research-driven Writing Framework (WF). The framework incorporated five elements: Content, Collaborate, Create, Critique and Celebrate and intertwined two traditional approaches to writing: process writing and the genre approach. The framework emphasised authentic purposes for writing, the use of exemplar texts and using peer feedback to influence further drafts. Presented in the article is how the framework was trialled within a Year Two classroom context, anticipating that it would enhance students' text structure and overall quality of writing. The research endeavoured to answer:

How does the innovative WF improve the quality of Year Two students' writing?

Which components of the WF influence the quality of student work?

The article also includes the reflections (in italics) on the planning used to strategically throw the stone in the right direction and my learnings as the Master Teacher as to what may support the creation of a perfect ripple to improve the quality of writing across a school context.

Knowing the Data – Surveying the pond

The project was implemented in a metropolitan Queensland primary school with a higher than average socio-educational advantage rating, in a growing suburb. The school in 2016 had approximately 950 primary school students aged 5–12 within 38 classes. The majority of students come from Anglo-Australian families; some have migrated to the area from interstate or from the United Kingdom. There are a small number of students representing other cultures and an even smaller percentage of indigenous students. Parents have high aspirations for their

children and this assists the school in establishing and maintaining high expectations in learning and social outcomes.

The school's National Assessment Program – Literacy and Numeracy (NAPLAN) data for Year Three Writing in 2014 indicated a decline in the school mean. The mean score dropped from 439 points in 2011, to 403 points in 2014. Furthermore, the percentage of students in the upper two bands also declined from 35 per cent in 2011 to 16 per cent in 2014. Examining the criteria used to mark the NAPLAN writing task, the areas of punctuation and text structure were the weakest, especially when compared with the national mean.

Through initial discussion, it was discovered that teachers in the school had the following concerns when teaching writing: a lack of student engagement in writing lessons; students were mainly completing one draft writing pieces; and students' main audience for writing was the teacher. Enhancing the quality of student writing was a major priority for the school and measuring success of the intervention was important in order to plan for future school improvement. Guided by the action research principles of Mills (2014), it was deemed necessary that a systematic inquiry conducted by the teachers involved would gather the relevant information on the effectiveness of the strategies implemented.

> *After getting to know my pond, I knew that improving writing skills was imperative to improving student outcomes. How we could do that and what the focus for research would be was not yet framed. It was a deliberate choice to not just throw any rock laying around the educational world and watch the splash.*

Literature Review

Researching the trends – Picking the perfect rock

Over the past 30 years, there have been differences of opinion in the literature about the most beneficial writing pedagogy. Most strategies published have centred on two main approaches: the writing process and the genre approach. Educators such as Badger and White (2000) acknowledge the need for balance and advocate the merging of the two approaches. These authors experimented with using the genre and process approaches together naming it the 'process genre approach'. Through their research they were able to affirm the blended approach worked well when it begins with texts, investigates language features and purpose, and subsequently students write using the writing process.

Layered with these merging approaches is the Explicit Instruction, 'I Do, We Do, You Do' and sixteen elements of Explicit Instruction as expounded by Archer and Hughes (2011). It is the belief of Archer and Hughes that when the content is new and students have little prior knowledge then Explicit Instruction has the highest yield. This is somewhat mirrored in the *First Steps in Writing Resources* developed by the Western Australian Education Department (2013) where the gradual release of responsibility process – Model, Shared, Guided and Independent – forms the underlying principles. The gradual release of responsibility has the teacher moving from assuming 'all the responsibility for performing a task ... to a situation in which the students assume all of the responsibility' (Duke & Pearson, 2002, p. 211). Read, Landon-Hays and Martin-Rivas (2014) completed research on how the gradual release of responsibility improved persuasive writing of fourth grade students. They made a direct link between the teacher modelling and the way students wrote their persuasive texts and therefore, they argue, quality teacher modelling impacts on the quality of student writing.

Cameron and Dempsey (2013) advocated that during the modelling stages of writing pedagogy or as teachers build the field knowledge, there should be use of exemplar texts, deconstructing texts and graphic organisers to represent texts. Berger, Rugen and Woodfin's

(2014) research further supported the findings that exemplars of work build a student's vision of quality.

> *It became clear through researching that we were not happy to just pick any stone – a custom designed pebble to meet the exact learning needs of our pond was suggested. Our research was starting to shape what a school-developed writing framework might look like. The team wanted to develop a framework that supported the teaching of text types, so the following points became very important to the development of a school-based writing framework:*
>
> - *A focus on teaching text structure*
> - *Incorporate elements of the writing process so that students build writing stamina and revise their work*
> - *Work collaboratively to build field knowledge.*

Development of a Writing Framework – The couture pebble

Leading a team of interested educators, we collaborated to research, develop and refine a school designed Writing Framework (WF) that intertwines with the genre and writing process approaches incorporating a variety of strategies, pedagogy and writing conventions. The school-developed WF, summarised at the end of this section in Table 1, was developed to focus learning around a specific text type and for teachers to use the pedagogy of:

- ***Content*** – What do my students need to know?
- ***Collaboration*** – How can we work together to build field knowledge and examine exemplars?
- ***Create*** – How can we plan and create a first draft?
- ***Critique*** – What feedback opportunities do students have to make multiple revisions?
- ***Celebrate*** – How can we share our final product with an authentic audience?

Important aspects of 'Content' and 'Celebrate'

The WF outlines the importance of considering student learning needs from recent writing samples and observations, Australian Curriculum documents and student learning goals and interests. In examining the literature, it can be best summarised that when you take the mandated curriculum and align it with student learning needs you get to what needs to be the focused content.

One of Archer and Hughes' (2011) 16 Elements of Explicit Instruction is to focus instruction on critical content. Critical content is empowering to students as it matches the learning with their instructional needs and what is necessary to complete the task. Marzano (2007) suggested that the critical content be established and communicated to students through the use of learning goals and progress tracked. The content part of the WF is driven through the student writing data and Australian Curriculum requirements. This allows the content being addressed within the unit to be focused and relevant.

It is in the publishing of the texts that the WF highlights how 'Content' and 'Celebrate' work closely together to ensure that students are assigned work that matters and that they get the opportunity to write for an authentic audience. Berger (2003) and Ruff (2010) indicated that students are intrinsically motivated when they are given interesting work that challenges them and the responsibility to complete it. Student engagement in writing is a key factor that influences the quality of the final product, and it is a specific area that the writing framework highlights for teachers. The audience of the writing plays an important role in maintaining

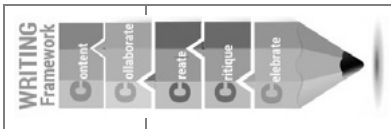
student engagement. A fundamental belief underpinning the framework is that children write best for real audiences and when the learning is matched to their learning needs.

Important aspects of 'Collaboration'

An important aspect of the 'Collaboration' is socially developing and building relevant field knowledge. Students write best when they have knowledge about the content, structural features, text type and related language. Generally, background knowledge can be built in two ways; through direct experiences or through indirect experiences (Marzano, 2004). Although Marzano (2004) indicated that direct experiences such as excursions, guest speakers and hands on activities are excellent ways to build the relevant knowledge, they are not always practical and time efficient in the classroom. Building from the literature, the WF, designed by our school and presented in Table 1, highlights the social aspects of building field knowledge; the importance of discussing texts; orally developing metalanguage around text types; and hooking the students into the writing topic.

The other important aspect of 'Collaboration' is the use of exemplars. One of the key uses of exemplars within the WF is for students to see quality writing and collaboratively begin to establish success criteria for creating texts. Sharratt and Harild (2015) indicated that students are more likely to be engaged if the success criteria are constructed between the students and teacher. Berger (2003) showed how building collaborative criteria through critique sessions defines the qualities of exceptional writing and is the first step to assist students to internalise the criteria for success. In her research, Ruff (2010) found that when students analyse exemplars as a class, it has two main advantages; one is the improved creation of student work and secondly, increased ability to evaluate the work of others.

TABLE 1: AN OVERVIEW OF THE INNOVATIVE WF AND THE COMPONENTS



Overview of the Writing Framework

Exceptional writing has lasting value

	Focus	Sample Activities
Content Work that Matters	***Curriculum Development:*** • Identify the relevant curriculum • Select a writing text type and purpose • Develop an authentic assessment task • Identify relevant exemplar texts • Ensure exemplar texts have focus language features	• *Identify Australian Curriculum* • *Identify individual and group learning needs* • *Write or find exemplar texts* • *Organise graphic organisers*
Collaboration Build relevant field knowledge Study Exemplars of Excellence	***Building Relevant Field Knowledge:*** • Make connections with student's background knowledge • Develop specialised knowledge of the subject matter • Introducing subject specific terminology • Develop the skills of English that students require to effectively deconstruct and construct texts • Provide shared experiences for students to jointly discuss and write	***Discover Exemplar Texts*** • *Discuss the central ideas, opinions and feelings* • *Discuss how the text is organised* ***Interact with Exemplar Texts*** • *Orally retell parts or all of the text* • *Identify the specialised language* • *Discuss similar texts* • *Create visual organisers, diagrams, graphs or concept maps* • *Expand, revise, summarise the text* ***Instructional Critique*** • *Students to collectively decide on the 'A' achievement in relation to the exemplar text*
	Deconstructing Exemplars: • Determine author's purpose and theme • Investigate techniques the author has used to hook, position or evoke a response from the reader • Identify the function of the different parts of the text • Explore the use and effect of different sentence structures	

	• Identify language choices made • Develop the metalanguage of the text • Instructional critique and development of student generated marking success criteria	***Focused Teaching:*** • *Examining the structure of the text* • *Identify author's purpose* • *Sentence structure* • *Transformation activities* • *Transitivity activities*
Create Important to plan and prepare	***Teachers as Writers – Modelling Construction:*** • Orally and visually construct a text highlighting the metacognitive thinking authors engage in when writing • Highlight the focused teaching through the modelling • Involve students in critique and feedback on teacher writing	***Can demonstrate and model:*** • *Various stages in the writing process including planning, first draft, seeking feedback, revising, editing and publishing* • *The language choices made in relation to the audience*
	Everyone as a Writer – Joint Construction: • Shared Writing • Interactive Writing • Guided Writing • Collaborative Writing	***Can include:*** • *Small group/partner writing activities* • *Practice of selected sections of the text type* • *Organising planning using graphic organisers* • *Targeted revising and editing*
	Creating a First Draft: • Selection of topic • Collection and organisation of information • Plan writing and composition of text using appropriate structure	***Can include:*** • *Writing as an individual, with a partner or within a small group.* • *Typing or handwriting*
Critique Culture of critique Multiple revisions	***Peer Instructional Critique and Feedback:*** • Feedback is Kind, Specific and Helpful • Feedback forms the catalyst for multiple revisions • Students are accountable for making revisions, responding to or ignoring feedback given. • Students revise and edit drafts	***Can include:*** • *Author's Chair, Authors' Circle, Show call* • *Class follows protocols for giving feedback* • *Peer critique and feedback* • *Teacher critique and feedback* • *Multiple revisions completed in different colours and included with the completed text*
Celebrate Real Audiences	***Writing presented to a suitable audience:*** • Students proofread and publish their work • Writing is presented to an authentic audience • Students reflect on their published work	***Ideas for presenting work to an audience:*** • *Creating a book for the library* • *Digital publishing of work* • *Emailing texts to relevant organisations* • *Posting postcards to a real person* • *Sharing texts at a Writing Expo* • *Class Book Launch* • *Class Newspaper*

Important aspects of 'Create'

'Create' as part of the writing framework is about creating and writing the first draft of a particular text type. It is heavily influenced by the gradual release of responsibility and the writing procedures in the *First Steps in Writing Resource Book* (Western Australian Education Department, 2013). The writing procedures release the responsibility from teacher to student. It allows the teacher to make judgements and ensure that the level of instruction and guidance

is given when needed and students are transitioned to be able to apply their textual knowledge to independent construction.

Important aspects of 'Critique'

The most important aspect of 'Critique' is giving the students the skills and voice to give feedback on the work of others and confidently critique their own work. Soep (2006) asserted that students participating in peer feedback allows them to develop skills and processes to decide what makes quality work and the language to give descriptive and meaningful feedback. It is through this feedback loop that subsequent writing drafts improve.

Ruff (2010) and Berger, Rugin and Woodfin (2014) all agreed that the teacher plays an important role in establishing the environment conducive to productive feedback. It is imperative to have whole class critique lessons where the protocols for creating a feedback environment can be established. Lemov (2015) has established a technique that fosters a 'Culture of Error' by which it is important that teachers create an environment in which students feel safe and supported even when discussing mistakes and errors. It is about shaping how students respond to one another's learning and establishing a classroom environment that respects the work of others and the potential for improving. Teachers need to be strong ambassadors for upholding the critique norms.

The work of Berger (2003), Berger, Rugin and Woodfin (2014) and Ruff (2010) suggested that critique actually begins with analysing models and establishing standards. This is where the link between 'Collaborate' and 'Critique' is strong in the WF. It is then utilising the established success criteria as the benchmarks when reviewing peer feedback.

Brookhart (2008) argued that self-assessment should be emphasised over peer assessment as it has a greater effect in improving the learning of the individual. Although self- assessing and improving draft writing is invaluable, these skills are developed when working on giving valuable peer feedback.

> *It was this eclectic mix of pedagogy of writing that made the backbone of the framework. We had our couture pebble that was entrenched in current research – the team was ready to throw.*

Methodology

Actively supporting implementation – Preparing to throw

> *Having completed extensive research and creating the framework, I was eager to work with others on implementing the framework and measuring the outcomes. The writing team felt quite accomplished to have on paper a well-researched idea to move forward with. Members of the writing team had informally trialled aspects of the framework and incorporated elements they had researched into their daily pedagogy. Anecdotal recounts at this stage sounded promising but what was the impact when all the pieces combined together?*

An interpretative qualitative approach that included elements of both qualitative and quantitative data was used in this project (Mills, 2014). The use of a variety of tools provided the best approach to answer the developed research questions and to determine the usefulness of the WF. The qualitative research aimed to support trends in the quantitative data. The qualitative data also gave the teachers implementing the project a 'voice' and a chance to share their professional learning journeys (Creswell, 2014).

As the school was directly looking at improving Year Three NAPLAN data, it was decided to target Year Two. Three teachers volunteered to pioneer the newly-designed WF and work collaboratively with the Master Teacher. The project adopted an action research

approach that valued the practitioners as the expert 'knowers' about their own classroom and students (Creswell, 2014). The age group of the students ranged from 6–8 years and included a range of abilities. Students participating in the study continued to receive targeted literacy support for extension and remediation, and adjustments were made to cater for diverse learners.

The study design used two phases. In Phase One, three teachers implemented a narrative unit of work at the end of the 2015 school year with 70 students. Phase Two retained two teachers from Phase One to implement a retell unit of work in 2016 with 47 students. Before commencing the project, the teachers participated in a day of professional development, which familiarised them with the writing framework, examined the background research and engaged them in a collaborative planning session. The professional development was led by the Master Teacher and members of the team that worked in developing the resource.

During Phase One implementation, each classroom teacher had the Master Teacher in their classroom each week. The support was customised to suit the individual needs of the classroom teacher and responsive to student needs. In each class, the teacher identified lessons during Phase One to be demonstrated by the Master Teacher including: using exemplars with students to determine success criteria and introducing peer feedback and critique using the protocols of kind, specific and helpful feedback. During Phase Two of the implementation, the Master Teacher visited the classrooms undertaking the project, interacting with students and teachers but no lessons were demonstrated.

Data Analysis

In order to determine whether the quality of 72 Year Two students' writing improved with the intervention of the WF, pre-intervention and post-intervention student writing samples were collected and scored. During the design of this action research, it was discovered that researchers have had difficulties developing methods that reliably assess the quality of writing (Rezaei & Lovorn, 2010). In particular, it was difficult to ensure that scores were reliable and valid between different markers (Hout, 1990). As this research wanted to specifically look at the quality of students' writing, it was important to ensure that counter measures could be taken to ensure consistency in scoring. The writing samples were scored using a five-point scale correlated with the Australian Curriculum Achievement Standard (ACARA, 2014) and the Queensland Curriculum and Assessment Authority (QCAA, 2014) draft standard elaborations for English. Focus criteria were marked on a five-point scale with 1 being well below year level expectation, 2 being below year level expectation, 3 being at year level expectation, 4 being above year level expectation and 5 being well above year level expectation. Particular focus criteria scored were: Text Structure, Audience and Purpose, Text Cohesion, Vocabulary, Punctuation, Spelling and Sentence Structure. All samples were marked and moderated by two people, with the Master Teacher being one of them.

It was also important for the research project to determine what components of the writing framework had the greatest influence. At the completion of both phases, participating teachers completed a face-to-face, semi-structured interview with the Master Teacher. Numerous student work samples were collected throughout the teaching sequence from a diverse range of students. The interview and work samples were analysed to determine what components had influence.

> *After completing two phases of intervention, I no longer needed to throw a rock to end up in the pond. I was swimming in data: hours of interviews, numerous student work samples, pre- and post-intervention scores and my own journal of notes. Actually, at times I didn't feel like I was swimming, the sheer volume of data was dragging me down and I was drowning in my own research. Needless to say, measuring and determining*

the outcomes of the research was more like a muddy puddle than the clear pond I had thrown the pebble into. Although the positive talk and observational records of student work through both phases did indicate an improvement, it was important that I analysed without bias. This was the point in my research that I felt on my own. Once it came to examining data, it was easy to see how a smaller more focused research topic would be an easier platform to practise action research. What I had learned so far would have changed the initial planning stages of the research, but hindsight was not productive to completing the project. I decided that I would depict the data collected in a dependable and honest fashion, interpreting what I did have.

Results

Measuring the ripples

Phase One pre-intervention data, as shown in Table 2, exposed that text structure attracted the least score. This pre-intervention data and corresponding student work samples were used by the trial teachers to identify critical content. Before planning and teaching the unit, the critical content identified by each teacher, through considering the data was:

Teacher A of classroom A – text structure, punctuation, and writing stamina

Teacher B of classroom B – text structure, adding dialogue, vocabulary and consistent tense

Teacher C of classroom C – text structure, vocabulary, matching problems to solutions and consistent tense.

Text structure across the three classes had the lowest pre-intervention score, and was identified as common critical content. All areas identified by teachers, including text structure, became the basis of explicit teaching and focus exemplar lessons throughout the writing unit. When comparing pre- and post-intervention scores, as also outlined in Table 2, text structure had the greatest gain and one of the highest effect size. Also, when combining the class data, the mean for each criterion across the classes is depicted in Figure 1, indicating that text structure gained 1.3 points, followed closely by vocabulary at 1.2 points.

TABLE 2: INDIVIDUAL CLASS MEANS FOR PHASE ONE PRE-INTERVENTION TO POST-INTERVENTION AND THE GAIN OF THE FOCUS CRITERIA

		Phase One Individual Class Average Scores per Focus Criteria								
		Class A n=23			**Class B n=24**			**Class C n=25**		
		Class Mean	Standard Deviation	Effect Size+	Class Mean	Standard Deviation	Effect Size+	Class Mean	Standard Deviation	Effect Size+
Text Structure	**Pre Intervention**	**1.3**	**0.5**		**1.8**	**0.8**		**1.6**	**0.7**	
	Post Intervention	***2.2***	***0.52***	0.67	***3.4***	***1.12***	0.57	***3.1***	***0.96***	0.66
	Gain	0.9			1.12			1.4		
Audience and Purpose	**Pre Intervention**	**1.6**	**0.5**		**2.2**	**0.6**		**2.1**	**0.38**	
	Post Intervention	***2.3***	***0.5***	0.57	***3.4***	***1.12***	*0.56*	***2.8***	***0.83***	0.57
	Gain	0.7			1.2			0.9		

Text Cohesion	**Pre Intervention**	**1.8**	**0.3**		**2**	**0**		**2**	**0.38**	
	Post Intervention	***2.1***	***0.39***	0.39	***3.2***	***0.88***	0.69	***2.9***	***0.83***	0.57
	Gain	0.3			1.2			0.9		
Vocabulary	**Pre Intervention**	**1.6**	**0.57**		**2.1**	**0.67**		**2.2**	**0.62**	
	Post Intervention	**2.3**	***0.57***	0.52	***3.4***	***1***	*0.60*	***3.3***	***0.8***	0.61
	Gain	**0.7**			1.3			1.1		
Punctuation	**Pre Intervention**	**1.5**	**0.57**		**2.7**	**0.96**		**2.8**	**1.17**	
	Post Intervention	***2.1***	***0.67***	0.41	***3.5***	***1.08***	0.36	***3.7***	***1.32***	0.9
	Gain	0.6			0.8			0.9		
Spelling	**Pre Intervention**	**2**	**0.6**		**2.8**	**0.87**		**2.8**	**0.98**	
	Post Intervention	***2.4***	***0.79***	0.27	***3.5***	***0.96***	0.35	***3.3***	***1.06***	0.23
	Gain	0.4			0.7			0.5		
Sentence Structure	**Pre Intervention**	**1.6**	**0.66**		**2.2**	**0.69**		**2.8**	**0.87**	
	Post Intervention	***2.3***	***0.79***	0.49	***3.4***	***1.04***	*0.56*	***3.3***	***1.02***	0.25
	Gain	0.7			1.2			0.5		
Overall Total	**Pre Intervention**	**11.5**	**3.71**		**14.8**	**5.12**		**16.3**	**4.05**	
	Post Intervention	***15.9***	***3.27***	0.53	***23.8***	***6.41***	*0.61*	***22.5***	***6.14***	0.51
	Gain	4.4			9.0			6.2		

+Effect size was calculated as a means as describing the data and is not a measure of reliability. Effect size was calculated by using the value of Cohen's d and the correlating effect size, using the mean and standard deviations between pre- and post-test intervention scores.

On the other hand, spelling made the lowest gain at 0.6 points, also depicted in Figure 1. When examining individual student samples, 36 of 72 students in the study made zero or regressed in the spelling criteria compared to 11 students for text structure as illustrated in the summarised data in Table 3. Also of note in Table 3, there was only one student who made no gain overall from the pre-intervention to post-intervention. The overall individual student gains ranged from 0–19 points, with the mean being 6.8 points and an effect size of 0.56 points.

Through Phase Two of the project, similar trends were recorded. When analysing pre-intervention scores in Phase Two, as represented in Table 4, punctuation had the lowest average score for each class, being 1.3 points. Using these data, both teachers identified sentence punctuation, noun groups and writing stamina to be the critical content.

FIGURE 1: PHASE ONE AVERAGE GAIN FROM PRE-INTERVENTION TO POST-INTERVENTION SCORES PER CRITERIA

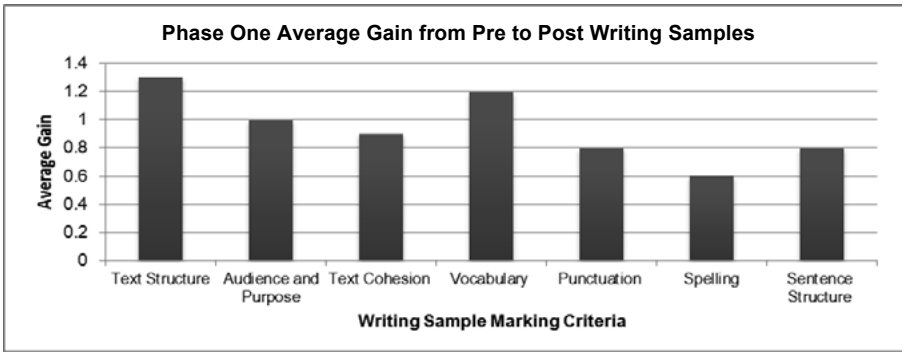


TABLE 3: NUMBER OF INDIVIDUAL STUDENTS WHO HAD NO GAIN OR REGRESSED IN PHASE ONE FROM A GROUP OF 70 STUDENTS

Phase One Individual Number of students who made no gain in the focus criteria or regressed							
Text Structure	Audience and Purpose	Text Cohesion	Vocabulary	Punctuation	Spelling	Sentence Structure	Overall Score
11	21	25	12	26	36	28	1

TABLE 4: INDIVIDUAL CLASS MEANS FOR PHASE TWO PRE-INTERVENTION TO POST-INTERVENTION AND THE GAIN OF FOCUS CRITERIA

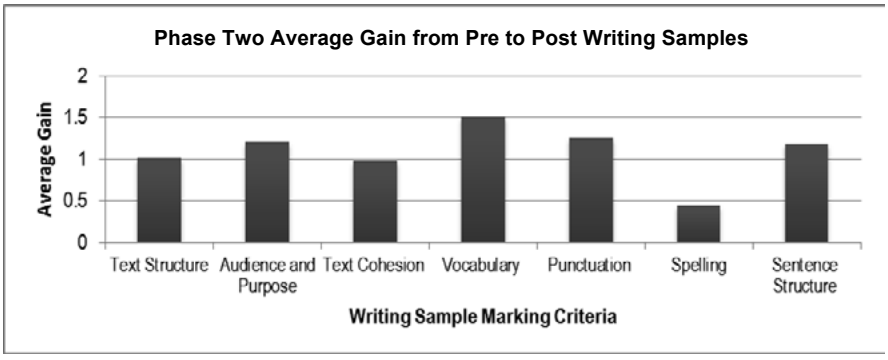
		Phase Two Individual Class Average Scores per Focus Criteria					
		Class B n=24			**Class C n=25**		
		Class Mean	Standard Deviation	Effect Size+	Class Mean	Standard Deviation	Effect Size+
Text Structure	**Pre Intervention**	**1.9**	**0.7**		**2.4**	**0.6**	
	Post Intervention	***2.9***	***0.77***	0.56	***3.4***	***0.87***	*0.56*
	Gain	1.0			1.0		
Audience and Purpose	**Pre Intervention**	**1.8**	**0.4**		**2.0**	**0.5**	
	Post Intervention	***2.8***	***0.65***	**0.68**	***3.5***	***0.77***	**0.76**
	Gain	1.0			1.5		
Text Cohesion	**Pre Intervention**	**2.0**	**0.72**		**2.0**	**0.64**	
	Post Intervention	***2.7***	***0.87***	0.41	***3.3***	***0.94***	**0.63**
	Gain	0.7			1.3		
Vocabulary	**Pre Intervention**	**1.9**	**0.53**		**2.0**	**0.35**	
	Post Intervention	***3.1***	***0.94***	**0.62**	***3.8***	***0.71***	**0.85**
	Gain	1.2			1.8		

Punctuation	**Pre Intervention**	**1.3**	**0.65**	**0.54**	**1.3**	**0.69**	**0.61**
	Post Intervention	***2.4***	***1.01***		***2.7***	***1.1***	
	Gain	1.1			1.4		
Spelling	**Pre Intervention**	**2.0**	**0.79**	**0.16**	**2.8**	**0.72**	**0.38**
	Post Intervention	***2.3***	***1.04***		***3.4***	***0.76***	
	Gain	0.3			0.6		
Sentence Structure	**Pre Intervention**	**1.6**	**0.58**	**0.54**	**2.0**	**0.4**	**0.75**
	Post Intervention	***2.6***	***0.95***		***3.4***	***0.79***	
	Gain	1			1.4		
Overall Total	**Pre Intervention**	**12.5**	**3.61**	**0.56**	**14.7**	**2.75**	**0.73**
	Post Intervention	***18.7***	***5.46***		***23.6***	***5.29***	
	Gain	6.2			8.9		

+Effect size was calculated as a means as describing the data and is not a measure of reliability. Effect size was calculated by using the value of Cohen's d and the correlating effect size, using the mean and standard deviations between pre- and post-test intervention scores.

Figure 2 graphs the average gain recorded over the duration of the intervention in Phase Two, for each of the criteria.

FIGURE 2: AVERAGE GAIN FROM PRE-INTERVENTION TO POST-INTERVENTION SCORES PER CRITERION IN PHASE TWO



When examining the average gains per criterion, as defined in Figure 2, vocabulary and punctuation had the most significant gains at 1.5 and 1.3 points. This directly relates the identified focused content of sentence punctuation and noun group.

To measure an increase in writing stamina, a percentage increase in word count was used, as depicted in Table 5. This could be said, indicates an increase in writing stamina or the willingness of students to write longer texts which is also in line with identified critical content. The overall gain ranges from 0–16 points with the overall average being 7.6 points. Also, the observed student work samples and habits indicated an increase in stamina after the intervention through an increase in word count and improved neatness of handwriting.

TABLE 5: PHASE TWO MEAN WORD COUNT OF PRE-INTERVENTION TO POST INTERVENTION WRITTEN SAMPLES

		Mean Word count Pre-Intervention/Post Intervention					
		Class B n=24			**Class C n=25**		
		Class Mean	Standard Deviation	Effect Size+	Class Mean	Standard Deviation	Effect Size+
WORD COUNT	**Pre Intervention**	**65.54**	**29.21**		**55**	**21.29**	
	Post Intervention	***131.73***	***46.17***	*0.64*	***189.44***	***61.25***	*0.83*
	Gain	66.19			134.44		

+Effect size was calculated as a means as describing the data and is not a measure of reliability. Effect size was calculated by using the value of Cohen's d and the correlating effect size, using the mean and standard deviations between pre- and post-test intervention scores.

Once more in Phase Two, there were some students who made no gain in particular criteria as indicated in Table 6. The table indicates that the vocabulary had the fewest number of students who made no gain, in line with the identified critical content. Across Phase Two data, spelling made the smallest gain with the mean being 0.4 and had the highest amount of students make zero gain at 27 of the 47 students. This trend for spelling was consistent with the data that were collected during Phase One. It also has the lowest effect size in both phases.

TABLE 6: NUMBER OF INDIVIDUAL STUDENTS WHO HAD NO GAIN IN PHASE TWO

Phase Two Individual Number of students who made no gain or regressed in particular focus criteria							
Text Structure	Audience and Purpose	Text Cohesion	Vocabulary	Punctuation	Spelling	Sentence Structure	Overall Score
10	5	13	4	10	27	5	1

Through the post unit interviews with teachers, some key questions were asked and responses condensed which are recorded in Table 7 (Phase One) and Table 8 (Phase Two). Through this data set it can be seen that a definite strategy used by all teachers in both phases of the research was the use of exemplar texts to teach text structure, language features, critical content and to create student-generated success criteria. Teachers also suggested that the motivation of students to participate in the writing tasks was directly linked to the content being matched to student interests.

The development of peer feedback in Phase One and Phase Two was different. In Phase One, teachers used the work of Berger (2013), particularly the example he has called 'Austin's Butterfly' to introduce multiple drafts in response to feedback. This learning was supported by the Master Teacher and peer feedback was explicitly taught. In comparison, in Phase Two, trial teachers did not introduce peer feedback or multiple drafts. Trial teachers believed that students did not have the required maturity and stamina and therefore decided it was not developmentally appropriate at this stage of their learning. The collective teacher efficacy influenced how the elements of the WF were utilised.

TABLE 7: PHASE ONE SUMMARIES OF POST UNIT INTERVIEWS WITH CLASS TEACHERS

Phase One Summary of Post Unit Interviews			
Questions	**Teacher A**	**Teacher B**	**Teacher C**
What did you enjoy about teaching this writing unit?	It was motivating for students which meant they completed more writing. It gave my students the confidence to write and trust their ability.	It let us mould it to suit the needs of our students.	I liked the explicit nature of the WF. I also enjoyed watching how much the students work grew in the seven weeks of the unit.
What area of the WF had the biggest impact on student writing?	The content, the topic of super heroes was instantly engaging. They asked to write a second chapter to their story.	The use of exemplars, they referred to these when writing their own stories. When I was modelling writing and highlighting the specific success criteria.	The use of exemplars and the student devised success criteria. We referred to these criteria throughout the unit and they owned them because they wrote them.
How did you use the exemplar texts?	• Creating success criteria • Identifying the text structure of a narrative • Sentence punctuation	• Text Structure • Highlighting past tense • Pronoun referencing • Creating success criteria	• Text Structure • Highlighting past tense • Pronoun referencing • Noun groups • Creating success criteria • Superhero characteristics
How did you develop success criteria?	Students individually marked on an exemplar text parts that they thought made it an exceptional narrative or story. Each student identified one important factor and recorded it on a superhero outline. We then put all the superhero outlines together to create class success criteria for a narrative. Each student owned the success criteria.	I went through one exemplar and we discussed what made it an exceptional narrative. I was able to teach them some of the metalanguage of narratives at this time. I then gave them another exemplar and they marked on it what they thought made it exceptional. As a class we then created a list of success criteria for an exceptional narrative. I had made a list for myself before I stated this with students because I didn't want to miss anything. I had to prompt them about the tense of the story but as a class they came up with everything on my list.	Students used the wipe and write boards to individually mark on an exemplar text what made it exceptional. They shared their ideas with a partner. We then discussed it as a class and I use some prompting questions. I recorded the success criteria on an anchor chart under the headings: must include, should include and could include.

How did students get feedback on their work?	As a class we looked at Austin's Butterfly and what kind, specific and helpful feedback was. We practised giving feedback on a constructed teacher text. Students found it difficult to give specific feedback. I decided that our buddy class of year four students would give students feedback on their stories so they could improve their drafts. Working with the year four teacher we taught them how to give specific feedback. I continued to model feedback and gave students opportunities to give peer feedback on everyday writing.	I didn't get to teach them about feedback and peer critique. I gave them feedback so that they could write a second draft. I wanted their stories completed for school reporting and was running out of time. It was more important that they got correct specific feedback quickly so they could complete the task.	We looked at Austin's butterfly and how you can use feedback to improve your story. We then used Author's chair to practise giving feedback. Student's them worked in partners to give feedback between draft one and two. When observing this feedback some of it was not accurate. I gave teacher feedback using the same model and clarified student feedback.

TABLE 8: PHASE TWO SUMMARIES OF POST UNIT INTERVIEWS WITH CLASS TEACHERS

Phase Two Summary of Post Unit Interviews		
Questions	**Teacher B**	**Teacher C**
What did you enjoy about teaching this writing unit?	The students are confident with retelling stories so the text structure was very familiar which meant we could focus on the mechanics of writing. This was a perfect start to the beginning of the year.	It was a great foundation unit for the start of the year. The amount the students could write just increased so much as they increased their writing stamina.
What area of the WF had the biggest impact on student writing?	Identifying the focus content. The raw (pre-intervention) writing samples really highlighted the areas we needed to work on when comparing them to what is expected in the Australian Curriculum.	Modelled writing. The students needed to see how to construct simple and compound sentences including correct finalisation marks.
How did you develop success criteria?	We read though the exemplar texts as a class and brainstormed what made it an exceptional retell. As a group we created an anchor chart that we could refer to.	As a class we read a large copy of the exemplar text. I modelled how to find text features and taught the language required simultaneously. We created a list of the success criteria we could refer back to.
How did students get feedback on their work?	We only completed one draft with emphasis on editing for punctuation. We read the first draft to a partner and reflected if the punctuation was correct. I used an editing checklist with some key features on it.	My students completed one draft and self-edited using a checklist. It took considerable time and planning to complete one draft.

What do you think influenced student work?	The choice of texts used.	Lots of writing workouts.
Why didn't you focus on feedback and authentic purpose for writing?	Working with students at the start of year two and establishing all the necessary routines, I did not feel that this was the most important element to work on.	The students did not have the maturity and stamina to do this. I will gradually release this across the year.
What was different between the Phase One unit and this Phase Two unit?	The students. The ability of each class was so different but I was able to make the unit respond to their learning needs.	The first unit looked at more complex text type and using techniques to engage the audience and the second unit focused on a more familiar text type allowing the students to practise basic writing skills.

Discussion

Reflections – What impact did the ripples have?

The development of the writing framework was about enhancing teacher behaviours and pedagogy to improve the quality of student writing. This action research investigated the design of a quality framework to support teachers with writing pedagogy and then to evaluate the impact the subsequent changes in pedagogy had on student writing at a Year Two level. At a simplistic level, the data indicate that the writing abilities of Phase One and Phase Two for most students improved with the intervention. The question is: what influence did the WF have on the improved quality of writing?

This action research suggests that effective writing pedagogy begins with clear planning that deliberately identifies critical content through the analysis of student work samples, aligns it to curriculum expectations and is reflective of the work of Archer and Hughes (2011) and Marzano (2007). In both phases of this project, critical content identified by teachers at the start of the unit and subsequently focused on throughout the unit improved at a higher rate than criteria that were not considered critical. It could be suggested that the 'Content' section of the writing framework directly influences the unit, especially if, through 'Collaboration' and 'Create', the pedagogy of explicit instruction and use of exemplar texts is used to teach focus content. Teachers in the action research project had a strong background in explicit instruction and in the gradual release of responsibility, and utilised these skills to support the writing framework. It would be recommended that when using the writing framework, teachers be trained to analyse student writing samples to accurately diagnose mistakes and how to best remediate them. Jones (2002) stated that the assessment of writing is central to the process of effective teaching of writing. It would be important that the critical focus identified by teachers was accurate to the learning needs of their students, making a deliberate choice of what to focus on that directly impacts learning.

The use of exemplar texts to teach text structure and language features highlighted the identified critical content and allowed student development of success criteria. This is embedded in the 'Collaborate' phase of the WF and was a strategy that the teachers quickly adopted and used in their teaching. This pedagogy could be directly linked to the consistent improvement in the text structure criteria. Berger (2013) suggested that students articulating what makes writing good and creating their own success criteria are the first steps towards

internalising the skill ready to transfer to their own writing. Students move their thinking from simply doing writing to thinking about writing.

What a teacher believes students can achieve or are ready for could also affect the planned instruction. During Phase Two, teachers made curriculum decisions to complete the writing in one draft, and so did not focus on 'Critique' and 'Celebrate'. This was based on their inherent knowledge of their students and developmental needs. The action research relied on teachers being the experts about their students; however, it did limit this research and questions whether peer critique is a useful technique to develop in young children. Further research into how best to develop critique skills with young children and whether critique influences the quality of student writing at a young age would be interesting. This action research has not been able to directly answer these questions but would reference the work of Berger (2003) and would suggest that it can make an impact and that further exploration into this would enhance the WF.

The WF has the potential to influence the motivation of students to participate in class writing lessons. Teachers suggest that this is directly linked to content chosen and how the text is celebrated. The importance of establishing an authentic purpose for writing and linking it to an audience that is motivating to the writing can impact writing stamina and mindset to produce quality work.

Whilst the WF does utilise well researched pedagogy to develop a new text type for students, it is recognised that this cannot be the only element of a writing program. Teachers need a maintenance program which regularly reviews writing and spelling skills that may not be the focus of their current text type.

Limitations and implications of the research – Polishing off the rock to throw again

The main limitation of this research was that it was point in time, short-term and a small-scale study. It is also worth noting that the data were time consuming and some elements subjective, influenced by the teacher's beliefs and how the WF was utilised slightly differently by different teachers.

Moving forward, as a school leader of learning, the biggest implication will be to track the longer-term sustainability and continual refinement of school frameworks and pedagogy support in response to data. The research also highlights the need to enhance teachers' skills in analysing student writing samples in order to identify critical content for future development. What is identified as critical content by teachers is the area in which students make best gains yet how do we ensure that the identified critical content is the best content to enhance overall student writing quality?

Conclusion

It took completing this action research to work out what my plan should have been! Like learning any new skill, learning to select the perfect rock and the correct throwing technique takes practise. Although there are acknowledged limitations in completing the action research, lessons have been learned about planning and completing future research. Part of the difficulty encountered was, completing action research is different to how I used and collected data in past coaching and curriculum positions. While the perfect ripple was not created, data were used to inform programs, my learning, and it did enable teachers to learn about the usefulness of rock throwing also. The research of the framework was solid, the enthusiasm of the project high and we all got our feet wet!

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Leading Secondary Teachers' Understandings and Practices of Differentiation Through Professional Learning

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ABSTRACT: *This article reports on the findings of a qualitative research project that explored teachers' understandings of differentiation, their application of differentiation in the classroom, and the role of targeted professional development and mentoring in improving teachers' understandings and practices related to differentiation in a regional public secondary school. Using action research methodology, the study builds on the limited body of Australian research relating to teachers' understanding and application of differentiated instruction, and explores the complexities of attempting to implement a differentiated approach to pedagogy within the framework of the Australian Curriculum. It also scrutinises a school leader's role in facilitating change toward more differentiated pedagogy. We found that teachers appeared willing to deepen their knowledge about differentiation and improve its practical classroom application when given targeted, contextual support and direction. The findings are relevant to those in pedagogical leadership, particularly those interested in examining the leader's role in enhancing differentiated pedagogy.*

Introduction

Teachers in Australian schools are increasingly expected to understand and routinely implement differentiation (also termed differentiated instruction or differentiated pedagogy), which can be understood as a holistic, principle-based approach to teaching and learning in heterogeneous settings through which teachers proactively plan for student differences in current knowledge and skill, content-related interests, and preferences for engaging with the curriculum (Tomlinson, 2014). This expectation is evident in contemporary educational policy documents at both state and federal levels, including the Australian Curriculum (Australian Curriculum Assessment & Reporting Authority (ACARA), 2013) and the Australian Professional Standards for Teachers (Australian Institute for Teaching and School Leadership (AITSL), 2011). Despite this documented obligation to address academic diversity among

students through curriculum planning and teaching, it is well documented that many teachers struggle to effectively embrace and implement the practicalities of a differentiated approach in their work contexts (e.g. Hertberg-Davis & Brighton, 2006). This is particularly so when differentiation, which represents a significant professional shift for some teachers and in some settings, is mandated but not supported by adequate resources and professional learning opportunities (e.g. Mills et al., 2014).

The research reported in this article investigated teacher beliefs and practices around differentiation, and how these developed through engagement with ongoing professional development and mentoring in a secondary school setting. With the intention of building teachers' capacity to effectively differentiate, structured and targeted professional development was provided to enable engagement with the ideas and practices of differentiation and to support changes in classroom practice. This targeted support is particularly important as teachers often feel they lack the requisite professional development to feel confident about teaching students with diverse learning needs (Savolainen et al., 2012; Shaddock, Giorcelli & Smith, 2007). It is important to acknowledge that the provision of professional development alone does not result in significant, sustained change in teacher practice. Dixon et al. (2014) maintain that teachers also need ongoing support as they attempt to implement professional development into their work setting.

The specific model of professional development used in the study was multifaceted, and incorporated follow-up activities and coaching as espoused by Ball (1996). The professional learning activities were administered as part of the principal researcher's normal work, rather than being introduced as a specific intervention for research purposes, and the scope of this research was limited to a snapshot of teacher development over a short period of time (20 weeks) in one setting. The principal researcher acted as participant/observer, which enabled systematic, contextual reflection about the engagement of both teachers and school leaders in a process of professional learning. The purpose of this action research project was to explore teachers' understandings of differentiation, their application of differentiation in the classroom, and the role of targeted professional learning and mentoring in facilitating shifts in understanding and practice in a specific school context. As such, the key questions were:

1. How do secondary teachers apply differentiation in their classrooms?
2. What enables teachers' implementation of differentiated instruction?
3. How do teachers' understandings of differentiation develop through engagement with in-service professional learning?
4. What was the school leader's (researcher's) role in effectively facilitating change toward a differentiated approach to classroom teaching?

There is limited research on differentiation within an Australian context, particularly within the domain of secondary schools. Kronborg et al. (2008) assert that whist many studies have been undertaken around differentiation, not all may be directly relevant to the cultural, curricular and policy conditions of an Australian context. Thus, while there is convergence in the international literature acknowledging differentiation as an effectual means of restructuring the traditional classroom to include students of diverse abilities, interests and learning profiles (Tomlinson & Murphy, 2015), this research adds to the body of evidence relating to the specific challenge of applying this approach to teaching and learning in the Australian context.

Literature Review

The literature relevant to this study falls within two categories: understandings of differentiation and approaches to professional development relating to differentiation.

The opening section of this review attends to contemporary understandings of differentiation to allow readers to pinpoint the relevant kinds of pedagogical practices. The latter section attends to the approach to professional development employed and positions literature that is also relevant to the methodological approach underpinning this study.

Differentiation

A review of contemporary educational research reveals a strong convergence around the assertion that heterogeneous classrooms and differentiation must form the core of classroom experience for students, as a pre-condition for educational success (e.g. George, 2005; Taylor 2015). Researchers assert that the primary goal of differentiation is ensuring that teachers focus on processes and procedures that provide effective learning opportunities for varied individuals (Tomlinson & McTighe, 2006). Put simply, differentiated instruction is an approach that enables teachers to plan strategically to address the needs of every student, while operating within a common curriculum framework. It is rooted in the belief that there is variability among any group of learners and that teachers should adjust instruction accordingly (Tomlinson, 1999, 2000, 2003). In short, it is the teacher's response to the diverse learning needs of his or her students:

> Differentiation is an approach to curriculum and instruction that systematically takes student differences into account in designing opportunities for each student to engage with information and ideas and to develop essential skills. Differentiation provides a framework for responding to differences in students' current and developing levels of readiness, their learning profiles, and their interests, to optimize the match between students and learning opportunities. These three dimensions of student difference can be addressed through adjustments to the content, process, products, and environments of student learning. (Tomlinson & Jarvis, 2009, p. 599)

A central tenet of differentiated instruction is to take full advantage of every student's proclivity to learn by adapting learning experiences and tasks to advance their current levels of background knowledge and skill, and take into account their personal interests and preferences (Tomlinson, 2014). Differentiation, when implemented skilfully, enables all students to experience academic growth through access to appropriately challenging learning experiences regardless of ability, and crucially allows all students to engage with key understandings and principles (Hattie, 2012). It allows the teacher to focus on a common curriculum framework for all students (Tomlinson & McTighe, 2006); however, the instructional process, the pace of learning, and the depth and complexity with which different students might engage with curricular concepts and content varies at different points in time (Kameenui & Simmons, 1999; Sizer, 1999). Contemporary models of differentiation, such as Tomlinson's (2003, 2014) continually evolving approach, maintain that differentiation is not simply an instructional strategy, nor is it a recipe for teaching; rather, it is a flexible, principle-based way of thinking about teaching and learning. Differentiation therefore encourages teachers to shift their thinking from completing or 'covering' the curriculum and compels them to move closer to understanding and continually enhancing individual learners' factual and conceptual knowledge and skills (Tomlinson, 1999, 2000, 2014).

While researching the effectiveness of an overall differentiated approach in schools remains inherently challenging, Jarvis, Bell and Sharp (2016) detail the growing body of research suggesting an association between well planned, consistent, differentiated approaches and outcomes including improved student achievement (e.g. Beecher & Sweeney, 2008; Brighton et al., 2005; Shaunessey-Dedrick et al., 2015; Tomlinson, Brimijoin & Narvaez, 2008). Effective differentiation is a holistic approach to planning and teaching that is grounded in an inclusive philosophy and a set of consistent guiding principles (Jarvis, 2015), and consequently the evidence base for differentiation draws from research on a range of

elements of classroom practice. These include the role of explicitly stated learning objectives for skill development, knowledge, and conceptual understanding (e.g. Hattie, 2012); formative assessment and feedback (e.g. Williams, 2011); aspects of a supportive learning environment, including positive teacher–student relationships (e.g. Sabol & Pianta, 2012); student engagement with learning tasks matched to their individual readiness (current knowledge and skill level in relation to task demands) (e.g. Kalyuga & Sweller, 2004; Tomlinson, 2014); personal interests (e.g. Heilman et al., 2010; Walkington, 2013); and identified learning needs and preferences (e.g. Meyer, Rose & Gordon, 2014).

Professional development for differentiation

The model of professional development chosen by schools seeking to embed a differentiated approach to teaching is one of the critical components in bridging the theory–praxis divide. Access to effective professional development is crucial in transitioning teachers from traditional teaching practices to more flexible, differentiated instruction (e.g. Dixon et al., 2014; Hertberg & Brighton, 2005; Tomlinson & Murphy, 2015). Research on evidence-based approaches to professional development conclude that it must integrate teachers, students and curriculum in a holistic way (e.g. Desimone, 2009; Hattie, 2009; Penuel et al., 2007; Yoon et al., 2007), be implemented in a highly aligned manner, and include time for teachers to collaborate during the change process (Wei et al., 2009). It must also be explicitly linked to the school's reform agenda and contextualised to account for the inherent subtleties and nuances of individual school communities (e.g. Garet et al., 2001; Penuel et al., 2007). Studies also confirm that without access to this kind of embedded professional learning, teachers struggle to acquire and use strategies that may be new to them (e.g. Van den Bergh, Ros, & Beijaard, 2015).

It is well documented that one-time professional development workshops that are outside the context of the school and not clearly aligned with ongoing practice do not reliably lead to changes in classroom teaching (Johnson, 2006). Current research therefore tells us that effective professional development models include improving teacher knowledge, providing job-embedded opportunities to collaborate around issues that are highly proximate to classroom practice, and investing enough time to develop meaningful learning (Allen & Penuel, 2015; Penuel et al., 2007).

Methodology

We chose action research as a methodological approach for this study. Specifically, the process of a dialectic action research spiral as espoused by Mills (2011) was used, which entails cycling back and forth between data collection and a core focus, and data collection and analysis and interpretation. As advocated by Kemmis (2006), action research in the context of this project allowed different voices to be heard, different perspectives to be taken into account, agreements to be reached between participants without coercion, and consensus around what should be done in the light of collectively reached understandings. This methodological approach was also useful in explicating how differentiation was being used at the research site and for recommendations to support future staff development in this area to be made at the completion of the project. Importantly, the action research methodology also enabled systematic reflection about the principal researcher's own practice as an educational leader in the setting.

Setting

The research project was conducted in a state, co-educational school in regional Queensland that is operated under the auspices of Education Queensland. The school caters for students

from grades 7–12. At the time of data collection, there were 1029 students enrolled at the school, 86 teaching staff and 36 non-teaching staff. Other important contextual features include the percentage of indigenous students (12 per cent), and percentage of students with a language background other than English (9 per cent) with 18 languages other than English being spoken in students' homes. The school's indicator of Socio-Educational Advantage (ICSEA) shown on the My School website is 974, placing the school in the 33rd percentile (http://www.myschool.edu.au). The school's feeder area includes a wealthy suburb, an economically disadvantaged suburb and rural suburbs. Significantly, 33 per cent of the student cohort is located in the bottom quartile of socio-educational advantage, while only 10 per cent lie in the top quartile. This statistic perhaps best reflects the extreme range in educational advantage that exists across the student cohort.

In positioning this research, it is important to acknowledge that the school had an extensive history (approximately five years) with professional development relating to differentiation prior to the commencement of the study. However, a significant amount of staff turnover across that period, including among the school leadership group, meant that while some teachers had participated in multiple learning opportunities over time, many others had engaged with little or no on-site professional development in this area. Therefore, staff at the site could be considered to have variable understandings and practices related to differentiation. Data for this research were collected during a period of concerted professional development aimed at reorienting staff towards a whole-school approach to differentiation, including through the facilitation of learning circles whereby small groups of teachers focused on a specific area of practice. While professional development within the learning circles is the primary focus of this research, other forms of professional development experienced by some or all staff included cluster workshops, presentations and workshops by university academics, staff meetings, lesson observations, resource development sessions and extensive professional collaboration.

Participants and recruitment

The participant group of 11 teachers was drawn from across the research site. Participants volunteered to be part of the research and completed two anonymous online surveys; one at the commencement of the project (pre-intervention) and a second toward the end of the project (post-intervention). Since it was necessary to match the pre and post survey responses for each individual, every participant selected an anonymous 'participant number' out of a container at a staff meeting. Participants included this number when completing each survey to enable the two sets of responses to be matched without making any participant identifiable. To further safeguard the anonymity of participants, surveys were designed without any demographic data, removing the possibility that participants could be inadvertently identified.

Of the 86 teachers employed at the school at the time of the research, 11 completed the online questionnaires. Of this group, three participants only partially completed the questionnaires, or completed the pre-intervention questionnaire and not the post-intervention questionnaire. Eight teacher participants completed full data sets.

The principal researcher also acted as a participant in this action research. Since a key aim of the research was to systematically reflect on the researcher's own leadership practices and role as a change agent, structured reflections, observation notes and journal entries were important sources of data. The principal researcher is a male teacher who was 34 years old at the time of data collection, and held the position of Head of Teaching and Learning. He had worked at the school for 12 years, previously in the roles of teacher, Head of Department and Head of Junior Schooling. He had been closely involved in planning and implementing a range of professional development opportunities related to differentiation (and other areas) at the school since the focus on differentiation was adopted under the leadership of a previous

principal. The principal researcher's history and role within the school were an advantage in terms of strong relationships with teaching and leadership staff and an intimate knowledge of the school context. At the same time, it was particularly important to continually engage in reflexive practices to ensure trustworthiness in the research process, such that findings were grounded in facts and not simply the researcher's own biases and constructions (Lincoln & Guba, 1985). The triangulation of multiple data sources, reflexive journalling and the position of the other two researchers as 'critical friends' to check and question data helped in the navigation of these dual roles.

Organisational structure of professional development

The research site enacted 'learning circles' to deliver professional development, including that around differentiation. Each learning circle consisted of approximately eight teachers with an identified 'leader'. The learning circles consisted of a heterogeneous mix of teachers from a variety of year levels, experience levels and curriculum areas. The principal researcher acted as mentor/coach for the learning circle leaders and met with these staff members each fortnight. The learning circles had been in operation for six months before data collection commenced. In total, 12 learning circle meetings and 12 leaders' workshops were conducted during the data collection period where different aspects of differentiation were examined. This particular study was a short-term piece of research where data were collected over the 20 weeks of semester 2 (July – December). It can therefore be considered a representative 'snapshot' of the change process, systematically focused on a specific period of time in the larger process of change already underway at the research site.

Procedure

Data were collected from two sources. The first source (Source A) included the opinions of teachers collected via anonymous on-line surveys. The second source (Source B) was reflexive documentation in the form of the researcher's journals. Journal entries were completed after each fortnightly leaders meeting. Completing journal entries at this time was essential in capturing the essence of conversations, the comments of participants in their own words, and the researcher's thoughts, reactions, ideas, and feelings in relation to the central phenomenon of the research.

The two data sources were explored separately and in relation to each other. Thematic analysis was applied with the aim to sort, synthesise, organise and explain larger segments of the data and uncover or isolate thematic aspects of the phenomenon under investigation (Van Manen, 1990). Survey transcripts, both pre- and post-intervention, were read in their entirety, as were the journal entries. In the initial phase of data analysis, memos were written in the margins of the transcripts. These memos were all short phrases, ideas, concepts or hunches reflective of the entire data set. Successive memos were written as records of analysis throughout the study to increase the level of abstraction of ideas (Creswell, 2012). Similar codes were aggregated together allowing four themes to emerge:

1. Defensible differentiation
2. Owning the learning
3. Productive professional development
4. Openness to change.

Findings

In presenting key themes that emerged from the data, we use the abbreviation 'RJ' for reflective journal and 'P' for participant number. Quotes from the participants as well as extracts from the principal researcher's journals are used to illustrate and explicate emergent themes. The first theme, 'defensible differentiation', presents the data in support of a differentiated approach to teaching and learning in this setting, as perceived by the teachers and school leader/researcher. The second relates to the perceived shift in teachers' thinking and understanding around differentiated instruction and it is titled 'owning the learning'. The third, 'productive professional development', presents the data relating to the professional learning suite while the fourth theme, 'openness to change', is framed around the change process that continued to evolve throughout the research project. While these research questions and themes are presented separately, they are in fact inseparable and as such should each be read as part of a whole.

Defensible differentiation

At the commencement of the project, there were multiple examples of teachers adopting the principles of differentiation. As the professional development suite was enacted, there was a deepening sense that teachers not only supported the rationale behind differentiation, but were increasingly experimenting with its practical implementation. The data also suggested that as teachers experimented with differentiation, they simultaneously became more aware of their students as individuals and as learners. Comments such as, 'The most important thing is, you need to know the class and how students best achieve. This is the heart of good teaching, and differentiation at the end of the day is just a vehicle for good teaching' (P-45) and, 'I feel like I know my students' brains! By the end of the year I felt quietly confident and comfortable to be able to tell them exactly what they need to do (what works for them) and how to do it next year – if they want to learn and succeed' (P-4) were reflective of this. The data also revealed specific examples of flexible student grouping, ongoing assessment with particular emphasis on pre-assessment and formative assessment, emphasis on explicit learning goals, reviewing prior skills and knowledge before proceeding to new ones, and modelling of proficient performance.

While the examples above were representative of good teaching related to differentiation and particularly its principles, they did not necessarily reflect a comprehensive, fully-formed differentiated approach per se. They were, however, supportive of the idea that teachers were focusing more on students and their needs, becoming more flexible in their practices, more confident experimenting with new routines and teaching strategies, more mindful of using a full continuum of assessment, and more explicit about what they were teaching and why. A good illustration of this was one teacher's (P-60) response when asked to recall a positive teaching experience they'd had with differentiating instruction since the project commenced:

> The one activity that stands out was a timeline activity that was directly linked to the learning goals. At the beginning of the lesson I asked students to place cut outs of events in order of how they thought they occurred. I also gave them definitions of each event and asked them to match these to their timelines. At the enhancing stage of the lesson, students were required to revise their original timeline and definitions and the response was amazing. Students were having discussions about their changes and justifying their original incorrect placement of definitions or timeline events. These discussions gave me further insight into their prior knowledge while allowing assessment of what had been taught thus far. Students to this day still remember this lesson and are able to retell these events.

The above example, while being representative of a starting point for differentiation as the teacher gathered information about student difference, does not reveal the teacher

systematically using that assessment to inform their planning or teaching practice. The data therefore suggested that 'pre-differentiation' was emerging throughout the school and affirmed the idea that some teachers were at a stage of deeply reflecting on and strengthening their teaching practices but were yet to take the next step in changing their practices. For most participants, there appeared to be a strengthening of practice that reflected the core foundations of differentiation, even for those who were not yet ready to take the next step of attending to individual learners.

A significant factor that appeared to foster teachers' implementation of differentiation was an outlook whereby difference was not only recognised and strategically planned for; it was celebrated. The celebration of difference appeared to be a key motivator underpinning improved student engagement and enhanced classroom communities. Numerous participants made reference to the flexibility that differentiation allowed, as reflected in comments such as, 'Differentiation allows aspects of instruction and assessment to be modified to cater for different learners' (RJ-20 August) and, 'Adapting lessons is important to cater for the range of difference or needs that exist in my classroom' (RJ-6 August). One learning circle leader painted an egalitarian picture of her classroom when she stated, 'Differentiation enables me to ensure equity in the classroom via catering for difference' (RJ-9 July). These quotes point to there being an emerging understanding of difference being inextricably linked to tolerant and respectful classrooms and an embracing of the principles of differentiation to deliver equally respectful curriculum to all students.

Owning the learning

The second theme that emerged from the data concerned teachers' evolving attitudes and thinking around differentiation. Most participants began their journey by critiquing the framework of differentiation, or at least the practicality of implementing the theory in their complex classroom environments. They also reflected on their current classroom practice, considering where it aligned and where it conflicted with their emerging understandings of differentiation. This initial phase was functional in teachers contemplating whether differentiation had a realistic place in their working classrooms. Teachers then appeared to move into a phase of experimentation, trialling different tools of differentiation in between learning circle meetings (workshops). Finally, the data showed a common pattern of teachers entering a stage of deeper reflection and self-critique where they questioned and challenged the very purpose of their pedagogy. Predispositions, assumptions and subjectivities were all unpacked along with a practical critique of 'why' they were implementing various classroom activities and crucially, whether they were socially just, respectful and defensible when viewed through the lens of differentiation. It was at this point that teachers began to exhibit a strong sense of ownership over the concept of differentiation as an integral part of their personal approach to teaching.

The first and most obvious sign of teachers' deepening understanding of differentiation was classrooms becoming more student-driven. As participants' understanding of differentiation deepened and they experimented with principles of differentiation in their classrooms, teachers described a process whereby control of the learning was progressively transferred to the students. Several teachers acknowledged this shift as students became partners with their teachers in designing learning methods, tools and environments best for them. Comments such as, 'Not as much teacher support was required; I became more of a facilitator' (P-6) and, 'Learning became student driven' (P-6) illustrate this. Complementing this was an apparent increase in students' capacity to self-regulate. Participants reported students developing a keen sense of monitoring their own learning, initiating steps to solve problems independently and a desire to progress to other activities without teacher assistance. Comments such as, 'There was definitely increased student autonomy' (RJ-10 December),

'Self-regulation is the key to success' (RJ-17 September) and, 'Self-regulation is tied to that feeling of success' (P-32) were reflective of this.

The data also indicated that participants not only believed that differentiation increased engagement but also stimulated a heightened interest in learning. Several participants commented that when they implemented and applied the principles of differentiation, embedding them deeper in their pedagogy, the curiosity and intrinsic desire to 'know' more seemed to increase among students. One participant claimed, 'Many of my kids have begun to see learning as a challenge in and of itself' (P-33). Comments from learning circle leaders also reflect this notion of students becoming increasingly engaged in learning in a holistic sense. 'There was a time when I had to drag answers out of students; now they are methodically working through the knowledge-gathering process and seeking the answers for themselves' (RJ-3 September). These observations highlight the benefits of professional learning that is embedded in teachers' daily work. They demonstrate the need for teachers to 'try out' the principles of differentiation and see the benefits with their own students in their own classrooms, and then share their experiences and seek feedback from colleagues and mentors, leading to increasing 'buy in'. The data also appear to affirm why the 'one shot' external professional development model with no on-site follow up is less effective in changing teachers' practices.

Another significant indicator of teachers' heightened understanding of differentiation was the manner in which they progressively challenged orthodox mindsets around effort and achievement. Specifically, the data revealed a shift in thinking around student achievement with teachers increasingly promoting a growth mindset in preference to a fixed mindset (to adopt Dweck's (2006) terminology), which was consistent with an area of focus in the learning circles. As one participant explained, 'I used to emphasise results (marks) over everything else. I now emphasise effort. This change in mindset has been huge for the kids … and me' (P-45). Participants were consistent in their assertion that the adoption of a growth mindset empowered students to experience success through sustained effort. Participants commented on the pervasive influence that a growth mindset had in debunking myths about student achievement and removing labels. 'Kids thinking they are in the "smart" group or the "dumb" group – challenging that mindset has been one of the most powerful realities of a differentiated classroom' (RJ-5 November).

The final indicator that teachers' understandings of differentiation developed over the course of the project was participants' realisation that all students, if appropriately engaged, had an innate desire to learn. Comments like, 'Kids want to learn' (RJ-8 October) and '… all kids want to learn and many just need a different pathway to get there' (RJ-10 December) are indicative of this insight. Moreover, the data suggested that several participants began to take increased ownership of the learning journey. Comments such as, 'Kids want to achieve a decent result' (P-46), 'They want to achieve but need direction, encouragement and help' (P-46) and 'It's my job to make this happen' (P-6) reflect a common understanding that it was the teachers' responsibility to attempt to awaken this intrinsic craving for learning. Other participants were more metaphorical in their description of how differentiation influenced the learning process: 'When you give students a chance to blossom, the flowering is a beautiful process' (P-60).

Productive professional development

Participants were very clear about the factors they believed precipitated meaningful professional learning over the course of the project. The main factor cited by participants was the collaborative and highly contextual nature of the professional development. Nearly every participant commented on how the cross-curricular design of the learning circles heightened professional conversations and helped them glean insights from their colleagues. For example,

participants commented that 'Learning circles enabled me to chat to colleagues you otherwise would not interact with in a large school' (P-45), and 'Cross-curricular sharing was particularly good' (P-60). The data also revealed that professional sharing strengthened as the project evolved and teams became more familiar with each other. One participant reflected that '… the learning circle is good for sharing and answering questions. It also increases the accountability of each group member because it's not too big' (P-11).

Another factor cited by participants when commenting about the positive aspects of the professional learning was its highly integrated nature. Specifically, many participants emphasised the way in which the framework of differentiation pulled the elements of teacher, student and curriculum together in a holistic way. The following representative comment is from one learning circle leader:

> I felt the more I understood the framework of differentiation, the more I realised that students, teachers and the curriculum can hang off it effectively. In fact it really drew me, the kids and the curriculum together. This was a positive experience as I've felt at times that the school has presented these elements separately (when in fact they're inseparable) which has led to them competing against each other. (RJ-10 December)

The final element that led to positive experiences with the professional learning was the distributive nature of the model. The data indicated that as the project continued, participants assumed increased ownership as they became more confident and competent with the professional learning material. This journal entry along with the previous participant quotes reflect the genesis of a learning community developing at the research site:

> Certainly though, the establishment of the leaders' group is a definite example of a learning group emerging on our campus. While building community is much bigger than this, the leaders' group have started to own their identity and become more confident leading teachers in their learning circles in the material we're playing with. I'm also seeing heightened collaboration between these 11 teachers (leaders). This doesn't just happen during the fortnightly meeting slot (although it certainly happens here too). There is a heightened sense of professional sharing (as opposed to the hoarding of information) which is potentially very powerful in spreading knowledge and skills across the teaching staff. (RJ-22 October)

Openness to change

The data included several powerful statements from participants relating to how differentiation was no longer an abstract concept but a usable approach to teaching that was possible to implement on a daily basis. Statements such as, 'It [differentiation] is possible to operationalise in a busy high school setting' (RJ-22 October), 'It does not have to be daunting. Small changes can make a big difference' (P-46), and, 'I have always "done" differentiation. I just haven't labelled it or at times thought explicitly about why I do it. It is now done intentionally, with purpose and is explicit' (P-33) are representative of this.

A similar sentiment was echoed by participants who stated that the effectiveness of differentiation was directly proportional to the effort they put in. 'My success is proportional to the willingness I have to put differentiation into practice' (P-33). Finally, the data exposed the belief that as teachers changed and experimented with differentiation, students were also perceived to undergo changes. 'Students are open to change and recognise that while all activities aren't for them, they will be perfect for someone else' (RJ-17 September). There was a clear sense that many teachers had become more open to changing their classroom practices as they began to understand the concept of differentiation more fully (and as more manageable) and see the potential benefits for their own students in their own setting.

Discussion

This small-scale action research study did not seek to examine whether or not differentiation 'worked' in terms of its measurable impact on student learning or achievement. Rather, it was designed to (a) explore the extent to which differentiation was being applied in a particular secondary setting, (b) investigate how it was being applied and understood, and (c) probe the extent to which embedded leadership fostered continued progress towards change. While only a small percentage of teachers completed the questionnaires, and these responses might not have been representative of all teachers at the site, the inclusion of the reflective journal data and the action research design allowed for broader observations about teachers' engagement with professional learning at the site, strengthened by the principal researcher's immersion in the school culture. In this way, the study was functional in uncovering teachers' understandings, their practices and their lived experiences of professional learning relating to differentiation. It was also valuable in scrutinising the researcher's role as a leader and one agent for change in a particular school setting.

The findings highlighted that, as teachers' conceptual understanding of differentiation deepened, so too did their perceived application of differentiated practices in the classroom. As differentiation became more embedded in teachers' planning and teaching, classrooms were described by teachers as more student-driven. As they increasingly saw themselves as agents for change, teachers also reported greater student ownership of the learning, improved relationships, and an innate desire to learn aroused in students. As the project progressed, there appeared to be a growing belief among teachers that all students could, and indeed would, achieve success (defined as personal academic growth) in a differentiated classroom. Some participants articulated this confidence at the commencement of the project. It could be argued that these teachers' confidence lay not in the efficacy of a differentiated approach to curriculum but in a deeply held pre-existing belief in the capacity of young people. Other teachers, however, exhibited a discernible shift in ethos. These participants moved from viewing differentiation as merely a tool for 'individualising' instruction to embracing the underlying assumptions and principles of differentiation, and enacting them in a holistic sense. For these participants, differentiation emerged as an approach to teaching and learning that consistently asked them to adjust their thinking around curriculum and instruction in an attempt to engage students and help them achieve success (Tomlinson, 2003, 2014). Further research into the levers that help some teachers make this shift and the factors that limit others' shift in thinking is recommended.

Another significant indicator that participants understood the construct of differentiation lay in the tenor of responses affirming that quality curriculum was the starting point for quality differentiation. The affirmation that differentiation does not 'fix' a poor curriculum, or poorly designed learning tasks, is echoed by Jarvis (2013). Many participants noted that when implemented correctly, differentiation enabled all students, regardless of ability, access to respectful curriculum and crucially, equal exposure to key understandings and principles. It also underscored participants' confidence in using differentiation as an egalitarian approach to teaching and stimulated the growing realisation that differentiation was principally about all students having exposure to the same conceptual understandings (Kameenui & Simmons, 1999; Round, Subban & Sharma, 2016; Sizer, 1999). Teachers' understandings and efforts to implement differentiation in this study highlight the importance of engaging with the concept in a holistic way, as reflected in Tomlinson's (2014) principle-based framework; that is, teachers cannot change one aspect of their practice without it affecting others, and professional learning must support teachers to understand how the interdependent elements of curriculum, assessment, teaching, learning and classroom management can work together in an effectively differentiated classroom.

In relation to professional development, the data supported the notion that its strength lay in the collaborative nature of learning circles, the alignment and integration of students (Wei et al., 2009), teaching and the curriculum (Dixon et al., 2014), and the distributive nature of the model whereby leaders were cultivated at multiple levels. The very construct of learning circles appeared to assist in professional development being delivered by a group of leaders who were supported by researchers (Allen & Penuel, 2015), and teachers who were in turn supported by leaders (Dixon et al., 2014) as they experimented with the application of differentiation in their classrooms (Van Den Bergh, Ros & Beijaard, 2015). This meant that professional development was not only collaborative, it was decentralised and its distributive nature allowed knowledge to be shared and accessed much more efficiently.

The final key question that this research aimed to answer was how effective the participant researcher was in continuing to contribute to a change process toward differentiation. Due to the scope of this research, it is difficult to answer this question comprehensively. A key limiting factor was the short time frame for data collection, and it is not possible to conclude a causal link between this study's findings and significant change being actualised at the research site. In addition, the professional development intervention built upon a range of preliminary experiences many staff had engaged with at this site over a period of time, and the influence of these prior opportunities to engage with the concept of differentiation was not the subject of the research. Despite these limitations, it was certainly evident that teachers made progress in their understandings and practices related to differentiation.

Participants appeared to experience a shift in thinking about teaching and learning. This was evident in the nature of participant responses as they deepened their conceptual understanding of differentiation. While stopping short of labelling differentiation a panacea for addressing educational disadvantage, participants overwhelmingly supported the rationale behind differentiation and appreciated that in a practical sense, it had the potential to give all students, regardless of academic ability, access to the curriculum. It could be argued that some participants developed a 'new way' of seeing things as their mission or vision was redefined in real terms. Some teachers experienced a renewal of their commitment and the restructuring of their systems for goal accomplishment, all indicators of change.

Another indicator that change may have progressed was the probability that new learning occurred over the course of the project. This new learning was visible in leaders' workshops and learning circle interactions as well as less formal, unstructured exchanges between colleagues. The final indicator that pointed toward change was that teachers were empowered over the course of the project. Participants displayed a willingness to engage and a desire to implement new learning and when enacted in a spirit of shared ownership, many teachers were inspired to take chances they may otherwise not have taken. These findings are consistent with research by Fullan (2014) affirming high performing collaborative cultures in which teachers focus on improving their teaching practice, learn from each other, and are well-led; and with the views of Marzano (2007) in asserting the importance of engaging teachers in group problem solving during the change process.

Finally, the findings suggested that participants' confidence in differentiation grew as they engaged with professional learning. The professional learning enabled participants to work through some of the practicalities around adopting a differentiated approach to teaching as they negotiated what it would mean for their teaching and their students in real terms. In many cases this process affirmed exceptional teaching practices that already existed in teachers' armoury. The appetite to differentiate curriculum appeared to increase as participants developed the skills necessary to enact the change. Fundamentally, participants realised that with appropriate support, change toward a more differentiated classroom was possible. Further,

they accepted that this approach was not only justifiable and possible, but socially responsible to maximise the chance that no student was left behind.

Conclusion

Teaching is both an intellectual and moral profession (Fullan, 2002). This study demonstrated that differentiation as a construct has the ability to engage teachers in growth around both of these domains. Intellectually, differentiation presented teachers in the study with an opportunity to practice, study and refine the craft of teaching. It also offered these teachers a challenge to critique existing mental models about teaching and learning, and a chance to acquire new knowledge, extend their teaching repertoire, and ultimately progress each student in their classroom. Morally, it provided teachers with a framework that took full advantage of every student's ability to learn and exposed all students to key understandings and principles regardless of their ability.

This study also demonstrated that teachers will deepen their knowledge about differentiation and improve its practical application in their classrooms if given appropriate, embedded support and direction. In the case of this study, the implementation of learning circles appeared to be an appropriate vehicle for this support. Learning circles were imperative in maximising knowledge creation and knowledge sharing. They also enabled leadership to grow at multiple levels, for teachers to take risks without fear of failure and for collaborative problem solving to flourish. This approach to professional learning assisted teachers working through the challenges of implementing the principles of differentiation within the context of the Australian Curriculum.

Finally, this study revealed that change is possible. The lead researcher's experience in this study confirms it is possible to lead educational networks by trialling and exploring new ideas, acting as a guide, coach and mentor to colleagues. For school leaders contemplating a similar journey of leading professional learning related to differentiation, we would recommend two things; first, that all professional learning be thoughtfully and explicitly linked to deliberate practice that aligns students, teachers and the curriculum and, second, that leaders are able to ensure the environment remains safe for change. If these conditions exist, meaningful pedagogical change is possible.

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Willing to Lead: The Dual Role of Principal and Religious Education Coordinator in Small Rural Catholic Schools

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ABSTRACT: This article reports a study of the practice of small school leadership in small rural Catholic schools. Within the contextual complexities of accentuated expectations by the local community, small school principals undertake the added burden of the position of Religious Education Coordinator (REC), where for many of them, the school is located in communities without the presence of a resident priest in the parish. The methodology in this study included semi-structured interviews and examined both individual human behaviour and the structure of the social order in these schools.

The findings suggest that the role of the principal/REC is seen as not just the religious leader in the school but the wider community as well. Though participants in this study face significant challenges in their role, there is a willingness by principals to take on significant religious leadership, to make a positive contribution to local communities and Catholic education. The participants in this study gave a very positive perspective on the future of small Catholic schools in rural areas, but there does appear to be a need for ongoing support for the principal/REC as a religious, school and community leader.

Introduction

The increasing demands educational reform places on school teachers and principals has been well documented in recent years (Maxwell & Riley, 2016). Few other leaders, however, in school systems will have experienced such an expansion of responsibilities and such limited change to the conceptualisation of their role as the teaching principal in a small school (Clarke & Wildy, 2011; Starr, 2016; Wildy & Clarke, 2012). Recent legislation relating to school-based management means that small schools are now subjected to heightened expectations as well as growing demands for accountability from parents, administrators and politicians (Clarke & Stevens, 2009; Clarke & Wildy, 2009**).** Issues such as the importance of leadership in small schools have been discussed in the wider literature but this is most often in relation to public schools in urban centres (Levine, 2002; Mohr, 2000). There is a need for more published research on faith based, in general, and of Catholic small schools, in particular, in regional and rural areas.

For Clark (2003), the competing demands on teaching principals can appear all the more daunting for the relatively young and inexperienced principals often appointed to small schools. Problems associated with role conflict are also likely to be accentuated by the isolation of many small schools, in so far as it restricts opportunities for teaching principals to exchange views and practice. In addition, the tendency for a small school to be at the heart of the community, especially if situated in a rural and remote area, can present significant challenges for the teaching principal (Clarke, Stevens & Wildy, 2006; Starr, 2016). The contextual factors of small Catholic schools, with the additional demands of the Religious Education Coordinator (REC) role and the growing demands and expectations are further accentuated with their close association with the local parish. These are extra demands placed upon them from Church authorities and the Church community (Belmonte & Cranston, 2007, 2009).

This article, therefore, reports on a study that seeks to address the following research question:

> What are the distinctive challenges facing principal/RECs of small schools in creating the school's Catholic identity and ethos, while at the same time achieving the more traditional outcomes of schooling expected by parents, governments and educators?

This study investigated the multiple demands, issues and tensions of the teaching principal/REC in small rural Catholic schools. It attempted to critically analyse the extra challenges faced by the Catholic school principal/RECs in small rural communities and the strategies they employed to continue the changing educational and religious landscape.

Religious Leadership and the REC in the Catholic School

The position of the REC was introduced into many Australian diocesan schools in the 1970s and 1980s, and in some dioceses, even as late as 1997 (Carlin et al., 2003). This was in response to demanding educational circumstances and specific Catholic school needs resulting from the changes in the Church since the Second Vatican Council (Arbuckle, 2016; Rossiter, 2013; Rymarz, 2006). The REC is the person who most directly works with teachers in their work in Religious Education and oversees the implementation of the school's Religious Education program (Neidhart & Lamb, 2014). The REC also coordinates the school's liturgy and sacramental programs. In larger primary and secondary schools, the REC role description includes aspects that are closely related to those of the principal's role (Catholic Education Office Sydney, May 2007, April 2009). These include liaising with priests of the parish, contact with families through sacramental and Christian sexuality programs, and other religious and pastoral domains such as pastoral care of students. In practical terms, the REC shoulders particular responsibilities in the religious domain of the school and is possibly the most visible religious identity of a Catholic school (Crotty, 2005; Fleming, 2001).

Given changing demands, a reconceptualisation of the leader of leadership in schools may be needed (Arbuckle, 2016; Rymarz, 2016). Crotty (2005) suggests, as leaders there is a need for both principals and RECs to work together in a combined effort that could become even more important as the demands increase for building Catholic identity in new ways. In an era of rapid societal change and principals' escalating responsibilities, the role of the Church in education needs to be rearticulated and new dimensions explored. Belmonte (2006) argues that it is the role of the REC that needs to be better understood in this changed social context. This is part of a larger consideration of how the religious dimension of Catholic education is made explicit (Bezzina & Wilson 1998; Engebretson, 2014; Lamb & Neidhart, 2014; Rymarz, 2006).

Contemporary Challenges of the Principal/REC

The transmission of a Catholic identity and culture in Catholic schools is the responsibility of all members, but the leadership of the principal is seen to be especially significant (Belmonte & Cranston, 2007, 2009; Coughlan, 2009; Neidhart, Lamb & Spry, 2012. While many of the expectations and responsibilities are similar to those of their colleagues in state schools, the nature of the schools in which Catholic school principals serve and lead differs (Engebretson, 2014; Rymarz, 2016). In addition to the basic knowledge associated with supervision, staff development and curriculum, the Catholic school principal is required to understand the place of the school in the Church's educational mission and how this relates to teachers as well as the development of faith with students. The challenge of explicit religious leadership takes place in a wider social context that sees the decline of the prominence of religion in lives of many Australians (Bouma, 2006; Singleton, 2014). Amongst Catholics, this decline is, perhaps, most obvious in the steady decline in participation in parish life marked most clearly by relentless, decades long, falls in mass attendance rates amongst Catholics (Dixon, Reid & Chee, 2013). The overall decline masks the fact that the most critical falls are in the younger ages, ages that would encompass typical parents and students in Catholic schools. This indicates a weakening of religious affiliation for many Catholics but this does mean that they are seeking to sever all connection with the Church. Rymarz (2016) argues that, in relation to Catholic schools, many parents see this connection as something which is negotiated. In the Catholic school they acknowledge a place for religion but this needs to be seen as an aspect, but not a decisive one, of their sense of an overall quality education.

Many small communities no longer have a resident priest and as a consequence the Catholic school is increasingly becoming the major experience of Church for many students and their families (Belmonte & Cranston, 2009; Engebretson, 2014; Rymarz, 2016). The added burden of being a principal/REC has resulted in a great deal of responsibility for organising and coordinating parish pastoral activities, and preparation of children for the sacraments in state schools, now falling to the principal/REC. As such, small communities place increasing demands on the Catholic principal/REC where they are now expected to be the faith leader of students and their families as well as being the educational leader in the Catholic school community.

As well as expanding religious leadership responsibilities, principals of small Catholic schools must be able to respond to issues that are pertinent to rural and regional areas. Clarke (2003) cites problems related to poverty and disadvantage often occurring in small isolated communities. These issues are often underestimated or not understood by administrators. Many rural communities are considered to be in a state of decline because drought and economic downturn have brought about a decline in traditional industries such as agriculture, mining and manufacturing (Kilpatrick et al., 2002). This downturn in rural Australia has been associated with unemployment and a declining population, which pose challenges for building and maintaining school–community relationships. This is heightened by young, inexperienced teachers' lack of maturity for dealing with the complex social issues that are often characteristic of isolated rural communities (Clarke 2003; Clarke & Wildy, 2009).

Methodology

Clarke (2003, p. 13) comments on the 'paucity of research into leadership of small schools, … especially those located in remote communities'. This lack of research, therefore, suggests there are few robust examples of leadership exercised on small school environments that can be used to develop theoretical models for informing best practice. It would be helpful,

therefore, to examine the work of principal/RECs in small, rural communities so as to better inform processes directed toward their learning and development.

The intention of the study was to undertake a qualitative methodology, using as a case study small primary (K–6) schools in one regional Australian Catholic diocese. Principal/RECs can be seen as being able to provide information-rich data (Merriam & Tisdell, 2015). Though contrasts and comparisons will be made in the analysis of the data, it is hoped the complexities and tensions experienced by such principal/RECs, within their context, would be the focus of the study (Patton, 2015). All principals of primary schools in the diocese with an enrolment of fewer than 90 were invited to take part in the study. All but one of the 10 principal/RECs agreed to be interviewed and as such constituted a purposeful sample (Yin, 2016).

Data were collected in the form of in-depth interviews. Each participant was interviewed for between one hour and one and a half hours. Interviews are well suited to the exploring of complex issues (Wuthnow, 2007). The interviews followed a semi-structured, in-depth pattern (Minichiello et al., 1995). Three general probe areas were established, namely: the religious experience and background of principal/RECs; particular challenges for principals/RECs; and what strategies they develop to address such challenges. After each interview, participant responses were analysed in detail, using contemporaneous notes as well as the taped record. On the basis of this analysis, thematic response codes were developed (Miles & Huberman, 1994). These codes were related to common responses and dominant categories identified. These categories then informed the next interview, and response categories became more and more refined (Taylor & Bogdan, 1984). This process involves creating a framework of codes to sort the data. The coding process involves studying to identify themes, ideas, concepts, interpretations, and propositions (Bogdan & Biklen, 2004).

Results and Discussion

In small schools the parish often lacked a resident priest and in these cases the schools provided an invaluable Catholic ‘shopfront’ in that community. This involved a range of responsibilities that helped facilitate Church ministry. As one principal/REC put it, ‘if someone wants to contact the priest they get in touch with us first’. Schools with higher enrolments as well often played some role in assisting parishes in practical ways but as the parishes associated with these schools were well established, such assistance was not as critical.

The small Catholic school represents an interesting micro culture in Catholic education. This study of small schools was defined as having an enrolment under 90 but many of the participants worked at schools with enrolments far lower than this. Many of the principals described their role as quite significant and not a reflection of their small size. This was in terms of both their contribution to the life of the parish but also to the wider community. One principal put it in these terms, ‘We really hit above our weight, even though we are a small school in a small town we have a huge interface with the local community’. All of the small Catholic schools in this study were situated in towns were there was also a public school. This school was larger but the relationship between the schools was usually described as being very harmonious. One reflection of this was how both schools combined their efforts to support community initiatives. One principal noted this when she commented, ‘If there is something on we all pitch in’. This is an important finding as it underlines the point that in small rural towns both Catholic and public schools provide a community resource that helps maintain the social structure of the town. This is especially important if communities are undergoing some type of economic downturn, a cyclic factor in many parts of the country.

This vulnerability of small rural communities is a major consideration when considering how best to support rural towns.

The small Catholic school is often able to articulate well a strong Catholic identity. The principal/RECs interviewed in this study were all very aware of the school, in many ways, being a 'virtual' parish in the local community. This type of ministry brings with it a range of acquired responsibilities and many commented that they would welcome more support in their role in the wider community. As one principal/REC remarked, 'we do so many liturgies for the parish'.

In the small school, a significant factor is the leadership provided by the school principal who often serves as the REC. When interviewed, many of those in these leadership positions strongly expressed the view that personal witness was a critical part of their role in the school. As one principal put it, 'for me it [Catholic identity] starts with being able to "walk the walk".....that means being able to witness to gospel values in the school'. One of the general challenges facing Catholic education is being able to provide strong faith-based leadership. This is a reflection of the decline across society of people who are strongly committed to religious communities. This is not a moral judgement but rather one that is more descriptive. It does have, however, significant implications for Catholic education. A good way of conceptualising the nature of the commitment of many parents and certainly some teachers involved in Catholic education is to see this as a dynamic negotiation. For leaders, however, this negotiation is much more limited. The school principal is expected to be the religious leader of the school and this is something that cannot easily be mitigated by other factors. In light of this, there are often challenges in finding suitable candidates to take on key leadership roles in Catholic education.

Many of the participants in this study elaborated on some of the challenges of leading a small Catholic school. Participants valued the autonomy and intimacy that comes from working in a school where, as one principal commented, 'no one is anonymous'. Another principal commented that you need to be an 'all-rounder'. By this he was referring to balancing the various demands placed on principals in small Catholic schools. Many of these are common across schools in a wide variety of contexts. Of critical importance amongst these are the educational goals of the schools. Parents expect the school to provide a range of services and to offer a complete educational experience for their children. The size of the schools does, however, make this challenging. One principal commented, 'we try to be creative but we just don't have the "bodies" to make all things work'. This includes extra curricula programs like providing a range of sporting and cultural options. It also involves more school-centred activities like providing support for particular students. As a compensator, however, many participants noted that the intimacy of the school meant that the needs of students could often be identified and addressed more readily. This is also a major factor when dealing with parents. One principal encapsulated this well when he commented, 'If someone needs a bit more help we can spot this, because of our size it's harder to fall through the cracks'.

Principals were very aware that for most of those in the school community, religious factors, while not insignificant, were not the key aspects attracting families to Catholic schools. As one principal, remarked, 'For most of the parents religion is something we [the school] do'. Parents are not religious but do have expectations of principals in this regard. One remarked that she sees this as having to 'carry the can' for religious identity. The best illustration of this is, perhaps, the dual role of the leader of the small Catholic school as both principal and REC. Parents were happy to participate in key religious events but this involvement is very much seen as part of school life and it is not an indication of an emerging link with the parish. The school is the place that is seen by parents as the centre of their religious affiliation. Noting the comments of parents she has dealt with over many years, one principal noted that for many

the school is seen as a place that is vibrant and alive while the parish is often described as being moribund. This undoubtedly reflects the much older demographic profile of those Catholics who regularly attend services.

Many participants commented on the high level of support that they received from the Catholic Education Office. These comments were partly of a general nature, pertaining to having to rely on their own resources and initiative. One principal commented, 'I don't have any support staff, it all comes back to me'. The reality of the small school is that staffing reflects the number of students enrolled in the school and the most successful principals are ones who are able to take the initiative often marshalling limited resources. There are times though in the school year when management becomes much more difficult and the principal felt under much greater pressure. One principal commented that she found the job stimulating but noted that there were a few times when she felt like she was 'going under'. Another principal gave the example of dealing with staffing issues. In any school there are times when staffing becomes critical, such as when teachers are away on sick or bereavement leave. In a small school, with a limited number of staff, one or two teachers being absent can bring with it acute planning challenges. This is where the isolation of the school becomes a significant factor. It would be good to know, as one participant put it, that 'the cavalry was coming when I need it!'

Support of the principal is an even more critical issue when it comes to discussion of the religious leadership aspect of the role. The small Catholic school as a place that represents the Church in many country towns has been commented on. As has the way that many principals feel comfortable in being able to fulfil this role. This does not mean, however, that principals are not challenged by religious leadership. This was expressed in many ways in this study. Being a religious leader at a time when religious salience is on the decline can be difficult. One principal commented, 'It's hard at times talking about the parish when I know that most of the students and parents are just not interested'. Another principal commented on how she would like to have the opportunity to talk over issues with a religious dimension with another person. She remarked that in other schools where she has had a leadership role, there was the REC and the parish priest to act as sounding boards. In her current role, she was also the REC and there was no resident priest.

A number of principal/RECs in this study noted that small Catholic schools are not required to find relatively large numbers of staff who sit comfortably with the witness aspect of working in Catholic education. Many of them commented on the difficulty that they had recruiting staff but even in light of this they may be better placed to ensure that new staff are well integrated with the mission and identity of the school as a result of their small size of the school. In addition, some suggested the impact of the principal/REC may be more substantial as they have a key role in all aspects of the school life. This may also be reflected in who is employed to work in the school, as the principal plays a major role in facilitating who is hired to work at the school.

Moving now to the more generalised aspect of leadership in small Catholic schools, what is evident here is the capacity of these schools to respond to individual circumstances. Many of the participants in the study, however, seem to not readily acknowledge this aspect of their role. As one commented, he was very much a 'get on with it' sort of person and tasks undertaken in the wider community were not anything remarkable, just a natural part of the job. In this study, there were many examples of this wider community engagement at both a spontaneous and structural level. One small school, for example, made changes to the classroom schedule in order to accommodate funerals that were held in the church which was on the same property. As the principal put it, 'we just reschedule our lunch break, we don't want to make too much noise'. Another example is through practical support of local festivals

and other community events. These occur on a regular basis and are often seen as events that bind the local community together.

More significantly, perhaps, of community support is the work that principals do dealing with members of the community. Due to its small size, principals of small Catholic schools can have a strong rapport with members of the school community. This was referred to earlier as having an intimacy when it comes to religious leadership as illustrated by outreach to families who are not connected to the parish. It was also evident in the sensitivity that principals expressed to those in the school community. Many of these issues are common across all schools, for instance, dealing with family breakdown. Some are more particular to rural areas such as families being under severe pressure when industries or services move away from small rural communities. As one principal commented, 'who do parents go to when they can no longer access a service that they have really needed? Often they come to us [Catholic school]'. Principals saw one of their roles as buttressing and building up the local community. This was especially so in difficult times such as when drought or bushfires threatened the community. In the words of one of the participants, 'things aren't always easy out here'.

Conclusion

A number of major issues emerged from this study. There is strong support here for the notion that multifaceted demands are placed on principal/RECs in Catholic schools. One of the most significant of these is the role of the principal/REC as the religious leader not just in the school but also in the community. The participants in this study saw this role as one that has emerged out of changes in the wider Church in recent decades. The most critical of these was the lack of a resident priest in many smaller communities. As the parish is unlikely to have a staffed office, it can devolve to the small Catholic school to be the point of contact that many have with the wider Church community. Participants in this study were not averse to doing this, in fact, most of them expressed their satisfaction. In addition, there was a strong impression that they fulfilled this role well.

In the wider cultural context where the willingness to take on significant religious leadership roles is on the wane, the fact that principals of small Catholic schools are willing to take this on is a key finding. In this sense, principals of small Catholic schools are taking up a counter cultural position. In spite of their willingness to do this, there is a need to better support the principal/REC as a religious, school and community leader.

There are several dimensions to better supporting principals of small schools. An enduring issue in the work of school principals is the ever-increasing demands on their time. This can be alleviated, to some degree, by providing greater administrative support. As leaders in a small community, principals are often challenged by the scope of their role. One illustrative example of this that emerges in this study was the expectation on principals to try and better facilitate links between the school and the parish. Given the reluctance of many parents to become more involved in the parish, giving principals some assistance in this task could be of great benefit. Part of this is practical but a critical dimension is conceptual. This would involve developing a much clearer understanding of the role of lay people as religious leaders in Catholic communities. In this study, it was evident that the principals had taken on this position almost by default and because of this there is a need for a rigorous examination of the demands, expectations and support given to principals in small schools.

A key aspect of better supporting principals in their role as religious leaders is to provide them with opportunities to discuss concerns and to develop more supportive networks. It is a simple observation but it does capture well the contrast between religious leadership in small and large Catholic schools. In the large school the principal has a well-defined support group

including people like the parish priest, deputy principal and REC. In the small school, all of these may be absent. A fair question is, who then does the principal/REC turn to for support? Given the constraints on hiring more staff, it may be necessary to develop alternative strategies that meet the human need of principals to include others in their support network. One possibility would be regular contact between principals of small schools to share time with each other. This could be a first step to developing more ongoing processes.

Principals of small Catholic schools in rural and regional areas also play a significant role as community leaders, and in this study, many of the participants were conscious of this aspect of their role. Small Catholic schools, and those associated with them, are practical examples of building community capacity in places where there is a paucity of these structures. Small Catholic schools can be seen as important community resources, adding to the vibrancy of vulnerable communities. Principals need to be more aware of this dimension of their role as supporters and animators of local communities.

The participants in this study gave a very positive perspective on the future of small Catholic schools in rural areas. These schools do face significant challenges, many of which have been addressed in this article. At the same time, however, it is important to consider the positive contribution these schools make to local communities. This is exemplified in the leadership provided by the principal/RECs. Being part of the community as well as taking on all aspects of the role of leader, they make an important contribution to Catholic education.

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A review of Efron, S. E. & Ravid, R. (2013) *Action Research in Education: A practical guide* (New York, NY: Guildford Press). ISBN-13: 978-1462509614

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The opening sentences to the Preface of this book state its purpose very clearly:

> This book was written for practicing and prospective educators. Our main goal in writing this book was to provide practical guidelines for school practitioners who would like to carry out action research in their current or future educational settings (p. v).

The contents of the book prove the accuracy of the opening statement by providing a scaffolded learning experience for all through each of the eight chapters. The chapter titles demonstrate the way in which the reader is led through the learning process:

1 Introduction to Action Research
2 Choosing and learning about Your Research Topic
3 Approaches to Action Research
4 Developing a Plan of Action
5 Data Collection Tools
6 Using Assessment Data in Action Research
7 Data Analysis and Interpretation
8 Writing, Sharing and Implementing the Research Findings

Chapter 1 sets the context of the discussion on educational research and action research in particular within the classroom context. An example is given of a classroom teacher faced with a problem within her class and describes how she (Ann) is lead into conducting her own research into the problem. In this way, a classroom teacher or any other practitioner within an education setting can identify with the context and realise that it can be applicable in their own setting. The authors introduce the broad scope of research in education and outline some of the history of its development and use. A very helpful table (1.1) on page five illustrates the comparison of traditional research with action research. The cyclic nature of action research is clearly explained through describing the process in both words and graphics. The chapter, as with all the chapters, concludes with a comprehensive summary and chapter exercises and activities as reinforcement of the user's learning. Each chapter also has its own reference list which can be used as a guide for further reading.

Chapter 4 is especially useful for the novice researcher because it clearly sets out the steps required in developing a research plan of action. All the basics are covered including: defining the role of the researcher; considering the scope of the research; carefully choosing the participants; data collection methods; and ethical guidelines. These are all key issues that the beginning researcher finds difficult.

The role of teacher as researcher is regarded as being of benefit to the classroom teacher, the students and the whole school community. Llewellyn and van Zee (2010) commented that 'in many schools action research is becoming a worthy form of professional development' (p. 2) and that, '[l]ike any effective professional development program, action research (a) is research based, (b) centres on authentic and genuine inquiry, (c) is data-driven, (d) bridges theory and practice, and (e) is collegial and collaborative' (p. 2). A drawback for teachers

engaging in research can be unwillingness to take on this seemingly additional role because of 'limitations of time, lack of resources and little or no support from school administration' (Maharaj-Sharma, 2011, p. 159). The articles in this special edition report on master teachers whose role includes that of researcher. The master teachers were given the time and resources to conduct the research. They were expected to work alongside classroom teachers to explore pedagogical practice and, through professional development opportunities lead reform in classroom practices to the benefit of the students and teachers alike. Specifically, the expectation was that test scores in literacy and numeracy would improve. Thorsten (2017) remarked 'If we want educational research to have an impact on teachers' daily work in the classroom, we need to address and explore questions that are relevant for teachers' (p. 152).

The Australian Institute for Teaching and School Leadership (AITSL) recognises the role that research has in professional learning in the Standards for Lead Teachers: 6.2 *Engage in professional learning and improve practice* 'Initiate collaborative relationships to expand professional learning opportunities, engage in research, and provide quality opportunities and placements for pre-service teachers'; 6.3 *Engage with colleagues and improve practice* 'Implement professional dialogue within the school or professional learning network(s) that is informed by feedback, analysis of current research and practice to improve the educational outcomes of students' (https://www.aitsl.edu.au/teach/standards).

Each of these standards requires an understanding of research methodology and methods to enable the conduct of research and critical understanding and interpretation of research findings. Using the *Action Research* book in a similar way to a text book will enable the user to develop those understandings required to meet the requirements of the Lead Teacher Standards. The book would be especially helpful for teachers at any point in their career progression who wish to improve their classroom practice through engagement in or with research.

The final chapter of the book guides the emerging researcher in how to share the findings from their research in a systematic way. The authors state their belief that 'all practitioners involved in action research need to document their study' (p. 225). The writing of the research report is laid out in a step-by-step format with each section expected in the report explained. A number of alternative ways of sharing the essential elements of the findings are suggested and are suitable for presentations to colleagues engaged in similar work. Sharing research findings with colleagues is important because, 'Problems and questions that initiated your study may resonate with issues that other practitioners face. Making your study available to others can help your colleagues gain new insights into their own practice' (p. 235). The articles in this journal are shared with this purpose in mind.

In conclusion, I would highly recommend this book to all teachers or other professionals who are intending to develop their research skills in a workplace environment and where action research is the most appropriate methodology. It would also provide a highly useful text for staff development sessions through which collaborative learning and research activities are encouraged. The book provides a sound mixture of theory and practice which would enable the user to undertake research based on proven methodology and methods. The included reference lists can lead the user to explore the theory in greater depth if they so wish. The book however, can readily stand alone as a text for the neophyte researcher.

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A Statement of Commitment to the Profession of Teaching was developed by the Queensland Executive of the Australian Council for Educational Leaders (ACEL).
<http://www.acel.org.au/acel/ACEL_docs/Branches/QLD%20Events/2017/Statement_of_Commitment_WEB.pdf>

A STATEMENT OF COMMITMENT TO THE PROFESSION OF TEACHING

I acknowledge that I am a member of a profession that extends to me the opportunity and the privilege to make a positive difference in the lives of young people.

I bring to the profession my unique talents to teach and to lead, which I commit to nurturing and developing throughout my career.

I understand that teaching is a deeply human endeavour. While I teach subjects, ideas and skills, above all I teach young people, who are our future.

I recognise and respect the body of distinct theory and knowledge which is gifted to me by those who have come before. I draw from it and strive to contribute further to it.

I recognise that young people learn in different ways and at different rates. I believe that given appropriate support and resourcing, all young people can learn, and I strive to nurture a love of learning that will help every young person to succeed.

I make judgements to evaluate student achievement through assessment that is valid, reliable and fair, and I give value to those learnings that cannot be measured.

I recognise that teaching is a collaborative profession and I am not the only teacher in a young person's life. My work is enriched through working with my colleagues, learning from them and contributing to their practice.

I acknowledge the contribution of the many parents, caregivers, and teachers past, present and future who contribute to a young person's education. I work with them wherever possible to enrich the learning of young people.

I offer a spirit of optimism, resilience and hope as I support young people to develop and act on the values, beliefs and capabilities that guide them throughout their lives.

I recognise the changing nature of knowledge, and I commit to continuous learning throughout my professional career.

In committing to this statement I accept the responsibilities of being a teacher, and acknowledge the deep trust placed in me by young people, parents, caregivers and society.

7 April 2017

The consultation, development and production of the statement were facilitated by the Australian Council for Educational Leaders (Queensland)

Context of the Statement

What is the Statement of Commitment?

The statement is a voluntary declaration of commitment to a set of values and beliefs for the teaching profession in Australia.

Why was the Statement of Commitment developed?

In 2015 the Queensland Executive of the Australian Council for Educational Leaders (ACEL) researched the criteria of established professions, with a view to ascertaining whether there exists a common set of criteria that comprise a profession. It was agreed that teaching clearly meets all but one of the criteria evident in the research. What is missing is a deep statement of ethically based values and beliefs that complements existing legislative and regulatory instruments.

The Executive resolved to lead the development of a professional statement that captures the spirit of the former Charter for the Australian Teaching Profession (Teaching Australia) and that of similar documents from other professions, and which speaks to all teachers.

Who has contributed to the development of the Statement?

The development of the statement was made possible through consultation with, and invaluable contributions from the following professional groups and their representatives:

> Association of Special Education Administrators Queensland, Australian College of Educators, Early Childhood Teachers' Association, Independent Schools Parents' Network, Independent Schools Queensland, Isolated Children's Parents' Association, Joint Council of Queensland Teachers' Associations, Parents and Citizens Queensland, Queensland Association of State School Principals, Queensland Catholic Education Commission, Queensland College of Teachers, Queensland Department of Education and Training, Queensland Independent Education Union, Queensland Secondary Principals' Association, Queensland Teachers' Union, Queensland University of Technology, University of Queensland, University of Southern Queensland, and University of the Sunshine Coast.

How might the Statement of Commitment be used?

It is hoped that the statement will inspire and engage teachers to take pride in being members of the teaching profession. The statement can be used formally or informally, at graduation ceremonies, induction ceremonies, celebrations of transitional moments in the careers of early childhood, primary and secondary teachers, or for recommitment to the profession for long-serving teachers. It can be used by teacher educators in their work with pre-service students, at the beginning and end of their courses. When using the statement, systems, schools, universities and professional associations may wish to brand the statement with their own identification.

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Leading & Managing

Journal of the Australian Council for Educational Leaders

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The use of two active, present participles in the journal title appears, perhaps, slightly unorthodox, but the choice is deliberate. **Leading & Managing *(L&M)***, for us, assumes that while leading and managing are qualitatively different activities, in reality they complement one another, and are vital to the effective performance of complex organisations and groups. We think managing is best thought of as tied to the performance of specific roles and organisational responsibilities. While this may also be true of leading, it is invariably not the case.

Instead of providing just one more scholarly vehicle for concentrating on leadership and management as conventionally understood and statically defined functions we believe ***L&M*** highlights two key organisational processes: the acts of leading and managing.

Specifically, we have aimed ***L&M*** at personnel working at all organisational levels and in all sectors and systems, principally, but not exclusively, in the sphere of education, with that word understood in its widest sense. We have set two goals for ***L&M***: (1) to advance understanding of what it means to lead and to manage, the experiences of organisational personnel while engaged in leading and managing and the experiences and reflections of those who find themselves being led and managed; and (2) to improve the practice of leading and managing through empirical research and theoretical analysis.

In the belief that no one particular school of thought ever has a monopoly on wisdom or truth, we want ***L&M*** to be eclectic in its scope and tolerant of diverse standpoints. Accordingly, we welcome manuscript contributions from a plurality of perspectives. These may report empirical research, best practice and pedagogy, propose intervention and consultancy strategies, or comprise discussions of theory and methodology.

We ask contributors to bear in mind the following broad indicators of quality writing when preparing manuscripts for submission. Above all, we seek significant contributions to ***L&M*** which advance understanding of leading and managing. We ask that authors should demonstrate their familiarity with current developments in the field and strive to bring to bear distinctive and new perspectives on their chosen topics. We expect arguments to be tightly structured, clearly presented and written in prose that is accessible to a diverse readership.

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Manuscripts should be between 5,000 and 7,000 words in length. They must be typed, double-spaced and with ample margins, on A4 paper, on one side only and with all pages numbered. The front page should bear the manuscript title, the author's name and institutional affiliation. The second page should carry the title and an abstract of 100–150 words. Avoid the excessive use of dot points.

Spelling will be checked to conform to the most common usage found in *The Macquarie Dictionary* (4th Edition, 2005). For **style**, the *Style manual* (Commonwealth of Australia, 6th Edition, 2002) will be used as the reference document.

Headings should appear in lower case and bold type and should be centred. Sub-headings should be in lower case, underlined and be left justified. The first sentence of the initial paragraph under headings and sub-headings should be left justified; thereafter indent the first sentence of succeeding paragraphs.

Notes appear at the end of the article, but authors are urged to avoid excessive footnoting.

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For articles: YAMMARINO, F.J., SPANGLER, W.D. & BASS, B.M. (1993) Transformational leadership and performance: A longitudinal investigation, *Leadership Quarterly*, 4(1), pp. 81-102.

For books: BASS, B.M. (1985) *Leadership and Performance beyond Expectations* (New York: Free Press).

For chapters: TRICE, H.M. & BEYER, J.M. (1986) Charisma and its routinisation in two social movement groups, in B.M. STAW & L.L. CUMMINGS (Eds), *Research in Organizational Behavior*, Volume 8 (Greenwich, Connecticut: JAI Press), pp. 113-164.

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