

A review of the literature and case studies that discuss and clearly identify

"Barriers to Data Driven Improvement Models in Schools"

How those barriers maybe overcome.

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Executive Summary

Over the past decade schools have been increasingly required to gather, examine and utilise meaningful achievement data in order to plan for improved student learning outcomes. Schools are required to set annual achievement targets and to report on the degree to which they have been met. Tensions arise between the need to report on student outcomes against set targets and the growing movement to foster and develop teachers as open critical reflective practitioners. Teachers are often divided between being open in their discourse about how well their students are performing academically and the perceived need to meet targets and be accountable for their

students' learning. This has required a considerable shift not only in terms of teacher practice, but more importantly in teacher beliefs. For the theory to inform practice, this review draws on the literature from both international and national contexts in the field of evaluation to examine recognised barriers to changing teacher practice and, through the examination of selected case studies, the degree to which some schools are working to overcome these and the dilemmas teachers face.

Research Problem

Despite in most cases the provision of significant quantities of information on student achievement [not all of it necessary relevant], coupled with the provision of resources to assist with the analysis of data, many if not most Senior Staff, Heads of Faculty and Teachers are unable to apply the concept of a *"data driven critical self review of practice"* in order to plan for improved student outcomes, either for individual students or groups of students.

Purpose

Aim of Literature Review

This Review is intended to explore the literature in New Zealand and Internationally in two parts:

- A review of the literature for studies which discuss and clearly identify "Barriers to Data Driven Improvement Models in Schools" and how those barriers maybe overcome.
- A review of real case studies of schools where strategies have been applied to overcome these barriers and to what degree they were successful

The aim therefore is to learn more about an issue of high relevance to my institution, with the intention of applying the findings to improve these processes in my school. Developing an inclusive and comprehensive school culture of reflective practice, supported by pertinent information in order to improve learning outcomes for students, with the premise that there are two elements that are essential to an effective accountability effort:

A belief that principals, teachers and community people can improve teaching and learning, and effective use of data in support of that effort to improve. (Keeney, L.: 1998).

The research also tells us that we need to structure the use of data so that it builds a sense of school wide efficacy. Teaching has, in a lot of ways, lost it sense of efficacy, lost the sense that teachers can make a difference. *"If a teacher has a strong sense of efficacy, she knows that what she does in the classroom tomorrow affects what kids produce in class that day"*. (Lachat, M. A & Stephen Smith: 2000).

Background and Rationale

This review will be written from the perspective that in order for teachers to plan improved learning outcomes for students, individuals and groups of students, they must embark on a process of gathering and analysing meaningful achievement data.

It is essential then, that Teachers must be able to honestly examine the data that they have gathered and provide open commentary on what that data tells them about how their students are learning, as individuals, compared to their peers, cohort and students in other schools.

This information will provide staff with both positive feedback about their practice, and should inform them on directions for improvement. Teachers should feel comfortable in reporting their findings for all levels. This process should be fully supported both in terms of resources and sociological factors to enhance a school wide culture of seeking continual improvement.

It is my view, and supported by the ERO, that whilst schools / teachers are generally proficient in gathering data, they experience barriers in openly and critically analysing the data in such a way as to provide them with meaningful information that can lead them to make changes to improve student learning outcomes.

Curriculum review will be most useful if it is focused on the effectiveness of the curriculum delivery in developing students' knowledge and skills, rather than simply on the coverage and design of teaching programmes. (ERO : 2000).

Barriers to critical self review are exacerbated when staff are required to formally report their findings to Principal's and Boards of Trustees and we need to remember that *"in a school, alignment starts with the ability to see and respect each other, and to establish some common models about reality. During dialogue people learn to think together and the resulting actions belong not to one individual but to all of them together"* (Senge et al : 2000)

I undertake this review cognisant that Schon, D. (1987) tells us that there is *"a real need for leadership in improving practice as few people are aware that they often do not use the theories they explicitly espouse"*. Within schools, individuals withholding information or giving information that is ambiguous, vague or inconsistent to the espoused culture to protect themselves and others is another important obstacle we must also address.

Methodology - Research Questions

Questions that will lead me to improve my practice would include:

- What does the literature identify as barriers to open data based critical self review of practice in schools?
- What do case studies say about how schools overcome these barriers and how successful are they?
- What does the literature say about the role of the Board of Trustees and the Principal in supporting data based improvement models?
- What does the literature say about the information that is available to teachers its relevance, reliability and ease of use?
- What does the literature say about Teacher attitudes to open reflective practice?
- How can schools develop a culture of open and critical self review and complete learning institutions?

Introduction

Since the advent of 'Tomorrows Schools' with its emphasis on site based management, there has been increased pressure on schools to comprehensively report on student achievement and provide quality discussion on: student achievement data collected, interpretation of data in terms of determining school direction and changes initiated in order to improve student learning based on outcomes as a result of data collected (ERO 2000).

The 2001 amendment to the 1989 New Zealand Education Act, whilst not explicitly requiring schools to maintain an ongoing programme of data based critical self review, does emphasise its importance in sharpening the focus of school performance relative to student achievement. The amendment highlights the need for schools to be deliberate and purposeful in their approach to ongoing school improvement. This legislative change marks the first time that achievement and student learning have indeed been mentioned in the Education Act.

Furthermore, the mandatory process of school wide strategic planning, as outlined in the National Administration Guidelines (NAG 2) [Section 60A Education Act 1989 paragraph ii and iii], requires the setting of quantifiable annual student achievement targets and reporting on the end of year variance from these targets and goals. The Education Review Office (ERO) when discussing self-review in schools states that:

A key part of strategic planning is, knowing when the goals and objectives have been achieved. Strategic planning involves establishing indicators and milestones that describe what will happen in the school when a goal has been

achieved. Monitoring against these milestones and making any necessary adjustments form a key part of self-review (ERO, 2000, b, p3).

Edwards (2006) discusses critical self review in terms of a culture of evaluation whereby teachers gather evidence, set goals, identify strategies for determining progress, seriously evaluate their practice and share their findings within their organisation. The ramification of such a shift in perception alongside meeting legislation mandates suggests schools need to develop a culture of evidenced based improvement where teachers are encouraged to be open, critical reflective practitioners in order to improve student learning outcomes (Edwards, 2006; Ministry of Education 2002; ERO, a, 2000).

Lachat and Smith (2004) acknowledge that despite the abundance of information gathered on student achievement in many schools and the provision of resources to assist with the analysis of data, staff struggle to engage in open evidenced based critical self reflection of practice. They argue that the challenge for schools is changing teacher core beliefs and encouraging immersion in evidenced based reflection rather than responding to external forces requiring measurable improvements. This dilemma is stated simply. However, in reality, the issue of teachers embracing evidenced based reflection is complex and many factors combine to inhibit reflective practice. Such factors Lachat and Smith (2004) believe center on a lack of staff training, cultural resistance, a lack of experience in using assessment results for program and instructional improvement and a fear of reprisals.

The focus of this literature review is to provide answers to the following questions:

- What do we want to change in order to develop a culture of evidence based critical self-reflection?
- Why is changing beliefs important for teachers to change their practice?
- What are some of the barriers to critical self-reflection in the school context?
- What does the literature tell us about schools that are endeavouring to develop critical self-reflective practices?

Findings

The Conflict of Product Versus Process, Accountability Versus Improvement - What Do We Really Want To Change?

Fullan (2001) identifies accountability, data analysis and goal setting as being at the heart of contemporary education reform efforts worldwide, with accountability the watchword of education and data analysis holding a central place in the current wave of large-scale school transformations. He goes on to say that policy makers are demanding that schools focus on achieving high standards for all students and that they require evidence of progress that is conceived explicitly in a language of data.

However as Senge (1999) argues, data usage does not have to be a mechanical or technical process that denigrates educator's intuition, teaching philosophy and

personal experience. Using data wisely is a human thinking activity that draws not only on personal views, but also on capturing and organising ideas in some systematic way, turning the information into actions and making the interpretation public and transparent.

These are key ideas, public and transparent, in using evidence to openly reflect on practice. A dilemma faced by practitioners occurs between reporting on progress towards stated goals and educational outcomes thereby meeting the requirements of accountability and a process of open, emancipatory critical review in which information gathered becomes knowledge as it is shaped, organised and embedded in a context that gives it meaning and connectedness (Schon 1987).

Fullan (2001) informs us that using data should not be considered as being separate from planning and routine decision making in schools. Instead data is a necessary part of an ongoing process of analysis, gaining insight, generating new learning and initiating change in practice. He points out that professional decisions in schools have historically been based on tacit knowledge; knowledge that is embedded in the individual's experience and which involves intangible factors like personal belief and values. He argues that schools are complex places presenting challenges that demand reflection, consideration of many points of view and attention to context and evidence based practice.

From my observations, schools are beginning to discover that knowledge creation, inquiry and sharing are essential to solving learning problems in a rapidly changing society. There is common acknowledgement of what Schon (1987) suggests is a tension in education between bureaucratic systems of central control searching for quantifiable improvements in education outcomes, and the development of professional empowerment in schools where educators endeavour to promote a focus on collaborative relationships and professional ownership to improve teaching and learning. A problem that Ball and Cohen (1999) note is for teachers who have never experienced this evidenced based reflection and who do not understand the epistemological assumptions surrounding it, to successfully translate the importance of collaboration in improvement into their belief structure and therefore their educational practice.

A further problem as Marks and Gerston (1997, in Chaney-Cullen and Duffy, 1998) note is that teachers can appropriate the superficial aspects of a method by simply interpreting the practice in terms of their existing belief structure. They note that although change may occur, any change remains consistent with existing beliefs about teaching and learning.

Hattie (2003) tell us it is important to examine how these changes in beliefs can be achieved particularly since teachers are viewed as important agents of change in the reform efforts currently underway in education. Although expected to play key roles in changing schools and improving educational outcomes, teachers are also considered major obstacles to change because of their adherence to outmoded forms of instruction that have in the past emphasised factual and procedural knowledge at the expense of deeper understanding (Schon, 1987; Hargreaves, 2004).

Changes teachers are required to make necessitate considerable support. As Duigan

and Collins (2003) assert, the challenges facing practitioners in contemporary educational organisations are complex and multi-dimensional and many present themselves as tensions where choices are not necessarily between right and wrong, but rather involve alternatives, each of which have merit. Finding optimal resolutions to such tensions therefore demands mindsets and belief structures based on practices, which seek answers from all the alternative choices presented.

Why Is Changing Teacher Beliefs Important In Changing Practice And How Can It Be Achieved?

Beliefs about learning and pedagogy provide the lens through which we interpret teaching practices. In other words, teaching practices are consistent with and guided by one's own belief systems. (Ball and Cohen, 1999; Richardson and Placier, 2001).

According to Marks and Gerston (1997, in Chaney-Cullen and Duffy, 1998), teachers are more likely to reject a practice if it cannot be interpreted in terms of their belief systems.

Peterson (1992) addresses the difficulty of changing teacher practices when he postulates that such change involves reworking a belief system that is deeply ingrained from an early age. He says that from the time many of us were first graders, we knew exactly what the teacher and student roles were. He points out that it may not be that we are content teaching the way we were taught, but rather it has become a convention that we may never have doubted or challenged before. Knapp and Glen (1996) also assert that our core teaching style is based on the way we were taught and a strong belief in helping students learn by what we believe is acceptable practice. They propose that most teachers have a common set of beliefs about education built upon years of participating in the traditional system as former students and then as teachers.

A change in beliefs while critical to successful adoption of reflective teaching practices is difficult to ensure because beliefs have been noticeably resistant to change. Pajares (1992) informs us that beliefs about teaching are well established by the time a student teacher leaves college and although belief change during adulthood is rare, it most frequently occurs in conjunction with a fundamental change in teacher situation.

As such, the challenges for our schools are: how to change teacher core beliefs to ensure immersion in a process of evidenced based reflection rather than mere response to external forces requiring measurable improvements? Promote a system that develops evidenced based self-analysis and open critical review in a form that is emancipatory for all participants? Develop a belief structure which Bridges (1994) describes as encouraging those involved in the process to view their own performance from inside their work, reflect on their own educational philosophies and enquire into the consequences of their actions?

Authors on the subject of evaluation and improvement contend that in order to change beliefs, those beliefs: must be positioned in the context of new understandings of learning and that the challenge involves the reframing of teacher experience to

include ideas such as collaboration with peers. Levin (2001) outlines the importance of schools developing resources and support structures to support change in practice and beliefs. Eisner (1985) argues that what is required is adoption of 'connoisseurship' in reflective practice. That is, the sampling and critique of ideas and processes in a combined examination of what works, what has made a difference and what should be held as exemplary practice.

Connoisseurship, Eisner (1985) informs us, is showing an appreciation of what is encountered. He goes on to describe teaching as an "activity that requires artistry" and that "schooling itself is a cultural artifact" (p91). In this respect evaluation plays a role in the cultivation of artistry; its role is diagnostic and predictive rather than prescriptive. Parlett and Hamilton (1997) discuss the need for illuminative evaluation which they describe as taking into account the wider context in which educational programmes function with the primary concern being description and interpretation rather than measurement and prediction and the linking of evaluation to processes of professional discussion and collaboration in order to find common understandings.

Ball and Cohen (1999) argue that a central activity in all models of change is working together collaboratively to challenge existing beliefs and practices, enacting new practices and critically reflecting on those to reframe understanding. Reflecting collectively is a way for teachers to become aware of how they are teaching, in other words, engagement in self-assessment. According to Hargreaves (2004), research has consistently identified a collaborative environment as critical to successfully changing teacher beliefs in practice. Change in beliefs he notes will not occur in isolation due to external pressures, but result from teachers working together to construct new understandings and belief systems.

Collaboration As A Way Of Fostering A Change In Beliefs

As schools move into the postmodern age, their basic structures and cultures must be realigned to meet new purposes and pressures. Bishop (1996) defines post-modernism as an eclectic movement originating in aesthetics, architecture and philosophy. Postmodernism espouses a systematic skepticism of grounded theoretical perspectives where the consumer of a cultural product (artwork, piece of writing, user of architecture) is free to deconstruct the meaning of a work and that different users will come to very different, but equally valid, conclusions of what that meaning is. Newmann, Rutter and Smith (1989) emphasise that if a change in beliefs is to succeed it must allow individuals to construct meaning from their work with an emphasis on providing the opportunity to work with peers in developing new understandings of practice.

What appears to be required is collaborative learning which Panitz (1996) describes as a personal philosophy, not just a classroom technique. Collaborative learning suggests a way of dealing with people which respects and highlights individual group members' abilities and contributions. There is a sharing of authority and acceptance of responsibility among group members for the group's actions. The underlying premise of collaborative learning is based on consensus building through group cooperation, in contrast to competition (Myers, 1995).

If collaboration in some fundamental sense is about the realignment of school power

relationships, then we would expect the working lives of teachers to be organised not around the principles of hierarchy and isolation, but ones of partnership and collegiality. Rockwood (1995, p.68) comments that "one of the emergent and most promising metaparadigms of the post modern age is that of collaboration as an articulating and integrating principle of action planning, culture, development, organisation and research". According to Ball and Cohen (1999), commonly advocated components of collaboration linked to improvement are: realignment which requires the development of a common vision, commitment to shared goals and developing clarity in understanding of the goals being implemented. This is seen as essential to developing confidence and consistency in a belief system shared among a community of teachers.

Myers (1995) notes that essential to collaborative reflection of practice is the redistribution of central control empowering teachers to become immersed in the decision making process. Nevo (2002) also describes how a transfer of authority from the center to the periphery fosters collaborative school based management practices that develop a belief system based on internal evaluation. Empowerment of teachers and redistribution of responsibility are critical for a change in beliefs for we have known. For a long time that mandating change from management doesn't work. Mandates may create an awareness that changes are necessary but real change, particularly to beliefs, depends on access to, ownership of, and control by teachers over their own practice and support systems (Cushman, 1997).

Sustained changes and improvements she argues can be achieved by schools through leadership support and teacher professional development practices that maximise the quality of teaching, learning and achievement. Under such circumstances school leaders and teachers themselves become the empowered agents and purveyors of change with positive effects on the teaching quality of other staff, particularly those within the collaborative group. Earl (2005) tells us that when teachers come to the planning process as investigators, wanting to understand and interested in working together and with others to find the best solutions, they find themselves engaged in a very different kind of organisation. One that values dissenting voices and is determined to generate and share knowledge and evidence, even when the evidence may mean having to make dramatic changes.

Essential Elements of Effective Evidence Based Improvements Models For Schools

There is an emerging body of research and school reform literature that cites the importance of evidenced based decision making in creating more effective schools (Armstrong and Anthes 2001; Bernhardt, 1998; Killion and Bellamy, 2000). Effective use of data by school personnel is increasingly identified as a central tenet in school improvement processes (Earl and Katz, 2002; Protheroe, 2001; Wayman and Stringfield, 2003) not only to raise test scores (Kennedy, 1999), but also to change school cultures, teacher beliefs and attitudes (Feldman and Tung, 2001) especially related to raising achievement levels of low and under performing students (Armstrong and Anthes, 2001).

Armstrong and Anthes (2001) highlight several elements associated with effective data use: strong leadership, a district-wide culture that supports the use of data for

continuous improvement, a structure for supporting and training teachers to use data, close accounting of every students' performance on academic standards and a well defined, data driven school improvement process. The Centre for Collaborative Education (2002; 2004) cites principal leadership at the school level as a key element of successful data use in school reform efforts. Despite: this, cultural resistance and teacher beliefs are significant barriers to effective data use in high schools. Many high school cultures, according to Lachat (2002) and Visher and Hudis (1999), do not focus on data collection, analysis, or use, and that the use of data for ongoing decision making, program improvement and critical self reflection requires a major cultural shift. In discussing teacher attitudes and the potential success of students, Armstrong and Anthes (2001) note that teachers find it difficult to link data to an appropriate intervention. Bernhardt (1998) claims that even when teachers are given training and time to think about using evidence to inform their practices, they may be reluctant to do so in a culture where they feel threatened or fear reprisals. Keeney (1998) reinforces this idea when he observes that effective data use requires a culture that is driven by inquiry, not fear.

According to Cizek (2000) few administrators and teachers have had formal training or experience in analyzing and interpreting data or use of assessment results for program and instructional improvement. Most schools do not provide teachers with the ongoing sustained training they need to ask the right questions in analysing and interpreting data (Protheroe, 2001). In an examination of data use in schools, Love (2000) highlights that schools are ill-equipped to use data to address problems, target improvements, or monitor progress. They lack the time, skill, and organisational structures to use data effectively (Holcomb, 2001).

In order to examine how these elements of effective evidence based reflective practice can be put into effect in a current school setting; I reviewed a seminal study carried out in five schools in the United States of America. The focus was on how these schools were addressing the inherent barriers to implementation of evidence based practice through the development of a school wide culture of collaboration and empowerment.

Case Studies of Schools Endeavouring To Implement Evidence Based Critical Self Reflective Practices

Currently in the United States of America the high school reform movement is drawing increasing attention to the need for more systematic uses of data to inform policy, management and instructional changes aimed at improving student achievement (Lachat and Smith, 2004). In conjunction with the movement, Lachat and Smith (2004) state that data can be a powerful ally as today's educators grapple with the challenge of changing current high school structures into more effective learning environments. They acknowledge that in urban low or under performing high schools increasing demands for accountability paralleled by equity concerns arising from the wide diversity of ethnicities have made it imperative that educators base their decisions on accurate and meaningful data about student learning.

In their recent study undertaken for the Northeast and Islands Regional Educational Laboratory at Brown University, Lachat and Smith (2004) investigated how five low

performing multicultural urban high schools implemented core elements of the systematic reform movement currently advocated in the United States of America. Core elements examined were: use of data to support continuous improvement, a shift to a standards based curriculum and establishment of personalised learning environments.

Lachat and Smith's study, aligned with the 'No Child Left Behind' legislation mandate emphasising use of data to monitor school progress in raising student achievement by identifying and targeting areas for improvement. An examination of findings from the study is pertinent to this report as it contributes towards a deeper understanding of conditions and practices that promote and or act as barriers to the use of data to change practice and improve learning outcomes for students.

Whilst each school in the study was unique and presented varying degrees of success, there are specific lessons applicable to the New Zealand context which can help educational leaders. Furthermore, the schools are of a type (size, ethnic mix, policy) similar to schools in the New Zealand context to make them worthwhile examples to investigate. The five schools investigated in the study were: Washington High School, Adams High School, McKinley High School, Jefferson High School and Monroe High School.

Implications For Policy and Practice From The Case Study Schools

These case study schools provide important lessons for school leaders seeking to successfully implement a philosophy of data use for critical self-improvement. It needs to be mentioned that although not all of the schools were equally successful, they all made some progress: All schools were strongly committed to a philosophy of using evidence for continuous improvement as opposed to evidence usage being a required duty or task. The findings showed that data driven decision making was a multifaceted concept that requires four core capacities: access to high quality and timely data; leadership structures that support data use; processes that support a change in beliefs and collaborative inquiry; and positive staff attitudes to data and the role of the teacher in improving learning outcomes. In the following sections each of the above points is discussed further.

Access To High Quality And Timely Data

An important finding from the study is that schools need strong data verification, integration and management procedures to ensure accuracy, timely collection and analysis of essential data.

Lachat and Smith (2004) found that addressing data quality issues, capabilities and access are important steps in building capacity to use data at the school level. This was particularly the case in the collection of predictive data from which expected outcomes can be compared against actual learning outcomes. Apart from the findings from this study, other authors such as Bernhardt (1998), Holcomb (1999), Johnson, (1996) and Love (2000) reiterate that without the ability to relate actual

outcomes against a measure of the expected, that is predictive data, teachers struggle to set targets and know whether they have reached them.

Leadership Structures That Support Data Use

The implementation of school wide data use in the high schools is greatly enhanced by leadership structures that involve the principal, other administrators, teacher teams and department heads. Findings from the case studies suggest that the multiple roles played by different school staff contribute to more pertinent use of data. Lachat (2002) considers that the combined strategy of using a data team and a data coach, that is a skilled practitioner in the use of evidence based improvement for learning outcomes, provides ongoing facilitation and support in building staff skills to interpret and apply data to achieve greater equity and higher student achievement. Lachat (2002) describes leadership and support from the principal as essential to establishing a belief and a culture of data driven decision making in schools. Principals he suggests must create a clear vision of data use, communicate clear expectations that staff will use data for improvement, model the use of data and provide time for school staff to analyse and use data. The principal, in other words, must champion the work of the team in using data, monitor the progress of the team and hold the team accountable for achieving its purpose (Love, 2000).

Lachat and Smith (2004) found that the data coach as facilitator contributes to school wide use of data for improvement and is an important factor in building the skills of a data team who can then lead the process of data use throughout the school. These findings are corroborated by the literature (Centre for Collaborative Education 2004; Greene, 2004; Rand, 2002) and reinforce the importance of such key roles in sustaining a focus on data use in the midst of extensive school demands for change.

Processes That Support A Change In Beliefs And Collaborative Inquiry

The case studies confirm the importance of teacher collaboration in analysing data that focuses on a set of clearly defined questions. Such activity is considered a potent strategy for building staff beliefs and skills and keeping the focus on student learning and achievement. School leaders however need to recognise that the practice of collaborative inquiry requires sufficient time for staff to have data driven conversations. Securing adequate uninterrupted time is essential to examining the implications of data and exploring options for improvement. School policies and practices that integrate the use of data into meetings already occurring in the school can overcome some of these time barriers. Such findings are supported by other authors in the field. Love (2000), for example, suggests that establishing common planning time for teacher teams can set an expectation that teachers will schedule time on a regular basis to collectively examine a variety of students' performance data.

Positive Staff Attitudes To Data And The Role Of The Teacher In Improving Learning Outcomes

All five high schools in the study underwent an important transition in staff attitudes and beliefs toward data. Although data had been available for some time within the schools, there had been little expectation that any group would purposefully examine

the data to drive changes in practice for improvement. Over the course of the study a major cultural change occurred in the case study schools. School administrators and various school teams became more confident that they would receive ongoing understandable reports that would allow them to examine their progress in improving indicators of student performance.

Having regular access to data contributed to the use of data becoming a more pervasive aspect of school culture. Changing the culture and belief systems allowed school teams to; examine how their students performed, plan instructional interventions more effectively and ask deeper questions about factors that might be influencing performance. In keeping with this claim, Protheroe (2001) informs us that teachers are in unique positions to develop an extensive and well developed range of strategies and techniques that can be used to identify and meet the current needs of a diverse range of students. He goes on say that it is teachers who interrogate the evidence, select assessment strategies that accurately reflect what students know and use the evidence to support students in improving academic achievement.

The value of evidence does not lie solely in the description that it provides of student achievement, but rather, in the way this description is interrogated and understood to develop and apply appropriate strategies to improve student learning (Allen, 2003). Buniges (2005) observes that if evidence is to be used more effectively, the capacity of the teacher to ask the right questions of evidence, to examine the how and why of evidentiary results and to respond with the most effective strategies must be realised. Protheroe (2001) notes that educators who have learned to effectively use assessment data have often initiated change and achieved positive results. Evidence from the literature, in addition to the aforementioned study, provides a compelling argument for the importance of continuing development of the teaching profession, and in particular teachers, to play leading roles in evidenced based approaches to teaching and learning. This includes supporting teachers to observe and learn from each other's work in order to expand the circle of professional collaboration. Luke et al (2000) argues that effective teacher development requires alignment of the three key message systems that exist in education; curriculum, pedagogy and assessment whilst Osterman & Kottkamp (1993, p135) tell us that by "posing questions we develop new perspectives, new ways of looking at our own actions and a new awareness of our own behaviour".

Limitations Of Case Study Findings

There is a plethora of literature discussing the various dimensions of data use in schools for improving learning outcomes. There are however few studies which investigate the implementation of an evidenced based approach to improvement within the school setting (Lachat 2002; Protheroe, 2001; Bruniges, 2005).

The findings discussed in this review are the result of investigations into a limited number of case study schools and do not present a comprehensive study of all case studies in the field. Limitations attributed to this study include:

- The case study schools chosen were urban highs schools that were already committed to the implementation of reform with respect to using data for

- improvement;
- A very small sample of schools were selected from a large population limiting statistical validity; and
- The schools were chosen rather than being randomly selected and had a commitment to change at the outset.

These aspects make the drawing of conclusions suffer from a lack of generalisability. Despite this, findings from the study are certainly not invalid. Comments from ERO (2000, b), for example, suggest that high schools across New Zealand struggle with many of the same issues as identified by the case study schools in terms of value gained. Hargreaves (2004) advice seems to be most applicable in that the most intelligent way forward is to have thoughtful conversations based on the knowledge available and apply it where it makes the most sense. In this respect all research is important but its effective use requires critical engagement rather than slavish dependency.

New Zealand Literature On Evidence Based Improvement And Implications For Implementation

In the New Zealand context researchers tell us that achievement data should help teachers to teach and students to learn (Hattie, 2003; Earl 2005; Black & William 1999). Hattie (2003) states that within schools teachers account for about 30% of the variance in determining student achievement. He goes on to say that a growing body of evidence indicates that the use of high quality targeted assessment data in the hands of school staff trained to use it effectively, can improve instruction and thereby outcomes.

Hattie (2003) suggests that assessment for learning is based in the classroom and involves students in not only their own assessment but also in their learning as a result of that assessment. Furthermore, that assessment should occur as a regular part of teaching and learning and the information gained used to shape the teaching and learning process. However Symes and Timperley (2003) note that many teachers collect achievement data because it fulfills a school requirement and the data collected is not perceived as being owned by the teacher but collected for someone else's use.

Hattie (2003) argues that when schools do not have established systems to make full use of data, teachers are unaware of how the data collected might be effectively used. For this reason Symes and Timperely (2003) suggest planning for improved student learning outcomes is ongoing, cyclical and should be embraced collaboratively by teachers, faculties and departments. Timperely and Parr (2004) propose that student achievement information has to be accurate, timely and ultimately linked to specific desired improvements. Data must also inform decisions about learning outcomes and the information requires presentation in ways that encourage teachers to use assessment techniques that foster improved outcomes for all students.

Quality Assessment Systems

Several researchers advocate using data to drive improvement and as a key to

improving learning outcomes (Craig, 2005; Earl, 2005; Hattie, 2005). Axworthy (2005), Black and Michel (1998) and Black and William (1999) point out that while collecting data is laudable there is a need for teachers to analyse and use the achievement data once it has been collected. The Ministry of Education (2003) describes a school wide focus on the use of achievement information as being a necessary condition for raising student achievement however to begin with a school must have a high quality assessment system which serves the needs of every student enrolled in that school (Axworthy, 2005; Black and William, 1999; Peters and Cornu, 2005). A quality system should incorporate such components as content standards that are complete yet flexible for each curriculum level, performance standards that have consistent meaning across year and curriculum levels, accurate measurement of individual achievement and knowledge growth and timely reporting of results to students, parents, other teachers in the faculty and the Board of Trustees.

An achievement measurement system, as identified in national literature by authors such as Earl (2005), Hattie (2005) and Kingsbury (2005), should also include consistent, stable, cross-year level measurement scale assessments that are targeted at each individual student's curriculum level not the middle of an achievement range and the reporting of individual outcomes against expected levels of achievement. Hattie (2005) in describing his Assessment Tool for Teaching and Learning (AsTTle) says that whilst it goes a long way to addressing the aforementioned needs, it is important to be mindful of interpretations made from any data collected and remember that it is just a snapshot of the level an individual student's learning is at. He makes a salient point that confirms my beliefs when he says that it is the interpretations that are critical rather than the data itself. Hattie (2003) maintains that the teacher is critical in the evidence cycle as it is the teacher who ascertains the nature of the evidence and uses it to make a difference to learning.

In interpreting the data collected to modify teacher practice, Bruniges (2005) identifies four major ways that teachers can make a difference to student learning: use data to improve the focus of teaching - a diagnostic capacity, focus students' attention on their strengths and weaknesses - a motivation capacity, improve programming, planning and reporting on assessment - communication of achievement.

Devising A School Wide Vision And Action Plan

The Ministry of Education (2002) and authors such as Black and William (1999) and Kingsbury (2005) observe that for any school beginning to make decisions about using achievement data to initiate improvements to teaching and learning, the initial step must be asking the right questions in order to develop a school wide vision, strategy and action plan. Hattie (2003), Lai and McNaughton (2003), Black and William (1999) suggests that the questions teachers need to ask include:

- How well are our students (individually) doing now?
- How do we know this?
- What is working well?
- What would we like to improve?
- How can we make these improvements?
- How do we know that we have achieved our goals?

Black and Michel (1998) consider that these questions lead teachers and other staff members to purposeful conversations about how data will be used to improve student's performance around the goals and targets they wish to set. Authors (Hattie, 2005; Kingsbury, 2005; Rallis and Mac Mullen, 2000) argue that data from reliable sources is required in order to set targets and goals on a faculty and school wide basis, as outlined by the Ministry of Education on their Te Kete Ipurangi - Online learning center website (2005). Some of the tools that may be used to address this include; Progressive Achievement Tests (PATs), AsTTle, Curriculum Evaluation and Management Centre entrance test (CEMO) and Middle Years Information Systems test (MIDYIS). Once the school has set goals, Hattie (2005) suggests an action plan should be devised that encompasses the central role of the teacher in raising learning outcomes through the use of achievement data.

The Role Of The Teacher And Effective Teaching Using An Evidenced Based Approach

Predominant in the literature over the last five years around the theme of using evidence has been discussion of the influence on student outcomes through effective teaching, (Hattie, 2005; Sutton, 1995; Black and William, 1999; Ministry of Education 2005). A great deal of discussion has surrounded the premise that learning outcomes are only improved through changes that are put into direct effect by teachers in classrooms. Improved outcomes Leder (1992), Black and William (1999), Hattie (2003) and Sutton (1995) suggest, require personal learning plans underpinned by evidence from formative assessment strategies. These goals based on early diagnostic or predictive as well as formative assessment should aim to make the vision of the school a reality. Effective teaching therefore should focus on defining learning aims for individual students related to their particular strengths and development needs. Hattie (2003), like other international researchers (Alton-Lee, 2003; Graves, 1983; Parr et al., 2004) notes that to be effective, teachers also need to involve students to the extent that they feel ownership over their learning and the setting of personal goals. Hattie, (2005) develops this further to say that if an indication of how achievement data will be collected and used is shared with the students as they commence a task, it makes the whole process meaningful to the student and more powerful.

Dialogue And Collaboration Between Teachers

From the New Zealand literature, similar to that of international contexts, an important theme to emerge in the use of achievement data concerns collaboration and teacher dialogue. Authors such as Black et al. (2003), Craig (2005), Wiggins (1998), and Lai and McNaughton (2003) discuss the importance of meetings and sharing best practice at every organisational level on a regular basis in reviewing achievement data, developing achievement rubrics, discussing ideas that have worked well in some classrooms and maximising opportunities for professional dialogue. Black et al. (2003), Craig (2005); Earl (2005), Leder (1992), Ministry of Education (2005) and Wiggins (1998) endorse the value of both formal and informal dialogue in schools not only between teaching staff but also between management, teachers and students to discuss ways of improving student outcomes both before and after curriculum strands or topics within strands are actually taught. Totally suffusing the organisation in professional dialogue about the use of achievement data and sharing ideas when

teachers and students meet, gives everyone a wider repertoire of resources to choose from.

Gaps In The Literature

Whilst the literature describes factors that are important in encouraging evidenced based improvement and those that inhibit these practices, the research is bereft of practical guidelines to help implement solutions to the problems identified in an actual school setting. The literature does not point to New Zealand schools where these barriers have clearly been overcome, nor does it refer to practices and policies that could be held to be exemplary and clear examples of best practice.

Questions That Remain Largely Unanswered:

- How do we overcome a reticence from teachers in open critical analysis of performance particularly that which is to be reported to the Board of Trustees?
- What forms of professional development are best in developing changes in teacher beliefs and school culture?
- How do we construct authentic data which describes clear expected outcomes for students, particularly in those learning areas without AsTTle, PATs or CEMO and from which we can plan realistic targets?
- How do we go about defining realistic targets for individual students or indeed cohorts of students across learning areas?
- How do we provide the time for teachers and students to develop these practices?
- Why is evidenced based improvement not a major focus for our teacher training institutions?

These questions seem to be at the heart of overcoming many of the barriers to evidence based improvement written in the literature. Yet there is very little practical research carried out within New Zealand schools that answers these questions. Such questions continue to remain the focus for both schools and the Education Review Office.

Benefits

As the Principal of a new school - Albany Junior High School - opened in 2005, is involved in actively inculcating a school wide philosophy and vision whereby a corner stone of belief in our culture is that of openness, focussing on and promoting practice that develops the school as a learning institution that is self critical and emancipatory, focussing on improving outcomes for all individual students.

This literature review will allow me to develop my own thinking in this particular area of interest and to potentially make a contribution to a better understanding of these issues and therefore improve our professional practice.

By identifying common barriers and some of the strategies that have been used by other schools, it should be possible to mitigate against these within my school and provide the support and resources that would enable staff to openly share best practice and discuss limitations in programs and curriculum delivery.

This paradigm of study is emancipatory in that it hopes to foster and encourage people to put their practices, ideas and assumptions to the test by gathering compelling evidence, but to be open as to what counts as evidence and what it means.

It involves helping people in making a critical analysis of the situation in which they work focusing not on a process of problem solving but rather one of change. This approach also identifies the need to progress from information gathering and knowledge generation to making changes to improve situations.

By gathering information in this study from which may lead us to improve our own school situation, I would envisage developing a school wide action research model, whereby action research aims at improvement in three areas: firstly, the improvement of *a practice*; secondly, the improvement of the *understanding* of the practice by its practitioners; and thirdly, the improvement of the *situation* in which the practice takes place. Carr and Kemmis, 1986 p.165) [italics as in original text]

The Inquiry cycle we would establish could involve us as a school attempting to:

- Establish outcomes for which stakeholders accept responsibility
- Define the questions
- Collect and organise data
- Conduct mindful analyses of data in light of the schools purposes
- Take actions with meaningful consequences for success or failure
- Assess effects of actions

(Lachat, M. A & Stephen Smith : 2000)

Conclusions

This review has identified key principles that will help guide me in my own school context to develop, support and encourage teachers on their pathway to evidenced based reflection and the sharing of critical analysis throughout the school. Furthermore it has highlighted common barriers that the senior leadership team and I will need to understand in order to foster a school wide philosophy of critical reflection for improvement.

The principles are:

- Effective leadership from the principal, in the setting of a clear vision and philosophy that is supported throughout the school at all levels;
- Alignment of teacher beliefs and attitudes towards the goal of building a reflective culture ;

- Development and support of school wide collaborative inquiry;
- Provision of adequate resources, particularly of time to reflect, discuss issues and scrutinize practice;
- Professional development in gathering, analysing, interpreting data and evaluating programmes; and
- Professional development in effective assessment processes, particularly in gathering and utilising diagnostic and predictive data.

On reflection and with these principles in mind, Edwards' (2006, p65) point on developing a culture of evaluation appears crucial:

The barriers to evaluation are not at all difficult to understand! Unless evaluation becomes an accepted part of a school's culture, it is very likely to always remain as something of a technocratic activity or a bureaucratic requirement; something that is either 'done to us' or that 'we do simply because we have to or through which we simply go through the motions'. But, when part of the culture, it assumes a place as part of the way of life our place, so to speak - it is valued, we talk about it, we try to get better at it, we celebrate our successes, we see evaluation as something that has a continuing and vital place in our organisation.

The message from Edwards and other authors is that fostering an ethos of open reflective practice requires effective leadership from the principal whose instrument for implementation is a clear, unified school wide vision. Whereas distributed leadership provides opportunities for staff to develop their educational leadership roles and strengths, a clear and committed leader is identified as being essential in setting the vision from which all school-wide philosophies and practices stem. This is particularly important in developing a culture that can work to diminish the inherent tensions that exist in education between accountability and improvement in the quest for improved student learning outcomes.

In developing teacher practice away from reporting for accountability to open, reflective critical review there is no simple solution, nor magic bullet. Dilemmas will continue to exist in this complex process we call education and there will continue to be a gap as Eisner (1985) tells us between the vision we anticipate and the reality we inhabit. Many staff I believe will remain reticent in opening their practice up to critique and will continually require encouragement within the supportive culture of their organisation. Reflective practice is a continuum on which we find ourselves placed in our own particular locus, and a leader must develop and support each teacher on their own individual journey.

Leaders need to be cognisant of the consequences the ideals they espouse have on teachers, understanding that they and their teachers are on an individual journey towards reflection for improvement the focus of which should be the voyage and not the arrival.

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Criteria for inclusion of articles in this Literature review

- Provide a theoretical base for the review-particular assessment / formative assessment
- Provide a range of settings - internationally and nationally
- Provide case studies that discuss overcoming barriers to improvement models
- Provide a range of improvement models using data
- Must provide a sound N.Z. background to experiences here
- Provide information on N.Z. education policy
- Include Ministry of Education reports and policy direction statements