A ROUTLEDGE FREEBOOK

KNOW THY IMPACT

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VISIBLE LEARNING IN THEORY AND PRACTICE

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FEATURING A NEW INTRODUCTION FROM John Hattie



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John Hattie

is Professor and Director of the Melbourne Education Research Institute at the University of Melbourne, Australia and chair of the Australian Institute for Teaching and School Leadership. He is the author of Visible Learning, Visible Learning for Teachers, and Visible Learning and the Science of How We Learn, and co-editor of the International Guide to Student Achievement. Ever since *Visible Learning* was published I have been continually asked what it means for the school and classroom. Indeed, I was working across New Zealand for many years trialing various interventions, researching the assessment capabilities of teachers, school leaders and students, and asking myself the same question – how to make a worthwhile difference. I soon realized that I needed collaborators to make it work successfully – as too often the schools found the Visible Learning research too hard to implement. During the early phases of implementation there was a need for difficult conversations, principals struggled with the concept of "what does impact mean", and they reverted quickly to ask for the recipe, the workshop they could send their teachers to, or better, the one hour after school talk by me that would change their school forever.

I teamed with the experts at Cognition Education, led by Deb Masters, and the real work then began. Over the years we have developed a Visible Learning evidence based framework along with many resources, directions, and tools to help in the implementation of Visible Learning. The program (Visible Learning^{plus}) is now in place in over 12 countries and many thousands of schools as a consequence of their work. There are many other schools that have tried Visible Learning alone or in book studies and smaller groups and some of the testaments and evidence from these schools are impressive. Some, however, miss the point of the message and have "the year of feedback", "a short burst of discussion about developing Visible Learners" or some other catch cry as if proclamation is implementation. Surely feedback is forever and not for a "year" and then move on to something else! The Christmas tree model is alive (with so many principals wanting more pretty baubles to hang without changing the nature of the tree) and well and too many asked us for Visible Learning to hang another slogan or another bauble on their tree. If only it were that simple.

For some time Cognition Education felt they were in the travel agency business. Many principals and system leaders asked to come to New Zealand to see Visible Learning in action. There are some stunning schools that have implemented the model in New Zealand and soon the schools were faced with the continual interruptions of the visitors. While they were proud of their evidence, could showcase students thinking aloud and knowing their own impact, some had to begin to ration the visits to minimize school disruption. While these trips were great for the New Zealand economy with visitors coming in bus loads, we realized that this was not sustainable for the schools and that we needed to do something more to show the world what Visible Learning looked like in practice.

Hence Visible Learning into Action. The aim of the book is to showcase 15 different schools as they implemented the thinking behind Visible Learning. The major message is that there is no one way, there is no script, there is no workbook – instead there is a way of thinking with a framework to guide that thinking. It involves asking what it means by the phrase "Know Thy Impact". It means school leaders having the courage to construct discussions about what impact means in each curriculum area, at each level of learning. It means bringing examples of what each teacher means by a year's growth and debating the merits of the claims. It means asking how would we know the magnitude of the effect – what does a year's growth look like and how is it related to external sources of evidence about a year's growth? It means asking the equity question as to whether all students in the school are gaining at least a year's growth. It means school leaders have to build trust to have these robust discussions (and this can sometimes take months): they have to dependably identify the high success impact teachers and privilege them while leaving no other teacher behind; and it means that a mere whiff of accountability in these discussions can derail the debate and progress.

Teachers are tired of being measured, accounted, and told what is wrong with them. In the Visible Learning work, one of the excitements is that those gaining that year's growth for all their students are esteemed – and there are many of them. In nearly every school, success is around us; if only we had the courage to reliably identify and esteem it. Then the school leader needs to build a coalition around these successful teachers (regardless of years of experience) and merely invite the others to join. This must be accomplished without leaving any teacher behind; it requires enormous amounts of trust to have open conversations; and it involves the professionalism of all to ensure all adults in the school are on the same page in terms of identifying, esteeming, and debating the notions of impact. Collaboration is the key and the essence of implementation success.

I am continually updating the database of meta-analyses and now have passed 1200 of them. The underlying story remains the same. It is all about the five major themes that resonate throughout each case in the Visible Learning into Action book: Know Thy Impact; Effective Feedback; Visible Learners; Inspired and Passionate Teachers; and The Visible Learning School. It is the case that as I add more meta-analyses, the ranking of some of the specific influences can change. These were 134 influences in Visible Learning, 150 in Visible Learning for Teachers, and over 200 now. A new influence in the top five is teacher's collaborative efficacy. That is, teachers working together with the confidence that they can successfully impact on student learning. Carol Dweck and Albert Bandura are right – the belief that you can do something

ROUTLEDGE



increases the chances that you do it. This occurs not only for students (as they build their confidence to tackle difficult problems) but also for teachers as we engage on making a year's growth for every student – no matter their starting point, their socio-economic background, or their parents. Working together about one's impact is the Visible Learning story. Each of the cases in the new book show that these are the core ingredients – engendered by great and inspiring school leaders – such as having the trust to learn from the missteps and mistakes, asking for help about students who do not learn via your influence, and seeking assistance to ensure the optimal diagnoses of where the student is, the most appropriately challenging success criteria about where they need to aspire to (usually over a 8 to 12 week period where you can actually see change or not), and joining together to enjoy the impact that is achieved and so the cycle continues.

> Recently at the Visible Learning Conference, Professor John Hattie stood up in his opening address and said, "I'm looking at you all and thinking 'What if I got this wrong?'" I feel the same way when educators ask to visit and I always end up in the same place – that Keilor Views is a living, breathing example that he didn't.

– Charles Branciforte, Principal of Keilor Views Primary School, Melbourne, Australia

Yes, the chapters in the book give much comfort to these educators finding ways to successfully implement the main ideas of Visible Learning. It has been a clear focus on the end game (maximizing impact in shared ways), a dogged pursuit of efficient implementation, a relentless focus on ensuring each person is understood and understands their shared role in making the difference, and a desire to celebrate across the adults and students in the school the joy of learning.

HOW TO USE THIS BOOK

Whether you've never heard of John Hattie and Visible Learning or you've read everything John Hattie's ever written, odds are you will benefit from learning about or refreshing your knowledge of the Visible Learning concept. We are proud to present this carefully curated selection of chapters from John Hattie's Visible Learning books, including a full chapter from the newly published *Visible Learning into Action*! The theme of this FreeBook is "Know Thy Impact" which is the concept of understanding and evaluating the effect teachers have on their students.

Please note that because this FreeBook is composed of excerpts from several *Visible Learning* books, you may see references to other books or chapters. To delve deeper into any of the ideas or concepts laid out in these chapters, use the discount code EDU12 to get 20% off your order at www.routledge.com.

CHAPTER 1

Pulled from the Preface of John Hattie's classic book *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement* (2008), this short chapter puts the ideas behind Visible Learning into context and identifies some of the key messages in this particular book.

CHAPTER 2

This chapter, taken from Hattie's bestselling second book *Visible Learning for Teachers: Maximizing Impact on Learning* (2011), summarizes the impact and lessons learned in the original book *Visible Learning* and goes further to show how these ideas can be applied specifically to teachers. Furthermore, this chapter introduces the key idea of "Know Thy Impact", explaining that in order to achieve "Visible Learning" teachers must understand and evaluate the effect they have on their students and act on this impact accordingly. This chapter also lays out the "six signposts" for excellence in education and the seven key characteristics of powerful, passionate teachers.

CHAPTER 3

In this final chapter from the original *Visible Learning* book, John Hattie delves deeper into the conclusions drawn from his research and considers the implications for policy and practice.



HOW TO USE THIS BOOK

CHAPTER 4

Pulled from the newest Visible Learning book, this chapter examines how one school – the Keilor Views Primary School in Australia – has put the concept and ideas of Visible Learning into action.



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1 :: PREFACE



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Elliott is my hero. On his fifth birthday he was diagnosed with leukemia, and this past year has been his annus horribilis. On the day of the diagnosis, it was impressive to see the medical team immediately begin interventions. While they aimed to make Elliott stable, the diagnosis regime burst into action. They knew which tests were needed to make the correct diagnosis and when they were satisfied with the initial diagnosis they immediately moved to interventions. Thus began a year of constant monitoring and feedback to the medical team about Elliott's progress. All throughout they collected evidence of progress, they knew what success looked like, and kept all informed about this evidence. Elliott went through many ups and downs, lost his hair (as did I when he gave me a No. 1 cut as his Christmas present, although I drew a line when he asked to shave my eyebrows off as well), and had daily injections in the front of his legs, but he never balked, and throughout the treatment maintained his sparkly personality. The family was never in the dark about what was happening, books were provided, sessions offered, and support for treatment was excellent. The messages in this book owe a lot to Elliott.

This book started in Gil Sax's office in 1990 searching and coding meta-analyses. Motivation to continue the search was inspired by Herb Walberg, and continued in Perth in Australia, North Carolina in the US, and finished here in Auckland in New Zealand. It is a journey that has taken 15 years. The messages have been questioned, labelled provocative, liked, and dismissed, among other more positive reactions. The typical comments are: "the results do not mirror my experience", "why have you not highlighted my pet method", "you are talking about averages and I'm not average", and "you are missing the nuances of what happens in classrooms". There are many criticisms and misunderstandings about what I am and am not saying.

So let me start with what this book is not.

- It is not a book about classroom life, and does not speak to the nuances and details of what happens within classrooms. Instead it synthesizes research based on what happens in classrooms; as it is more concerned with main effects than interactions. Although I have spent many hundreds of hours in classrooms in many countries, have observed, interviewed, and aimed to dig quite deeply into the nuances of classrooms, this book will not show these details of class living.
- It is not a book about what cannot be influenced in schools—thus critical discussions about class, poverty, resources in families, health in families, and nutrition are not included—but this is NOT because they are unimportant, indeed they may be more important than many of the influences discussed in this book. It is just that I have not included these topics in my orbit.



1 :: PREFACE

- 3. It is not a book that includes qualitative studies. It only includes studies that have used basic statistics (means, variances, sample sizes). Again, this should not mean qualitative studies are not important or powerful but just that I have had to draw some lines around what can be accomplished over a 15-year writing span.
- 4. It is not a book about criticism of research, and I have deliberately not included much about moderators of research findings based on research attributes (quality of study, nature of design) again not because these are unimportant (my expertise is measurement and research design), but because they have been dealt with elsewhere by others (e.g., Lipsey & Wilson, 1993; Sipe & Curlette, 1996a, 1996b).

Rather this is a book about synthesizing many meta-analyses. It is based on over 50,000 studies, and many millions of students—and this is a cut down version of what I could have included as I also collected studies on affective and physical outcomes and on many other outcomes of schooling. I occasionally receive emails expressing disbelief that I have had the time to read so many studies. No, I have not read all primary studies, but as will be seen I have read all meta-analyses, and in some cases many of the primary studies. I am an avid reader, thoroughly enjoy learning the arts of synthesizing and detecting main ideas, and want to create explanations from the myriad of ideas in our discipline. The aim of this book is not to overwhelm with data—indeed my first attempt was discarded after 500 pages of trenchant details; who would care about such details? Instead this book aims to have a message, a story, and a set of supporting accounts of this story.

The message about schools is a positive one. So often when talking about the findings in this book, teachers think I am attacking them as below average, non-thinking, boring drones. In New Zealand, for example, it is clear to me why we rank in the top half-dozen nations in reading, mathematics, and science—we have a nation of excellent teachers. They exist and there are many of them. This book is a story of many real teachers I have met, seen, and some who have taught my own boys. Many teachers already think in the ways I argue in this book; many are seeking to always improve and constantly monitor their performances to make a difference to what they do; and many inspire the love of learning that is one of the major outcomes of any school. This is not a book claiming that teachers are below par, that the profession is terrible, and that we all need to "put in more effort and do better". Nearly all studies in the book are based on real students in front of real teachers in real schools—and that so many of the effects are powerful is a testament that excellence is happening. The major message is that we need a barometer of what



1 :: PREFACE

works best, and such a barometer can also establish guidelines as to what is excellent—too often we shy from using this word thinking that excellence is unattainable in schools. Excellence is attainable: there are many instances of excellence, some of it fleeting, some of it aplenty. We need better evaluation to acknowledge and esteem it when it occurs—as it does.







The following is excerpted from Visible Learning for Teachers by John Hattie. ©2011 Taylor and Francis Group. All rights reserved.

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In 2009, *Visible Learning* was published. This was the culmination of many decades of work – finding, reading, and analysing meta-analyses. I recently spoke in Seattle to a group of educators about this work. It was like a return to the beginning: my search began there in 1984, when I was on sabbatical at the University of Washington. In many cases, as part of researching the meta-analyses, I went back to the original articles, wrote separate articles on themes, and spoke to many groups about the meaning of these analyses. Always, the question was: 'So, what does all of this mean?' Addressing this question is the reason the book had a long gestation. The aim of *Visible Learning* was to tell a story, and in most cases the reviews and reactions indicate that the story has been heard – although, as expected, not always agreed with.

The *Times Educational Supplement* was first to review it. Mansell (2008) argued that *Visible Learning* was 'perhaps education's equivalent to the search for the Holy Grail – or the answer to life, the universe and everything'. Mansell recognized that the 'education Grail' was most likely to be found in the improvement in the level of interaction between pupils and their teachers. (Please note that we have yet to find the 'real' Holy Grail – despite the efforts of Dan Brown, Lord of the Rings, and Spamalot!)

It was not the aim of *Visible Learning* to suggest that the state of teaching is woeful; indeed, the theme was the opposite. The majority of effects above the average were attributable to success in teaching, and there is no greater pleasure than to visit schools and classrooms in which the ideas in *Visible Learning* are transparently visible. As I wrote in the conclusion to *Visible Learning*:

I have seen teachers who are stunning, who live the principles outlined in this book, and demonstrably make a difference. They play the game according to the principles outlined here. They question themselves, they worry about which students are not making appropriate progress, they seek evidence of successes and gaps, and they seek help when they need it in their teaching. The future is one of hope as many of these teachers exist in our schools. They are often head-down in the school, not always picked by parents as the better teachers, but the students know and welcome being in their classes. The message in this book is one of hope for an excellent future for teachers and teaching, and based on not just my explanation for 146,000+ effect sizes but on the comfort that there are already many excellent teachers in our profession.

(Hattie, 2009: 261)

So what was the story and what was the evidence base? This chapter introduces the main implications from *Visible Learning* and, most importantly, introduces the course of ideas for this book. The next chapter, Chapter 3, will provide more about the evidence on which this story is based – although it is not intended to be a substitute for detailed discussion of the evidence presented in *Visible Learning*.

THE EVIDENCE BASE

The basic units of analysis are the 900+ meta-analyses. A meta-analysis involves identifying a specific outcome (such as achievement) and identifying an influence on that outcome (for example, homework), and then systematically searching the various databases: mainstream journals and books (such as ERIC, PsycINFO); dissertations (for example, ProQuest); grey literature (material such as conference papers, submissions, technical reports, and working papers not easily found through normal channels). It involved contacting authors for copies of their work, checking references in the articles found, and reading widely to find other sources. For each study, effect sizes are calculated for appropriate comparisons. In general, there are two major types of effect size: comparisons between groups (for example, comparing those who did get homework with those who did not get homework), or comparisons over time (for example, baseline results compared with results four months later).

Take, for example, Cooper, Robinson, and Patall's (2006) meta-analysis on homework. They were interested in the effect of homework on student achievement based on research over the past twenty years. They searched various databases, contacted the deans of 77 departments of education (inviting them also to ask their faculties), sent requests to 21 researchers who have published on homework, and letters to more than 100 school districts and directors of evaluation. They then examined each title, abstract, and document to identify any further research. They found 59 studies, and concluded that the effect size between homework and achievement was d = 0.40; effects of homework were higher for high-school students (d = 0.50) than for elementary-school students (d = -0.08). They suggested that secondary students were less likely to be distracted while doing homework and more likely to have been taught effective study habits, and could have better self-regulation and monitoring of their work and time investment. Like all good research, their study suggested the most important questions that now needed to be addressed and reduced other questions to being of lesser importance.

As I have noted, more than 800 of these meta-analyses formed the basis of *Visible Learning*. For each meta-analysis, I created a database of the average effect size plus

some related information (for example, standard error of the mean). A major part of the analyses was looking for a moderator: for example, did the effects of homework on achievement differ across ages, subjects, types of homework, quality of the meta-analyses, and so on?

Consider my synthesis of five meta-analyses on homework (Cooper, 1989, 1994; Cooper et al., 2006; DeBaz, 1994; Paschal,Weinstein, & Walberg, 1984). Over these five meta-analyses, there were 161 studies involving more than 100,000 students that investigated the effects of homework on students' achievement. The average of all of these effect sizes was d = 0.29, which can be used as the best typical effect size of the influence of homework on achievement. Thus, compared to classes without homework, the use of homework was associated with advancing students' achievement by approximately one year, or improving the rate of learning by 15 per cent. About 65 per cent of the effects were positive (that is, improved achievement), and 35 per cent of the effects were zero or negative. The average achievement level of students in classes that prescribed homework exceeded 62 per cent of the achievement levels of the students not prescribed homework. However, an effect size of d = 0.29 would not, according to Cohen (1977), be perceptible to the naked eye, and would be approximately equivalent to the difference in height between someone measuring 5'11" (180 cm) and someone 6'0" (182 cm).

The 800+ meta-analyses analysed for *Visible Learning* encompassed 52,637 studies – about 240 million students – and provided 146,142 effect sizes about the influence of some program, policy, or innovation on academic achievement in school (early childhood, elementary, high, and tertiary). Appendices A and B (taken from *Visible Learning*) sum up this evidence. The appendices include 115 additional meta-analyses discovered since 2008 (an extra 7,518 studies, 5 million students, and 13,428 effect sizes). There are a few additional major categories (going from 138 to 147), and some minor changes in the rank order of influences, but the major messages have not changed.

Since *Visible Learning* was published, I have continued to add to this database, locating a further 100 meta-analyses – added in Appendix A. The overall ranking of the influences, however, has negligibly changed between this and the previous version (r > 0.99 for both rankings and effect sizes). The underlying messages have certainly not changed. The estimated total sample size is about 240 million+ students (the 88 million below is only from the 345 meta-analyses that included sample size).

The overall average effect from all meta-analyses was d = 0.40. So what does this mean? I did not want to simplistically relate adjectives to the size of the effects.Yes, there is a



general feeling that d < 0.20 is small, 0.3–0.6 is medium, and > 0.6 is large – but often specific interpretations make these adjectives misleading. For example, a small effect size that requires few resources may be more critical than a larger one that requires high levels of resourcing. The effect of reducing class size from 25–30 students to 15–20 students is 0.22 and the effect of teaching specific programs to assist students in test-taking is about 0.27. Both are smallish effects, but one is far cheaper to implement than the other. The relatively better return on cost from the latter is obvious – thus, the relative effect of two smallish effects can have different implications.

| ACROSS DIMENSIONS | NO. OF META- ANALYSES | NO. OF STUDIES | NO. OF PEOPLE | NO. OF EFFECTS | ES | SE |
|----------------------|-----------------------------|-------------------|------------------|-------------------|------|-------|
| Student | 152 | 11,909 | 9,397,859 | 40,197 | 0.39 | 0.044 |
| Home | 40 | 2,347 | 12,066,705 | 6,031 | 0.31 | 0.053 |
| School | 115 | 4,688 | 4,613,129 | 15,536 | 0.23 | 0.072 |
| Teacher | 41 | 2,452 | 2,407,527 | 6,014 | 0.47 | 0.054 |
| Curricula | 153 | 10,129 | 7,555,134 | 32,367 | 0.45 | 0.075 |
| Teaching | 412 | 28,642 | 52,611,720 | 59,909 | 0.43 | 0.070 |
| Average | 913 | 60,167 | 88,652,074 | 160,054 | 0.40 | 0.061 |

Almost everyone can impact on learning if the benchmark is set at d > 0.0 – as is so often the case. Most interventions with a modicum of implementation can gain an effect of 0.20, and on average we can have an influence of 0.40. There are many students who benefit from being in classes in which they regularly gain > 0.40 from a program implemented by a high-impact teacher. The central question should be the debate about allocating resources to sustain and support those who have this d > 0.40 influence, and to ask seriously what to change where there is evidence of lower effects. While bus routes, utility bills, and lengthy administrative meetings may be needed to make schools run, the true debate is about the nature, quality, and effects of the influences that we have on students – and in this book it is argued that we should attain at minimum gains of at least or above the average for all students. This is accomplished already in so many classrooms, and great schools can be known for the choice of their debates – about 'knowing thy impact'.

Perhaps the most important thing to remember when using these adjectives to describe effect sizes is that *Visible Learning* has summed up what has happened – the imperative here is the past tense. For example, consider the homework example. The



general message from the overall d = 0.29 is that the effects of homework are small, and even smaller (near to zero) in elementary schools. On the one hand, this is not a big issue, as the cost of adding homework to the school costs is negligible. On the other hand, the finding should be an invitation to change how we do homework in elementary schools, because homework as it has traditionally been done (and thus reported in the 161 studies) has not been very effective in elementary schools. What a wonderful opportunity for schools to try something different . . .

Indeed, many New Zealand schools did exactly this: they did not abandon homework (because too many parents judge the quality of a school by the mere presence of homework and get upset if there is none), but they tried different approaches. One school worked with students and parents to create a website of various 'home challenges' and evaluated the effects of this new policy on student motivation, achievement, and parent involvement with their children's learning. When teachers and schools evaluate the effect of what they do on student learning (and this was the major message in *Visible Learning*), we have *'visible learning* inside'. The term refers not to the specific presence or otherwise of an initiative, but to the evaluation of its effect. Such an evaluation must, of necessity, take into account local conditions, local moderators, and local interpretations. And that is the main message in this current book: become evaluators of your effect. I want you to aim for a d > 0.40 effect, which, on average, is most definitely attainable.

THE BAROMETER AND THE HINGE-POINT

One of the tensions in writing *Visible Learning* was to present the evidence without overwhelming the reader with data. I wanted a visual image to summarize the oodles of data. My partner devised the illustration shown in **Figure 2.1** as a 'barometer of influences'.

The arrow in Figure 2.1 points to the average effect of the various metaanalyses on the particular topic (in Figure 2.1, it is d = 0.29 for the five homework meta-analyses). The variability (or standard error) of the average effect sizes from each meta-analysis is not always easy to determine. Across all 800+ meta-analyses, the typical standard error of the mean is about d = 0.07. To provide a broad sense of variance, any influence for which the average 'spread of effects' was less than d = 0.04 was considered low, between d = 0.041 and d = 0.079 was deemed medium, and greater than d = 0.08 was deemed large. While these are crude estimates, rather than focus on them, it is more important to read the discussion about each influence to ascertain whether important sources of variance can be identified to explain

Figure 2.1 The barometer for the influence of homework



| KEY | |
|-------------------------|------------------|
| Standard error | .027 (Low) |
| Rank | 88 th |
| Number of meta-analyses | 5 |
| Number of studies | 161 |
| Number of effects | 295 |
| Number of people (4) | 105,282 |

differential effects within that influence. The information under the barometer provides more detail on how confident we can be about the summary information: the number of meta-analyses on each category (five in Figure 2.1, based on 161 studies, and 295 effect sizes). There were 105,282 students in the four meta-analyses that provided information about sample size (one did not provide sample size information). The average effect is d = 0.29, with a standard error of 0.027 (considered 'low' relative to all meta-analyses). The effects of homework ranked 88th out of all 138 influences.

Like all summaries of literature, caution should be the byword when interpreting overall effects. The nuances and details of each influence are important, and these are discussed in more detail in *Visible Learning*. The overall hinge-point of 0.40 is suggested as a starting point for discussion – clearly, there are many hinge-points (for example, one for each influence), but the variability, the moderators, the quality of the studies (and meta-analyses), and the costs of implementation need to be considered.

There is also, as noted in Chapter 1, the finding that most changed my way of thinking: when you look at the distribution of all 50,000-plus effect sizes, almost everything works. All that is needed to enhance achievement is a pulse. This indicates that it is not enough merely to provide evidence that you have a positive effect on achievement; we need also to identify a level of evidence that might be considered the minimum level for claiming a worthwhile positive effect. When I looked at the

distribution of effects, it seemed to follow an approximate normal distribution, so I used the average effect of 0.4 as the 'hinge-point' for identifying actions that could be considered to be 'working' in terms of making a visible difference to student learning. Because it is the 'average' point, it becomes an achievable, 'real-world' hinge-point, not an idealistic or aspirational target.



The 0.40 hinge-point is also important because it is close to the average effect that we can expect from a year's schooling. I searched longitudinal databases, interrogated the US National Education Longitudinal Study (NELS), Trends in International Mathematics and Science Study (TIMSS), the Program for International Student Assessment (PISA), the Australian National Assessment Program in Literacy and Numeracy (NAPLAN), the National Assessment of Educational Progress (NAEP), and Progress in International Reading Literacy Study (PIRLS), and my own longitudinal data based on nearly 1 million New Zealand students. The average yearly gain was 0.4, although it was slightly higher for lower-grade students and lower for upper-grade students. So d = 0.4 is what we can expect as growth per year on average, and it is also the case that 0.4 is what we can expect from all possible interventions. Hill, Bloom, Black, and Lipsey (2008) analysed the norms for 13 major standardized achievement tests (in USA), and found an average growth in maths and reading of about 0.40 – and, like in the NZ sample, the effects for each year were greater in the younger and lower in the older grades. So while d = 0.40 is a



Figure 2.2 What teachers see



worthwhile average, we may need to expect more from the younger grades (d > 0.60) than for the older grades (d > 0.30). I choose this average (0.4) as the benchmark for assessing the influence that teachers have on achievement. In my work in schools since the publication of *Visible Learning*, we have used this hinge-point as the basis for discussions. (Please note that I did not say that we use this hinge-point for making decisions, but rather that we use it to start discussions about the effect of teachers on students.)

THE STORY

The simple principle underlying most of the syntheses discussed in this book is 'visible teaching and learning'. Visible teaching and learning occurs when learning is the explicit and transparent goal, when it is appropriately challenging, and when the teacher and the student both (in their various ways) seek to ascertain whether and to what degree the challenging goal is attained. Visible teaching and learning occurs when there is deliberate practice aimed at attaining mastery of the goal, when there is feedback given and sought, and when there are active, passionate, and engaging people (teacher, students, peers) participating in the act of learning. It is teachers seeing learning through the eyes of students, and students seeing teaching as the key to their ongoing learning. The remarkable feature of the evidence is that the greatest effects on student learning occur when teachers become learners of their own teaching, and when students become their own teachers. When students become their own teachers, they exhibit the selfregulatory attributes that seem most desirable for learners (self-monitoring, selfevaluation, self-assessment, self-teaching). Thus, it is visible teaching and learning by teachers and students that makes the difference.

A key premise is that the teacher's view of his or her role is critical. It is the specific mind frames that teachers have about their role – and most critically a mind frame within which they ask themselves about the effect that they are having on student learning. Fundamentally, the most powerful way of thinking about a teacher's role is for teachers to see themselves as evaluators of their effects on students. Teachers need to use evidence-based methods to inform, change, and sustain these evaluation beliefs about their effect. These beliefs relate to claims about what each student can do as a consequence of the teacher's actions, and how every resource (especially peers) can be used to play a part in moving students from what they can do now to where the teacher considers they should be – and to do so in the most efficient, as well as effective, manner. It matters what teachers do – but what matters most is having an appropriate mind frame relating to the impact of what they do. An

appropriate mind frame combined with appropriate actions work together to achieve a positive learning effect.

What I am not saying is that 'teachers matter': this cliché is the most unsupported claim from the evidence in *Visible Learning*. It is a cliché that masks the fact that the greatest source of variance in our system relates to teachers (both between teachers, and even in that a single teacher can vary in his or her impact across students, across days, and across lessons). What does matter is teachers having a mind frame in which they see it as their role to evaluate their effect on learning.

As I argued in *Visible Learning* (Hattie, 2009: 22–4), when teachers see learning occurring or not occurring, they intervene in calculated and meaningful ways to alter the direction of learning to attain various shared, specific, and challenging goals. In particular, they provide students with multiple opportunities and alternatives for developing learning strategies based on the surface and deep levels of learning some content or domain matter, leading to students building conceptual understanding of this learning, which the students and teachers then use in future learning. Learners can be so different, making it difficult for a teacher to achieve such teaching acts: students can be in different learning places at various times, using a multiplicity of unique learning strategies, meeting different and appropriately challenging goals. Learning is a very personal journey for the teacher and the student, although there are remarkable commonalities in this journey for many teachers and students. It requires much skill for teachers to demonstrate to all of their students that they can see the students' perspective, communicate it back to them so that they have valuable feedback to self-assess, feel safe, and learn to understand others and the content with the same interest and concern' (Cornelius-White, 2007: 23).

The act of teaching requires deliberate interventions to ensure that there is cognitive change in the student; thus the key ingredients are being aware of the learning intentions, knowing when a student is successful in attaining those intentions, having sufficient understanding of the student's prior understanding as he or she comes to the task, and knowing enough about the content to provide meaningful and challenging experiences so that there is some sort of progressive development. It involves a teacher who knows a range of learning strategies with which to supply the student when they seem not to understand, who can provide direction and redirection in terms of the content being understood and thus maximize the power of feedback, and who has the skill to 'get out the way' when learning is progressing towards the success criteria.

Of course, it helps if these learning intentions and success criteria are shared with, committed to, and understood by the learner – because in the right caring and idearich environment, the learner can then experiment (be right and wrong) with the content and the thinking about the content, and make connections across ideas. A safe environment for the learner (and for the teacher) is an environment in which error is welcomed and fostered – because we learn so much from errors and from the feedback that then accrues from going in the wrong direction or not going sufficiently fluently in the right direction. In the same way, teachers themselves need to be in a safe environment to learn about the success or otherwise of their teaching from others.

To create such an environment, to command a range of learning strategies, and to be cognitively aware of the pedagogical means that enable the student to learn requires dedicated, passionate people. Such teachers need to be aware of which of their teaching strategies are working or not, need to be prepared to understand and adapt to the learner(s) and their situations, contexts, and prior learning, and need to share the experience of learning in this manner in an open, forthright, and enjoyable way with their students and their colleagues.

As I noted in Visible Learning, we rarely talk about passion in education, as if doing so makes the work of teachers seem less serious, more emotional than cognitive, somewhat biased or of lesser import. When we do consider passion, we typically constrain such expressions of joy and involvement to secluded settings not in the public space of being a teacher (Neumann, 2006). The key components of passion for the teacher and for the learner appear to be the sheer thrill of being a learner or teacher, the absorption that accompanies the process of teaching and learning, the sensations of being involved in the activity of teaching and learning, and the willingness to be involved in deliberate practice to attain understanding. Passion reflects the thrill, as well as the frustrations, of learning; it can be infectious, it can be taught, it can be modelled, and it can be learnt. It is among the most prized outcomes of schooling and, while rarely covered in any of the studies reviewed in this book, it infuses many of the influences that make the difference to the outcomes. It requires more than content knowledge, acts of skilled teaching, or engaged students to make the difference (although these help). It requires a love of the content, an ethical, caring stance deriving from the desire to instill in others a liking, or even love, of the discipline being taught, and a demonstration that the teacher is not only teaching, but also learning (typically about the students' processes and outcomes of learning). In the current economic climate of many countries, property values have plummeted, leading to fewer resources available for the education budget. As Doug Reeves pointed out to me, passion may be the only natural renewable resource that we have.

ROUTLEDGE



Learning is not always pleasurable and easy; it requires over-learning at certain points, spiralling up and down the knowledge continuum, building a working relationship with others in grappling with challenging tasks. Students appreciate that learning is not always pleasurable and easy, and indeed can engage with and enjoy the challenges that learning entails. This is the power of deliberate practice and concentration. It also requires a commitment to seeking further challenges – and herein lies a major link between challenge and feedback, two of the essential ingredients of learning. The greater the challenge, the higher the probability that one seeks and needs feedback, but the more important it is that there is a teacher to provide feedback and to ensure that the learner is on the right path to successfully meet the challenges.

The key to many of the influences above the d = 0.40 hinge-point is that they are deliberate interventions aimed at enhancing teaching and learning. It is critical that teachers learn about the success or otherwise of their interventions: those teachers who are students of their own impact are the teachers who are the most influential in raising students' achievement. Seeking positive effects on student learning (say, d > 0.40) should be a constant theme and challenge for teachers and school leaders. Because this does not happen by serendipity or accident, the excellent teacher must be vigilant to what is working and what is not working in the classroom – that is, teachers must be vigilant as to the consequences for learning based on their classroom climate, their teaching, and their students' co-teaching and co-learning. They must also assess the merits of any gains in terms of the 'worthwhileness' of the learning aims.

It is critical that the teaching and the learning are visible. There is no deep secret called 'teaching and learning': teaching and learning are visible in the classrooms of successful teachers and students; teaching and learning are visible in the passion displayed by the teacher and learner when successful learning and teaching occurs; and teaching and learning requires much skill and knowledge by both teacher and student (initially by the teacher and later more by the student). The teacher must know when learning is occurring or not, know when to experiment and when learn from the experience, learn to monitor, seek and give feedback, and learn when to provide alternative learning is visible to the student, and that the learning is visible to the teacher. The more the student becomes the teacher and the more the teacher becomes the learner, then the more successful are the outcomes (see Hattie, 2009: 25–6).

This explanation of visible teaching relates to teachers as activators, as deliberate change agents, and as directors of learning (Hattie & Clinton, 2011). This does not mean that they are didactic, spend 80 per cent or more of the day talking, and aim to get through the curriculum or lesson come what may. The model of visible teaching and learning combines, rather than contrasts, teacher-centred teaching and student-centred learning and knowing.

As well as surface and deep learning, we also want efficiency or fluency as a valued outcome. We know what 'fluency' is when we talk of being fluent in a language; the same concept can apply to any learning. 'Over-learning' can be a factor in helping us to achieve fluency. Over-learning is what happens when we reach a stage of knowing what to do without thinking about it; its critical feature is that it reduces the load on our thinking and cognition, allowing us to attend to new ideas. To reach a state of over-learning requires much deliberate practice – that is, extensive engagement in relevant practice activities for improving performance (as when swimmers swim lap after lap aiming to over-learn the key aspects of their strokes, turns, and breathing). It is not deliberate practice for the sake of repetitive training, but deliberate practice focused on improving particular aspects of performance, to better understand how to monitor, self-regulate, and evaluate one's performance, and to reduce errors.

CONCLUSIONS

The major argument presented in this book is that when teaching and learning are visible, there is a greater likelihood of students reaching higher levels of achievement. To make teaching and learning visible requires an accomplished 'teacher as evaluator and activator', who knows a range of learning strategies to build the students' surface knowledge, deep knowledge and understanding, and conceptual understanding. The teacher needs to provide direction and redirection in terms of the content being understood, and thus make the most of the power of feedback. The teacher also needs to have the skill to get out of the way when learning is taking place and the student is making progress towards meeting the criteria against which successful learning will be judged. Visible teaching and learning also requires a commitment to seeking further challenge and feedback, two of the essential ingredients of learning. The greater the challenge, the higher the probability that one seeks and needs feedback, and the more important it is that there is a teacher to ensure that the learner is on the right path to successfully meet the challenge.

It is some teachers with certain mind frames that make the difference. That teachers are the greatest source of variance is often disputed, but how many more studies do we need to show their impact? There are production studies that relate specific attributes of teachers (such as education, experience); there are variance studies that evaluate teacher effects across different classrooms; there are association studies that relate teaching practices to student achievement. All of these methods control differing effects of students (for example, prior achievement, socio-economic status). These various value-added studies typically show high levels of variability due to teacher effects (hence the claim that it is 'not all teachers that make the difference'), but the variance is the largest source over which we have any control (Alton-Lee, 2003).

The conclusions in *Visible Learning* were cast as six signposts towards excellence in education, as follows.

- 1. Teachers are among the most powerful influences in learning.
- 2. Teachers need to be directive, influential, caring, and actively and passionately engaged in the process of teaching and learning.
- 3. Teachers need to be aware of what each and every student in their class is thinking and what they know, be able to construct meaning and meaningful experiences in light of this knowledge of the students, and have proficient knowledge and understanding of their subject content so that they can provide meaningful and appropriate feedback such that each student moves progressively through the curriculum levels.
- 4. Teachers and students need to know the learning intentions and the criteria for student success for their lessons, know how well they are attaining these criteria for all students, and know where to go next in light of the gap between students' current knowledge and understanding and the success criteria of 'Where are you going?', 'How are you going?', and 'Where to next?'
- 5. Teachers need to move from the single idea to multiple ideas, and to relate and then extend these ideas such that learners construct, and reconstruct, knowledge and ideas. It is not the knowledge or ideas, but the learner's construction of this knowledge and ideas that is critical.
- 6. School leaders and teachers need to create schools, staffrooms, and classroom environments in which error is welcomed as a learning opportunity, in which discarding incorrect knowledge and understandings is welcomed, and in which teachers can feel safe to learn, re-learn, and explore knowledge and understanding.

In these six signposts, the word 'teachers' is deliberate, because a major theme is when teachers meet to discuss, evaluate, and plan their teaching in light of the feedback evidence about the success or otherwise of their teaching strategies and, their conceptions about progress and appropriate challenge. This is not critical reflection, but critical reflection in light of evidence about their teaching.

The messages in *Visible Learning* are not another recipe for success, another quest for certainty, another unmasking of truth. There is no recipe, no professional development set of worksheets, no new teaching method, and no band-aid remedy. It is a way of thinking: 'My role, as teacher, is to evaluate the effect I have on my students.' It is to 'know thy impact', it is to understand this impact, and it is to act on this knowing and understanding. This requires that teachers gather defensible and dependable evidence from many sources, and hold collaborative discussions with colleagues and students about this evidence, thus making the effect of their teaching visible to themselves and to others.

Powerful, passionate, accomplished teachers are those who:

- Focus on students' cognitive engagement with the content of what it is that is being taught;
- Focus on developing a way of thinking and reasoning that emphasizes problem-solving and teaching strategies relating to the content that they wish students to learn;
- Focus on imparting new knowledge and understanding, and then monitor how students gain fluency and appreciation in this new knowledge;
- Focus on providing feedback in an appropriate and timely manner to help students to attain the worthwhile goals of the lesson;
- Seek feedback about their effect on the progress and proficiency of all of their students;
- Have deep understanding about how we learn; and
- Focus on seeing learning through the eyes of the students, appreciating their fits and starts in learning, and their often non-linear progressions to the goals, supporting their deliberate practice, providing feedback about their errors and misdirections, and caring that the students get to the goals and that the students share the teacher's passion for the material being learnt.

This focus is sustained, unrelenting, and needs to shared by all in a school. As Reeves (2011) has demonstrated, there is a strong link between a sustained focus across all involved within a school on limited goals and improved student achievement. The above are the 'foci' that can make a sustained improvement.

Without focus, even the best leadership ideas will fail, the most ideal research-based initiatives will fail, and the most self-sacrificing earnest leaders will fail. Worst of all, without focus by educational leaders, students and teachers will fail.

(Reeves, 2011: 14)

EXERCISE

Provide the following list to all teachers (and parents) and ask them to decide whether, on average, they have low, medium, or high impacts on student achievement. After completing the task, provide the effects (see Appendix D) and ask what may now need to be changed in this school and in your class.

| INFLUENCE | IMPA | IMPACT | |
|---|------|--------|-----|
| Ability grouping/tracking/streaming | High | Medium | Low |
| Acceleration (for example, skipping a year) | High | Medium | Low |
| Comprehension programs | High | Medium | Low |
| Concept mapping | High | Medium | Low |
| Cooperative vs individualistic learning | High | Medium | Low |
| Direct instruction | High | Medium | Low |
| Feedback | High | Medium | Low |
| Gender (male compared with female achievement) | High | Medium | Low |
| Home environment | High | Medium | Low |
| Individualizing instruction | High | Medium | Low |
| Influence of peers | High | Medium | Low |
| Matching teaching with student learning styles | High | Medium | Low |
| Meta-cognitive strategy programs | High | Medium | Low |
| Phonics instruction | High | Medium | Low |
| Professional development on student achievement | High | Medium | Low |
| Providing formative evaluation to teachers | High | Medium | Low |
| Providing worked examples | High | Medium | Low |
| Reciprocal teaching | High | Medium | Low |
| Reducing class size | High | Medium | Low |
| Retention (holding back a year) | High | Medium | Low |
| Student control over learning | High | Medium | Low |
| Student expectations | High | Medium | Low |
| Teacher credibility in eyes of the students | High | Medium | Low |
| Teacher expectations | High | Medium | Low |
| Teacher subject matter knowledge | High | Medium | Low |
| Teacher-student relationships | High | Medium | Low |
| Using simulations and gaming | High | Medium | Low |
| Vocabulary programs | High | Medium | Low |
| Whole language programs | High | Medium | Low |
| Within-class grouping | High | Medium | Low |





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Where is the wisdom we have lost in knowledge?

Where is the knowledge we have lost in information?

(Eliot, 1934)

Any book synthesizing meta-analyses is fundamentally a literature review, and thus it builds on the scholarship and research of those who have come before. A major purpose of this book is to generate a model of successful teaching and learning based on the many thousands of studies in 800 and more meta-analyses. The aim is not to merely average the studies and present screeds of data. This is not uncommon; so often meta-analyses have been criticized as mere number crunching exercises, and a book based on more than 800 meta-analyses could certainly have been just that. That was not my intent. Instead, I aimed to build a model based on the theme of "visible teaching, visible learning" that not only synthesized existing literature but also permitted a new perspective on that literature.

What seems needed is not another recipe for success, another quest for certainty, another unmasking of truth—if for no other reason that these are aplenty and no one should be asked to listen to yet another. A recipe would lead to little change, and there would little interest developing policy to build on another recipe. Certainly it could be claimed that more than 800 meta-analyses based on many millions of students is the epitome of "evidence based" decision making. But the current obsession with evidence-based too often ignores the lens that researchers use to make decisions about what to include (as evidence), what to exclude, and how they marshal the evidence to tell their story. It is the story that is meant to be the compelling contribution—it is my lens on this evidence.

Michael Scriven claimed that one of the more difficult tasks in research is providing explanation rather than determining causality. Often I may have slipped and made or inferred causality—and in some cases reasonably so. Certainly, the fundamental word in meta-analysis, effect size, implies causation (What is the effect of a on b?) and this claim is often not defensible. The claims in this book are more oriented to developing an explanation—a plausible set of claims based on evidence. It is more an abductive than an inductive or deductive exercise (Haig, 2005)—the explanation or story offers a plausible theory, a set of inferences to the best explanation in light of my experience of reviewing and interpreting the many studies, and it is hoped the story is bold enough to be potentially disprovable. My task is to present a series of claims that have high explanatory value, with many (refutable) conjectures.

In the present case, the story is about the visibility of teaching and learning; it is the power of passionate, accomplished teachers who focus on students' cognitive engagement with the content of what it is they are teaching. It is about teachers who focus their skills in developing a way of thinking, reasoning, and emphasizing problem solving and strategies in their teaching about the content they wish students to learn. It is about teachers enabling students to do more than what teachers do unto them; it is the focus on imparting new knowledge and understanding and then considering and monitoring how students gain fluency and appreciation in this new knowledge and build conceptions of this knowing and understanding. It is how teachers and students strategize, think about, play with, and build conceptions about worthwhile knowledge and understanding. Monitoring, assessing, and evaluating the progress in this task is what then leads to the power of feedback—which comes second in the learning equation. Feedback to students involves providing information and understanding about the tasks that make the difference in light of what the student already understands, misunderstands, and constructs. Feedback from students to teachers involves information and understanding about the tasks that make the difference in light of what the teacher already understands, misunderstands, and constructs about the learning of his or her students. It matters when teachers see learning through the lens of the student grappling to construct beliefs and knowledge about whatever is the goal of the lesson. This is never linear, not always easy, requires learning and over learning, needs dollops of feedback, involves much deliberative practice, leads to lots of errors and mis-directions, requires both accommodating and assimilating prior knowledge and conceptions, and demands a sense of excitement and mission to know, understand, and make a difference

The conclusions are recast here as six signposts towards excellence in education:

- 1. Teachers are among the most powerful influences in learning.
- 2. Teachers need to be directive, influential, caring, and actively engaged in the passion of teaching and learning.
- 3. Teachers need to be aware of what each and every student is thinking and knowing, to construct meaning and meaningful experiences in light of this knowledge, and have proficient knowledge and understanding of their content to provide meaningful and appropriate feedback such that each student moves progressively through the curriculum levels.
- 4. Teachers need to know the learning intentions and success criteria of their lessons, know how well they are attaining these criteria for all students, and



know where to go next in light of the gap between students' current knowledge and understanding and the success criteria of: "Where are you going?", "How are you going?", and "Where to next?".

- 5. Teachers need to move from the single idea to multiple ideas, and to relate and then extend these ideas such that learners construct and reconstruct knowledge and ideas. It is not the knowledge or ideas, but the learner's construction of this knowledge and these ideas that is critical.
- 6. School leaders and teachers need to create school, staff-room, and classroom environments where error is welcomed as a learning opportunity, where discarding incorrect knowledge and understandings is welcomed, and where participants can feel safe to learn, re-learn, and explore knowledge and understanding.

In these six signposts, the word "teachers" is deliberate, as a major theme is when teachers meet to discuss, evaluate, and plan their teaching in light of the feedback evidence about the success or otherwise of their teaching strategies and conceptions about progress an appropriate challenge. This is not critical reflection, but critical reflection in light of evidence about their teaching.



Note what is not said. There are no claims about additional structural resources, although to achieve the above it helps not to have the hindrance of a lack of resources. There is nothing about class size, about which particular students are



Figure 11.1 A model of Visible teaching – Visible learning

present in the school or class, or about which subject is being taught—effective teaching can occur similarly for all students, all ethnicities, and all subjects. There is nothing about between-school differences, which are not a major effect in developed countries. There is little about working conditions of teachers or students—although their effects, though small, are positive, and positive means we should not make these working conditions worse.

Sure, it helps to have students who are committed learners, who are quiet and receptive, who have high levels of self-regulation, and who have financially gifted parents. Such desires are often the basis for claims about school choice. The usual argument is that if only parents had the power (e.g., vouchers) to choose the best schools, then the quality of education would be driven up. Such choice claims imply that lower performing schools would close or change, and that parents who do not make the choice to send their children away from the neighborhood school do not "want" to. New Zealand experienced a voucher-type system for more than a decade, and the disparity between the top and bottom schools increased dramatically. Parents moved their children from the schools in lower socioeconomic areas to those in higher socioeconomic areas; there was "white flight" to the higher socioeconomic areas that left increasingly concentrated ethnic minorities in lower socioeconomic schools. The reasons were not that they were moving to schools where student outcomes were higher (such information was not available in New Zealand) but because they were "fleeing from schools with high proportions of minorities" (Fiske & Ladd, 2000, p. 201). Certainly, children from the more advantaged families were the major beneficiaries of the voucher system (and loudest advocates). With few exceptions, we have to teach all in front of us.

WILL EVIDENCE MAKE A DIFFERENCE?

The theme throughout this book is that the beliefs and conceptions held by teachers need to be questioned—not because they are wrong (or right) but because the essence of good teaching is that teachers' expectations and conceptions must be subjected to debate, refutation, and investigation. Only then can there be major improvements in student achievement. We need to ask about the conceptions of teaching that have led to teachers making decisions about:

- What is best to teach next, without attending closely to what these students already know;
- What materials to choose, with no regard to any evidence (other than prior use) that these are the optimal materials (and so often these materials are made by the cottage industry in teachers' homes);

- How to keep students engaged and busy, but not ensuring that they actually learn;
- What activities provoke the most interest, instead of asking what leads to students putting in effort (it is the effort, not the interest level, of the activity that is important);
- How to maximize the challenge of the learning goals and create structures for students to learn via the challenge, rather than structuring the material so that it is easy to learn.

We can set benchmarks of what progress looks like (preferably d = 0.40 for every student, at least d = 0.30, and certainly not less than d = 0.20) per implementation or year. We can agree to learning intentions and success criteria, and we can set the goalpost of accomplished teachers at the level of those who systematically make these differences to students: that is, those who engage them, turn them on to the subject, who inspire them, and who communicate a passion for learning. We also need to recognize that sometimes learning is dull and repetitive, but turning students on to this part of learning requires the same passions. As I learn to make bread, or coach cricket, there are many tasks I have to repeat seemingly endlessly to over learn some skills to thus allow cognitive resources to be freed for other tasks—especially anticipation and a sense of understanding about the bread or state of the cricket game. My cricket coaching requires monitoring process and not just performance—my aim is to be a coach, not a score keeper.

Teachers and principals need to collect the effect sizes within their schools and then ask "What is working best?", "Why is it working best?", and "Who is it not working for?" (e.g., see Petty, 2006; Schagen & Elliot, 2004). This will create a discussion among teachers about teaching. This would require a caring, supportive staffroom, a tolerance of errors, and for learning from other teachers, a peer culture among teachers of engagement, trust, shared passion, and so on. It is the same attributes that work for student learning that also work for teachers' learning. Bryk and Schneider (2002) found that higher levels of trust were reported in schools that eventually could be categorized as academically improving than in those in the non-improving group (d = 0.61 for increases in reading and d = 0.64 in mathematics). Their message was that trust does not directly affect student learning, but it fosters a set of organizational conditions. Trust reduces the sense of vulnerability that teachers experience as they take on new and uncertain tasks associated with reform; it facilitates teachers' efforts to innovate in their classroom in order to develop more effective instruction, facilitates public problem solving within a school, and creates a moral resource that leads to commitments and greater effort to implement successful innovations (Bryk & Schneider, 2002, p. 117). Trust also maximizes the



occurrence of error and thus allows feedback to be powerful in use and effectiveness. To engender reform that will make the difference requires incentives primarily in terms of teachers learning about their teaching, about what is working and for whom, and from sharing evidence of the effectiveness of their methods. The current penchant for "reflective teaching" too often ignores that such reflection needs to be based on evidence and not on post-hoc justification. We can go further, as my colleagues and I are doing in a trial of our work, which involves providing a computerized system for teachers to set targets for their students based on the students' prior progress, then creating a dialogue among principal and teachers about the desirability of these targets, and then closely monitoring the success of achieving the targets (Hattie, et al., 2007). Hence the theme of visible teaching and visible learning.

THE PERSONAL NATURE OF LEARNING

Olson (2003) states it simply—it is students themselves, in the end, not teachers, who decide what students will learn. Thus we must attend to what students are thinking, what their goals are, and why they would want to engage in learning what is offered in schools. Learning is very personal to the teacher and to each student. While we assemble students in groups (classes, and within-class groups), the meaning of the implications of education is personal for each of us. This does not mean we need to attend to individualized instruction but that we need to be aware of the progression of knowledge and understanding for each student—and how they learn by themselves, learn with others, and learn with adults, along with an awareness of what they bring from their home and their culture. There are at least three worlds in the classroom (Nuthall, 2005): the public world, which includes teacher-led discussion and work tasks; the private-social word of informal peer interactions, whispers, and note-passing; and the private-individual world of self-talk and thinking. Each world has its own characteristic patterns of behavior, interaction structures, customs, rules, roles, expectations, and discourse.

Nuthall (2005) spent many years putting microphones on every student in the class and monitoring and evaluating their dialogue. This is a robust method of understanding teaching and learning through the eyes of the students—even observations were not sufficient, argued Nuthall, as up to 40 percent of what occurred among students was missed by the observation recordings and observers. No wonder that critical reflection by teachers is barely adequate. His major conclusion related to "how little teachers knew about what was going on in their classrooms" (p. 902). It is, therefore, no surprise that "Teachers often feel that learning outcomes are unpredictable, mysterious, and

uncontrollable" (Kennedy, 1999, p. 528). Nuthall found that students lived in a personal and social world of their own in the classroom, they already knew at least 40 percent of what the teachers intended them to learn, a third of what each student learned was not learned by any other student in the class, students learned how and when the teacher would notice them and how to give the appearance of active involvement, and a quarter of the specific concepts and principles that students learned were critically dependent on private peer talk or on self-designed activities or use of resources (Nuthall, 2005). The world of learning and classrooms from the student's personal viewpoint is so often unknown to the teacher—hence reinforcing the major claim in this book about how teachers need to spend more time and energy understanding learning through the eyes of students.

Nuthall found that teachers, rather than seeing learning through the eyes of students, knew their teaching was going well from signs that their students were actively engaged with learning activities. "They monitor the look in their students' eyes, their enthusiasm, their puzzlement, and the questions they ask. In most teachers' minds, the criteria for successful learning are the same as the criteria for successful classroom management" (Nuthall, 2005, p. 916). The focus of teachers' thinking when they were planning and carrying out their role in the classroom was keeping students busily engaged in activities that produced some tangible product. Further, although the learning activity was supposed to produce learning, neither the teachers nor the students talked about learning. Instead, teachers talked about resources, about how long an activity should take, and what would happen if it was not finished on time.

The teacher is largely cut off from information about what individual students are learning. Teachers are forced to rely on secondary indicators such as the visible signs that students are motivated and interested. They are sustained, however, by the commonly held belief that if students are engaged most of the time in appropriate activities, some kind of learning will be taking place ... Teachers depend on the responses of a small number of key students as indicators and remain ignorant of what most of the class knows and understands.

(Nuthall, 2005, pp. 919–920)

Students' on-task talk was about the same things. When students were asked what they were thinking, "their most common response was that they were thinking about how to get finished quickly or how to the answer with the least possible effort" (Nuthall, 2005, p. 918).


Nuthall (2007) found that the experiences from the less able and more able students were similar. Less able students appeared to learn from their experiences in exactly the same way as the more able students. For both groups of students, a significant proportion of their learning experiences was either self-selected or self-generated. even in traditional classrooms. Those students, regardless of prior ability, who used the classroom and its activities to further their own interests and purposes learned more than those who dutifully did what they were told but did not want or know how to create their own opportunities. It takes "three or four experiences involving interaction with relevant information for a new knowledge construct to be created in working memory and then transferred to long-term memory" (Nuthall, 2000, p. 93). This is not simple repetitions but opportunities to come at the material to be learned in different ways. Students need much deliberative practice distributed over the learning time. Such distributed, rather than spaced, teaching has been noted in Chapter 9, and well studied in psychology. Cepeda, Pashler, Vul, Wixted, and Rohrer (2006) completed a meta-analysis of the effects of distributed practice and concluded that "Distributing practice across different days (instead of grouping learning episodes within a single day) greatly improves the amount of material retained for sizeable periods of time; the literature clearly suggests that distributing practice in this way is likely to markedly improve students' retention of course material" (p. 371). Students who, for reasons of cultural and ethnic differences, may have difficulty participating in a learning activity, not only fail to acquire the knowledge they need to understand and acquire further knowledge; they "learn" that their ability to acquire knowledge is inferior. Such deficit thinking can be reinforced by teachers sharing the same beliefs (Bishop, 2003).

Nuthall argued that teachers should focus on direct observation of the realities of student experience and the processes that students experience in developing knowledge and skill. This involves developing a precise, accurate, and replicable account of both the subjective and objective realities of student experience. This is personalized teaching and personalized learning by the teacher, as only this kind of understanding maximizes the personal learning by the student.

THE EMPIRICAL QUEST FOR EXPLANATIONS

The aim in this book has been to provide an explanatory story about active and passionate teachers as contrasted with facilitative and inquiry methods. Teachers who are passionate about making a difference are more likely to make a difference. Consider a contrast between the teacher as an "activator" and the teacher as a "facilitator". In the activist mode, teachers are key agents in all the interventions on the left of Table 11.1, and more facilitative in the interventions on the right hand side. The contrast in effects is marked—from an average of d = 0.60 to d = 0.17.

These results show that active and guided instruction is much more effective than unguided, facilitative instruction. Kirschner, Sweller, and Clark (2006) provided an extensive review on why providing only minimal guidance during instruction does not work. They contrasted guided models, such as direct instruction, with minimally guided methods such as discovery learning, problem-based learning, inquiry learning, experiential learning, and constructivist learning. These latter methods, they argued, are based on two main assumptions. First, they challenge students to solve "authentic" problems on the assumption that learners construct their own solutions, and second, knowledge is best acquired through experience based on the procedures of the discipline (e.g., developing processes for understanding mathematics rather than learning the skills of mathematics). They noted that each new set of advocates for these approaches seem either unaware of or uninterested in previous evidence that unquided approaches have not been validated. No matter if students preferred less guided methods, they learned less from them (Clark, 1989). Students profit from the facility, active use, and flexibility of various learning strategies (Samuelstuen & Bråten, 2007), and the use of various strategies is a major attribute of expertise in many domains (Lundeberg, 1987; Pressley & Afflerbach, 1995). Constructivism is a form of knowing and not a form of teaching, and it is important not to confuse constructing conceptual knowledge with the current fad of constructivism (Bereiter, 2002; Small, 2003). Constructing conceptual knowledge involves considering learning from the learner's viewpoint; starting from the premise that all learners are active, appreciating that what they learn is socially constructed, and understanding that learners need to create or recreate knowledge of themselves (Phillips, 1995). If this is the meaning of constructivism from a learner perspective, then the more direct and active methods of teaching appear to be optimal for achieving this type of learning. The only way constructive thinking applies to teaching is to the teachers themselves, as they "construct" conceptions, beliefs, and models about how they teach and how students learn. The methods that work best, as identified from the synthesis of meta-analyses, lead to a very active, direct

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involvement, and high sense of agency, in the learning and teaching process. Such teaching leads to higher levels of learning, autonomy, and self-regulation on behalf of the learner (whether student or teacher).

| Teacher as activator | d | Teacher as facilitator | d |
|--------------------------------------|------|---------------------------------------|------|
| Reciprocal teaching | 0.74 | Simulations and gaming | 0.32 |
| Feedback | 0.72 | Inquiry-based teaching | 0.31 |
| Teaching students self-verbalization | 0.67 | Smaller class sizes | 0.21 |
| Meta-cognition strategies | 0.67 | Individualized instruction | 0.20 |
| Direct Instruction | 0.59 | Problem-based learning | 0.15 |
| Mastery learning | 0.57 | Different teaching for boys and girls | 0.12 |
| Goals – challenging | 0.56 | Web-based learning | 0.09 |
| Frequent/effects of testing | 0.46 | Whole language – reading | 0.06 |
| Behavioral organizers | 0.41 | Inductive teaching | 0.06 |
| Average activator | 0.60 | Average facilitator | 0.17 |

Another contrast is between active and quality teaching strategies on the one hand, working conditions on the other; and the averages are d = 0.68 compared to d = 0.08(Table 11.2). Educational structures and working conditions have mainly indirect or probabilistic effects on student learning (Barr & Dreeben, 1983). That is, the effects of these structures (e.g., tracking, class size, school mix, finances) are mediated by an array of instructional and peer processes. The presence or otherwise of these kinds of structures can change the probability that these processes occur (which then influences student learning). So, for example, reducing class size does not directly influence student learning. Rather, reducing class size merely increases the probability that the environment can be structured to capitalize on various teaching and peer influences (such as changing self-efficacy, enhancing academic reputations, and altering expectancies for success). Reducing class size rarely has a direct effect on outcomes. I noted in Chapter 6 the many instances when changing these class structures led to no change in the manner in which teachers configured interactions, no change in the nature of the curricula and instructional strategies used by teachers, and no change in the interactions among students (Hattie, 2007). Hence, the claim is that the school and class compositional effects, at best, change probabilities that successful learning conditions can be constructed. Any inspection of the policies of state or federal government, however, would show that there are few policies that directly affect teaching. Most policies are about structural issues such as resources, smaller class sizes, choice (or whom you want to send your children to school with), curriculum, and tests and high stakes assessment. It is rare to find a policy that relates to teaching.



TEACHING AND LEARNING STRATEGIES

Table 11.2 Effect sizes from teaching or working conditions

| Teaching | d | Working Conditions | d |
|-------------------------------------|------|------------------------------|-------|
| Quality of teaching | 0.77 | Within-class grouping | 0.28 |
| Reciprocal teaching | 0.74 | Adding more finances | 0.23 |
| Teacher-student relationships | 0.72 | Reducing class size | 0.21 |
| Providing feedback | 0.72 | Ability grouping | 0.11 |
| Teaching student self-verbalization | 0.67 | Multi-grade/age classes | 0.04 |
| Meta-cognition strategies | 0.67 | Open vs. traditional classes | 0.01 |
| Direct Instruction | 0.59 | Summer vacation classes | -0.09 |
| Mastery learning | 0.57 | Retention | -0.16 |
| Average | 0.68 | | 0.08 |

The messages in this book relate to the six signposts noted above rather than to endorsing particular methods. It may be very possible to use these signposts and other messages about what makes the best difference to teaching and learning to improve many of the methods that may not, on average, be above the d = 0.40 hinge-point. For example, team teaching has an overall very low effect (d = 0.19), but if team teaching is undertaken with more attention to the feedback from students to the teachers, from each teacher to the other(s), and using appropriately challenging goals and so on, then the effects may be much greater. It is less the "methods" per se, than the principles of effective teaching and learning that matter. Fullan, Hill, and Crévola (2006) have warned against what they term the "prescription trap". Such prescription prescribes "specificity to instruction with the promise of and in some cases the evidence of, increased student performance" (Fullan et al., 2006, p. 9). They claim that prescriptions, like Direct Instruction, more often work in schools where teachers are poorly prepared, where there is a long history of failure, and where there is chaos and disorder. But the method is difficult to maintain, particularly as the students do not become independent learners when they are confronted with new tasks. This is not my reading of this literature, but the point made by Fullan et al. about "prescriptions" of a particular teaching package is well worth heeding. It is not a particular method, nor a particular script, that makes the difference; it is attending to personalizing the learning, getting greater precision about how students are progressing in this learning, and ensuring professional learning of the teachers about how and when to provide different or more effective strategies for teaching and learning.

These principles should not be confused with transmission teaching, or what Ben-Ari and Eliassy (2003) called the traditional frontal instructional strategy. This transmission strategy involves primarily teacher directed instruction of tasks to all the class,

suggesting uniform ways of performing them .The level of instruction is adjusted to meet the needs of middle to high achieving students, and the pacing of instruction based on feedback from lower achieving students. "As a result, the entire student body suffers, so that fast-paced achievers are not sufficiently stimulated, whereas low achievers may feel frustrated; decreased motivation and off-task behaviors are likely to follow" (Ben-Ari & Eliassy, 2003, p. 145).This then leads to teachers conceiving their role to finding more engaging rather than more challenging tasks, more frontal talking, and asking questions they already know the answers to, lower self-regulation by students, and students learning that progress depends on the teacher-directed methods and tasks.

Instead, active teaching involves more backward design. Rather than starting from the textbooks, favored lesson, and time honored activities, start backwards—from the desired results (success criteria related to learning intentions) (van Gog, Ericsson, Rikers, & Paas, 2005; Wiggins & McTighe, 2005). The aim is to help students to develop explicit cognitive schemas to thence self-regulate and teach themselves the knowledge and understanding, to realize why they need to invest deliberative practice, and then for teachers to evaluate the success of their chosen textbooks, favored lessons, methods, and activities to achieve these goals. The aim is to get students to learn the skills of teaching themselves—to self-regulate their learning.

Learning strategies clearly make a difference. Learning strategies enable progress through the three "worlds" of surface, deep, and constructed knowing and understanding. Such strategies assist in reducing cognitive load (e.g., over learning of surface information to assist in developing learning strategies and developing heuristics, Shah & Oppenheimer, 2008) and can assist in deliberative practice, which depends on and can lead to expectations of "can do", a thriving on challenge, deliberative practice, and an appreciation of feedback. For such deliberative practice to be effective there need to be various pre-conditions, of which the most important is that the practice must be embedded into a higher-order set of learnings—practice by itself without relating to more challenging goals is dull, repetitive, and counter to engaging students in learning. Other pre-conditions could include being aware of the learning intentions, goals, advance organizers, showing worked examples, and pre-practice briefs and orientation. Associated conditions can include the effectiveness of deliberative practice (including feedback), alternative learning strategies, and peer tutoring and assistance (see Cannon-Bowers, Rhodenizer, Salas, & Bowers, 1998).

A recent major review by Bransford,Brown,and Cocking (Bransford,Brown,& Cocking, 2000) of how people learn identified three major principles, which are consistent with



the findings in these meta-analyses. The first was that students come into classes with preconceptions about how the world works, and teachers need to engage with this initial understanding otherwise the students may fail to grasp the new concepts and information. Second, for teachers to develop student competence, their students must have a deep foundation of factual knowledge, understand the ideas in the context of a conceptual framework, and organize knowledge in ways that facilitate retrieval and application. Third, a meta-cognitive approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them. The key questions are: "Where are we going?", "How are we going?", and "Where to next?".

There is also much consistency with the principles for "how children learn" outlined by Vosniadou (2001): learning requires the active involvement of the learner; learning is primarily a social activity; new knowledge is constructed on the basis of what is already understood and believed; we learn by employing effective and flexible strategies that help us to understand, reason, memorize, and solve problems; learners must know how to plan and monitor their learning, how to set their own learning goals, and how to correct errors; sometimes prior knowledge can stand in the way of learning something new, and students must learn how to solve internal inconsistencies and restructure existing conceptions when necessary; and learning takes considerable time and periods of practice to start building expertise in that area.

This means that teachers need to be "adaptive learning experts" (Bransford et al., 2000; Hatano & Inagaki, 1986), who not only use many of the effective strategies outlined in these chapters but also have high levels of flexibility that allow them to innovate when routines are not enough. They can ascertain when students are not learning, know where to go next, can adapt resources and strategies to assist students meet worthwhile learning intentions, and can recreate or alter the classroom climate to attain these learning goals. "Adaptive experts also know how to continuously expand their expertise, restructuring their knowledge and competencies to meet new challenges" (Darling-Hammond, 2006, p. 11). They have the empathy required "to express concern and take the perspective of a student and it involves cognitive and affective domains of empathy" (Tettegah & Anderson, 2007, p. 50). This involves hearing "the intent and emotions behind what another says and reflecting them back by paraphrasing" (Woolfolk Hoy, 1998, p. 466). Further, teachers need to pay special attention to the way children define, describe, and interpret phenomena and problem-solving situations and begin to understand these experience from the unique perspectives of students (Gage & Berliner, 1998).

The presence of challenging learning intentions has multiple consequences. Students can be induced to invest greater effort, and invest more of their total capacity than under low demand conditions. Such intellectual engagement involves a desire to engage and understand the world, have an interest in a wide variety of things, and not be put off by complex and challenging problems (Goff & Ackerman, 1992). The rate of learning is a direct function of goal difficulty, as is the level of persistence over time to attain difficult goals. It certainly assists if the students are also committed to the goals (and of course they need to know them before committing to them), and doing "one for the Gipper" or "do your best" may help in a few situations but is rarely enough to sustain interest in learning.

Challenging goals increase the effectiveness and need for feedback. If the goal is easy, then feedback is not necessary, but if difficult, there is a greater need for feedback. As Locke and Latham wrote:

Feedback tells people what is; goals tell them what is desirable. Feedback involves information; goals involve evaluation. Goals inform individuals as to what type or level of performance is to be attained so that they can direct and evaluate their actions and efforts accordingly. Feedback allows them to set reasonable goals and to track their performance in relating to their goals, so that adjustments in effort, direction, and even strategy can be made as needed. Goals and feedback can be considered a paradigm case of the joint effect of motivation and cognition controlling action.

(Locke & Latham, 1990, p. 197)

CLASSROOM CONTEXTS ARE DIVERSE

None of the above should imply that classroom cultures are not critical. Throughout the chapters of this book, the importance of relationships, trust, caring, and safety have been emphasized, as has the importance of teachers choosing worthwhile and appropriately challenging tasks. This highlights the classroom climate and the ethics of making decisions about what is appropriately worthwhile. Evidence does not provide us with rules for action but only with hypotheses for intelligent problem solving, and for making inquiries about our ends of education (Dewey, 1938). Key questions that need to be explored include "What works best?", "Compared to what alternatives?", "When?", "For whom?", and "To what ends?". By itself, "What works?" can be barren (Glass, 1987). It is hoped that the messages in this book highlight the

enormous power of the teacher, the amazing power of some of the methods they use, the critical nature of teachers' proficiencies in decision making and making judgments, the vital need to develop a caring relationship with and among students, and the constant need to ask what the desirable outcomes of any "teaching" are—all of which point to the moral dimensions of teaching.

Any recommendations about "what works best" invoke claims about cultural matters that influence and drive classroom interaction and discourse patterns. Consider, for example, the place of "talk" in classrooms. In Alexander's (2003) study of classrooms in many countries, he found that teachers in France, Russia, Britain, and America articulated and enacted three versions of values:

- **Individualism** (a view that knowledge and expression is personal and unique).
- **Community** (a view that learning and doing is collaborative in a climate of sharing and caring).
- **Collectivism** (learning together rather than in small groups, with common ideals and knowledge).

New Zealand classrooms, it would appear, align with Alexander's data on British and American classrooms where one-to-one monitoring, with private and often whispered exchanges, are prominent; in his terms, these classrooms share individualistic and community values. In British classrooms "mistakes" were "embarrassing" and teachers strove to minimize public "mistakes" to avoid the child "losing face". The emphasis tended to be on needing to express "correct" answers and on teacher approval. In contrast, in Russian classrooms problems and "mistakes" were in the public domain to be engaged with alongside "correct" or preferred responses. Collective and public discourse engagement dominated. Where Russian teachers highlighted their role in creating and sustaining dialogue and conversation. British and American teachers aimed to run their classrooms such that conversations were "shared" and seen as "democratic", where there were many teacher-managed sequences of "unchained two-part exchanges", where voices were allowed to be heard rather than creating a strategic expansion of meaning-making. Video studies from the PISA mathematics comparisons across seven countries showed much consistency in lessons, whereby students were asked to solve problems, usually alone or in whole-class groups (rarely in small peer groups), an extensive use of textbooks or work sheets, and teachers talking eight times more than students (Hiebert et al., 2003).



My colleague, Alison Jones, remarked how fascinating it was that I could understand classrooms to the second decimal point. Her comment was a sobering reminder of the importance of the cultural context of the classroom, and what the students and teachers bring to the class from cultural and sociological perspectives. Reducing classrooms to an index number (effect size) could be considered akin to reducing society to unemployment indices, intelligence quotients, or currency rates. This debate about "index numbers" was plentiful in the 1950s and it is well worth remembering the cautions about their use (Guilford, 1954). The variability around the typical value of the effect size can be as informative (as the homework example showed), the unexplained variance is worth knowing as it limits the importance of the wanted variance (and thus highlights the importance of quality measures and research designs), the reference point is critical (as in the argument that the h-point of d = 0.40 is a more critical reference point than the usual d = 0.00, and the interactions with other variables can dramatically alter the conclusions (as in the learning styles example). Most important to any discussion on indices are "rival plausible hypotheses." The "story" told in this book about visible teaching and visible learning is one set of plausible hypotheses to fit a model to these data and the data to the model—there are certainly many more. Alternative plausible hypotheses are welcomed.

THE CONCEPT OF LEVELS OF UNDERSTANDING

As noted at the outset of this book, the focus has been on achievement—but there are many other worthwhile outcomes of schooling. It was surprising to find that, while achievement can be construed across a number of content areas, there was a struggle to find differential effects within the many meta-analyses related to subject. The subject chauvinism of so many high schools may be justified on the basis of the nature of the achievement desired, but good teaching and the most powerful influences on student outcomes seem to be similar across domains. Somewhat surprisingly there was no preponderance of evidence supporting the importance of subject or pedagogical content knowledge. The latter includes not only the content matter (the production view so often studied), and the pedagogical content knowledge (knowing how to teach), but also the teacher knowing when a learner does not comprehend, make mistakes, and so on (see Deng, 2007 for a most worthwhile debate on these issues). One type of content knowledge rarely explored may be more critical-teachers' conception of progress in the subject, knowledge of when to intervene, knowledge of learning theory, and openness to the experience of alternative ways to teach the content. These may be well worth deeper investigation.

In Chapter 3, it was proposed that achievement can be discussed at three levels: surface, deep, and conceptual or constructed understandings. There are also other critical achievement outcomes such as fluency, retention, application, endurance, and problem solving strategies. As well, there are various types of "thinking" and understanding that are critical to developing conceptual understanding: information gathering, building understanding, productive thinking, reflective thinking, strategic management of thinking, and evaluating thinking (Moseley et al., 2004). The model used throughout this book was based on Biggs and Collis's SOLO (Biggs & Collis, 1982) model, and akin to the claims by Bereiter (2002) who used Popper's distinction between three worlds— the physical, the subjective, and the world of ideas. Thus there are multiple meanings of achievement, such as surface, deep, and construction of knowing. It is the case that most tests used in the studies in these meta-analyses are particularly effective at measuring surface features, somewhat effective at measuring deep learning, but rarely effective at measuring the construct representations that students build from their classroom experiences. Knowing is an activity, not a thing, in this third sense, and it is reciprocally constructed in the individual-environment-teacher interaction and not easily objectively defined by a one-off test (Barab & Roth, 2006). Many researchers are aiming to gain a better sense of how measurement would work at this Third World, and this is exciting [Gierl, Zheng, & Cui, 2008; Luecht, 2006; Luecht, Gierl, Tan, & Huff, 2006; Mislevy, 2007). A limitation of many of the results in this book is that they are more related to the surface and deep knowing and less to conceptual understanding.

THE ZERO AND HINGE POINT

Even if the story developed to explain the findings is not convincing, the use of the "h-point" (d = 0.40) to demarcate the expected value of any innovations in schools is critical. Rather than using the zero point, which is hardly worthwhile, the standards for minimal success in schools should be more like d = 0.40. Any innovation, any teaching program, and all teachers should be aiming to demonstrate that the effects on student achievement should exceed d = 0.40. This h-point is not only attainable by many innovations but is the average, not the maximum, effect. Many students experience gains of d = 0.40, primarily because of excellent teaching; why cannot all?!

So often progress is cast in terms of activities and events and not in terms of increasingly more challenging demands from the underlying concepts in the curricula. Too often, progress is defined in terms of test scores, rather than in terms of proficiencies and competencies of what these test scores supposedly measure. So

often in schools, students' achievement is compared to their achievement last year (or before a treatment) with the usual claims that "It worked", "I was happy with it", "I have passed on all the students to the next teacher who has never criticized my teaching of these students", "Yes, some students are not so able but that is more a function of what they brought to the class and not a consequence of my teaching". It turns out that these claims are among the weakest of all.

A fascinating question to ask teachers is: "What percentage of the students in your class go backwards in one year with you?". The concept of going backwards does not just mean those who genuinely fall behind compared with where they started (and they do exist), but also those who do not make the appropriately expected yearly gain for that year, and those who start falling behind or going backwards, compared to what they could achieve, because their teachers have low expectations. In our experience in a large city in the United States, we found 80 percent of students went backwards in some schools—in mathematics in grade 9, where they first encountered algebra, the students struggled to the point that they become disengaged from mathematics, developed beliefs about their lowered performance in mathematics, and often dropped out of mathematics (Hattie, et al. 2007). For many, this question of "going backwards" is rarely considered, and this reduces the chance of teachers looking for these students, and thus being in front of rather than behind the problems these students then encounter.

I would go further and claim those students who do not achieve at least a 0.40 improvement in a year are going backwards—they are with respect to those students who do exceed this average. The current standard, however, is more referenced to the zero point, and this is probably why it is difficult to find a below average teacher; why every teacher is considered effective; and why all can find evidence that they have "added value" (i.e., > d = 0.0). In addition, too often the claim is that the quality of teachers has little if any variance—one of the greatest myths of teaching is that all teachers are equal. There is an appreciable amount of variability in the effectiveness of teachers (this is demonstrated by, for example, there being so little between-school variance).We may indeed proclaim that all teachers are performing well; but not all students would agree.

If the criterion of success is achieving effect sizes greater than 0 then nearly all teachers could be considered effective. But this is a false comparison and assumes that any achievement is better than none! Students are more discriminating about teachers and, as noted in Chapter 7, Irving (2004) demonstrated that they are often accurate in their discrimination. Perhaps it is no wonder there is an increasing set of

problems relating to student engagement. As Steinberg, Brown, and Dornbusch (1997) claimed, so many students "are physically present but psychologically absent" (p. 67). They also cited that about 40 percent of students are "going through the motions" and say they neither try hard nor pay attention. So many cut class and are truant, so many admit to cheating to get through, so many lose interest because they cannot keep up, and so many are bored by the lack of appropriate challenge. So many do not learn that ability is not enough, and that effort is critical. About half who drop out of school claim that classes were not interesting or inviting, and two-thirds claim that not one teacher was interested in their success in learning at school (Bridgeland, Dilulio, & Morison, 2006) All is not rosy with teachers, teaching, and schooling.

It is sobering to realize that we have a teaching cohort that is average, at best, in the eyes of most students. It is sobering to realize that each child will meet only a few teachers who they will consider to have a lasting and positive effect on them. It is sobering to realize that these teachers will be remembered not because they taught social studies or mathematics but because they cared about teaching the students their passion for their subject, gave students confidence in themselves as learners and as people, treated the student as a person, and instilled a love of learning of their subject(s).

But—teachers claim they are doing the best job they can. Principals attend to implementing the best programs they can. Systems aim to devise policies with the greatest effects they can. A major theme in this book is that these intentions—to introduce the best we know—often fall short because the decisions are inappropriately compared, they are inadequately evaluated relative to alternatives, they tend to be related to structural and working conditions and not to teaching strategies and conceptions, and they are evaluated using models that seek success (anything greater than 0 is too often considered successful) and ignore failures.To readdress this problem, a more effective barometer model of relative success has been suggested, such that educators can use this barometer to more effectively ask whether their influences of choice are successful.

WHAT IS SPECIAL ABOUT "INNOVATIONS"?

The typical teacher's effects are about d = 0.15 to d = 0.35. It is when there is an intervention or innovation that the effects can increase markedly beyond this. This does not mean that change for the sake of change is needed, as the question is "What are the attributes of innovations that lead to above average effects?". Innovation does not occur merely because it is something new or different. Innovation occurs when a teacher makes a deliberate action to introduce a different (not necessarily new) method

of teaching, curriculum, or strategy that is different from what he or she is currently using. The aim is to encourage teachers to construe their teaching in terms of a series of related experimental designs, as then the benefits of the increased attention to outcomes can be accrued. Many of the innovations that appear near the top of the barometer of influence could be conceived as clinical treatments— for example, direct instruction, reciprocal teaching, reading recovery. It is fascinating to compare a meta-analysis of 150 articles concerning the critical change agents in therapy (Holly, 2002). The critical change agents (in order) are knowledge and skills; a plan of action; strategies to overcome setbacks; a high sense of confidence; monitoring progress; a commitment to achieve; social and environment support; and, finally, freedom, control, or choice.

There are various stages to innovation such as initiation, implementation, and evaluation— and most often the "innovation" changes during the implementation. The most critical attribute, however, is that when undertaking an innovation there is a heightened attention to its effects, to feedback to the teacher about the effects of the innovation, and to a focus on the learning intentions and success criteria from any innovation. Innovations carry the risk of failure; innovations help us free ourselves from the structured life and schemes that are created around us. It is this searching for that which is not working, and those students for whom you are not being successful; it is the heightened sense of seeking feedback, the increased attention to the principles of evaluation (discerning that of merit and worth), and the focus on how to seek the evidence of disconfirmation of the teaching so as to improve it that are important. In the search for how science progresses, Karl Popper (1963) claimed that a key was the search for disconfirmation (as so often we see evidence of our success everywhere). When teachers seek evidence that their teaching may not have been successful, then the desirable lens of success is in place. The teaching may not be successful for all students, for all parts of the learning intentions, towards all aspects of the success criteria; and even our goals, level of challenge, and processes of both effortful and conduct engagement may need to be constantly questioned.

WHY CAN'T THEY CHANGE?

"They" are teachers, policy makers, teacher educators, and oftentimes parents. I started this book by noting that there are many hundreds of solutions as to how to make learning as effective as possible. Teachers are willing to change, although they are probably sick of change. Most changes they experience are to structural and working conditions. But what if the changes were to their own conceptions of

teaching and learning in the directions suggested in the book? This requires an openness to the idea, and a willingness to be wrong. That is, a willingness to seek a better alternative to what the teacher is currently doing by evaluating the effects of the change on student learning. Adopting any innovation means discontinuing the use of familiar practice.

The key issue is less how to change, but why we do not. In a fascinating study, Shermer (1997) researched why we tend (often passionately) to believe in ideas even when they do not work. He attributed this to an over reliance on anecdotes, dressing up one's beliefs in the trappings of science or pedagogical language and jargon, making bold claims, relying on one's past experiences rather than others' experiences, claiming that one's own experience is sufficient evidence, and circular reasoning (I am doing it so it must be ok). He also cited various psychological processes that lead to our accepting what we have done as the "best": the need for certainty, control, and simplicity; the seeking of examples to confirm our current methods; the lack of seeking evidence to demonstrate what is not working; the attributions of cause to the student when he or she is not learning but to the teacher when the student is learning; and a build up of an immunity to new or different ideas or ways of doing things (and some of these new ideas are indeed wacky). New and revolutionary ideas in teaching will tend to be "resisted rather than welcomed with open arms, because every successful teacher has a vested intellectual, social, and even financial interest in maintaining the status quo. If every revolutionary new idea were welcomed with open arms, utter chaos would be the result" (Cohen, 1985, p. 35). We have an uphill task.

In an analysis of teachers' accounts of classroom experience, Little (2007) noted that teaching was carried out largely out of sight and hearing of other teachers, and thus there was a tendency to rely on narrative accounts to construct a shared understanding. So often teachers depended on "war stories", personal experiences, and a reliance on their own experience to justify their personal preferences. If this swapping of war stories is the closest teachers come to professional conversations, the picture is bleak for the messages in this book about teachers needing to share evidence about their teaching with their colleagues. Little proceeds to show how these conversations could be more productive. The key is to develop teachers' accounts of classroom experience (and I would add "outcomes for the student and for the teachers") as a "useful resource in making sense of more aggregate patterns of student behavior and achievement, [as] ... they constitute a resource for learning and instructional decision making anchored in the particularities of classes and curricula" (Little, 2007, p. 237). By questioning one another, eliciting replays and rehearsals, using evidence in these narratives, and offering and revising interpretations and explanations,



teachers can build "general principles of practice anchored both in the conceptual frames they had acquired and in the particularities of their experience" (p. 231). But it takes instructional leadership and the creation of a safe and trusting environment to engage in such criticism, a commitment to share evidence about the effects of teaching, and an openness to new experiences. The message about "what works best" for students also applies to "what works best" for teachers.

The theme throughout the findings is that the lens the teacher uses is critical to success, and it needs to be subject to close scrutiny, considered from an "others" viewpoint, and checked for evidence as to whether all students are learning desirable curricular outcomes at a sufficient rate. If the teacher's lens can be changed to seeing learning through the eyes of students, this would be an excellent beginning. This involves teachers seeking countering evidence as to the effectiveness of their teaching, looking for errors in their thinking and knowledge, seeing how students build on prior knowledge and conceptions of learning, asking whether there is sufficient challenge and engagement in the learning, and understanding the strategies students are using when learning and confronting difficulties.

Another reason for the lack of change is the over reliance on teacher judgments rather than evidence. There has been a long history in many areas of placing more reliance on "professional judgments" than on evidence. This debate has percolated in the literature since Meehl's (1954) book Clinical versus statistical prediction, in which he found that in all but one of 20 studies, statistical methods were more accurate than or equally as accurate as the clinical methods. Clinical prediction refers to any judgment using informal or intuitive processes to make decisions. Aegisdottir et al. (2006) used 173 effect sizes from 69 studies published over the past 56 years, and concluded that there was a somewhat greater accuracy for statistical rather than clinical judgment methods. Similarly, Martin, Quinn, Ruger, and Kim (2004) found that statistical models could predict the outcomes of United States Supreme Court decisions more effectively than a set of independent predictions by 83 legal experts. The most fascinating aspect of this domain of research, which has been replicated many times, is that these findings have had little influence on clinical practice. Practitioners often lack familiarity with evaluation and statistical methods, are often incredulous about the evidence, more highly value interpersonal cues, believe that statistical methods dehumanize, believe that there is more individual variation than group consensus, and are subject to confirmatory biases such that they recall instances in which their predictions were correct but fail to recall those instances in which independent evidence was more accurate.

A further reason is that the contingencies in schools do not attend to student outcomes as much as the working and structural conditions of teaching and learning. Hanushek (1997) has argued that little rides on success or failure, and teachers measure success more in terms of satisfaction they receive from doing a "good job", and the potential approval or disapproval of parents and principals. There are few direct incentives related to student performance and so often, claimed Hanushek, teachers are "simply reacting to the incentive structure that does not emphasize student performance" (p. 305).

Many years ago, Alessi (1988) reviewed more than 5,000 children referred to school psychologists because they were failing at school. Not one located the problem as due to a poor instructional program, poor school practices, a poor teacher, or something to do with school. The problems were claimed, by the teachers, to be related to the home and located within the student. As Engelmann (1991) claimed "An arrogant system would conclude that all the problems were caused by defects in the children, none caused by defects in the system" (p. 298). Instead, Engelmann challenged teachers and schools to ask:

- Precisely where have you seen this practice installed so that it produces effective results?
- Precisely where have you trained teachers so they can uniformly perform within the guidelines of this new system?
- Where is the data that show you have achieved performance that is superior to that achieved by successful programs (not simply the administration's last unsuccessful attempt)?
- Where are your endorsements from historically successful teachers (those whose students outperform demographic predictions)?

The depressing news is that "the closer an innovation gets to the core of schooling, the less likely it is that it will influence teaching and learning on a large scale" (Elmore, 1996, p. 4) and reciprocally those further away from teaching and learning are more likely to become national policies. The problem is not general resistance or failure of schools to change, claimed Elmore, as schools are constantly changing. He located the resistance, as do I, with the conceptions of teaching and learning shared by teachers. "Just leave me alone to teach my way" is the common mantra. We see the increasing numbers of disengaged students as the problems of students or their families, or of society, not of teachers or schools. It is nigh on impossible to legislate changes to conceptions of teaching and learning—and this is where professional development becomes critical. So often the policy changes have little or no effect.

The effect of a storm on the ocean is that the "surface is agitated and turbulent, while the ocean floor is calm and serene (if a bit murky). Policy churns dramatically, creating the appearance of major changes ... while deep below the surface, life goes on largely uninterrupted" (Cuban, 1984, p. 234).

A major area in educational research should be why we continue to believe many claims about "what works best" when there is no evidence for these claims (Yates, 2008). The most obvious is class size, as most seem to believe that reducing class size has a major influence on student outcomes. It does not, but listeners to recitations of the evidence so often suspend belief in such claims, and argue from the probabilistic claim—surely reduced class size would lead to many desirable benefits (more feedback, more individualization, better listening to students). Such probability may indeed be the case, but the fascinating question is why the benefits do not accrue when we reduce class sizes (Hattie, 2006). There are so many instances of teachers and parents believing claims when there is an enormous amount of contrary evidence.

If teachers have barely changed teaching methods over the past 200 years, if the predominant mode of classroom "action" is questioning, recall, and the acquisition of large chunks of surface knowledge, where engagement and busyness are sought, then recommendations about the nature of teaching outlined in this book to change this transmission model are unlikely to make a dent. It is so much easier to discuss and seek funds for working conditions—reduced class size, salary, buildings, lengthening school periods or days—or at appeasements to parents (computers, school choice, charter schools, more examinations). We have in education a long history of innovation but it rarely touches but a chosen few. The likelihood of the claims in this book having a major effect will depend more on whether schools can turn, as did much of medicine, to evidence-based claims. The request is for teachers and schools to enhance learning by at least d = 0.30 more than last year, and preferably more than d = 0.40 before any intervention is considered worthy of retaining or implementing. Putting this challenge squarely on the table of schools and government departments is the most likely mechanism for change.

THE NATURE OF EVIDENCE

"Evidence" is not neutral. Biesta (2007), for example, has criticized the evidence-based approach such as used in this book on a variety of grounds. First, she claimed that what counts as "effective" crucially depends on judgments about what is educationally desirable. Agreed, but achievement is among what is crucially desirable. Agreed also,



there are other critical outcomes such as affective outcomes, persistence and engagement, physical outcomes, and social normative behaviors and skills.

Second, evidence-based methods appear to offer a neutral framework that can be applied across areas (such as education, or medicine) and central to the method is the idea of effective intervention. Education, however, is never neutral, and its fundamental purpose is intervention or behavior change. This is what makes teaching a moral profession, with such fundamental issues as: "Why teach this rather than that?", "How does one teach in defensible and ethical ways?". Snook (2003) has argued that teaching involves close personal relationships: between teachers and students, between one student and another, and between one teacher and another. Teaching involves a mission to change people in certain ways. This teaching occurs in schools in which there are hierarchies of control and rules to be obeyed. The "power" in these interactions and contests is very real. Hence, claimed Snook, teaching involves ethics in its aims, its methods and its relationships. He argued that the role of the teacher involved a respect for autonomy, and a respect for reason. He cautioned that "when we hear too much of the technicist teacher, the competent teacher, the skilled teacher, we should remind ourselves that education is essentially a moral enterprise and in that enterprise the ethical teacher has a central role to play" (p. 8).

It is the case that in this book only meta-analyses have been given the privilege of being considered. A review of non-meta-analytic studies could lead to a richer and more nuanced statement of the evidence. I leave this to others to review in this manner, although I have tried to incorporate aspects of these other views in my own summaries of each area. The emerging methodology of qualitative synthesis promises to add a richness to our literature (Au, 2007;Thorne, Jensen, Kearney, Noblit, & Sandelowski, 2004).

THE COSTS AS WELL AS THE BENEFITS OF INNOVATIONS

It needs to be noted that evidence based on effect sizes alone could lead to poor decisions. For any set of choices, there are costs as well as benefits. The financial costs of the various interventions may need to be taken into account when making decisions about what works best. It may be that we can use some of the cheaper interventions if their effects are positive, and this may be preferable to using some of the more expensive interventions. The problem is that there are many kinds of costs in education: cost-minimization, where the intervention that is least costly is preferred; cost-benefit, where there is a trade-off of the costs and the benefits (in

terms of effect size, ease of implementation, consistency with prior teacher practice, alignment with aims of the program); there is also average versus incremental cost-effectiveness, whereby the averages in this book can be considered relative to the average d = 0.40, or the incremental or marginal cost-effectiveness ratio, which is the cost of switching from what you are doing now to another treatment. Perhaps more critically, there are also the costs associated with lost opportunities for students to learn or engage in educational activities that truly make a difference—and which many of their fellow students are benefiting from! There are the "suffering costs" of being exposed to interventions with least effectiveness—no matter that the teacher has used the intervention before, how much the teacher enjoys it, or finds evidence to support it from anecdotal and rose-tinted perspectives (e.g., looking for the positives). As Hanushek (2005) and others have demonstrated repeatedly, we spend millions, if not trillions, of dollars investing in innovations, changes, and policies in education without a lot of evidence that this investment is making a difference to student outcomes. They may make a major difference to teachers' and students' working conditions, but not to the achievement outcomes.

The education dollar in the United States has risen a steady 3.5 percent annually over the past 100 years, and the majority (60 percent) is spent on instruction. Odden (2007) argued that increasing the portion spent on instruction will be unlikely to have an effect on student learning, Instead, the schools that doubled performance followed a set of similar strategies such as setting high goals (e.g.,90–95 percent of students to proficiency), analyzed student data to become deeply knowledgeable about the status of student performance in the schools, made use of formative assessments, collectively reviewed evidence on good instruction, used time more productively, and were led by leaders providing instructional leadership.

The cost-benefits of innovations are certainly relatively unexplored. At best, production functions have been used to estimate the relationships between the costs of varying school inputs and the educational outcomes (usually attempting to control for various background features). Such models rarely include the influence of nonpurchased and nonmonetary inputs, (such as peer effects, Hanushek, 1998; Subotnik & Walberg, 2006). In one of the more interesting models,Walberg (1980) proposed using the Cobb-Douglas (1928) production function as it includes many valuable properties. The marginal products of capital and labor are both positive, which means that adding more teaching leads to greater gains (to a point). There are, however, diminishing marginal returns, such that doubling learning time does not mean doubling learning outcomes, or adding more influences and methods may lead to fewer outcomes. Adding more into the teaching situation may not necessarily be as

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powerful in return as choosing the optimal smaller set of what leads more directly to learning outcomes. This model also highlights the importance of interaction effects or, more importantly, ensuring that the right combination of interventions exists in the right proportions to ensure an interaction effect.

It is unlikely that many of the effects reported in this book are additive—simply coupling together some of the effects does not mean that we can merely "add" the effects together and then expect these changes. There may be some cases where there could be additive effects (e.g., home plus school effects), and there were additive effects from the Adventure programs, but as was noted, this was unusual.

Comparisons of costs can also be most informative. For example, reducing class sizes from 30 to 15 produces an effect size between d = 0.10 to d = 0.20. Buckingham (2003) estimated that the effects of reducing the overall average ratio of New Zealand elementary and high school students by one student (to 18.4 and 14.5, respectively) was around NZ\$113 million per year (it was acknowledged that this ratio is not the same as reducing class size). This cost only provides for one less student per class on average, it would be an ongoing commitment, and is not a one-off investment as it would account only for extra staffing costs. Other additional costs include building more and smaller classrooms, providing additional classroom resources and ongoing professional development, and finding the extra gualified teachers (see also Greenwald, Hedges, & Laine, 1996). Brewer, Krop, Gill, and Reichardt (1999) estimated the costs of reducing class sizes to 18 students in grades 1 to 3 in the United States would require hiring an additional 100,000 teachers at a cost of \$US5-6 billion per year, and an additional 55 percent more classrooms. To reduce again from 18 to 15 students would cost a further \$US5-6 billion per year. They estimate that this investment could, instead, be used to raise teachers' salaries by \$20,000 per year (see also Blatchford, Goldstein, Martin, & Browne, 2002). The right question is to ask "What is the best use of this resource?" or "What could be accomplished if this amount is spent on other innovations with higher effects on student outcomes?".

In a study comparing the relative magnitude of achievement effects resulting from the introduction of textbooks, establishment of radio instruction, and lowering of mean class size, Jamison (1982; see also Heyneman, Jamison, & Montenegro, 1983) estimated that to obtain the achievement benefit gained from increasing the availability of textbooks at a constant increment of cost, schools must lower average class size from 40 to 10 students per teacher. Fuller concluded "in most situations, lowering class size with the intent of raising achievement is not an efficient strategy"(1987,p.276). Similarly, Levin (1988) compared the cost-effectiveness of four

reforms for raising student achievement at the elementary level in reading and mathematics: a longer school day, computer-assisted instruction, cross-age tutoring, and reduced class size. Cross-age tutoring was the most cost-effective. The longer school day and reducing class size by five students showed the smallest returns. Computer-assisted instruction was associated with gains in the middle of the range of results.

The aim of these analyses is not to suggest that the costs of improvement are cheap. As Pressley et al. (2006, also see Chapter 7) have noted, the costs of implementing the reforms that seem to have most power in influencing student learning are expensive. These costs are mostly in effort costs of the teachers and school leaders. and in the effort costs of the students. So often these are assumed to be free, or taken from the social and home life of teachers. Changing teachers' conceptions is not easy or cheap. Rogers (1962), for example, proposed an "S-shaped curve of learning" to explain such changes to teachers and teaching. His diffusion model of innovation suggests that initially only a few teachers (typically those open to change, more educated, who have a greater store of knowledge, are self-confident, and are not so concerned with the norms of others) begin trying an innovation. Then when there is sufficient critical mix, many more begin to innovate, but it is hard to get acceptance from the final 20 percent plus. Teachers will not just move from not doing a new behavior to doing it; they go through decision phases. Rogers (2003) called these phases: awareness, knowledge, persuasion, decision, implementation, and confirmation. The boundaries between these are not precise, and not all occur, but his argument is that adoption is a process, not a discrete event. There are many ways to make teachers aware of new ideas, but to close the deal and to accelerate the process of innovation adoption there is often a need for interpersonal outreach. The social networks are powerful but often these are the biggest barrier to innovation. Rogers' claims echo the comments in Chapter 1 about Cuban and Tyack's (1995) study of teaching over the past 200 years: 85 percent are resistant to change what they claim works for them; ten percent are willing to change to be more efficient, and five percent are willing to try new innovations. Hence the moves to use accountability, government pressure, compulsion, and the stick rarely change the conceptions or lens of teachers. The costs to make the implementations recommended in this book are among the more expensive, but the claim is that they are the right ones on which to spend our resources.

IMPLICATIONS FOR POLICY

In many classrooms and schools, there is evidence of low effect sizes, reliance on poor methods and strategies, a dependence on "war stories" and anecdotes, and an agreement to tolerate different and sometimes poor teaching. We beseech these teachers to be evidence-based but so many government agencies and departments, teacher educators, and others are not evidence-based, and seem reluctant to accept evidence if it is contrary to current policies. There is a preference instead to make changes to structural and working conditions. The clients of schools include government ministers and parents (voters), and it is common to find parents who want schooling for their children better than they experienced. There is a preference for the teaching method that fits the latest ideology, and rarely are these methods assessed by evidence. As the evidence in this book shows, we can do damage in schools—and by this I do not just mean those teachers that have 0 or negative gains over the year: I mean those teachers and schools who do not aim and achieve the h-point (+d = 0.40) effects that so many of our children do receive. The others are condemned to mediocrity and lesser opportunities. These high effects can be obtained—they are obtained by many teachers in our schools. This is no dream; it is a reality for many students. But for just as many students, the reality is the ordinary the devil in this story is not the negative, criminal, and incompetent teacher, but the average, let's get through the curricula, behave, be busy, we are "all friends in here" teacher who has no idea of the damage he or she is doing.

Perhaps the most famous example of policy makers not using or being convinced by evidence was Project Follow Through, which started in the late 1960s. It was conducted over 10 years, involved over 72,000 students, and had more than 22 sponsors who worked in more than 180 sites to find the most effective education innovations to break the cycle of poverty through enhancing student learning. The innovations included Direct Instruction, whole language, open education, and developmentally appropriate practices (see Carnine, 2000; House, Glass, McLean, & Walker, 1978 for a history). The students in these programs were compared to control students (Stebbins, 1976; Stebbins, St. Pierre, Proper, Anderson, & Cerva, 1977). All but one program had close to zero effects (some had negative effects). Only Direct Instruction had positive effects on basic skills, on deeper comprehension measures, on social measures, and on affective measures. Meyer (1984) followed these students through to the end of their schooling, and those in the Direct Instruction compared to peers not in this program were twice as likely to graduate from high school, had higher scores on reading (d = 0.43) and mathematics [d = 0.28]—significant long-term differences in the Direct Instruction program effects.

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The outcome of this study, however, was not to support more implementation of Direct Instruction but to spend more resources on the methods that did not work but were preferred by educators. As Carnine (2000) commented, the romantic view of students discovering learning was more powerful than a method invented by a teacher that actually made a difference; a method that required an attention to detail, to deliberately changing behavior, and to teaching specific skills. The rejection of Direct Instruction in favor of Rousseian inspired methods "is a classic case of an immature profession, one that lacks a solid scientific base and has less respect for evidence than for opinion and ideology" (p. 12).

Consider the following quotation:

It is hard to conceive of a less scientific enterprise among human endeavors. Virtually anything that could be thought up for treatment was tried out at one time or another, and, once tried, lasted decades or even centuries before being given up. It was, in retrospect, the most frivolous and irresponsible kind of human experimentation, based on nothing but trial and error, and usually resulting in precisely that sequence.

(Thomas 1979, p. 159)

Thomas was referring to the study of medicine and noted how evidence-based medicine was the mechanism for driving out dogma, as dogma does not destroy itself. The evidencebased revolution came through repugnance and pressure from groups that were adversely affected by the poor quality of service in the medical profession. Maybe legal cases about equity in outcomes across various ethnic groups, poor service by teachers, clinical trials of new educational treatments, and a set of international standards and expectations for outcomes from schooling may be the catalyst for change and improvement in education.

More of the same is certainly not the answer. The key question is whether teaching can shift from an immature to a mature profession, from opinions to evidence, from subjective judgments and personal contact to critique of judgments.

CAN ALL THIS BE DONE?

Two studies make the case that the claims in this book can be attained. First, a recent set of studies provided a portrait of schools that produced high achievement even though they had previously failed. Pressley, Mohan, Raphael, and Fingeret (2007)



used grounded theory to build a picture based on interviews, analyses of test scores, and an in-depth study of the school. They concluded:

Effective elementary teachers, especially those effective in promoting reading and writing, tend to do the following: They devote much of their class time to academic activity, engaging most students consistently in activities that require them to think as they read, write, and discuss. Effective teachers do explicit teaching (and re-teaching as needed) of skills, and this teaching included modeling and explaining skills, followed by guided student practice. That is, effective teachers show a strong balancing of skills instruction and holistic reading and writing activities. Teacher scaffolding and re-teaching are salient, accounting for a large proportion of such teachers' effort. Effective teachers connect content learning (i.e., social studies, science, math) to reading and writing instruction. Effective teachers have high expectations and increase the academic demands on their students (i.e., consistently encouraging students to attempt slightly more advanced books and write slightly longer and more complex stories). From the first day of school, effective teachers communicate high expectations for students to self-regulate and take charge of their behavior and academic engagement.

(Pressley, Mohan, Raphael, & Fingeret, 2007, p. 222)

Second, I was involved in an in-depth investigation of the classrooms of a large cohort of teachers who had passed or not passed National Board Certification (see Chapter 7). Our interest was to evaluate the differences between experienced experts and experienced non-experts. We visited many teachers' classrooms to observe and to collect many artifacts, transcripts of lessons, interviews, questionnaires, and student work (Smith, Baker, Hattie, & Bond, 2008). We choose two groups: half the teachers had passed (just above the cut-score) the rigorous assessment to become National Board Certified teachers and the others had applied but not passed (just below the cut-score; see NBPTS, 2003; www.nbpts.org). Each set of evidence was independently coded across 13 dimensions identified from a literature review of experienced experts and experienced non-experts. There were marked differences between the two groups, and a stepwise discriminant function analysis indicated that three of the dimensions (challenge, deep representation, and monitoring and feedback) were sufficient to distinguish between the two groups (Figure 11.2).

We coded all student work along the SOLO scale: 74 percent of student work samples in the classes of certified teachers were judged to reflect a level of deeper understanding and 26 percent reflected a more surface understanding. This compares with 29 percent of the work samples of non-certified teachers so classified as deep and 71 percent as surface. The effects of expertise are greatest on deep understanding (Figure 11.3).



Figure 11.2 The means for the National

Board certified teachers (NBCTs) and non-National Board certified teachers (non-NBCTs), and the effect size of the difference between these two groups.



The conclusion seems clear: experienced experts possess pedagogical content knowledge that is more flexibly and innovatively employed in instruction; they are more able to improvise and to alter instruction in response to contextual features of the classroom situation; they understand at a deeper level the reasons for individual student success and failure on any given academic task; their understanding of students is such that they are more able to provide developmentally appropriate learning tasks that engage, challenge, and even intrigue students, without boring or overwhelming them; they are more able to anticipate and plan for difficulties students are likely to encounter with new concepts; they can more easily improvise when things do not run smoothly; they are more able to generate accurate hypotheses about the causes of student success and failure; and they bring a distinct passion to their work.

Over the years, working with the National Board teachers, as a teacher educator, as a parent, and as a student, I have seen teachers who are stunning, who live the principles outlined in this book, and demonstrably make a difference. They play the game according to the principles outlined here. They question themselves, they worry about which students are not making appropriate progress, they seek evidence of successes and gaps, and they seek help when they need it in their teaching. The future is one of hope as many of these teachers exist in our schools. They are often head-down in the school, not always picked by parents as the better teachers, but the students know and welcome being in their classes. The message in this book is one of hope for an excellent future for teachers and teaching, and based on not just my explanation for 146,000+ effect sizes but on the comfort that there are already many excellent teachers in our profession.

I leave the last words to my friend and colleague Paul Brock:

Therefore, not just as a professional educator, but as a Dad, I want all future teachers of my Sophie and Millie to abide by three fundamental principles that I believe should underpin teaching and learning in every public school.

First, to nurture and challenge my daughters' intellectual and imaginative capacities way out to horizons unsullied by selffulfilling minimalist expectations. Don't patronize them with lowest-common-denominator blancmange masquerading as knowledge and learning; nor crush their love for learning through boring pedagogy. Don't bludgeon them with mindless 'busy work'

and limit the exploration of the world of evolving knowledge merely to the tyranny of repetitively churned-out recycled worksheets. Ensure that there is legitimate progression of learning from one day, week, month, term and year to the next.

Second, to care for Sophie and Millie with humanity and sensitivity, as developing human beings worthy of being taught with genuine respect, enlightened discipline and imaginative flair.

And third, please strive to maximize their potential for later schooling, post-school education, training and employment and for the quality of life itself so that they can contribute to and enjoy the fruits of living within an Australian society that is fair, just, tolerant, honorable, knowledgeable, prosperous and happy.

When all is said and done, surely this is what every parent and every student should be able to expect of school education: not only as delivered within every public school in NSW, but within every school not only in Australia but throughout the entire world.

(Brock, P., 2004, pp. 250–251)



For me, the two guestions that drive things from the leadership



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point of view are "What evidence do you have that you are making an impact?" and "How do you evaluate that evidence?" So the principal needs to involve the teachers by saying, "Is this good enough?" and "Is there evidence that this is good enough?" and then "What are we doing in light of that evidence?" ... Now this notion about impact requires opening up classrooms. It has to do with looking at what the impacts on student learning are, looking for evidence in the artefacts of students' work, and then leading those dialogues and discussions. For example, "What does progress look like in your area?", or "What does challenge look like to you?" And then, particularly in a high school setting, "How do you know that each student is making progress across all the subjects?"

Interview with Hattie (2013, p. 15)

Essentially, Knowing Thy Impact means connecting what we do as educators with what happens to learners. At Keilor Views Primary School, this continual inquiry into impact drives improvement at all levels.

CONTEXT

Keilor Views Primary School was formed in January 2010 from the merger between Keilor Downs Primary School and Calder Rise Primary School. It is located in Australia, 25 kilometers north west of Melbourne in the suburb of Keilor Downs, and on the former site of Keilor Downs Primary School. Since the merger, this "new-old" school has gone through a process of regeneration, including a major building program. This has seen the refurbishment of 10 classrooms and the construction of six additional classrooms, a library, and an outdoor sports facility.

Keilor Views has 420 students, ranging from the preparatory level (five years old) to year 6 (11–12 years old). The students are ethnically diverse, with many speaking a language other than English. Many are from homes where the income is below the national average.

The 24-member teaching staff is drawn largely from the two former schools. It is led by principal Charles Branciforte. His senior leadership team consists of assistant principal Matt Borg and leading teachers Gloria Puopolo and Rita Scuteri. Rita is also the school's teaching and learning coach.

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Figure 1.1 Welcome to Keilor Views Primary School¹



The school's motto is "Vision, Integrity, Pride."

OVERVIEW

Professional learning has always been prioritized at Keilor Views Primary School, but the journey has not always been straightforward. Prior to the schools' merger, Charles was principal at Keilor Downs Primary School. He had a strategic plan for improvement that included professional development for himself as a leader of teaching and learning. The curriculum focus was on literacy, with educational consultant Sally Slattery employed to mentor and coach selected teachers. Sally also took on the role of critical friend to the leadership team. This approach bore fruit but could not be sustained due to the expense of the merger process. Instead, building on what they had learnt, Matt and Rita implemented an internal coaching model supported by a new reading assessment system. In the meantime, Charles worked with the regional education authority to establish a professional development conference center. This initiative has provided a revenue source that has helped fund new professional learning initiatives. One of these was the employment of consultant Sue Costello, who supported staff in the use of exemplars as an approach to literacy assessment. This led on to an interest in Visible Learning and the school's inclusion in a 2012 study tour to New Zealand organized by Cognition Education and the Keilor/St Albans Network. Alongside other schools in the network (including Monmia School, whose story is also told in this book), the school was convinced by what they

¹ These welcome signs, erected outside the school entrance, are written in all the languages spoken by the families who are a part of Keilor Views Primary School. The 2013 student leaders drove the fundraising that allowed the welcome sign to eventuate.

saw in the Visible Learning schools they visited. They consequently embarked on a Visible Learning journey of their own that has seen impressive improvements in student outcomes.

This story is primarily focused on the concept of "Know Thy Impact." It looks at how teachers and leaders at Keilor Views Primary School are learning to look for evidence of their impact on students, considering this evidence through their students' eyes and taking on board the lessons for their own learning and practice.

FEATURED LEADERS

This story is based primarily on the reflections of the guiding coalition as a whole, but three leaders are quoted directly:

In 2013, the state government acknowledged principal **Charles Branciforte's** success as an inspirational leader of learning by making him the Victorian Primary Principal of the Year. Charles explains, "Our learning community is what motivates me; it motivates me to provide excellent learning opportunities and to provide the best possible resources for our kids, our staff, and our learning environment. What drives and inspires me is providing opportunities for kids from diverse backgrounds to succeed."

Matthew Borg has been the assistant principal at Keilor Views Primary School since January 2012. He has been a specialist teacher, classroom teacher, and leading teacher. Matt says, "My passion in teaching and learning is to amplify every opportunity for the students we teach; together, we work out what's worth keeping."

Rita Scuteri began her teaching career at Keilor Downs in 2005 and was given the role of literacy coordinator in 2009. At the same time, she was given the opportunity to receive coaching from Sally Slattery and to work with Matt on the new reading assessment system. Rita says, "This was the beginning of the journey for me. It suddenly all became clear! I understood how simple pedagogy and explicit practices could transform the learning that occurred in the classroom." Today, she is helping to drive changes to the school's curriculum and pedagogical practices through coaching and the Visible Learning whole-school improvement strategies.





KEILOR VIEWS PRIMARY SCHOOL'S VISIBLE LEARNING STORY

WHAT WERE THE DESIRED STUDENT OUTCOMES?



While the merger of the two schools provided a significant challenge, it also gave the school community the opportunity to redefine its aspirations for students and to revisit its basic beliefs and practices, evaluating them in light of their contribution to the intended student outcomes:

> This was a unique position to be in. We seized the opportunity to have a deeper look at "what was worth keeping." We reviewed everything from our uniform and logo to what would stand as our school's core values and our core purpose. In order to ensure enduring success for our students, our values and purpose would remain fixed at the same time as we ventured into the process of exploring, trialing, and developing strategies and practices that enable adaptation to a changing world.

(Charles Branciforte)

By 2011, Charles and his team knew that student achievement was not where they wanted it to be. While their data told them that previous initiatives had led to improvements, the situation remained that students were not progressing at the



national average. There were pockets of success, especially in literacy, but there was also considerable variation in student achievement across the school. This is exemplified in Figure 1.2, which shows reading progress in one class, over one year.

Figure 1.2 reflects the situation at an early stage of implementation and demonstrates that the use of a new tracking sheet and newly-devised benchmarking system was already having an impact. It made the growth patterns clearly visible so they could be interpreted, analyzed, compared, and discussed. This sort of clarity is essential if teachers are to understand their impact.



KEILOR VIEWS PRIMARY SCHOOL - READING BENCHMARKING TRACKING SHEET 2012

Figure 1.2 Reading benchmarking data

As a consequence of the classroom observations and walkthroughs that had become a normal part of the school's routines, the leadership team had a good idea of what was going on inside classrooms. This was affirmed through implementation of the Visible Learningplus tools and processes, such as student interviews and focus groups. It was clear to the team that students were often not at the center of teaching and learning and certainly did not have the understandings and strategies they needed to "see themselves as their own teachers." When the student focus group were asked about what they thought a "good learner" looked like or did, they made the following responses, most of which indicated a passive approach to learning:

"Listen to the teacher."

"Doing their work."

"Well-behaved."

"Listens."

"Not distracted by others."

"Always listens to the teacher / attentive to the teacher."

"Tries their hardest."

"Tries their best."

"Starting their work straight away."

"Very little talking / don't talk very much."

"Head down."

"Does neat work."

"Focused."

"Asks questions."

The opportunity to visit successful Visible Learning schools in New Zealand demonstrated what could be: that students with the skills and capabilities of visible learners are able to achieve the kinds of learning outcomes that make for success and fulfilment in later life.

As a consequence of this inquiry, the school decided that its central purpose was to support each student to achieve "at least one year's growth for one year's work." Its



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strategic outcome for students – the outcome through which this purpose would be achieved – was to grow students as visible learners.

This is our aspiration for Visible Learning in our school: All students at Keilor Views Primary School will show a greater than year's growth for one year's input in all learning disciplines and they will exhibit qualities of assessment capable visible learners. The language of learning, assessment, and feedback will be embedded across the school.

(Keilor Views Primary School, Visible Learning Plan, 2013)

WHAT KNOWLEDGE AND SKILLS DID THE TEACHERS AND SCHOOL LEADERS NEED TO SUPPORT THESE OUTCOMES?



Following the trip to New Zealand, Keilor Views Primary School joined with 21 other schools in the region to enrol in the Network Visible Learning threeday series. Visible Learningplus consultant Helen Butler took on the role of critical friend and external coach, guiding the school in its review of learning needs for students, teachers, and leaders. The school formed a guiding coalition, with the leadership team of Charles, Matt, and Rita taking responsibility for planning the whole-school journey and selected teachers invited to focus on classroom practices.

Charles explains the strategic decision-making that went into his selection of the guiding coalition:



Initially, the mindframes and beliefs have to be shared by leadership with a guiding coalition. I appointed a team that shared the vision. This is not easy, as it requires hard conversations with incumbents, potentially not renewing contracts, outside appointments, or a disruption to the "hidden promotion agenda" within a school.

The review affirmed the leadership team's impression that the variability in student outcomes was the consequence of the variability in teacher effectiveness. However, the same connection between student achievement and teacher practice was not being made by many teachers. They were not paying enough attention to what students were saying or doing and they were not using their learning from that kind of inquiry to determine what to do next. A particular area of concern was that many teachers did not understand the importance and function of learning intentions and success criteria as a means of ensuring they and their students truly understood the purpose of learning and could monitor its progress.

> We did a lot of work expelling the "but" culture, for example, "but our kids are poor," "but our kids don't read at home." Teachers who looked more deeply into this notion began the wave of improvement at a classroom level.

(Guiding coalition)

The two statements below reflect the team's understanding that the school's intended outcomes for students needed to be intimately connected to the intended outcomes for teachers and school leaders. The first statement indicates the importance of developing the characteristics of visible learners in educators as well as in students:

We are an inclusive educational setting that prides ourselves on the delivery of a quality curriculum based on the principles of Visible Learning where we are building assessment-capable learners. When teachers see learning through the eyes of their students and students see themselves as their own teachers, we become highly visible learners together.

> (Keilor Views Primary School, 2013 Annual Report to the School Community)
This second statement reflects the school's commitment to the use of data to "Know Thy Impact."

> Our refined data collection and analyses enable strategic intent for individual students and cohorts of students.

> > (Ibid.)

These concepts about Visible Learning, assessment capability, and knowing thy impact informed an analysis of how teachers were doing and the kind and degree of support they would need to improve. Using the analogy of the lifecycle of a butterfly, the school leaders mapped teachers' readiness for the journey ahead (Figure 1.3). Caterpillars were those who were happy with the status quo and resistant to change, while the butterflies were effective practitioners with a deep and abiding interest in improving their own professional knowledge and skills in the interests of student learning.



WHAT NEW ACTIONS DID THE TEACHERS AND SCHOOL LEADERS TRY?



The leaders were careful to share the learning journey with the whole staff, bearing in mind the differences in teachers' readiness for what they had to learn and change.

Whole staff sessions included opportunities to engage with the research – both Hattie's Visible Learning research and that of colleagues such as Shirley Clarke and Helen Timperley. All these researchers share a fundamental commitment to the concept that assessment must primarily be a tool for understanding progress in relation to valued student outcomes, and for using that understanding to make decisions on next steps in classrooms and across the school.

The learning from research provided a theoretical lens through which the school, led by the guiding coalition, looked at their own data and the messages from the Visible Learning research to ask:

> What's worth keeping? How much of what we do and how we do it positively impacts on the learning of our students ... not "what they do" but "what they learn?" ... Our action research into Hattie's work was the stimulus that prompted many significant changes, and through the perspective of a different lens we began to declutter, debug, and disrupt tradition; there were "sacred cows" dying all around us!

> > (Guiding coalition)



A commercial spelling program provides an example of a "sacred cow" that had to go. Regardless of the relevance to purpose or content, the student's spelling level, or the student's ability to comprehend individual words without context, teachers kept asking students at the same time each day to "work from their Smart Words" booklet. For many students, this was a waste of time.

Of course, ending one approach that is comfortable and known leads to the question, "What do we replace it with?" The school needed to identify what might be "better" and more effective. The Visible Learning research provided the principles and framework necessary to construct a new shared pedagogy based on the evidence of what actually works to improve student outcomes:

> Our ongoing evaluation against the principles of Visible Learning forms the basis of our whole-school strategy. It impacts on all we do, from providing an engaging curriculum, to creating high expectations, to closing the feedback loop through formative assessment that promotes individual growth, to maximizing attendance, and to creating a shared vision that raises enthusiasm for learning.

(Guiding coalition)

Teachers have had multiple opportunities to learn through small groups, each supported by a member of the guiding coalition. The guiding coalition deliberately constructed the teams to ensure each included at least one teacher at the "butterfly" stage, who was likely to have a positive influence on others. Teachers also received individual modeling and coaching tailored to their particular needs.

An important strategy for knowing thy impact is to be observed by colleagues and have follow-up learning conversations. Observations and walkthroughs by the leadership team have continued, with a new focus on the practices that the research shows to work, how well those practices are being implemented, and whether in fact they are having the intended impact. Student voice is now built into these observations.

Teachers are also visiting each other's classrooms to see what is happening and provide each other with feedback.

Figure 1.4 is a list that was developed by the Keilor Views guiding coalition to support observations. Based on the research into what works in effective classrooms, it sets out the school's expectations and provides a basis for rigorous conversations based on evidence.



Quantitative data is critical to an understanding of impact at both the classroom level and the whole-school level:

We regularly look at and share student data of achievement and growth as a way of reflecting on the learning and the effectiveness of our professional program. We evaluate and re-evaluate based on what other support needs to be in place.

(Guiding coalition)

Figure 1.5 provides another example of the teacher benchmarking data that is collated each term in order to analyze whole-school achievement in reading. The data is shared with staff to facilitate discussions centered on the key questions, "Where are we going?" "How are we going?" "Where to next?"

Conversations centered on knowing thy impact are often challenging. When we see things through the eyes of our students, we may experience a sense of dissonance – a feeling of disequilibrium as our fundamental beliefs and assumptions are challenged. As Helen Timperley and colleagues (2007) have demonstrated, this can lead us to restructure our former beliefs and assumptions in such a way that we achieve the impact we intended. But it can also result in our shutting down, explaining the findings away in order to protect our personal sense of identity. Genuine two-way learning conversations take time and sensitivity to where individual educators are in their personal improvement journey.

As they implemented Visible Learning in their school, the guiding coalition at Keilor Views was deeply aware of the need to build relationships of trust and challenge:

There had to be transparency in the way we operated and the default position of 'trust' was paramount: Trust in the data you are receiving from the previous teacher from year to year, trust that the intention of "educational walks" into your classroom is to identify growth and learning points in students and to provide you with quality feedback, trust that this coaching model really is reciprocal and will help build your professional capacity, trust in the research, and trust in the instructional knowledge of the school's leadership.

(Guiding coalition)



Figure 1.4 Deservation guide

0

| NTS | Engagement: Focused and interacting with the learning | |
|---------------------|--|--|
| STUDE | Learning: Can articulate how they are learning and how they can show success | |
| PEDAGOGY | Lesson Structure : Mini lesson, independent time, share GANAG | |
| | Learning Intentions and Success Criteria: LI and SC, clear, written, discussed Students engage with it (read it, write it, score to it) At the forefront of the classroom Referred to during and at end of lesson | |
| | Turn and Talk : Used in shared thinking mini lessons Turn and Talk expectations established Use of conversation stems | |
| | Resources : Use of anchor charts eLearning | |
| | Transition : Students know the routine Transition between lesson parts is smooth | |
| | Vocabulary : Explicit and relevant | |
| L | Planning: | |
| E | Ieam alignment Aligned with KVFS curriculum documents | |
| CONTENT | learn alignment Aligned with KVFS curriculum documents Assessment: Linked to learning of a lesson Formative or summative? Conferring? Self-assessment scoring? | |
| CONTENT | learn alignment Aligned with KVFS curriculum documents Assessment: Linked to learning of a lesson Formative or summative? Conferring? Self-assessment scoring? Effective Learner Qualities: Posters displayed Vocabulary used | |
| DNMENT CONTENT | Ieam alignment Aligned with KVFS curriculum documents Assessment: Linked to learning of a lesson Formative or summative? Conferring? Self-assessment scoring? Effective Learner Qualities: Posters displayed Vocabulary used Anchor Charts: Relevant, clear and engaging Charts of need at the forefront Logical display of charts around the room | |
| HYSICAL ENVIRONMENT | Ieam alignment Aligned with KVFS curriculum documents Assessment: Linked to learning of a lesson Formative or summative? Conferring? Self-assessment scoring? Effective Learner Qualities: Posters displayed Vocabulary used Anchor Charts: Relevant, clear and engaging Charts of need at the forefront Logical display of charts around the room Classroom Library: Covers facing out Categories/labels clear 500–1000 books Range of texts Inviting space | |

Term 4

| By student numbers | | | | | | |
|--------------------|-------------|----------|-------------|----------------|--|--|
| Year level | Below level | At level | Above level | Total students | | |
| Prep | 6 | 12 | 40 | 58 | | |
| Year 1 | 9 | 8 | 36 | 53 | | |
| Year 2 | 7 | 11 | 35 | 53 | | |
| Year 3 | 24 | 14 | 18 | 56 | | |
| Year 4 | 25 | 6 | 28 | 59 | | |
| Year 5 | 15 | 14 | 23 | 52 | | |
| Year 6 | 25 | 12 | 37 | 74 | | |
| Total | 444 | 77 | 217 | 405 | | |





| By percentage | | | |
|---------------|-------------|----------|-------------|
| Year level | Below level | At level | Above level |
| Prep | 10% | 21% | 69% |
| Year 1 | 17% | 15% | 68% |
| Year 2 | 13% | 21% | 66% |
| Year 3 | 43% | 25% | 32% |
| Year 4 | 42% | 10% | 47% |
| Year 5 | 29% | 27% | 44% |
| Year 6 | 34% | 16% | 50% |
| Total | 27% | 19% | 54% |



Figure 1.5 2013 – Term 4 reading data analysis Teachers Rita and Katie provide an example of two teachers who built a trusting relationship that meant they could have challenging conversations focused on student outcomes. Both these teachers were early champions of Visible Learning who were quick to see how it would enable the school to achieve its strategic intentions, and keen to adopt its principles in their classrooms. Following expert coaching, they decided to conduct a joint inquiry into mathematics teaching. Working with matched cohorts of students, they administered a linear pre-test and then used the evidence about student strengths and needs to design a sequence of lessons. During implementation, they observed each other and provided each other with feedback, and afterwards they administered a post-test.

Rita and Katie's analysis of what happened during the teaching and learning sequence and its impact went deep. Together, they calculated the effect size for each individual student, for each class, and for the whole cohort. They unpacked where



they had added value and where they had not, and looked at where there were differences. Critically, they asked "why," asking difficult questions about the expectations they had set and the ways in which they had delivered the lessons. By keeping the students and instructional practice at the core of the discussion, they avoided emotion and instead had meaningful conversations that were enriching for them both. They learnt from each other through sharing their evaluation.

WHAT WAS THE IMPACT OF THE CHANGED ACTIONS?



By the end of 2012, the school had completed its first impact cycle. The teacher observations and walkthroughs revealed that teacher pedagogy had become more consistent and was more in line with what is needed for both students and teachers to be assessment-capable.

Changes at the school level, such as opportunities for collaborative planning using shared templates, were supporting the shifts. Visible Learning began to take on a momentum of its own:

I began to get very deliberate about my planning and delivery of learning content. My planning documents were no longer just for compliance; they were a living, breathing reflection of what was happening in my room. The more purposeful I got, the clearer the student voice became about success and achievement.

(Katie Salera, classroom teacher)



Rita reports that feedback conversations centered on knowing thy impact have become a normal part of how things are done at Keilor Views:

As the KVPS Teaching and Learning coach, I am involved in regular debrief meetings with teachers. These discussions allow for the teacher to reflect, ask questions, and plan future goals for their own personal pedagogical practice, as well as to drive whole-school improvement. We look at the impact we have within and across lessons using student scoring, student voice, and assessment data. It is an expectation that as colleagues, we will be involved in this feedback cycle, and it has become a critical part of the coaching process.

While it is not yet embedded practice, some teachers are collating effect-size data and using what it tells them about student learning to plan next steps. For example, **Figure 1.6** shows the data collated by the year 5 teaching team to analyze the effect of a unit on division in mathematics. It compares the students' knowledge of the content and processes related to division over a term. The teachers jointly analyzed the data to make interpretations based on the following questions:

- What does this mean for future planning?
- How can we share practices to make the data show more consistent success across the grades?
- What could be the cause of the differences among individual students?

The teachers also found that this was invaluable data to show the students themselves, as a means of giving feedback about progress and working with them to set future learning goals in mathematics.

The guiding coalition records the following impacts on the outcomes for students:

- Student voice about the learning intention and success of their own learning has become clearer;
- Students are seeing themselves as the key to their success;
- Students now discuss what they are learning, not what they are doing;
- The Student Opinion Survey results for years 5 and 6 improved; and critically
- Achievement data shows accelerated improvement in academic outcomes for the majority of students, with an average effect size above 0.4.

In its first two years, the school exceeded its target for year 5 students. These students, who had been part of the Visible Learning journey through two years of implementation, achieved effect-size gains in NAPLAN of 1.11 for reading and 1.35 for numeracy over two years. The gains were especially impressive for the students who began at "below expected level," with effect sizes ranging from 1.2 to 3.58. **Figure 1.6** provides an insight into this for mathematics, and **Figure 1.7** shows the improved NAPLAN data for reading.

Figure 1.6 Effect size data for

| Effect Size | S | | | |
|----------------------------|---------|---------|----------|-------------|
| Assessment Titles Division | | | Grade: 5 | |
| Grade | Name | Score 1 | Score 2 | Effect size |
| 5G | Student | 0 | 20 | 2.35 |
| 5G | Student | 12 | 20 | 0.94 |
| 5G | Student | 9 | 22 | 1.53 |
| 5G | Student | 24 | 25 | 0.12 |
| 5G | Student | 1 | 22 | 2.47 |
| 5G | Student | 0 | 18 | 2.12 |
| 5G | Student | 26 | 25 | -0.12 |
| 5G | Student | 1 | 22 | 2.47 |
| 5G | Student | 26 | 26 | 0.00 |
| 5G | Student | 1 | 14 | 1.53 |
| 5G | Student | 1 | 23 | 2.59 |
| 5G | Student | 2 | 22 | 2.35 |
| 5G | Student | 5 | 26 | 2.47 |
| 5G | Student | 0 | 20 | 2.35 |
| 5G | Student | 25 | 26 | 0.12 |
| 5G | Student | 19 | 26 | 0.82 |
| 5G | Student | 0 | 21 | 2.47 |
| 5G | Student | 0 | 17 | 2.00 |
| 5H | Student | 7 | 24 | 2.00 |
| 5H | Student | 23 | 26 | 0.35 |
| 5H | Student | 2 | 24 | 2.59 |
| 5H | Student | 26 | 26 | 0.00 |
| 5H | Student | 3 | 24 | 2.47 |
| 5H | Student | 0 | 2 | 0.24 |
| 5H | Student | 0 | 0 | 0.00 |
| 5H | Student | 4 | 24 | 2.35 |
| 5H | Student | 24 | 26 | 0.24 |
| 5H | Student | 0 | 22 | 2.59 |
| 5H | Student | 6 | 25 | 2.23 |
| 5H | Student | 2 | 26 | 2.82 |
| 5H | Student | 26 | 26 | 0.00 |
| 5H | Student | 2 | 24 | 2.59 |
| 5H | Student | 0 | 1 | 0.12 |

Figure 1.6 Effect size data for unit on division (continued)

| Assessment Titles Division assessment | | sessment | Grade: 5 | | |
|---------------------------------------|---------|----------|----------|-------------|--|
| Grade | Name | Score 1 | Score 2 | Effect size | |
| 5H | Student | 0 | 21 | 2.47 | |
| 5H | Student | 1 | 24 | 2.70 | |
| 5H | Student | 6 | 23 | 2.00 | |
| 5H | Student | 3 | 11 | 0.94 | |
| 5H | Student | 0 | 2 | 0.24 | |
| 5H | Student | 26 | 25 | -0.12 | |
| 5S | Student | 1 | 20 | 2.23 | |
| 5S | Student | 25 | 24 | -0.12 | |
| 5S | Student | 23 | 25 | 0.24 | |
| 5S | Student | 1 | 4 | 0.35 | |
| 5S | Student | 0 | 25 | 2.94 | |
| 5S | Student | 0 | 10 | 1.18 | |
| 5S | Student | 0 | 11 | 1.29 | |
| 5S | Student | 4 | 16 | 1.41 | |
| 5S | Student | 0 | 25 | 2.94 | |
| 5S | Student | 1 | 25 | 2.82 | |
| 5S | Student | 2 | 22 | 2.35 | |
| 5S | Student | 26 | 24 | -0.24 | |
| 5S | Student | 6 | 24 | 2.12 | |
| 5S | Student | 1 | 23 | 2.59 | |
| 5S | Student | 1 | 25 | 2.82 | |
| 5S | Student | 3 | 18 | 1.76 | |
| 5S | Student | 2 | 19 | 2.00 | |
| 5S | Student | 1 | 16 | 1.76 | |
| 5S | Student | 1 | 2 | 0.12 | |
| 5S | Student | 1 | 21 | 2.35 | |
| 5S | Student | 2 | 25 | 2.70 | |
| 5S | Student | 22 | 24 | 0.24 | |
| Average | | 7.15 | 20.15 | | |
| STDEV | | 9.79 | 7.22 | | |
| Average STE | DEV | 8.50 | | | |
| Effect size | | 1.53 | | | |



Figure 1.7 NAPLAN reading data for 2013

| Na | ne | 2011 | | 2013 | Effect Size |
|-------------------|-----------|------|--------|------|-------------|
| 1 Stu | dent name | 247 | | 418 | 2.38 |
| 2 Stu | dent name | 247 | | 436 | 2.63 |
| 3 Stu | dent name | 305 | | 445 | 1.94 |
| 4 Stu | dent name | 305 | | 462 | 2.18 |
| 5 Stu | dent name | 305 | | 454 | 2.07 |
| 6 Stu | dent name | 305 | | 462 | 2.18 |
| 7 Stu | dent name | 318 | | 462 | 2.00 |
| 8 Stu | dent name | 341 | | 523 | 2.53 |
| 9 Stu | dent name | 352 | | 471 | 1.65 |
| 10 Stu | dent name | 363 | | 445 | 1.14 |
| 11 Stu | dent name | 363 | | 409 | 0.64 |
| 12 Stu | dent name | 374 | | 479 | 1.46 |
| 13 Stu | dent name | 394 | | 532 | 1.92 |
| 14 Stu | dent name | 394 | | 399 | 0.07 |
| 15 Stu | dent name | 405 | | 389 | -0.22 |
| 16 Stu | dent name | 405 | | 495 | 1.26 |
| 17 Stu | dent name | 405 | | 471 | 0.92 |
| 18 Stu | dent name | 415 | | 436 | 0.29 |
| 19 Stu | dent name | 415 | | 488 | 1.01 |
| 20 Stu | dent name | 415 | | 532 | 1.63 |
| 21 Stu | dent name | 415 | | 542 | 1.76 |
| 22 Stu | dent name | 426 | | 551 | 1.74 |
| 23 Stu | dent name | 426 | | 523 | 1.35 |
| 24 Stu | dent name | 426 | | 427 | 0.01 |
| 25 Stu | dent name | 426 | | 532 | 1.47 |
| 26 Stu | dent name | 436 | | 488 | 0.72 |
| 27 Stu | dent name | 436 | | 532 | 1.33 |
| 28 Stu | dent name | 436 | | 542 | 1.47 |
| 29 Stu | dent name | 436 | | 505 | 0.96 |
| 30 Stu | dent name | 447 | | 523 | 1.06 |
| 31 Stu | dent name | 447 | | 479 | 0.44 |
| 32 Stu | dent name | 447 | | 495 | 0.68 |
| 33 Stu | dent name | 447 | | 532 | 1.18 |
| 34 Stu | dent name | 458 | | 585 | 1.76 |
| 35 Stu | dent name | 481 | | 585 | 1.44 |
| 36 Stu | dent name | 494 | | 532 | 0.53 |
| 37 Stu | dent name | 507 | | 599 | 1.28 |
| 38 Stu | dent name | 507 | | 514 | 0.10 |
| 39 Stu | dent name | 536 | | 551 | 0.21 |
| 40 Stu | dent name | 536 | | 632 | 1.33 |
| 41 Stu | dent name | 536 | | 614 | 1.08 |
| 42 Stu | dent name | 536 | | 505 | -0.43 |
| 43 Stu | dent name | 554 | | 551 | -0.04 |
| 44 Stu | dent name | 573 | | 551 | -0.31 |
| 45 Stu | dent name | 573 | | 562 | -0.15 |
| 46 Stu | dent name | 597 | | 614 | 0.24 |
| Average | 426.35 | | 506.00 | | |
| STDEV | 84.68 | | 59.29 | |] |
| Average STDEV | 71.99 | | | | |
| Group Effect Size | 1.11 | | | | |

The improvements are clearly evident in the way students talk about their learning:

Now when students are asked about the disposition of being determined, they respond with:

"I use the learning intention to focus my learning."

"I have strategies for when I get stuck!"

"I know that learning can be tricky."

(Guiding coalition)





Student ownership of the learning is reflected in the fact that it was the student leadership team who presented the school community with the new *Keilor Views Primary School Effective Learner Qualities Student Handbook*² at an assembly in April 2014.





Today, Keilor Views is regarded as an exemplar school by other school communities who visit on a regular basis to see the shifts that have taken place.

CONTINUING THE CYCLE



Keilor Views understands that the journey is never over. Ongoing inquiry into impact means that there is always something new to learn and improve:

By early 2013, our pedagogical consistency across the school was at its best. The use of learning intentions and success criteria had become a fundamental aspect of all lessons, assessment practices had become more streamlined and purposeful, and school-level planning and curriculum documents had been refined to suit school priorities. However, we could still see the gaps and needed to continue this journey.

During 2013, we collected evidence of where we were at with our Visible Learning priorities. It opened our eyes to a whole new set of goals and targets.

Our follow-up Visible Learning Plan paved the way for future work. 2014 has seen Keilor Views create our own set of 'Effective Learner Qualities' that will support the explicitness of what we do, each and every lesson. Furthermore, I am working with the rest of the leadership team to make the use of effect sizes more commonplace when analyzing assessments, as well as shifting the way we give feedback to students and each other as a learning community.

(Rita Scuteri)

The school has a plan in place that includes specific targets and strategies for achieving those targets. The plan sets out the learning and change that is needed for all groups – students, teachers, leaders, and families/communities. It explains how the learning will be undertaken, how it will be monitored, and how the school will know it has achieved its targets.

There is joy in this journey:

When I am lucky enough to take school tours of prospective families or visitors to our school, I can't wipe the smile off my face. It is only when I step back and observe where we are at that I realize the extent of our journey and all that we have been able to achieve. The key to our success is attributed to many factors, but the standout aspect for me, coming from a teaching and learning perspective, is the goal congruence of the leadership team. Everything we do leads back to "How will it help students learn?" and "What is best for our students?" This is our core business and



this is what we should be spending time on. We have come a long way in recent years and I look forward to seeing what lies ahead!

(Rita Scuteri)

Charles warns that there is danger in becoming comfortable and that it is important to continue to observe, learn, and constantly stretch your boundaries. But that said, he makes the following observation:

> Recently at the Visible Learning Conference, Professor John Hattie stood up in his opening address and said, "I'm looking at you all and thinking 'What if I got this wrong?'" I feel the same way when educators ask to visit and I always end up in the same place – that Keilor Views is a living, breathing example that he didn't.