Teachers Make a Difference
What is the research evidence?

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My journey this morning takes me from identifying the relative power of the teacher, to a reflection on the qualities of excellence among teachers, and dwells mainly on a study undertaken in the classroom of America's very best teachers. My search is driven by the goal of ascertaining the attributes of excellence – because if we can discover the location of these goal posts, if we can understand the height of the bar of the goal posts, we then have the basis for developing appropriate professional development, the basis for teacher education programs to highlight that which truly makes the difference, the basis for extolling that our profession truly does have recognisable excellence which can be identified in defensible ways, and the basis for a renewed focus on the success of our teachers to make the difference.

As has been noted in the USA in recent years, it is by such a focus on the attributes of excellent teachers that more faith is being restored in the public school system – which has taken a major bashing. The typical redress has been to devise so-called "idiot-proof" solutions where the proofing has been to restrain the idiots to tight scripts – tighter curricula specification, prescribed textbooks, bounded structures of classrooms, scripts of the teaching act, and all this underpinned by a structure of accountability. The national testing movements have been introduced to ensure teachers teach the right stuff, concentrate on the right set of processes (those to pass pencil and paper tests), and then use the best set of teaching activities to maximise this narrow form of achievement (i.e., lots of worksheets of mock multiple choice exams).

Identifying that what matters

Instead, we should be asking where the major source of variance in student's achievement lie, and concentrate on enhancing these sources of variance to truly make the difference. There have been many studies over the past few years that have asked this question about wherein lies the variance. Most have been conducted using Hierarchical Linear Modelling, which decomposes the variance of many influences such as what the student brings to the task, the curricula, the policy, the principal, the school climate, the teacher, the various teaching strategies, and the home. Ignoring the interaction effects, which are too often, minor, then the major sources of variance are six-fold.

Students -- which account for about 50% of the variance of achievement. It is what students brings to the table that predicts achievement more than any other variable. The correlation between ability and achievement is high, so it is no surprise that bright students have steeper trajectories of learning than their less bright students. Our role in schools is to improve the trajectory of all these students, and I note the recent PIRLS

[1] Thanks to Richard Jaeger, Lloyd Bond, Tracy Smith, Wanda Baker, and all teachers, students, and researchers involved with the project.

and TIMMS studies which have shown that our trajectory for the not so bright students is one of the flattest in the OECD worlds.

Home -- which accounts for about 5-10% of the variance – considering that the major effects of the home are already accounted for by the attributes of the student. The home effects are more related to the levels of expectation and encouragement, and certainly not a function of the involvement of the parents or caregivers in the management of schools.

Schools -- which account for about 5-10% of the variance. Schools barely make a difference to achievement. The discussion on the attributes of schools – the finances, the school size, the class size, the buildings are important as they must be there in some form for a school to exist, but that is about it. Given NZ schools are well resourced with more uniformity in the minimum standards than most countries, it should be less surprising that in NZ the school effects are probably even lower than in other countries.

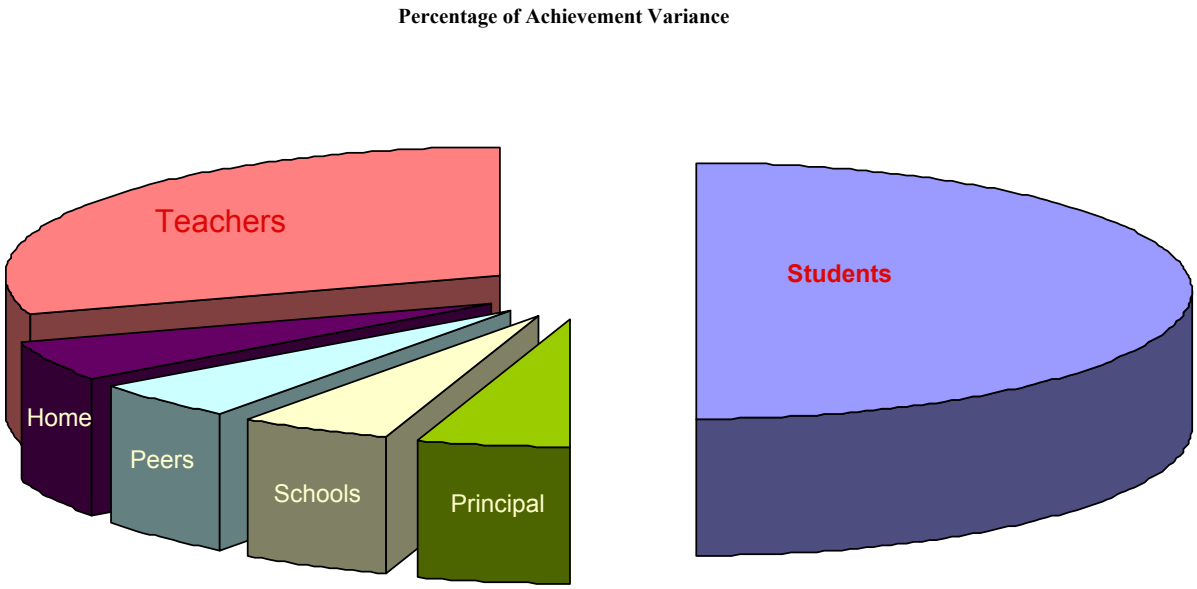
Principals --are already accounted for in the variance attributed to schools and mainly, I would argue, because of their influence on the climate of the school. Principals who create a school with high student responsiveness rather than bureaucratic control (i.e., more like a primary school atmosphere than an Intermediate and unlike so many NZ secondary schools), who create a climate of psychological safety to learn, who create a focus of discussion on student learning have the influence. The effect on learning is trickled through these attributes rather than directly on learning.

Peer effects -- which accounts for about 5-10% of the variance. It does not matter too much who you go to school with, and when students are taken from one school and put in another the influence of peers is minimal (of course, there are exceptions, but they do not make the norm). My colleagues, lead by Ian Wilkinson, completed a major study on peer influences and perhaps we are more surprised by the under utilisation of peers as co-teachers in classrooms, and the dominance of the adult in the room to the diminution of the power of the peer. Certainly peers can have a positive effect on learning, but the discussion is too quickly moving to the negative powers with the recent increase in discussion on bullying (which is too real), and on the manner students create reputations around almost anything other than pride in learning.

Teachers – who account for about 30% of the variance. It is what teachers know, do, and care about which is very powerful in this learning equation.

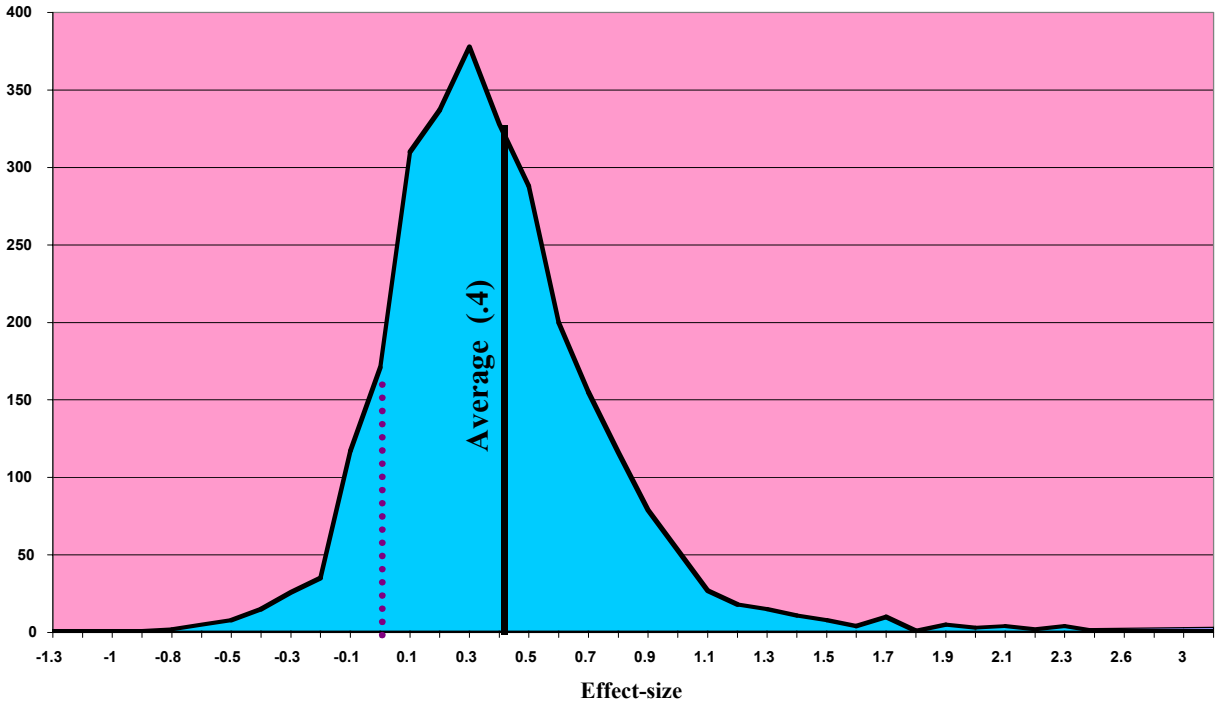
The following pie-chart illustrates the relative influences of the above sources. When I review the initiatives of the previous Ministrys of Education up to a couple of years ago, and when I review the policies in so many New Zealand schools, I note that the focus of discussions are more about the influences of the home, and the structures of schools. We have poured more money into school buildings, school structures, we hear so much about reduced class sizes and new examinations and curricula, we ask parents to help manage schools and thus ignore their major responsibility to help co-educate, and we highlight student problems as if students are the problem whereas it is the role of schools to reduce these problems. Interventions at the structural, home, policy, or school level is like searching for your wallet which you lost in the bushes, under the lamppost because that is where there is light. The answer lies elsewhere – it lies in the person who gently closes the classroom door and performs the teaching act –the person who puts into place the end effects of so

many policies, who interprets these policies, and who is alone with students during their 15,000 hours of schooling.



I therefore suggest that we should focus on the greatest source of variance that can make the difference – the teacher. We need to ensure that this greatest influence is optimised to have powerful and sensationally positive effects on the learner. Teacher can and usually do have positive effects, but they must have exceptional effects. We need to direct attention at higher quality teaching, and higher expectations that students can meet appropriate challenges - and these occur once the classroom door is closed and not by reorganising which or how many students are behind those doors, by promoting different topics for these teachers to teach, or by bringing in more sticks to ensure they are following policy.

In my synthesis of over 500,000 studies of the effects of these above influences on student achievement, it can be shown that almost all things we do in the name of education have a positive effect on achievement (Hattie, 1992, 1993a, 1993b, 1997, 1999). The aim needs to be to identify



those attributes that have a marked and meaningful effect on student learning – not just a positive (greater than zero) effect.

Therefore, the focus is to have a powerful effect on achievement, and this is where excellent teachers come to the fore – as such excellence in teaching is the single most powerful influence on achievement. As can be seen from a sample of the possible influences, the major influence near the top of this chart is in the hands of the teacher. (Although we note some at the bottom, which highlights that it is excellence in teachers that make the greatest differences, not just teachers.)

Influence	*Effect Size*	*Source of Influence*
Feedback	**1.13**	**Teacher**
Students' prior cognitive ability	**1.04**	**Student**
Instructional quality	**1.00**	**Teacher**
Direct instruction	**.82**	**Teacher**
Remediation/feedback	**.65**	**Teacher**
Students' disposition to learn	**.61**	**Student**
Class environment	**.56**	**Teacher**
Challenge of Goals	**.52**	**Teacher**
Peer tutoring	**.50**	**Teacher**
Mastery learning	**.50**	**Teacher**
Parent involvement	**.46**	**Home**
Homework	**.43**	**Teacher**
Teacher Style	**.42**	**Teacher**
Questioning	.41	Teacher
Peer effects	.38	**Peers**
Advance organisers	.37	**Teacher**
Simulation & games	.34	**Teacher**
Computer-assisted instruction	.31	**Teacher**
Testing	.30	**Teacher**
Instructional media	.30	**Teacher**
Aims & policy of the school	.24	**School**
Affective attributes of students	.24	**Student**
Physical attributes of students	.21	**Student**
Programmed instruction	.18	**Teacher**
Ability grouping	.18	**School**
Audio-visual aids	.16	**Teacher**
Individualisation	.14	**Teacher**
Finances/money	.12	**School**
Behavioural objectives	.12	**Teacher**
Team teaching	.06	**Teacher**
Physical attributes (e.g., class size)	-.05	**School**
Television	-.12	**Home**
Retention	-.15	**School**

While teachers have the power – few do damage, some maintain a status quo in growth of student achievement, and many are excellent. We need to identify, esteem, and grow those who have powerful influences on student learning. My quest has been to discover these teachers and study

them. Only when we dependably identify excellence, and study excellence, can be provide the goalposts to aim for. Let us have more studies of excellence.

A major thrust of our work has been to ascertain the differences between expert from experienced and novice teachers. Too much of the current work has been contrasting expert and novice, which while interesting, ignores the confound of experience, too often compares new with older teachers, and does not get to the heart of the matter – which is to allow for experience and then ask what makes the difference between excellent, or accomplished, and experienced. This contrast also assists in NOT making the fallacy of assuming that all non-excellent teachers are poor teachers: certainly not.

The Difference between Expert and Experienced Teachers: The Review

My colleague, Dick Jaeger and I reviewed the literature on the distinctions between expert and experienced, and then sent these findings to the pre-eminent researchers and to expert teachers in the field for comment, changes and input (Hattie & Jaeger, in review). We were particularly interested, not so much in the contrast of expert and experienced, but the expertise that underpinned the expert teachers.

We identified five major dimensions of excellent teachers. Expert teachers

- can identify essential representations of their subject,
- can guide learning through classroom interactions,
- can monitor learning and provide feedback,
- can attend to affective attributes, and
- can influence student outcomes

These five major dimensions lead to 16 prototypic attributes of expertise. Herein lie the differences.

A. Can identify essential representations of their subject(s)

A1. Expert teachers have deeper representations about teaching and learning.

A major attribute of experts is their deep representations about teaching and learning. Experts and experienced teachers do not differ in the amount of knowledge they have about curriculum matters or knowledge about teaching strategies. But experts do differ in how they organize and use this content knowledge. Experts possess knowledge that is more integrated, in that they combine new subject matter content knowledge with prior knowledge; can relate current lesson content to other subjects in the curriculum; and make lessons uniquely their own by changing, combining, and adding to them according to their students' needs and their own goals.

Because of these deeper representations expert teachers:

- can spontaneously relate what is happening to these deeper sets of principles
- can quickly recognize sequences of events occurring in the classroom which in some way affect the learning and teaching of a topic.
- can detect and concentrate more on information that has instructional significance,

- can make better predictions based on their representations about the classroom.
- can identify a greater store of algorithms that students might use when solving a particular problem, and therefore are able to predict and determine what types of errors students might make
- can be much more responsive to students [One of my criticisms of secondary schooling in NZ is the degree to which it is powered by curriculum, assessment, time bells, and other bureaucratic controls and not by responsiveness to students.]

I find it fascinating that experts take more time than experienced teachers to build these representations, have more understanding of the how and why of student success, are more able to reorganize their problem solving in light of ongoing classroom activities, can readily formulate a more extensive range of likely solutions, and are more able to check and test out their hypothesis or strategies.

Expert teachers are VERY context bound, and find it hard to think outside the specifics of their classrooms and students. Generalization is not always their strength.

A2. Expert teachers adopt a problem-solving stance to their work.

The expert teacher more often than the experienced teacher seeks further information, whereas experienced teachers focus more on directly available data; experts are more focused on solving problems with respect to individual students' performance in the class, whereas the experienced teachers generally focus their decision on the entire class.

A key notion here is that of flexibility. Experts are more opportunistic and flexible in their teaching. They take advantage of new information, quickly bringing new interpretations and representations of the problem to light (Shulman, 1987). It is this flexibility, and not merely the knowledge/experience of possible scenarios that made the difference.

A3. Expert teachers can anticipate, plan, and improvise as required by the situation.

Experts are more adept at anticipating problems and then improvising. They tend to spend a greater proportion of their solution time trying to understand the problem to be solved as opposed to trying out different solutions. Experts are more likely to monitor their ongoing solution attempts, checking for accuracy, and updating or elaborating problem representations as new constraints emerge (Larkin, 1983; Voss & Post, 1988). That is, they are greater seekers and users of feedback information about their teaching (Hattie, in review).

My colleague, Helen Timperley is researching how teachers use feedback information from tests in NZ schools to improve their teaching. Too often, they see such feedback as providing information about children, their home backgrounds, and their grasp of curricula – and too rarely do they see such feedback as reflecting on their expertise as teachers.

A4. Expert teachers are better decision-makers and can identify what decisions are important and which are less important decisions.

This improvisation leads to experts being between decision makers. In their study comparing expert and novice teachers, Borko and Livingston (1990) found that, although none of the expert teachers had written lesson plans, all could easily describe mental plans for their lessons. These mental plans typically included a general sequence of lesson components and content, although

they did not include details such as timing, or pacing the exact number of examples and problems. These aspects of instruction were determined during the class session on the basis of student questions and responses. When asked what would be happening in class each day, the experts described plans that explicitly anticipated contingencies that were dependent on student performance. They were skilful in keeping the lesson on track and accomplishing their objectives, while also allowing students' questions and comments as springboards for discussions. Moreover, they achieved a balance between content-centered and student-centered instruction.

B. Guiding Learning through Classroom Interactions

B5 Expert teachers are proficient at creating an optimal classroom climate for learning.

Expert teachers are proficient in creating optimal classroom climates for learning, particularly to increase the probability of feedback occurring (which often involves allowing for, and certainly tolerating, student errors). The build climates where error is welcomed, where student questioning is high, where engagement is the norm, and where students can gain reputations as effective learners.

B6 Expert teachers have a multidimensionally complex perception of classroom situations.

Related to the superior pattern recognition, experts are more able to deal with the multidimensionality of classrooms. Expert teachers are more effective scanners of classroom behavior, make greater references to the language of instruction and learning of students, whereas experienced teachers concentrate more on what the teacher is doing and saying to the class and novices concentrate more on student behavior.

B7 Expert teachers are more context-dependent and have high situation cognition.

When experts classify learning scenarios, the categories they create are more dependent on existing context, surrounding setting, or embedded in particular circumstances. Experts are more dependent on context than experienced teachers.

Housner and Griffey (1985) found that the number of requests for information made by expert and experienced teachers during the time they were planning instruction was about the same, but experts needed to know about the ability, experience, and background of the students they were to teach, and they needed to know about the facility in which they would be teaching.

C. Monitoring Learning and Provide Feedback

C8 Expert teachers are more adept at monitoring student problems and assessing their level of understanding and progress, and they provide much more relevant, useful feedback.

Expert teachers anticipate and prevent disturbances from occurring whereas non-experts tend to correct already existing disturbances. This is because expert teachers have a wider scope of anticipation and more selective information gathering (Cellier et al., 1997, p. 33). Because of their responsiveness to students, experts can detect when students lose interest and are not understanding.

They are better able to filter relevant from irrelevant information, and are able to monitor, understand, and interpret events in more detail and with more insight than experienced teachers. As a consequence they seek and provide more and better **feedback** in light of this monitoring (you may recall from the earlier chart of influences, the most powerful single moderator that enhances achievement is feedback.)

C9 Expert teachers are more adept at developing and testing hypotheses about learning difficulties or instructional strategies.

Experts use this feedback information to develop and test hypotheses about learning, they are adept at evaluating possible strategies while seeking and adding further feedback information to ascertain the effectiveness of their teaching. Expert teachers were more meticulous in their efforts to adequately check and test out their hypotheses or strategies (Swanson et al., 1996c).

C10 Expert teachers are more automatic.

Not only do experts and experienced perform better than novices, they also seem to do so with less effort. They achieve this because their cognitive skills become **automatic** with extensive practice (Chase & Simon, 1973; Chi et al., 1981). Expert and experienced teachers can automate well-learned routines. But automaticity is insufficient by itself to distinguish expert from experienced teachers.

The difference, rather, is that experts develop automaticity so as to free working memory to deal with other more complex characteristics of the situation, whereas experienced non-experts do not optimise the opportunities gained from automaticity. These floaters are not incompetent but are not expert, as they do not use the advantages of the automaticity to put more back into the teaching act.

D. Attending to Affective Attributes

D11 Expert teachers have high respect for students.

The manner used by the teacher to treat the students, respect them as learners and people, and demonstrate care and commitment for them are attributes of expert teachers. By having such respect, they can recognize possible barriers to learning and can seek ways to overcome these barriers.

The picture drawn of experts is one of involvement and caring for the students, a willingness to be receptive to what the students need, not attempting to dominate the situation. Too often experienced teachers tended to create more physical and psychological distance between themselves and their students than do experts.

D12 Expert teachers are passionate about teaching and learning.

Berliner (1988) claimed that experts' sense of responsibility played a part in their feelings as well. Expert teachers, like experts in most domains, show more emotionality about successes and failures in their work.

E. Influencing Student Outcomes

E13 Expert teachers engage students in learning and develop in their students' self-regulation, involvement in mastery learning, enhanced self-efficacy, and self-esteem as learners.

Expert teachers aim for more than achievement goals. They also aim to motivate their students to master rather than perform, they enhance students' self-concept and self-efficacy about learning, they set appropriate challenging tasks, and they aim for both surface and deep outcomes.

E14 Expert teachers provide appropriate challenging tasks and goals for students.

Expert teachers are more likely to set challenging rather than "do your best" goals, they set challenging and not merely time consuming activities, they invite students to engage rather than copy, and they aim to encourage students to share commitment to these challenging goals. 80% of most class time is spent with teachers talking and students listening, whereas expert teachers have students engage in challenging tasks to a greater extent of the time.

E15 Expert teachers have positive influences on students' achievement.

The impact of teachers on students' achievement is often considered the gold standard of expertise. While we consider that other dimensions of outcomes (self-efficacy, self-regulation, willingness to be challenged) are critical outcomes, the effects on achievement and learning are important. The problem is that we have not yet discovered dependable and credible ways to capture these achievement effects and attribute them to teacher effects.

The power of prior learning is one problem, and an obvious method would be to measure the gain between the end and beginning of the school year and attribute this gain to the teacher. This gain is often termed "value added", and while a seductive claim we have yet to find a defensible way to assess value added of teachers – as the differences can be related to prior achievement of students, others influences such as the home, the resources available differentially to students even in the one class (e.g., out-of-class experiences), and the effects of other teachers (especially in intermediate and secondary schools). The use of tests also elevates them to the level of curriculum goals, obscuring the distinction between learning and performing on tests.

While not questioning that tests can be important indicators of student learning, their use has too many problems to dependably, credibly, and fairly assess teacher effectiveness (at this time). An alternative is to evaluate the quality of learning, such as surface and deep learning.

E16 Expert teachers enhance surface and deep learning.

We can make a distinction between surface and deep learning. Surface learning is more about the content (knowing the ideas, and doing what is needed to gain a passing grade), and deep learning more about understanding (relating and extending ideas, and an intention to understand and impose meaning). The claim is that experts are more successful at both types of learning, whereas both experienced and expert teachers are similar in terms of surface learning.

Conclusions to these Dimensions that Distinguish Expert from Experienced Teachers

Before concluding this section, let me comment on one attribute not present – and that is content knowledge. Our argument is that content knowledge is necessary for both experienced and expert teachers, and is thus not a key distinguishing feature. We are not underestimating the importance of content knowledge – it must be present -- but it is more pedagogical content knowledge that is important: that is, the way knowledge is used in teaching situations.

Our claim, from a review of literature and a synthesis of over 500,000 studies, is that expert teachers can be distinguished by these five dimensions, or 16 attributes. This is not aimed to be a checklist, but a profile. We see these attributes as 16 facets of the gem-stone, we see there is no one necessary facet, nor the equal presence of all, but the overlapping of many facets into the whole.

This review sets the scene for an exciting study we participated in to give meaning and flesh to this claims. Along with my colleagues Lloyd Bond, Tracy Smith, and Wanda Baker we had the good fortune of being able to evaluate our model in over 300 classrooms throughout the USA (Bond, Smith, Baker, & Hattie, 2000). The particular study I wish to highlight today is more concerned with a sub sample of these teachers – those who just passed and those who did not pass the National Board for Professional Teaching Standards (NBPTS) tests of excellence of teachers.

The Difference between Expert and Experienced Teachers: The Study

The NBPTS is a system of advanced, voluntary certification for K-12 teachers, based on six site-based portfolio exercises and four on-demand assessment center exercises – and these constitute the most comprehensive assessment of teaching yet devised. Further information on the nature of these tasks is available from the web site (www.nbpts.org) and is the topic of an address next week in Auckland by the Deputy Director of the NBPTS – Garry Galluzzo.

Overhead of Invitation.

We worked with 65 Middle Childhood/Generalists or Early Adolescence/ English Language Arts. teachers selected from four groups.

Experienced teachers

Group 1	17	scored – 1.25 standard deviations from the cut score
Group 2	17	scored between .25 and .75 below the cut score

Expert teachers

Group 3	15	scored between .25 and .75 above the cut score
Group 4	16	scored + 1.25 standard deviations from the cut score

For each of the 16 attributes we devised a series of student tasks, observation schedules, interviews with the teacher and selected students, surveys, and artifacts of the instruction we observed.

INCLUDE TABLE 3.1

Specific examples for each form of assessment include:

Teacher Interviews before and after the lessons observed

Before

- What did you think about as you planned?
- What factors influenced your planning?
- If one of your students had difficultly understanding (specific content from lesson observed), what are some suggestions you could generate for helping him/her to make connections?

After

- What were the most important decisions you made during today's lessons?
- What influenced your lesson planning?
- What expectation do you have for [student's name]
- How does [student's name] approach to learning vary from day to day?
- Would you rate this lesson as successful? Why or why not?
- How else could the lesson have gone?
- What particular things do you want to accomplish as teacher?

Lesson transcripts

- Analyze to determine teachers ability to use classroom data to define and address learning.
- Determine the degree with which questions were used to assess skill, obtain control, or exercise management in the classroom.
- Determine how teachers generate specific modifications to activities that address the changing social and cognitive needs of students.
- Coded independently based on surface and deep learning opportunities, teacher questions and student responses to teacher, to each other, and to concepts.

Classroom observations

- Code students off- and on-task behaviours.
- Student engagement in lesson.
- Class groupings.
- Management vs. instructional time.
- Nature of classroom activity (e.g., development of new content, review, practice, enrichment, assessment, homework, transitional, lesson close, assigning tasks, relationships)
- Code feedback – amount and nature, and from whom to whom.
- Determine teachers ability to identify events occurring simultaneously in the classroom.

Scenarios

- It is five weeks into the school year, and you have just been assigned a new English class, because the previous teacher left abruptly. The previous teacher left a grade book with grades and attendance recorded, student information cards containing demographic information on one side and teacher comments about the student on the other, corrected tests and homework assignments, and the text book. Question: Imagine that you have no more than 4-5 minutes before you meet the class for the first time, what would you plan to do in the first lesson?

Student Interviews before and after the lessons observed

- Tell me what you did during this lesson [Probe for examples[
- What do you think your teacher wanted you to learn today?
- What expectations do you believe the teacher has of you?

Student Surveys

- Fraser's classroom climate questionnaire
- Patterns of Adaptive Learning Survey – measures task and ability goal orientations, academic efficacy, and self-handicapping strategies
- Teacher Dispositions Scales – assessed respect for students, passion for teaching, and learning, etc.

Artifacts from the lesson

- Samples of student work, coded independently based on surface and deep learning/outcomes
- Grade appropriate writing prompts developed by the research team

A pair of trained observers, unaware of the teachers' expertise status, visited the classrooms, collected the class based data, taped the lessons, took a transcript of the lesson, completed observation protocols, took detailed observations of selected students, completed the narrative running record, drew a movement around the room chart, and interviewed teachers and students. Further, surveys and writing prompts were sent for students to complete.

All this material was then reviewed for completeness, and sorted into specific tasks. Twenty-two trained scorers then reviewed each piece of material and coded it along the 16 dimensions, using a four point scale. Levels 1 and 2 described performances that were not characteristics of expert teachers for that dimension, and Levels 3 and 4 described performances that were characteristics of expert teachers.

Benchmarks cases of cut-score tasks were extensively debated to ensure consistency and common understanding. During two days of training, scorers completed practice tasks independently, and discussion ensued around discrepancies. These practice tasks were then re-scored, and any scorer who could not successfully complete the training and practice sessions in a reliable manner was released. Then each scorer evaluated the tasks independently (this took one week). The mean inter-rater reliability of this coding was a respectable .79.

Inter-rate agreement indices for the various dimensions

Dimensions	Inter-rater agreement
Challenge	.87
Classroom climate	.88
Deep representations	.79
Deep understanding and accomplishment	.84
Improvisation	.95
Monitor learning and provide Feedback	.87
Multidimensional perception	.88
Passion	.90
Problem solving	.83
Respect	.81
Sensitivity to context	.62
Test Hypotheses	.37
Use of knowledge	.72

The students' work from the lessons observed was coded on the surface and deep, or SOLO rubric, which assesses surface to deep on a four-point scale.

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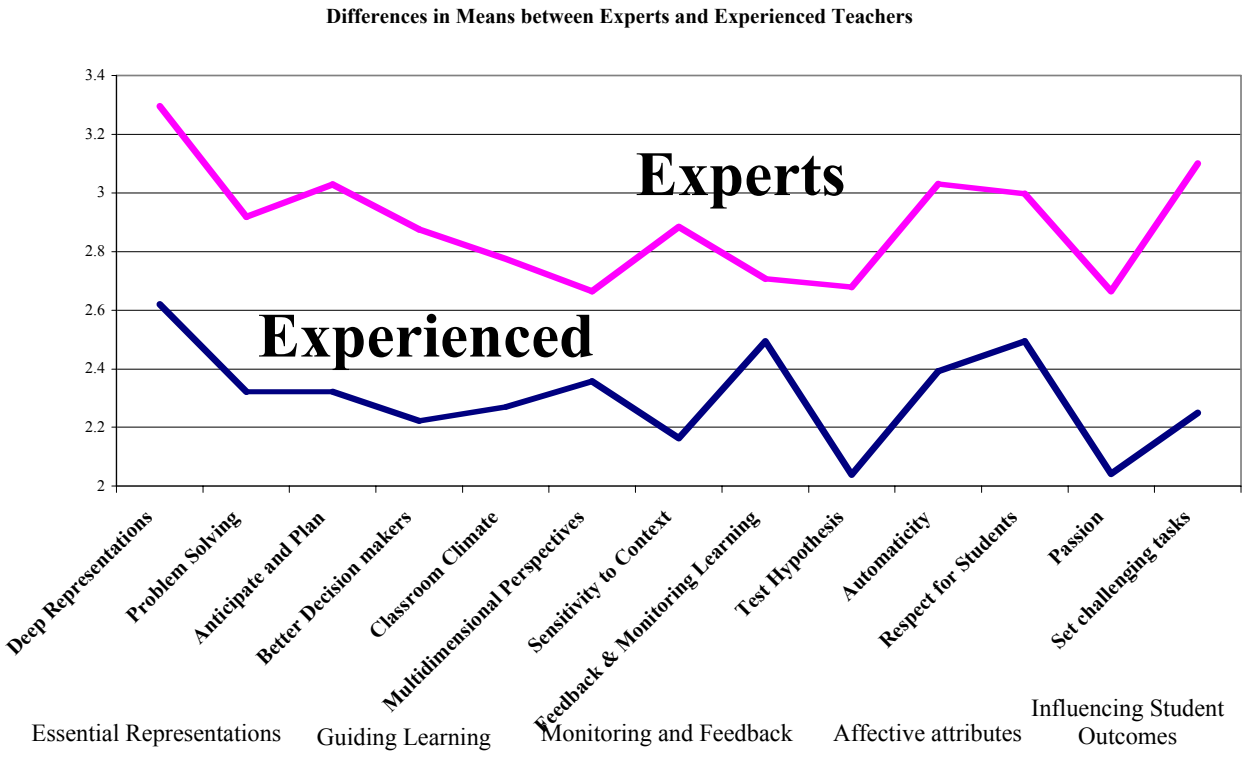
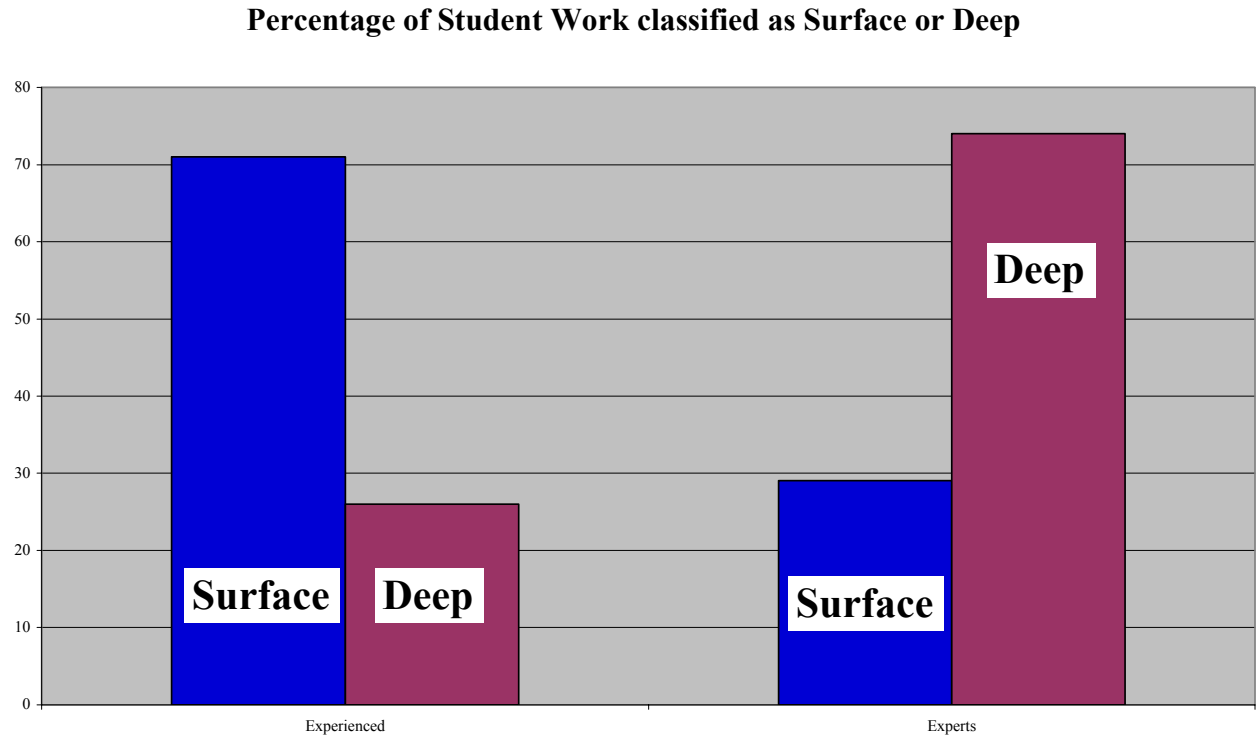
The differences in the means indicate that there are reasonably major differences for most attributes.

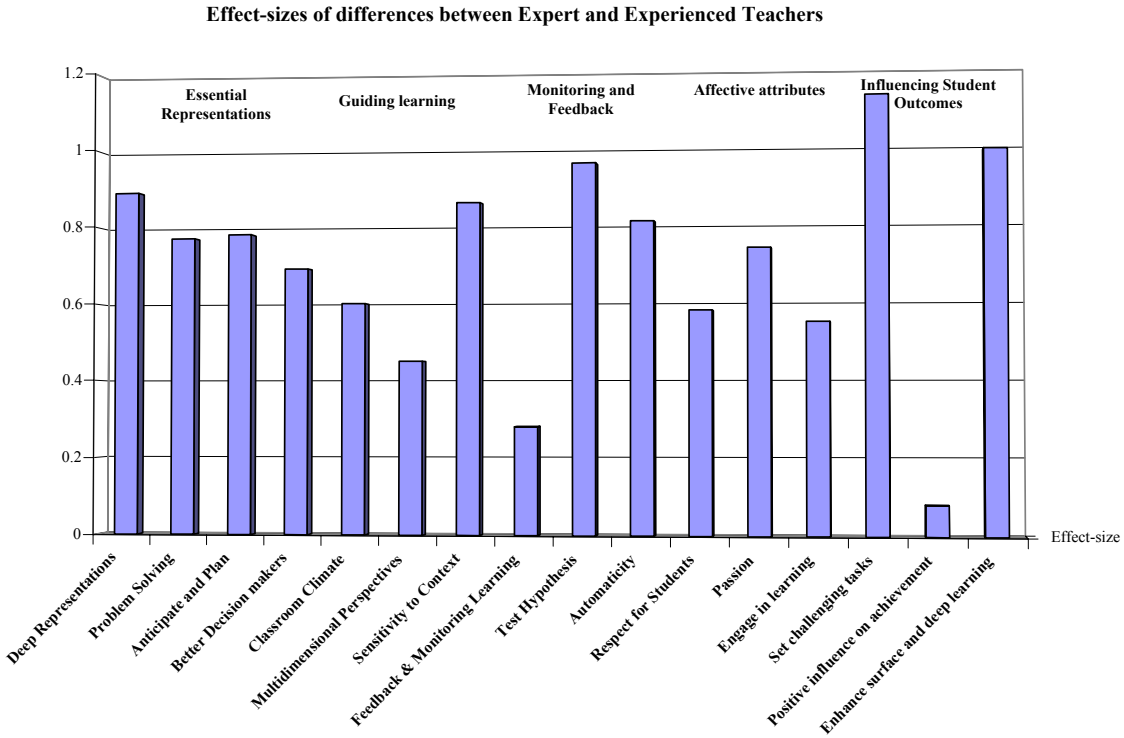


Let me now add the all critical evidence about achievement. Recall, we used the SOLO taxonomy to assess all artifacts student work – and this was undertaken by independent scorers who were not aware which student materials related to which teachers. The differences were profound.

74% of the work samples of students in the classes of expert teachers were judged to reflect a level of undertaking that is Relational or Extended Abstract. This compares with 29% of the work samples of non-certified teachers o classified. This is demonstrating that, at least the NBPTS system, its series of comprehensive performance assessments of teaching proficient, is identifying and certifying teachers that are producing students who differ in profound and important ways from those taught by less proficient teachers. These students appear to exhibit an understanding of the concepts targeted in instruction that is more integrated, more coherent, and at a higher level of abstraction than the understanding achieved by other students.



A more effective method for demonstrating the magnitude or importance of the differences in means is to graph the effect-size (difference in means divided by the pooled standard deviation). The effect-sizes (the of each of the 16 dimensions can be seen in the next Figure.



Given that there are correlations between these 16 dimensions we used discriminant analysis and logistic regression analysis to determine the best sub-set of dimensions that distinguished between experts and experienced teachers (recalling all dimensions do, but here we are interested in the best but minimal sub-set). Three dimensions

- Challenge
- Deep Representation
- Monitoring and Feedback

These three most effectively separated expert from experienced teachers. (Where all 16 dimensions can successfully classify 84% of the teachers correctly, these three alone could classify 80%, so are probably sufficient to highlight the major differences between expert and experienced teachers.

We then looked at only those teachers just above and just below the cut score. The same pattern of effect-size differences and two of three subsets of dimensions made the difference: Challenge and Monitoring and Feedback.

Let me remind you of these three attributes – as these are the greatest differences between expert and experienced teachers, and these in particular, and all 16 dimensions in general, need to become critical goalposts in the professional development of our teachers.

INCLUDE SCORING GUIDE FROM THESE THREE.

Conclusions

Although there have been many lists of what makes an effective teacher, too few have been based on evidence from classrooms, particularly considering the effects on student learning: the learning of affective outcomes, respect and caring, and quality of achievement. Too often the lists have been based on simple analyses of single variables, on small numbers of teachers, and on teachers that have not already been identified as expert based on a rigorous and extensive assessment process. This study commenced from an extensive review of literature and a synthesis of over half a million studies. It then led to a very detailed specification of information that was gathered in classrooms over many days. This information was then independently coded, using some exciting new developments in classroom observation methodology. The results are clear.

Expert teachers do differ from experienced teachers – particularly on the way they represent their classrooms, the degree of challenges that they present to students, and most critically, in the depth of processing that their students attain. Students who are taught by expert teachers exhibit an understanding of the concepts targeted in instruction that is more integrated, more coherent, and at a higher level of abstraction than the understanding achieved by other students.

These studies have demonstrated the need for a focus on dependably identifying, esteeming and encouraging excellent teachers, wherever they may be. We do have excellent teachers in our schools in New Zealand, but we have a reticence to identify such excellence in the fear that the others could be deemed not-excellent. We work on the absurd assumption that all teachers are equal, which is patently not true to any child, any parent, any principal, and known by all teachers. Such an assumption of equality brings all teachers down to the latest press scandal about a teacher, and our profession needs and deserves better than this. Every other profession recognizes and esteems excellence (Queens Counsels, Colleges of Surgeons, Supreme Court Judges) but in

teaching we reward primarily by experience irrespective of excellence, we promote the best out of the classroom, and we have few goalposts to aim for in professional development, instead allowing others to define what latest fad, what new gimmick, what new policy will underline the content of professional development.

Like expertise in teaching, we need a deeper representation of excellence in teachers, a greater challenge and commitment to recognizing excellence, and a coherent, integrated, high level of deep understanding about teacher expertise.

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Dimension	Lesson Transcript & Observation Coding	Teacher Interview	Student Interviews	Pre-Observation Questions	Assignment Log	Student Questionnaires	Student Work Samples	Writing Sample
Use of Knowledge	✓	✓						
Deep Representations		✓		✓				
Problem Solving	✓	✓						
Improvisation		✓		✓				
Challenge of Objectives		✓	✓	✓				
Classroom Climate	✓					✓		
Multidimensional Perception	✓					✓		
Sensitivity to Context	✓	✓						
Monitoring Learning and Providing Feedback	✓	✓						
Test Hypotheses		✓						
Respect for Students	✓	✓		✓		✓		
Passion for Teaching and Learning	✓							
Motivation and Self-Efficacy						✓		
Outcomes of Lessons: Surface and Deep			✓		✓	✓	✓	
Outcomes of Lessons: Achievement							✓	✓