Teachers talk, talk, and talk

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

14. The staffrooms and classrooms are dominated more by dialogue than by monologue about learning.

Classrooms are dominated by teacher talk, and one of the themes of *Visible Learning* is that the proportion of talk to listening needs to change to far less talk and much more listening.

Yair (2000) asked 865 Grades 6–12 students to wear digital wristwatches that were programmed to emit signals eight times a day – leading to 28,193 experiences. They were asked to note 'Where were you at the time of the beep?' and 'What was on your mind?'. Students were engaged with their lessons for only half of the time; this engagement hardly varied relative to their ability or across subjects. Most of the instruction was teacher talk, but such talk produced the lowest engagement. Teachers talk between 70 and 80 per cent of class time, on average. Teachers' talking increases as the year level rises and as the class size decreases! Across the grades, when instruction was challenging, relevant, and academically demanding, then all students had higher engagement and teachers talked less – and the greatest beneficiaries were at-risk students.

Teacher talk also follows a typical pattern: teacher *initiation*, student *response*, and teacher *evaluation* – often referred to as 'IRE' (Meehan, 1979). This three-part exchange leads to teacher-dominated talking, supporting the teacher to continue talking and follow the IRE pattern such that it fosters lower-order cognitive learning outcomes (because so often the initiation involves cues to recall facts and confirmation of declarative knowledge), and limits and discourages students' talking together about their learning (Alexander, 2008; Duschl & Osborne, 2002; Mercer & Littleton, 2007). So little (less than 5 per cent) of class time is devoted to group discussions, or to teacher–student interactions involving the meaningful discussion of ideas (Newton, Driver, & Osborne, 1999), and so often the teacher is off on the next part of his or her monologue before students have responded to the first. Teachers can involve all students in IRE, but it is usually through a choral answer, and many students learn to 'play the game' and thus are physically present, passively engaged, but psychologically absent. Teachers love to talk – to clarify, summarize, reflect, share personal experiences, explain, correct, repeat, praise. About 5–10 per cent of teacher talk triggers more conversation or dialogue engaging the student. Please note that this is not how teachers *perceive* what happens in their classrooms, but what *is* happening – as shown by video analysis, class observations, and event sampling.

This dominance of teacher talk leads to particular relationships being developed in classrooms – mainly aimed at facilitating teacher talk and controlling the transmission of knowledge: 'Keep quiet, behave, listen, and then react to my factual closed questions when I ask you.' 'Interaction' means: 'Tell me what I have just said so that I can check that you were listening, and then I can continue talking.' This imbalance needs redressing and teachers may well get independent analyses of their classrooms to check the proportions of the lesson during which they talk to students. Of course, some didactic imparting of

information and ideas is necessary – but in too many classrooms there needs to be less teacher-dominated talk, and more student talking and involvement.

Hardman, Smith, and Wall (2003) have contributed much to the resurgence of interest in classroom observation. They developed handheld devices to continuously record classroom interactions and then used sophisticated software to provide real-time analyses. In one of their studies, for example, based on 35 literacy and 37 numeracy classes in the UK, 60 per cent of each lesson was a whole-class session, with mostly closed questions (69 per hour), evaluation (65 per hour), explaining (50 per hour), and direction (39 per hour); 15 per cent of teachers never asked an open question. As regards students, they most commonly answered a teacher question (118 per hour), gave a choral response (13 per hour), or gave a presentation (13 per hour), and only in nine times per hour did they provide a spontaneous contribution. When highly effective and other teachers were compared, the former had more general class talk and less directive talk.

The more important task is for teachers to listen. Parker (2006) considered listening to involve humility (realizing that we may miss something), caution (not giving voice to every thought that comes into our minds), and reciprocity (understanding the student's perspective). Listening needs dialogue – which involves students and teachers joining together in addressing questions or issues of common concern, considering and evaluating differing ways of addressing and learning about these issues, exchanging and appreciating each other's views, and collectively resolving the issues. Listening requires not only showing respect for others' views and evaluating the students' views (because not all are worthwhile or necessarily leading in the best directions), but also allows for sharing genuine depth of thinking and processing in our questioning, and permitting the dialogue so necessary if we are to engage students successfully in learning. The listening can inform teachers (and other students) about what the student brings to the learning, what strategies and prior achievement he or she is using, and the nature and extent of the gap between where he or she is and where he or she needs to be, and provides opportunities to use the student's 'voice' to encourage the most effective ways of teaching him or her new or more effective strategies and knowledge to better attain the intentions of the lesson.

One of the difficulties of so much teacher talk is that it demonstrates to students that teachers are the owners of subject content, and controllers of the pacing and sequencing of learning, and it reduces the opportunities for students to impose their own prior achievement, understanding, sequencing, and questions. Burns and Myhill (2004) analysed 54 lessons from Years 2–6 UK students (after the introduction of national standard assessment tests, or 'SATs') and reported that, 84 per cent of the time, teachers made statements or asked questions. There was far more telling than listening, far more teachers than students in action, and the most prominent engagement was compliance and responsiveness to teacher demands. For most of the classes that were observed, interactions and questions were factual or giving directions. English (2002) reported an average of three student utterances in a literacy hour, and most interactions were like table tennis: back and forth from teacher to student to teacher. Students seem to come to school to watch teachers working!

Note that if we invite teachers to 'shut up', the message is not then about allowing the students to engage in busy work (or worse, to complete worksheets); rather, it is about productive talking about learning.

Bakhtin (1981) made a very useful distinction between 'monologic' and 'dialogic' talk. The monologic teacher is largely concerned with the transmission of knowledge, and

remains firmly in charge of his or her goal, uses a recitation/response/response form of discussion with students, and checks that at least some of the students have acquired at least surface knowledge. The aim is to ensure that students, as far as possible, gain the knowledge desired by the teacher. In contrast, dialogic talk aims to promote communication with and between students, to demonstrate the value of the views of the students, and to help participants to share and build meaning collaboratively. In the former, whole-class talking by the teacher dominates and questioning usually invokes no more than three words – or less than 5 seconds' response by students 70 per cent of the time (Hardman et al., 2003). Students learn that the teacher's voice and views dominate, and this is the model of knowing that is communicated and realized by those who succeed in this model. Mercer and Littleton (2007) have documented these classrooms, which are dominated by recapitulations (reviewing what has gone before), elicitation (asking question to stimulate recall), repetition (repeating student answers), reformulation (paraphrasing a student's response to improve it for the rest of the class), and exhortation (encouraging students to think or remember what has been said earlier).

Consider what we do (as do children) in regular conversation: we have conversations with others that are negotiated, participatory, and meaning-making – both one-on-one and with peers – and there is often as much listening as there is talking. But in the class, talk is typically controlled by the teacher, who provides explanations, corrections, and directives; the student responses are brief, reactionary, and certainly rarely conversational. Mistakes are so often seen as embarrassing, and teachers strive to minimize public errors to avoid the child 'losing face'. Teachers therefore lose major opportunities for exploring these errors and misconceptions collectively.

Alexander (2008) has documented the dialogic classroom, which has a powerful effect on student involvement and learning, noting how teachers begin to probe children's thinking and understanding, in which students ask questions (more than teachers ask them), and in which students comment on ideas. The essential features are defined as: collective (doing learning tasks together); reciprocal (listening to each other, sharing ideas, considering alternatives); supportive (exploring ideas with no fear of negative repercussion from making errors); cumulative (building on own and others' ideas); and purposeful (teachers plan with clear learning intentions and success criteria in mind). Dialogue is seen as an essential tool for learning, student involvement is what happens during and not 'at the end' of an exchange, and teachers can learn so much about their effect on student learning by listening to students thinking aloud. This involves the effective use of talk for learning, in contrast to the ineffective talk for teaching that features in many classrooms.

Questions

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

15. The classrooms are dominated more by student than teacher questions.

Teachers ask so many questions. Brualdi (1998) counted 200–300 per day, and the majority of these were low-level cognitive questions: 60 per cent recall facts; 20 per cent are procedural. For teachers, questions are often the glue to the flow of the lesson, and they see questions as enabling, keeping students active in the lesson, arousing interest, modelling enquiry, and confirming for the teacher that 'most' of the students are keeping up. But the majority of questions are about 'the facts, just give me the facts', and the students all know that the teacher knows the answer. Teachers are most able to choose students who do or do not know the answers and use this decision about whom to ask to maintain their flow of the lesson. Students are given, on average, one second or less to think, consider their ideas, and respond (Cazden, 2001); the brighter students are given longer to respond than the less able, and thus those students who most need the wait time are least likely to get it. No wonder there are a lot of students in every class hoping not to be asked these questions! More effort needs to be given to framing questions that are worth asking – ones that open the dialogue in the classroom so that teachers can 'hear' students' suggested strategies.

Rich Mayer and colleagues (Mayer, 2004, 2009; Mayer et al., 2009) have an interest in using questioning in classes to promote active learning such that students attend to relevant material, mentally organize the selected material, and integrate the material with prior knowledge so that they advance in their knowing and understanding. Mayer et al. noted the positive effects from asking students to answer adjunct questions while reading a text, asking questions at the end rather than beginning of the learning, teaching students how to ask questions during learning, asking students to take a practice test, and encouraging students to explain aloud to themselves as they read a text. They conducted a series of studies on the effect of immediate response to feedback – in their case, in large lecture halls. A personal response, or 'clicker', involves teachers asking questions and asking students to vote using handheld clickers; in a matter of seconds, a graph is shown indicating the correct answer and the percentage of students voting for each alternative. The effect size from adjunct questions was 0.40, which shows that there can be important gains from only a small change to the typical lecture. Mayer argued that this gain (from immediate feedback) was likely to be due to students paying more attention to the lecture in anticipation of having to answer questions, and mentally organizing and interpreting learning knowledge in order to answer questions. He also argued that students were developing meta-cognitive skills for gauging how well they understood the lecture material and for how to answer exam-like questions in the future. He suggested that it helped students to adjust their study habits to be in tune with the teachers' likely exam questions, and increased their attendance and thus exposure to ideas. It may be that another important reason is involved: the teacher teaches differently, because he or she needs to think before the class about the optimal questions for the intentions of the lesson, think about common mistakes that students are likely to make, and thus become more responsive to gaining feedback about his or her own teaching.

Teachers need to talk, listen, and do – as do students

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

16. There is a balance between teachers talking, listening, and doing; there is a similar balance between students talking, listening, and doing.

It may be that monologue and dialogue forms of discourse are not opposites; the art lies in knowing when to engage in monologue and when in dialogue. What are the optimal proportions? It is difficult to find evidence to defend the optimal balance and the best example is probably the Paideia research.

The Paideia program is one of the more successful programs with which I have been involved (as both user and evaluator). Paideia aims to move the attention of teachers more towards process and skills than only content, and involves a balance of three modes of teaching and learning: didactic classes in which students learn concepts and curriculum content; coaching labs in which students practise and master skills introduced in the didactic classes; and seminars in which Socratic-type questioning leads students to question, listen, and think critically, and coherently communicate their ideas along with other group members (Hattie et al., 1998; Roberts & Billings, 1999).

The program was introduced into 91 schools in one US school district. Schools that had most implemented Paideia had a more positive school and class climate (for example, $d = 0.94$ for satisfaction and 0.70 for lack of friction between those schools that fully implemented the program or had a high level of implementation compared to those with no or little implementation); students in these schools believed that they were more independent ($d = 0.81$) and task-oriented ($d = 0.67$), and there were enhancements in rule consistency ($d = 0.36$) and rule clarity ($d = 0.36$). Students in Paideia classes had lower levels of self-handicapping and lower use of social comparisons, and they had greater respect for others' ideas even if they disagreed. They were more likely to work as a team, to listen to the ideas and opinions of others, and to take responsibility for their own actions. Most importantly, there were positive effects on reading and maths outcomes over the five years of implementation, as show in Figure 5.1.

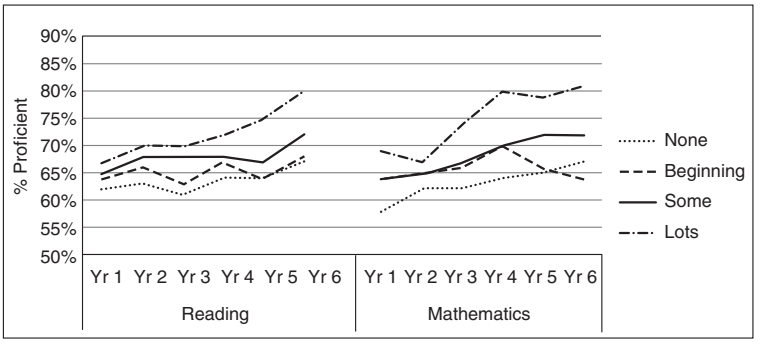

FIGURE 5.1 Percentage proficiency in reading and maths in relation to the degree of implementing Paideia across five years

Proportions of surface, deep, and conceptual understanding

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

17. Teachers and students are aware of the balance of surface, deep, and conceptual understanding involved in the lesson intentions.

There are three major levels of achievement outcome that teachers need to consider when they prepare, teach, and evaluate their lessons: the surface knowledge needed to understand the concepts; the deeper understandings of how ideas relate to each other and extend to other understandings; and the conceptual thinking that allows surface and deep knowledge to turn into conjectures and concepts upon which to build new surface and deep understandings. These distinctions are often not clear-cut: such knowledge-building includes thinking of alternatives, thinking of criticisms, proposing experimental tests, deriving one object from another, proposing a problem, proposing a solution, and criticizing the solution (Bereiter, 2002).

So much of classroom instruction relates to the surface and the query here is whether this is the desired emphasis. It is more likely that there needs to be a major shift from an over-reliance on surface information and a reduced emphasis that the goal of education is deep understanding or development of thinking skills, towards a balance of surface and deep learning, leading to students more successfully constructing defensible theories of knowing and reality (the conceptual level). There is no place for cramming mills, for test-driven surface instruction, for enquiry schools pushing thinking skill training – for Dickens' Mr Gradgrind, the tyrant teacher in *Hard Times* described as 'a cannon loaded to the muzzle with facts'. Instead, what is needed is a balance between surface knowledge and deeper processes, leading to conceptual understanding. The choice of the classroom instruction and learning activities to maximize these outcomes are hallmarks of quality teaching (Kennedy, 2010).

Students, however, are quite insightful of what teachers really value as they listen to their questions in class, and check their assignments and exams (both the nature of them and the comments on them), and they know from many encounters that the real value in too many classrooms is surface level: 'Just give me the facts, ma'am.' Hence, cramming, knowing lots, and adopting a surface approach to understanding both how and what they should learn is strategic, and thus successful. My recommendation is for teachers to spend more time working through their notions of what success looks like in terms of the balance of surface and deep *before* they teach the lesson; they must make these proportions clear to the students, use a great deal of formative evaluation to understand how the students are learning at both surface and deep levels, and ensure that the assessments and the questions asked by students (and teachers) in the class are appropriate to the desired balance of surface, deep, and conceptual learning.

Other goals of learning can be fluency, efficiency, and reinvestment in learning. Often, to attain deep and conceptual knowledge, we need to over-learn some of the surface information. This then allows us to use our cognitive resources to attend to the relationships between ideas and other deeper understandings. As we become more fluent, we are less likely to engage in mere trial and error in learning, and more likely to build more strategic

understanding to apply in these situations of 'not knowing'. The novice aims to produce data, whereas the expert is more interested in data interpretations; the data gathering precedes the data interpretation. These claims are the case for both the learner and for the teacher. With fluency and thus enhanced efficiency, we are more likely to reinvest in learning more about the surface and deeper understandings.

The role of peers and social support

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

18. Teachers and students use the power of peers positively to progress learning.

While much of learning and testing in our schools has been aimed at the individual, more often we learn and live with each other. The effects of peers on learning is high ($d = 0.52$) and can be much higher indeed if some of the negative influences of peers is mitigated. Peers can influence learning by helping, tutoring, providing friendship, giving feedback, and making class and school a place to which students want to come each day (Wilkinson, Parr, Fung, Hattie, & Townsend 2002). Peers can assist in providing social comparisons, emotional support, social facilitation, cognitive restructuring, and rehearsal or deliberate practice. They can provide caring, support, and help, and can ease conflict resolution, and this can all lead to more learning opportunities, enhancing academic achievement (Anderman & Anderman, 1999). Students, particularly during early adolescence, tend to want to have a reputation among their peers and one aim should be to make this reputation about success in learning academic topics (see Carroll et al., 2009).

For many students, school can be a lonely place, and low classroom acceptance by peers can be linked with subsequent disengagement and lowered achievement. There needs to be a sense of belonging and this can come from peers. Certainly, when a student has friends at school, it is a different and better place. In the studies looking at what happens to students when they move schools, the single greatest predictor of subsequent success is whether the students makes a friend in the first month (Galton et al., 2000; Pratt and George, 2005). It is incumbent therefore upon schools to attend to student friendships, to ensure that the class makes newcomers welcomed, and, at minimum, to ensure that all students have a sense of belonging.

Cooperative learning is certainly a powerful intervention. It exceeds its alternatives: for cooperative learning versus heterogeneous classes, $d = 0.41$; for cooperative versus individualistic learning, $d = 0.59$; for cooperative versus competitive learning, $d = 0.54$; and for competitive versus individualistic learning, $d = 0.24$. Both cooperative and competitive (particularly when the competitive element relates to attaining personal bests and personal levels of attainment rather than competition between students for a higher ranking) are more effective than individualistic methods – pointing again to the power of peers in the learning equation. Cooperative learning is most powerful after the students have acquired sufficient surface knowledge to then be involved in discussion and learning with their peers – usually in some structured manner. It is then most useful for learning concepts, verbal

problem-solving, categorizing, spatial problem-solving, retention and memory, and guessing–judging–predicting. As Roseth, Fang, Johnson, & Johnson (2006: 7) concluded: '. . . if you want to increase student academic achievement, give each student a friend.'

Another form of peer learning is through tutoring (d = 0.54) and the effects are as great on the tutor as on the person being tutored. This should not be surprising given the adage of this book – that is, that students learn much when they become their own teachers (and teachers of others). If the aim is to teach students self-regulation and control over their own learning, then they must move from being students to being teachers of themselves. And most of us appreciate that we learn a tremendous amount when we are asked to then teach something, rather than sitting being talked at by others. While peer tutoring is useful for getting older or more able students to tutor younger or less able students, there are still major effects from peer tutoring in a cooperative learning situation, particularly when it involves teachers helping student tutors to set mastery goals, monitor performance, evaluate effect, and provide feedback. Thus when students become teachers of others, they learn as much as those they are teaching.

Know the kids and let go of the labels

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

19. In each class and across the school, labelling of students is rare.

We seem to love labels – labels such as 'mentally disabled', 'struggling', 'dyslexic', 'ADHD' (attention deficit hyperactivity disorder), 'autistic', 'learning styles' (for example, kinesthetic learning), 'OCD' (obsessive–compulsive disorder), and so on. The point of the argument is not to claim that these are not real (they are), but to note how quick we are to medicalize or label (sometimes then to accrue funding) and then explain why we cannot teach or the labelled cannot learn (Hattie et al., 1996). Every time a parent or colleague says that he (they usually are boys) has x or y, then this is the starting point for teaching, not the barrier or reason not to teach.

One of the more fruitless pursuits is labelling students with 'learning styles'. This modern fad for learning styles, not to be confused with the more worthwhile notion of multiple learning strategies, assumes that different students have differing preferences for particular ways of learning (Pashler, McDaniel, Rohrer, & Bjork, 2009; Riener & Willingham, 2010). Often, the claim is that when teaching is aligned with the preferred or dominant learning style (for example, auditory, visual, tactile, or kinesthetic), then achievement is enhanced. While there can be many advantages by teaching content using many different methods (visual, spoken, movement), this must not be confused with thinking that students have differential strengths in thinking in these styles.

There is much evidence that students are assigned quite different styles by different teachers (Holt, Denny, Capps, & DeVore, 2005), and the common measures are notoriously unreliable and not predictive of much at all. The most extensive review, by Coffield, Moseley, Ecclestone, and Hall (2004) found few studies that met their minimum

acceptability criteria, and the authors provided many criticisms of the field, such as too much overstatement, poor items and assessments, low validity and negligible effect on practice, and too much of the advocacy being aimed at commercial ends. Learning strategies? Yes. Enjoying learning? Yes. Learning styles? No. More importantly, teachers who speak of 'learning styles' are labelling students in terms of how they (the teachers) think the students think, and thus overlooking the fact that students can change, can learn new ways of thinking, and can meet challenges in learning.

Perhaps the most simplistic labelling is to assume that there are but two ways of learning: a male way and a female way! The difference in effect sizes between boys and girls is small (d = 0.15, and this favours boys) – more specifically, for language, d = 0.03, for maths, 0.04, for science, 0.07, for affective outcomes, 0.04, for motivation –0.03, but there are much greater differences in motor activities, in which d = 0.42. Janet Hyde (2005) has completed the largest study, summarizing 124 meta-analyses and many millions of students on this topic; she speaks about the *gender similarity* hypothesis. Across her four major outcomes, the differences slightly favoured girls in communication (d = –0.17), and boys in achievement (d = 0.03), and social and personality (d = 0.20) outcomes. In relation to the last of these, boys are more aggressive (d = 0.40), are more likely to be involved in helping others (d = 0.30) and in negotiating (d = 0.09), but the greatest differences relate to sexuality (for arousal, d = 0.30; for masturbation, d = 0.95). Girls were much higher on attention (d = –0.23), effortful control (d = –1.10), and inhibitory control (d = –0.42) – that is, girls display a greater ability to manage and regulate their attention and inhibit their impulses: skills that are most useful in classrooms.

We need to be careful about generalization across countries, because these studies are mainly Western or more developed countries (in which research studies are more plenti-

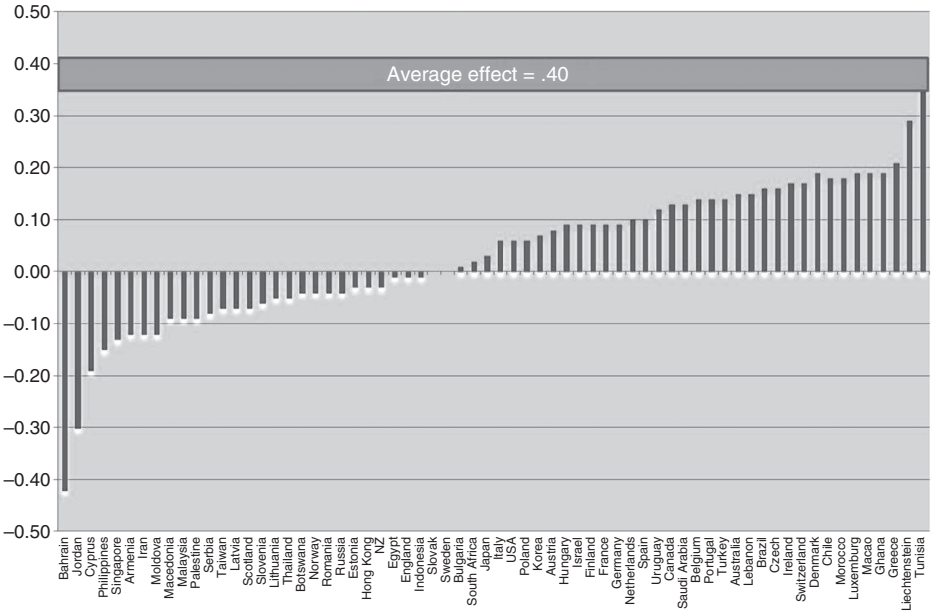

FIGURE 5.2 Effect sizes between boys and girls across 66 countries (positive effects favour boys; negative effects favour girls)

ful). When I calculate the effect sizes from the various international studies (TIMSS, PISA) across 66 countries, then there is marked variability – with major differences favouring girls in Bahrain and Jordan, and favouring boys in Tunisia and Liechtenstein.

I could not find gender differences when students enter school (in relation to the School Entry Assessment Kit: for 'Concepts about print', $d = -0.03$; for 'Tell me', $d = -0.12$; and for 'Number', $d = -0.00$), in the New Zealand National Monitoring study (for Year 4, $d = -0.05$; for Year 8, $d = -0.10$), and in national assessment data (in relation to asTTle: for reading, $d = -0.16$; for maths, $d = 0.02$; for writing, a much larger $d = -0.44$ favouring girls) (Hattie, 2010a). Nor was there a difference in the pass rates relating to the nature of the high-school exams: for teacher internal exams, $d = -0.07$; for external assessment exams, $d = -0.05$.

It is simple: the variability among boys and among girls is very large – and much, much greater than the average difference between boys and girls. The differences in how students learn is not related to their boy or girl attributes, and while the labelling of 'boy' and 'girl' learning may appease some, it is not based on actual differences.

Similarly, the pursuit of multiple intelligences has limited return. Realizing that students have different abilities, talents, and interests is obviously critical, but there is no need for a rhetoric of multiple intelligences that goes beyond this well-argued, well-known, and almost simplistic (but powerful) message. Further, in our society there is, in general, a hierarchy among Gardner's multiple intelligences: we favour verbal and numeracy abilities over those that are kinesthetic, musical, sporting, etc. I say 'in general', because there are obvious cases in which there are exceptions (sports people, musicians), but 'in general' to be successful in these endeavours is much harder given the low probability of success. Instead, there are many daily needs and vocations that involve verbal or numerical abilities. More and more, we need competencies in evaluating and synthesizing, and high levels of people intelligence – which involves respect for self and respect for others. It is not merely high skills and knowledge that is needed, but also the skills to think about, evaluate, and communicate our thinking (see Fletcher & Hattie, 2011) – and all students need these 'intelligences'. Gardner (2009) has cautioned about misleading implications, claiming there were two main implications from his arguments: pay attention to individual differences, and decide on what is really important in your discipline; and teach it and convey it in several different ways. This reiterates the claims above that it is desirable to have *multiple ways of teaching* and that there is no need to classify students into different 'intelligences'.

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

20. Teachers have high expectations for all students, and constantly seek evidence to check and enhance these expectations. The aim of the school is to help all students to exceed their potential.

Another form of labelling comes from *teacher expectations*. We have known for a long time about the effects that expectations play in classrooms ($d = 0.43$). The question, however, is not 'Do teachers have expectations?', but: 'Do they have false and misleading expectations that lead to decrements in learning or learning gains – and for which students?' Better still: 'Do teachers have high expectations based on what students know and can do?'

There has been a long search to identify which particular students are differentially affected by teacher expectations – by their gender, prior conduct, social class, physical attractiveness, previously taught siblings, name stereotypes, the track in which they are placed, and ethnicity. These differential expectations, however, are not the major issue. Instead, if teachers have high expectations, they tend to have them for all students; similarly, if they have low expectations, they tend to have them for all students. Rubie-Davis (2007; Rubie-Davies, Hattie, & Hamilton, 2006) asked teachers (after about a month of working with the students) to predict where the students would end up at the end of the year in maths, reading, and physical education – and when the students were tested at the end of the year, the teachers proved to have been reasonably accurate. The problem is that even though some teachers set targets below where the students began the year, some set targets with little improvement, and some set targets reasonably randomly – the students met whatever expectations the teachers had.

The role of expectations is a good example of how the mind frames of the teachers are important. There are differences in achievement gains relating to whether teachers *believe* that achievement is difficult to change because it is fixed and innate, compared to teachers who believe that achievement is changeable (the latter leading to higher gains). Teachers need to stop overemphasizing ability, and start to emphasize increased effort and progress (steep learning curves are the right of all students regardless of where they start); they need to stop seeking evidence to confirm their prior expectations, but rather seek evidence to surprise them and find ways in which to raise the achievement of all. School leaders need to stop creating schools that attempt to lock in prior achievement and experiences (such as by using tracking), and instead be evidence-informed about the talents and growth of all students by welcoming diversity and being accountable for all (regardless of the teachers' and schools' expectations). 'Be prepared to be surprised' seems to be an important mantra to use to avoid negative expectation effects. If teachers and schools are going to have expectations (and indeed we *do* have them), then they must make the expectations challenging, appropriate, and checkable, such that all students are achieving what is deemed valuable.

Weinstein (2002) has shown that students know that they are treated in different ways in the classroom due to expectations held by teachers, and are reasonably accurate in informing on when teachers favour some students over others with higher expectations. She also demonstrated that many institutional practices (such as tracking or streaming) can lead to beliefs that preclude many opportunities to learn:

> Expectancy processes do not reside solely 'in the minds of teachers' but instead are built into the very fabric of our institutions and our society.
>
> (Weinstein, 2002: 290)

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

21. Students have high expectations relative to their current learning for themselves.

An additional 'label' relates to the potentially negative effects of *students' setting their own expectations* too low or too high, and then not having sufficiently high levels of confidence that they can exceed these expectations. Students have reasonably accurate understandings of their levels of achievement, but less about their rate of progress. On the one hand, this shows a remarkably high level of predictability about achievement in the classroom; on the other hand, these expectations may be set at a 'safe' level that they know they can reach without too much effort, and thus that they are failing to challenge themselves to reach higher.

In *Visible Learning*, the top-ranked effect relating to student expectations was self-reported grades ($d = 1.44$). Imagine that I tell my class that they are about to have a test relating to the learning intentions of the past lessons – but before the students sit the test, I ask them to predict their score or grade. They are very good at making such predictions. This should make us pause and ask why we ever set tests; indeed, the best answer to this question is 'so that we, as teachers, know who we taught well, what they mastered or failed to master, who made larger and smaller gains, and what we may need to re-teach'. Tests are primarily to help teachers to gather formative information about their impact. With this mind frame, the students reap the dividends.

The problem with the students being so accurate in their predictions is that their expectations are so often based on the 'doing just enough', or *minimax*, principle – that is, maximum grade return for minimal extra effort. Students so often set 'safe' predictions and our role as educators is to raise these student expectations. Our role is not to enable students to reach their potential, or to meet their needs; our role is to find out what students can do, and make them exceed their potential and needs. Our role is to create new horizons of success and then to help the students to attain them. We can set our aspirations low or, at best, make them about where we think we can reach now; the aim of schooling is to dependably identify talents and then create opportunities to assist in realizing these talents. Many of these talents are not necessarily within the current expectations of students.

Choosing the method

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

22. Teachers choose the teaching methods as a final step in the lesson planning process and evaluate this choice in terms of their impact on students.

We spend far too much time talking about particular methods of teaching. The debate seems so often to centre on this or that method: we have had battles about direct instruction, constructivism, cooperative versus individualistic teaching, and so on. Our attention, instead, should be on the effect that we have on student learning – and sometimes we need multiple strategies and, more often, some students need different teaching strategies from those that they have been getting. A strong message from the findings in *Visible Learning* is that, more often than not, when students do not learn, they do not need 'more'; rather, they need 'different'.

Various successful methods of teaching were identified in *Visible Learning*, but the book also identified the importance of not rushing to implement only the top strategies; rather, it is important to understand the underlying reasons for the success of the strategies and use this as the basis for making decisions about teaching methods. The programs that had the most success were acceleration ($d = 0.88$), reciprocal teaching ($d = 0.72$), problem-solving teaching ($d = 0.61$), and self-verbalization/self-questioning ($d = 0.64$). These top methods rely on the influence of peers, feedback, transparent learning intentions and success criteria, teaching multiple strategies or teaching using various strategies, and attending to both surface and deep knowing. The least effective methods seem not to involve peers, to focus too much on deep to the detriment of first attending to surface knowledge or skill development, to overemphasize technologies, and to fail to take into account similarities, instead overemphasizing differences.

The message is not to choose a top method, but to choose a method and then evaluate its impact on student learning. So often the evaluation is in terms such as 'It worked for me', 'The students seem to enjoy it', 'The students appeared engaged', or 'It allowed me to get through the curriculum'. The only game in town is the impact of the choice of teaching method on all students learning. Recently, I visited a group of committed educators wishing to make a major difference to minority students in a remote rural area. They had decided to implement direct instruction – which certainly increased the probability of successful impacting on student learning. The measure of success, however, is not the dosage of direct instruction, but evidence of its impact on student gains. I encouraged them first to consider the evidence that the teachers and schools were providing their Board on learning gains (and to be assured by the quality of this evidence, as well as the information provided as to what the school intends as consequences of this evidence), and only then to talk about the dosage and effects of direct instruction. We spend a lot of time in our work devising dashboards of evidence of impact (and never use only test scores, but also value teacher judgement, classroom evidence, student reports, etc.) and then ask what is needed to enhance or, where necessary, change the methods to get the impact for which we are looking (for example, $d = >0.40$ within a year's work).

One of the more difficult tasks is to convince teachers to change their methods of teaching, because so many adopt one method and vary it throughout their career. Because of this long history of use, they often have a corpus of anecdotal evidence suggesting why it has worked for them – so why take a risk and change what seems to work? Teachers do not mind change; they are not so happy about being changed. But *does* it work for all of the students? Perhaps many of the various methods work reasonably well for above-average students (they are going to learn despite our efforts), but the quality of instruction is most paramount for those below average (and whatever method works for these students often also works best for above-average students). As will be discussed in Chapter 6, when we learn something new to us (struggling or bright), we need more skill development and content; as we progress, we need more connections, relationships, and schemas to organize these skills and content; we then need more regulation or self-control over how we continue to learn the content and ideas. The methods with the greatest effects are particularly powerful for students in the earlier stages of learning. The major message, however, is that rather than recommending a particular teaching method, teachers need to be evaluators of the effect of the methods that they choose. When students do not learn via one method, it is more likely that it then needs to be re-taught using a different method; it will not be

TABLE 5.1 Effect sizes from various programs

PROGRAMS	NO. OF METAS	NO. OF STUDIES	NO. OF PEOPLE	NO. OF EFFECTS	ES	SE	RANK
Reciprocal teaching	2	38	677	53	0.74		9
Vocabulary programs	10	442		1,109	0.67	0.108	15
Repeated reading programs	2	54		156	0.67	0.080	16
Study skills programs	19	1,278	135,778	3,450	0.63	0.090	20
Problem-solving teaching	6	221	15,235	719	0.61	0.076	22
Comprehension programs	16	657	38,393	3,146	0.60	0.056	24
Concept mapping	7	325	8,471	378	0.60	0.051	25
Cooperative vs individualistic learning	4	774		284	0.59	0.088	26
Direct instruction	4	304	42,618	597	0.59	0.096	27
Mastery learning	10	420	9,323	374	0.58	0.055	29
Providing worked examples	1	62	3,324	151	0.57	0.042	30
Peer tutoring	14	767	2,676	1,200	0.55	0.103	32
Cooperative vs competitive learning	7	1,024	17,000	933	0.54	0.112	33
Phonics instruction	19	523	21,134	6,453	0.54	0.191	34
Keller's Mastery PIS	3	263		162	0.53		38
Interactive video methods	6	441	4,800	3,930	0.52	0.076	44
Play programs	2	70	5,056	70	0.50		47
Second-/third-chance programs	2	52	5,685	1,395	0.50		48
Computer-assisted instruction	100	5,947	4,239,997	10,291	0.37	0.059	76
Simulations	10	426	10,934	550	0.33	0.081	85
Inductive teaching	2	97	3,595	103	0.33	0.035	86
Inquiry-based teaching	4	205	7,437	420	0.31	0.092	90
Teaching test taking and coaching	11	275	15,772	372	0.27	0.024	97
Competitive vs individualistic learning	4	831		203	0.24	0.232	103
Programmed instruction	8	493		391	0.23	0.084	104
Individualized instruction	10	638	9,380	1,185	0.22	0.060	108
Visual/audiovisual methods	6	359	2,760	231	0.22	0.070	109
Extracurricular programs	8	2,161		1,036	0.19	0.055	115
Co-teaching/team teaching	2	136	1,617	47	0.19	0.057	117
Web-based learning	3	45	22,554	136	0.18	0.124	123
Problem-based learning	9	367	38,090	747	0.15	0.085	126
Sentence-combining programs	2	35		40	0.15	0.087	127
Perceptual–motor programs	1	180	13,000	637	0.08	0.011	136
Whole language	4	64	630	197	0.06	0.056	137
Average/sum	**330**	**20,339**	**4,699,961**	**42,054**	**0.41**	**0.080**	**–**

enough merely to repeat the same method again and again. We, as teachers, need to change if the students do not change in their learning.

Teachers as evaluators and activators

VISIBLE LEARNING – CHECKLIST FOR STARTING THE LESSON

23. Teachers see their fundamental role as evaluators and activators of learning.

An 'activator' is any agency bringing about change, or something that 'increases the activity of an enzyme or a protein that increases the production of a gene product in DNA transcription'. This notion has action, agency, and augmentation – and thus is a most appropriate metaphor for describing the major role of the teacher. The other role is 'evaluator', in which the teacher is asked to attend to the worth and merit of the activation. By having a mind frame that the fundamental role is evaluator and activator, teachers then are focused more on their impact on all students, focused more on the quality of the outcomes that they wish to impact, and are placed in the position of seeing their effect more in terms of the consequences for students than in getting through the curriculum, having students passing exams, and running excellent lessons with engaging activities.

The best way in which to choose the best teaching method (and way in which to change teachers so that they begin to use the best method) is to place more attention on the evaluation of the learning effect sizes from the lesson, and use these as the first discussion point for considering whether the optimal teaching methods have been used. This use of such 'evidence-into-action' can then influence teachers' beliefs about learning, planning, motivation, and the regulation of learning. Note, however, that this approach only creates the right question; it does not answer the question of which is the best teaching method, which answer requires judgement, listening, and expertise. It may well be that one method is better for this student than for that student, for this content rather than for that content – but the key is the impact not the method.

Teacher education programs need to attend less to promoting various teaching strategies and overemphasizing diversity, and more to how new teachers can evaluate the impact of their teaching on students, more to how then to use different and multiple strategies, and more to seeing the similarities and allowing for the diversity of their impact on their group of students. This approach to choosing which teaching method based on evidence of the impact on students entails specific steps (see Appendix E for more details).

1. Be clear about the outcomes (success criteria) of the lesson or series of lessons. (This is most likely to include some outcomes relating to achievement, but there are, of course, many other outcomes.)
2. Decide, preferably before you start teaching the lesson(s), the best way in which to measure the outcomes. (When you first use this method, it is recommended that you use some form of standardized assessment, and then later move to teacher-made assessments.)

3. Administer this outcome measure at the start of the lessons. Such 'progress testing', as it is often called, can establish what the students already know and can do, and can help to identify strengths and gaps. (Yes, they may learn something from doing the test at the outset – but why not?)
4. Conduct the teaching.
5. Re-administer the outcome measure at the end of the lesson or lessons.
   a. Calculate the average score and standard deviation (measure of spread) for the scores at the beginning and the end.
   b. Calculate the effect size for the class (see Appendix E for more on how to estimate effect sizes).
      i. If it is greater than 0.40, then reflect on what seemed to be optimal about that lesson series.
      ii. If it is less than 0.40, then reflect on what seemed to be less than optimal about the lesson series, and make any changes needed to the lesson, the teaching method, activities and so on. (Doing 'more' is rarely the answer.)
   c. Using the measure of spread (*SD*) and assuming that it can be used for each student, calculate the effect size for each student.
      i. If it is greater than 0.40, then reflect on what seemed to be optimal about that lesson series for these students.
      ii. If it is less than 0.40, then reflect on what seemed to be less than optimal about the lesson series, and make the changes needed to the lesson, the teaching method, activities and so on for these students.

Conclusions

The notion of teachers (and school leaders) as evaluators and activators implies deliberate change, directing of learning, and visibly making a difference to the experiences and outcomes for the students (and for the teachers) – and the key mechanism for this activation is a mind frame that embraces the role of evaluation. The key questions for the teacher include the following.

- 'How do I know this is working?'
- 'How can I compare this with that?'
- 'What is the merit and worth of this influence on learning?'
- 'What is the magnitude of the effect?'
- 'What evidence would convince me that I am wrong?'
- 'Where is the evidence that shows that this is superior to other programs?'
- 'Where have I seen this practice installed so that it produces effective results?'
- 'Do I share a common conception of progress with other teachers?'

The 'teacher as evaluator' involves more than using the skills and tools developed within evaluation or social science; indeed, it is primarily about deciding which are the critical

analyses to be pursued and ensuring that they are indeed pursued in the context of the impact of students' learning. This is not to claim that there is only one evaluation model or method, because these issues are hotly debated; instead, the claim is that the 'teacher as evaluator' needs to consider the 'goodness of fit' notions of asking and deciding the best methods that led to judgements of merit, such that there is sufficient and appropriate rigour to defend the evidence, and interpretations of this evidence that lead to evaluative claims. (For a discussion on leaders as activators, see Hattie and Clinton, 2011.)

The aim is to get the students actively involved in seeking this evidence: their role is not simply to do tasks as decided by teachers, but to actively manage and understand their learning gains. This includes evaluating their own progress, being more responsible for their learning, and being involved with peers in learning together about gains in learning. If students are to become active evaluators of their own progress, teachers must provide the students with appropriate feedback so that they can engage in this task. Van den Bergh, Ros, and Beijaard (2010: 3) describe the task thus:

> Fostering active learning seems a very challenging and demanding task for teachers, requiring knowledge of students' learning processes, skills in providing guidance and feedback and classroom management.

The need is to engage students in this same challenging and demanding task.

The suggestion in this chapter is to start lessons with helping students to understand the intention of the lesson and showing them what success might look like at the end. Many times, teachers look for the interesting beginning to a lesson – for the hook, and the motivating question. Dan Willingham (2009) has provided an excellent argument for not thinking in this way. He advocates starting with what the student is likely to think about. Interesting hooks, demonstrations, fascinating facts, and likewise may seem to be captivating (and often are), but he suggests that there are likely to be other parts of the lesson that are more suitable for the attention-grabber. The place for the attention-grabber is more likely to be at the end of the lesson, because this will help to consolidate what has been learnt. Most importantly, Willingham asks teachers to think long and hard about how to make the connection between the attention-grabber and the point that it is designed to make; preferably, that point will be the main idea from the lesson.

Having too many open-ended activities (discovery learning, searching the Internet, preparing PowerPoint presentations) can make it difficult to direct students' attention to that which matters – because they often love to explore the details, the irrelevancies, and the unimportant while doing these activities. One of Willingham's principles is that any teaching method is most useful when there is plenty of prompt feedback about whether the student is thinking about a problem in the right way. Similarly, he promotes the notion that assignments should be primarily about what the teacher wants the students to think about (not about demonstrating 'what they know'). Students are very good at ignoring what you say ('I value connections, deep ideas, your thoughts') and seeing what you value (corrections to the grammar, comments on referencing, correctness or absence of facts). Thus teachers must develop a scoring rubric for any assignment before they complete the question or prompts, and show the rubric to the students so that they know what the teacher values. Such formative feedback can reinforce the 'big ideas' and the important

understandings, and help to make the investment of energy worthwhile. It is more likely to lead to cognitive understanding, and to reduce the false leads and any overemphasis on surface knowledge – and it will be more rewarding for all.

Exercises

1. Administer the five items from Bryk and Schneider's 'Teacher Trust Scale' (see p. 71) to teachers in the school (anonymously) and discuss with fellow teachers how the levels of trust can then be maximized in this school.
2. During observations of classrooms, monitor the amount of talking and questioning by teachers and students. How many students are engaged in asking and answering fellow students' questions? Is there a teacher initiation, response, and evaluation dominance? Are the questions surface or deep?
3. Consider the following two extracts from Charles Dickens' *Hard Times*. How has teaching and teacher education changed since the 1800s?

   [Mr Gradgrind:] 'Now, what I want is, Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts: nothing else will ever be of any service to them. This is the principle on which I bring up my own children, and this is the principle on which I bring up these children. Stick to Facts, sir!'

   So, Mr M'Choakumchild began in his best manner. He and some one hundred and forty other schoolmasters had been lately turned at the same time, in the same factory, on the same principles, like so many pianoforte legs. He had been put through an immense variety of paces, and had answered volumes of head-breaking questions. Orthography, etymology, syntax, and prosody, biography, astronomy, geography, and general cosmography, the sciences of compound proportion, algebra, land-surveying and levelling, vocal music, and drawing from models, were all at the ends of his ten chilled fingers. He had worked his stony way into Her Majesty's most Honourable Privy Council's Schedule B, and had taken the bloom off the higher branches of mathematics and physical science, French, German, Latin, and Greek. He knew all about all the Water Sheds of all the world (whatever they are), and all the histories of all the peoples, and all the names of all the rivers and mountains, and all the productions, manners, and customs of all the countries, and all their boundaries and bearings on the two and thirty points of the compass. Ah, rather overdone, M'Choakumchild. If he had only learnt a little less, how infinitely better he might have taught much more!
4. Run a Paideia-type Socratic questioning session. After teaching some content, group about 15 students in a circle (if more than 15, then have the others sit behind the circle and then later give them the opportunity to become the inner and active circle). Start by asking an open question (one that leads to further discussion and debate), and then allow students to ask each other questions, answer these questions, and engage in dialogue. *At no time* can you, as teacher, intervene with prompts, questions, or answers. After 10–20 minutes, debrief from the session. Most importantly, use the student questions and answers as formative evidence about what you, as teacher, do next. If

you need help with developing opening questions, with ways in which to avoid becoming engaged, and with teaching students to be more respectful of each other, see Roberts and Billings (1999) for more details and advice.

5. Observe a class and 'listen' to what the teacher and students are saying. Then reflect back what you heard to the participants in your own words. Such empathic listening requires you to put yourself in a position to understand the other person; by reflecting back, you demonstrate to the other person that you have respect for what they have said. Allow the other to self-correct what you heard, and in this way share their moments of learning, misunderstanding, inactivity, self-discovery, and challenge. Does the other now feel understood?
6. Google 'Productive pedagogy', which is based on the assumption that teachers need to make highly complex decisions about the impact of their teaching often 'on the run' during a lesson. Evaluate your lesson – especially the start of the lesson – using the following questions.

INTELLECTUAL QUALITY QUESTIONS

Higher-order thinking	Are higher-order thinking and critical analysis occurring?
Deep knowledge	Does the lesson cover operational fields in any depth, detail, or level of specificity?
Deep understanding	Do the work and responses of the students provide evidence of understanding of concepts or ideas?
Substantive conversation	Does classroom talk break out of the IRE pattern and lead to sustained dialogue between students, and between teachers and students?
Knowledge problematic	Are students critiquing and second-guessing texts, ideas, and knowledge?
Meta-language	Are aspects of language, grammar, and technical vocabulary being foregrounded?

RELEVANCE QUESTIONS

Knowledge integration	Does the lesson range across diverse fields, disciplines, and paradigms?
Background knowledge	Is there an attempt to connect with students' background knowledge?
Connectedness to the world	Do lessons and the assigned work bear any resemblance or connection to real-life contexts?
Problem-based curriculum	Is there a focus on identifying and solving intellectual and/or real-world problems?

SUPPORTIVE CLASSROOM ENVIRONMENT QUESTIONS	
Student control	Do students have any say in the pace, direction, or outcome of the lesson?
Social support	Is the classroom a socially supportive, positive environment?
Engagement	Are students engaged and on-task?
Explicit criteria	Are criteria for student performance made explicit?
Self-regulation	Is the direction of student behaviour implicit and self-regulatory or explicit?

RECOGNITION OF DIFFERENCE QUESTIONS	
Cultural knowledge	Are diverse cultural knowledges brought into play?
Inclusivity	Are deliberate attempts made to increase the participation of all students of different backgrounds?
Narrative	Is the teaching principally narrative, or is it expository?
Group identity	Does teaching build a sense of community and identity?
Citizenship	Are attempts made to foster active citizenship?