

The flow of the lesson: the place of feedback

Feedback is among the most common features of successful teaching and learning. But there is an enigma: while feedback is among the most powerful moderators of learning, its effects are among the most variable. I have spent many years pondering this problem and have been building a model of feedback that helps to explain how to take full benefits from feedback in the classroom.

The best way in which to understand feedback is to consider Sadler's (1989) notion of the 'gap': feedback aims to reduce the gap between where the student 'is' and where he or she is 'meant to be' – that is, between prior or current achievement and the success criteria. To make feedback effective, therefore, teachers must have a good understanding of where the students are, and where they are meant to be – and the more transparent they make this status for the students, the more students can help to get themselves from the points at which they are to the success points, and thus enjoy the fruits of feedback. Feedback serves various purposes in reducing this gap: it can provide cues that capture a person's attention and helps him or her to focus on succeeding with the task; it can direct attention towards the processes needed to accomplish the task; it can provide information about ideas that have been misunderstood; and it can be motivational so that students invest more effort or skill in the task (see Hattie & Timperley, 2006).

Feedback can be provided in many ways: through affective processes, increased effort, motivation, or engagement; by providing students with different cognitive processes, restructuring understandings, confirming to the student that he or she is correct or incorrect, indicating that more information is available or needed, pointing to directions that the students might pursue, and indicating alternative strategies with which to understand particular information. A key consideration is that feedback typically comes second – after instruction – and thus its effectiveness is limited if it is provided in a vacuum.

An important notion is that feedback thrives on error, but error should not be considered the privilege of lower-achieving students. All students (as all teachers) do not always succeed first time, nor do they always know what to do next, and nor do they always attain perfection. This is not a deficit, or deficit thinking, or concentrating on the negative; rather, it is the opposite in that

acknowledging errors allows for opportunities. Error is the difference between what we know and can do, and what we aim to know and do – and this applies to all (struggling and talented; students and teachers). Knowing this error is fundamental to moving towards success. This is the purpose of feedback.

Further, the focus in this chapter is on using evidence from students about what they do, say, make, or write to then infer what they understand, know, feel, or think (Griffin, 2007). Working from observables is the basis of the formative evaluation of learning. Too often, teachers work from theories or inferences about what students do that are not always open to change in light of what students *actually* do. Instead, teachers need first to concentrate on what students do, say, make, or write, and modify their theories about students in light of these observations (or this evidence). Feedback from such evaluation is what teachers need to seek so that they can then modify their instruction. This is assessment as feedback for teachers, providing rapid formative feedback, or assessment as teaching.

The evidence about its effectiveness is documented in *Visible Learning*. In brief, the average effect size is 0.79, which is twice the average effect of all other schooling effects. This places feedback in the top ten influences on achievement, although there is considerable variability – but how to account for this variability? My argument is that feedback works at four levels and addresses three questions.

The three feedback questions

VISIBLE LEARNING – CHECKLIST FOR DURING THE LESSON: FEEDBACK

33. Teachers are aware of, and aim to provide feedback relative to, the three important feedback questions: 'Where am I going?'; 'How am I going there?'; and 'Where to next?'

Levels		Major questions	Three feedback questions
1	Task	How well has the task been performed; is it correct or incorrect?	Where am I going? What are my goals?
2	Process	What are the strategies needed to perform the task; are there alternative strategies that can be used?	How am I going? What progress is being made towards the goal?
3	Self-regulation	What is the conditional knowledge and understanding needed to know what you are doing? Self-monitoring, directing the processes and tasks	Where to next? What activities need to be undertaken next to make better progress?
4	Self	Personal evaluation and affect about the learning	

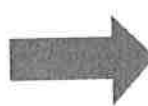


FIGURE 7.1 The feedback levels and questions

Where am I going?

The first question relates to goals – that is: ‘Where am I going?’ This means that teachers need to know, and communicate to students, the goals of the lesson – hence the importance of learning intentions and success criteria. What seems surprising is that many students cannot articulate the goals of the lesson: at best, their goals are performance-related: ‘finish the task’; ‘make it neat’; ‘include as many resources as possible’. Rarely are the goals mastery-related: ‘understand the content’; ‘master the skill’. Part of this is that so many lessons are about ‘the facts’, teachers talking, and ‘covering the curriculum’, which begs for performance goals, because students have little notion of what mastery looks like.

Sandra Hastie (2011) interviewed middle-school students, who certainly knew about setting mastery goals in their sport and social lives (see Chapter 4). But most of their academic goals related more to completion of work, being on time, and trying harder than to the quality of the academic outcomes. She taught the teachers how to set mastery goals and communicate these to the students, and then have students monitor their goals and their progress towards these goals each day – and the teachers were requested to monitor their success in communicating their goals to the students.

Samantha Smith (2009) was the ‘dean of success’ in her high school. She plotted all 1,000+ students’ achievement over the previous five years in reading and maths. She used this achievement data to project the expected number of credits and the grade point average (GPA) for each student at the end of the current year. She then gave these to teachers and asked them to read them, to see if they agreed, and to consider whether they would be willing to set slightly higher targets than projected. About half of the teachers in the school agreed to these tasks and half refused (‘I am not responsible for students reaching targets; they need to come to class prepared, do their homework, and take responsibility’). At the end of the year, the teachers in the first group greatly outperformed the resisters. Targets can make a difference.

As was argued in Chapter 4, there are two further elements of goals: challenge and commitment. Challenging goals relate to feedback in three major ways.

1. They inform individuals about the level of performance desired, meaning that these individuals can then track their performance towards these targets.
2. Feedback allows students (and/or their teachers) to set further appropriately challenging goals as the previous ones are attained, thus establishing the conditions for ongoing learning. This requires a reasonable understanding of what progress looks like in a subject and this is probably the most critical source of content knowledge required of teachers.
3. If there is no challenge, the feedback is probably of little or any value: if students already know the material or find it too easy, then seeking or providing feedback will have little effect. Indeed, providing feedback of success not only has

little or no effect, but it may also be costly as students wait for the feedback, do not go on to new more challenging tasks, and become dependent on the presence of feedback, or when tasks are too easy and they do not spend more time on more challenging activities (see Hays, Kornell, & Bjork, 2010).

The key components of the first feedback question 'Where am I going?' relates to learning intentions, goals and targets, clarity, challenge, and commitment; the key is not only the teacher creating and knowing these, but also students being fully conversant with them. Students who speak in terms of and understand these notions are students who have made great headway in 'regulation of their own learning', and students who are more likely to seek feedback.

How am I going there?

The second question, 'How am I going there?', highlights the notions of progress feedback, or feedback relative to the starting or finishing point, and is often expressed in relation to some expected standard, to prior performance, or to success or failure on a specific part of the task. This is where it is most valuable to provide rapid formative feedback – particularly relative to the criteria of success rather than comparative to where other students are. Wiliam and colleagues (Wiliam & Thompson, 2008; Wiliam, Lee, Harrison, & Black, 2004; Black, Lee, Marshall, & Wiliam, 2003) argued that there are five broad strategies that teachers can use in this phase to make learning more efficient and effective relative to 'How am I going there?': clarifying and sharing learning intentions and criteria for success; engineering effective classroom discussions, questions, and learning tasks; providing feedback that moves learners forward; encouraging students to see themselves as the owners of their own learning; and activating students as instructional resources for one another.

Where to next?

The third question is more consequential: 'Where to next?' Such feedback can assist in choosing the next most appropriate challenges, and can lead to developing more self-regulation over the learning process, and greater fluency and automaticity, to learning different strategies and processes to work on the tasks, to deeper understanding, and to more information about what is and what is not understood. This is the question of most interest to students and the aim is to not only provide them with the answer to 'Where to next?', but also to teach them to have their own answers to this question.

The four feedback levels

VISIBLE LEARNING – CHECKLIST FOR DURING THE LESSON: FEEDBACK

34. Teachers are aware of, and aim to provide feedback relative to, the three important levels of feedback: task; process; and self-regulation.

The three feedback questions work at four levels of feedback – and the four levels correspond to phases of learning: from novice, through proficient, to competent.

1. Task and product level

Feedback at the task and product level is powerful if it is more information-focused (for example, correct or incorrect), leads to acquiring more or different information, and builds more surface knowledge. This type of feedback is most common in classrooms and most students see feedback in these terms. It is often termed ‘corrective feedback’, or ‘knowledge of results’, and is commonly given in classrooms through teacher questions (most of which are at this information level); it is most provided in comments on assignments; it is often specific and not generalizable; it is more often the nature of feedback given to a whole class; and it can be powerful particularly when the learner is a novice (Heubusch & Lloyd, 1998). Examples include indicating correct or incorrect responses, needing more or different responses, providing more or different information relevant to the task, and building more task knowledge. Such task feedback is critical and serves as a pedestal on which processing (level 2) and self-regulation (level 3) can be effectively built.

An example of such feedback might be as follows.

... Your learning goal was to structure your account in such a way that the first thing that you wrote was the first thing that you did. Then, you were to write about the other things that you did in the same order that they happened.

You've written the first thing first, but after that it becomes muddled. You need to go through what you've written, number the order in which things happened, and rewrite them in that order.

2. Process level

The second level is feedback aimed at the processes used to create the product or to complete the task. Such feedback can lead to providing alternative processing, reducing cognitive load, helping to develop learning strategies and error detection, cueing to seek a more effective information search, recognizing relationships between ideas, and employing task strategies. Examples include helping to provide connections between ideas, providing strategies for identifying errors, learning how to explicitly learn from mistakes, and providing cues about different strategies or errors. Feedback at this process level appears to be more effective for enhancing deeper learning than it is at the task level, and there can be a powerful interactive effect between feedback aimed at improving the strategies and processes, and feedback aimed at the more surface task information. The latter can assist in improving task confidence and self-efficacy, which in turn provides resources for more effective and innovative information and strategy searching. Chan (2006) induced a failure situation and then found that feedback was more likely to enhance self-efficacy when it was formative rather than summative, and self-referenced rather than comparative to other peers' feedback.

Examples of feedback at this level might be as follows.

. . . You're stuck on this word and you've looked at me instead of tried to work it out. Can you work out why you might have got it wrong – and can you then try a different strategy?

. . . You're asked to compare these ideas. For example, you could try to see how they are similar, how they are different . . . How do they relate together?

3. Self-regulation or conditional level

The third level is more focused at the self-regulation level, or on the student's monitoring of their own learning processes. Feedback at this level can enhance students' skills in self-evaluation, provide greater confidence to engage further with the task, assist in the student seeking and accepting feedback, and enhance the willingness to invest effort into seeking and dealing with feedback information. Examples include helping students to identify feedback themselves and how to self-evaluate, providing opportunities and awareness of the importance of deliberate practice and effort, and developing confidence to pursue the learning. When students can monitor and self-regulate their learning, they can use feedback more effectively to reduce discrepancies between where they are in their learning and the desired outcomes or successes of their learning. Such feedback – usually in the form of reflective or probing questions – can guide

the learner on 'when', 'where', and 'why' in selecting or employing task and process-level knowledge and strategies.

Examples of such feedback might be as follows.

... I'm impressed by how you went back to the beginning of the sentence when you became stuck on this word – but, in this case, it didn't help. What else could you do? When you decide on what it means, I want you to tell me how confident you are and why.

... You checked your answer with the resource book [Self-help] and found that you'd got it wrong. Have you got any idea(s) why you got it wrong? [Error detection] What strategy did you use? Can you think of another strategy to try and how else might you work out if you're right?

4. Self level

VISIBLE LEARNING – CHECKLIST FOR DURING THE LESSON: FEEDBACK

35. Teachers are aware of the importance of praise, but do not mix praise with feedback information.

The fourth level is feedback directed to the 'self' (for example, 'You're a great student', or 'Well done') and is commonly subsumed under the notion of 'praise'. Praise is often used to comfort and support, is ever-present in many classrooms, and is welcomed and expected by students – but it so often directs attention away from the task, processes, or self-regulation. The major message is to provide praise, but not to give it in such a way that it dilutes the power of feedback: keep *praise* and *feedback* about the learning separate.

Praise usually contains little task-related information and is rarely converted into more engagement, commitment to the learning goals, enhanced self-efficacy, or understanding about the task. By incorporating praise with other forms of feedback, the learning information is diluted; praise includes little information about performance on the task and praise provides little help in answering the three feedback questions. Wilkinson (1980) found a low effect size for praise ($d = 0.12$), as did Kluger and deNisi (1996; 0.09), and providing feedback with no praise compared to feedback with praise has a greater effect on achievement (0.34).

There is now increasing evidence for this dilution effect of praise on learning. Kessels, Warner, Holle, & Hannover (2008) provided students with feedback with

and without praise; praise led to lower engagement and effort. Kamins and Dweck (1999) compared the effects of praising a person as a whole (for example, 'You're a clever girl!') with the effect of praising a person's efforts ('You're excellent in putting in the effort'). Both led to zero or negative effects on achievement. The effects of praise are particularly negative not when students succeed, but when they begin to fail or not to understand the lesson. Hyland and Hyland (2006) noted that almost half of teachers' feedback was praise, and that premature and gratuitous praise confused students and discouraged revisions. Most often, teachers used praise to mitigate critical comments, which indeed diluted the positive effect of such comments (Hyland & Hyland, 2001). Perhaps the most deleterious effect of praise is that it supports learned helplessness: students come to depend on the presence of praise to be involved in their schoolwork. At best, praising effort has a neutral or no effect when students are successful, but is likely to be negative when students are not successful, because this leads to a more 'helpless or hopeless' reaction (Skipper & Douglas, 2011).

This lack of support for praise does not mean that we should be horrible to the students; this is one of the clearest negative influences. Students need to feel that they 'belong' in learning, that there is a high level of trust both between teacher and student and with their peers, and feel that their work is appropriately esteemed (when earned). Indeed, students see praise as important for their success in school and the presence of praise is related to learning outcomes. The message is that for *feedback* to be effective in the act of learning, praise dissipates the message. Praise the students and make them feel welcomed to your class and worthwhile as learners, but if you wish to make a major difference to learning, leave praise out of feedback about learning.

Overall comment on the four levels

The art of effective teaching is to provide the right form of feedback at, or just above, the level at which the student is working – with one exception: do not mix praise into the feedback prompt, because this dilutes the effect! When feedback draws attention to the self, students try to avoid the risks involved in tackling a challenging assignment – particularly if they have a high fear of failure (and thus aim to minimize the risk to the self). Thus, ideally, teaching and learning need to move from the task towards the processes or understandings necessary to learn the task, and then to regulation about continuing beyond the task to more challenging tasks and goals – that is: from 'What do I know and what can I do?', to 'What do I not know and what can I not do?', to 'What can I teach others (and myself) about what I know and can do?' This process results in higher confidence and greater investment of effort, and the aim of providing feedback is to assist students through this process. This flow typically occurs as the student gains greater fluency, efficiency, and mastery. The first three feedback levels form a progression; the hypothesis is that it is optimal to provide appropriate feedback

at or one level above that at which the student is currently functioning, and to clearly distinguish between feedback at the first three and the fourth (self) levels.

Frequency of feedback

VISIBLE LEARNING – CHECKLIST FOR DURING THE LESSON: FEEDBACK

36. Teachers provide feedback appropriate to the point at which students are in their learning, and seek evidence that this feedback is appropriately received.

The aim is to provide feedback that is ‘just in time’, ‘just for me’, ‘just for where I am in my learning process’, and ‘just what I need to help me move forward’. There is a need to be aware that such feedback can come from many sources (and that such feedback can be wrong!). It may be misleading merely to increase the amount of feedback, or to concentrate on the giving as opposed to the receiving of feedback.

There has been much evidence about the frequency of feedback and most of it is not that informative – because there are more important factors than merely increasing the amount of feedback, or whether it is immediate or delayed. For example, Carless (2006) has shown that most feedback given by teachers is to the whole class and most of this is not received by any student – because no single student believes that it pertains to him or her! Further, feedback can come from many sources: as will be shown below, most feedback comes from peers, and sometimes this exceeds the amount of feedback received from teachers and other sources (such as books or the Internet). Most critically, wherever the feedback comes from, it is often poorly received and hardly used in revision of work.

Teachers consider their feedback to be far more valuable than do the students, because so often the latter find the former’s feedback confusing, non-reasoned, and not understandable. Worse, students often think that they have understood the teacher’s feedback when they have not, and even when they do understand, claim to have difficulties in applying it to their learning (Goldstein, 2006; Nuthall, 2007). Higgins, Hartley, and Skelton (2001: 270) argued that ‘many students are simply unable to understand feedback comments and interpret them correctly’. Much depends on their understanding of the feedback discourse, on whether the provider is perceived as powerful, fair, and trustworthy, and on the emotions (rejection, acceptance) associated with the context and level of investment.

There have been surprisingly few studies that have investigated the actual amount and nature of feedback given *and* received in classrooms. Teachers see feedback more in terms of how much they *give* than the more important consideration of how much feedback is *received* by students. Carless (2006) found

that 70 per cent of teachers claimed that they provided detailed feedback that helped students to improve their next assignments – but only 45 per cent of students agreed with their teachers' claims. Further, Nuthall (2005) found that most feedback that students obtained in any day in classrooms was from other students – and that most of this feedback was incorrect.

In our work, I ask a neutral person to sit at the back of classrooms and type a transcript of everything that is said and done in a 40–60 minute lesson. This person also chooses two students close to where he or she is typing, and notes all that they say and do. Of course, it is not possible to get into these students' 'heads', but at the end of the lesson, the script is printed out, and the teacher and a person experienced in decoding lessons highlights each instance in which one of these students *received* feedback (from whomever, and about whatever).

The analyses of the transcripts so often shows that the typical lesson includes very few instances of feedback received – and that much of this is when the student looks across or checks with a peer. So many classrooms are dominated by teacher talk – giving instructions on what to do, conducting the question-and-answer recitation in which so many students do not engage, but are happy to sit and watch the action. This is not implying that no learning is happening, but the power of feedback is rarely operationalized during these soliloquies. Feedback comes into its own when students 'do not know', 'do not know how to choose the best strategies to tackle the work', 'do not know how to monitor their own learning', or 'do not know where to go next'.

In one recent analysis of 18 classes in a school noted for its major success in achievement, there was a feedback instance *given* for one of the two observed students every 25 minutes. The majority of feedback *given* to all students was task-related, and this pattern can be seen across two other studies that have used this breakdown (Table 7.1). The question is how to get the right proportions of the four levels, and 'right' refers to ensuring that the levels of feedback relate to where the students are in the progression from novice to competent. In these various classes (across the three studies), the feedback would be appropriate provided that the students were mostly at the novice or early learning phase. When we showed our distributions (and highlighted scripts) to the teachers and

TABLE 7.1 Percentage of feedback given at the various feedback levels in three studies

	HATTIE & MASTERS (2011)	VAN DEN BERGH, ROSE, & BEIJAARD (2010)	GAN (2011)
Level	18 HS classes	32 teachers in middle school	235 peers
Task	59%	51%	70%
Process	25%	42%	25%
Regulation	2%	2%	1%
Self	14%	5%	4%

asked if this was appropriate, the claim was a definite 'no': their students were much more involved in processing and self-regulating. These data then served as baseline to change the nature of how feedback was provided in these schools.

Types of feedback

Disconfirmation can be more powerful than confirmation

Confirmation is related to feedback that confirms a student's preconceptions of hypotheses. *Disconfirmation* is related to feedback that corrects an erroneous idea or assumption, or which provides information that goes against current expectations (see Nickerson, 1998). Students (and teachers) often seek confirmation evidence by, for example, seeking feedback that confirms their current beliefs or understandings, and disregard feedback that is contrary to their prior beliefs. When feedback is provided that disconfirms, then there can be greater change – provided that it is accepted.

These notions should not be confused with negative and positive feedback, because disconfirmation can be positive and confirmation negative. Feedback is most powerful when it addresses faulty interpretations and not a total lack of understanding (in which latter case re-teaching is often most effective). In this latter circumstance, feedback may even be threatening to the student:

If the material studied is unfamiliar or abstruse, providing feedback should have little effect on criterion performance, since there is no way to relate the new information to what is already known.

(Kulhavy, 1977: 220)

Disconfirmation feedback can improve retrieval performance (at the task level) when learners receive feedback on incorrect answers, but not when they receive feedback on correct answers (Kang, McDermott, & Roediger, 2007). In similar research, Peeck, van den Bosch, and Kreupeling (1985) found that feedback improved performance from 20 per cent to 56 per cent correct on initially incorrect answers, but made little difference for correct answers (88 per cent with no feedback and 89 per cent with feedback).

Errors need to be welcomed

Feedback is most effective when students do not have proficiency or mastery – and thus it thrives when there is error or incomplete knowing and understanding. (Often, there is little information value in providing task-level feedback when the student has mastered the content.) Errors invite opportunities. They should not be seen as embarrassments, signs of failure, or something to be avoided. They are exciting, because they indicate a tension between what we *now* know and what we *could* know; they are signs of opportunities to learn and

they are to be embraced. William James (1897: 19), my favourite psychologist (after whom one of my dogs is named!), put errors into perspective:

Our errors are surely not such awfully solemn things. In a world where we are so certain to incur them in spite of all our caution, a certain lightness of heart seems healthier than this excessive nervousness on their behalf.

This means that there needs to be a classroom climate in which there is minimum peer reactivity to not knowing or acknowledgement of errors, and in which there is low personal risk involved in responding publicly and failing (Alton-Lee & Nuthall, 1990). Too often, students respond only when they are fairly sure that they can respond correctly – which often indicates that they have already learned the answer to the question being asked. Heimbeck, Frese, Sonnentag, and Keith (2003) noted the paucity of research on errors, and they recommended that rather than being error-avoidant, error training that increases the exposure to errors in a safe environment can lead to higher performance. Such an environment requires high levels of self-regulation or safety (for example, explicit instruction that emphasizes the positive function of errors) for errors to be valuable, and it is necessary to deal primarily with errors as potentially avoidable deviations from goals. Michael Jordan claimed in a Nike advert that he:

missed more than nine thousand shots in my career. I've lost almost three hundred games. Twenty-six times I've been trusted to take the game-winning shot and missed. I've failed over and over and over again in my life. And that is why I succeed.

Failure or learning from errors is critical also in the staffroom. A school needs to have a culture of no blame, a willingness to investigate what is not working (or what is not working with which students). Care and analysis is needed to correctly attribute failure to the right reasons; clearly, the one reason that is within our powers to fix is our own teaching and mindsets. It may well be that outside factors (the home, resources, etc.) can be major factors, but the mindset that teachers can positively change student outcomes is a powerful prerequisite to making such changes – and reducing the effects of these other factors (even though it may be well be that these factors are powerful). There are so many teachers who become most aware of what is not working and put in place strategies to redress this situation; these teachers have much more success than those who accept the external constraints. The mental toughness and resilience that underlies that 'you' can make a difference in the face of adversity is a common factor underlying success in sports, business, and in schools. Confidence that we can change is a powerful precursor to change. Similarly, we can fall prey to overconfidence – success can lead to us believing that we are better than we actually are – hence the need for working parties to study and explain success, the need to find ways in which we can get better than we are, how we may

need to consider alternatives to make these greater differences, and the need not to become complacent when successful. We need to see how the future can undermine a winning formula. Celebrate success, but examine it. Scrums, working groups, walk-throughs, and checking the impact on all students can be part of evaluating (and esteeming) success, seeing where we can improve, investigating which students are not sharing the success, asking about the five things that are working well and the five that are not working so well, and ensuring that we do not become overconfident and miss opportunities. With failure, we often ask 'why?'; similarly, with success, we must ask 'why?'. Evaluation of processes, products, people, and programs needs to be an inherent part of all schools.

Feedback from assessment to teachers

There have been many recent moves toward assessment *for*, rather than an emphasis on assessment *of*, learning. An alternative is to consider 'assessment as feedback', and I have argued that this is very powerful when such assessment feedback is oriented towards the teacher and about which students are moving towards the success criteria, what they have/have not taught well, and the strengths and gaps of their teaching, and when it provides information about the three feedback questions (Hattie, 2009). As teachers derive feedback information from assessments that they set their students, there can then be important adjustments to how they teach, how they consider what success looks like, how they recognize students' strengths and gaps, and how they regard their own effects on students. The essence of such formative interpretations is providing teachers with feedback from assessments about how they need to modify their teaching, and providing students with feedback so that they can learn how to self-regulate and be motivated to engage in further learning. This is more effective than when assessment is aimed at the students, who typically can estimate their performance before completing the assessments and thus often receive minimal feedback from assessments. Teachers too often see assessment feedback as making statements about students and not about their teaching, and hence the benefits of feedback from such testing are often diluted.

In New Zealand, there has been much uptake by teachers and schools about formative interpretations. Most schools are aware of the distinction between formative and summative interpretations. One of the concerns that arose is to not see 'everything' in school as formative interpretations: there is a place for summative interpretations; some tests have little to no formative interpretations; and it was not necessary to justify some negative practices by calling them 'formative'. A group was asked to move beyond formative interpretations and the recommendation was to promote 'student assessment capabilities' (Absolum, Flockton, Hattie, Hipkins, & Reid, 2009). The fundamental premise is that all students should be educated in ways that develop their capability to assess their own learning. So often, the most important assessment decisions tend to be made by adults on behalf of students. Instead, the claim is that the primary function

of assessment is to support learning by generating feedback that students can act upon in terms of where they are going, how they are going there, and where they might go next. Such assessment involves active student–teacher collaboration, and teachers who also demonstrate that they use assessment in their formative interpretations. The claim is that when students participate in the assessment of their own learning, they learn to recognize and understand main ideas, and to apply new learning in different ways and situations. Students who have developed their assessment capabilities are more able and motivated to access, interpret, and use information from quality assessments in ways that affirm or further their learning. This is formative interpretation in action.

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37. Teachers use multiple assessment methods to provide rapid formative interpretations to students and to make adjustments to their teaching to maximize learning.

Rapid formative assessment

The notion of rapid formative assessment is very powerful as a form of feedback. Yeh (2011) compared the cost–effectiveness of 22 approaches to learning and found rapid formative assessment to be the most cost–effective – compared to comprehensive school reform, cross–age tutoring, computer–assisted instruction, a longer school day, increases in teacher education, teacher experience, or teacher salaries, summer school, more rigorous maths classes, value–added teacher assessment, class size reduction, a 10 per cent increase in per pupil expenditure, full–day kindergarten, Head Start (preschool), high–standards exit exams, National Board for Professional Teaching Standards (NBPTS) certification, higher teacher licensure test scores, high–quality preschool, an additional school year, voucher programs, or charter schools. It emerged out of the work of the Black and Wiliam (1998), ‘Inside the black box’, and starts from the premise that assessment *for* learning is based on five key factors:

- students are actively involved in their own learning processes;
- effective feedback is provided to students;
- teaching activities are adapted in a response to assessment results;
- students are able to perform self–assessments; and
- the influence of assessment on students’ motivation and self–esteem is recognized.

From this, Black and Wiliam (2009) derived five major strategies:

1. clarifying and sharing learning intentions and criteria for success;
2. engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding;
3. providing feedback that moves learners forward;
4. activating students as instructional resources for one another; and
5. activating students as the owners of their own learning.

Dylan Wiliam and colleagues have demonstrated the value of formative assessment – that is, that assessment that can lead to feedback during the process of learning (Wiliam, 2011). This means much more than tests, and includes many forms of evidence:

Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited.

(Black & Wiliam, 2009: 9)

The key is the focus on decisions that teachers and students make during the lesson, so most of all the aim is to inform teacher or student judgements about the key decisions: ‘Should I relearn . . . Practice again . . . Move forward . . . To what?’, and so on. In our own work, we have devised reports that help teachers and learners to appreciate which concepts they have mastered or not mastered, and where their strengths and gaps are, which students need additional input or time, which students are reaching the success criteria, and so on (Hattie and team, 2009).

But what Wiliam is most concerned with is feedback during the lesson – that is, short-cycle formative assessments, or what he terms ‘rapid formative assessment’ (assessments conducted between two and five times per week). For example, Black et al. (2003) described how they supported a group of 24 teachers to develop their use of ‘in-the-moment’ formative assessment in mathematics and science. They found that the gains in student achievement were substantial – equivalent to an increase of the rate of student learning of around 70 per cent.

Wiliam makes the important distinction between the ‘strategies’ and the ‘techniques’ of formative assessment. Strategies relate to identifying where the learners are in their learning, where they are going, and what steps need to be taken to get there. This closely aligns to our three feedback questions: ‘Where am I going?’; ‘How am I going there?’; ‘Where to next?’

Leahy and Wiliam’s (2009: 15) work in schools shows that:

when formative assessment practices are integrated into the minute-to-minute and day-by-day classroom activities of teachers, substantial increases in student

achievement – of the order of a 70 to 80 percent increase in the speed of learning – are possible, even when outcomes are measured with externally-mandated standardized tests.

Their overall messages about putting their ideas into practice also mirror much in this book.

- The criteria for evaluating any learning achievements must be made transparent to students to enable them to have a clear overview of the aims of their work and of what it means to complete it successfully.
- Students should be taught the habits and skills of collaboration in peer assessment, both because these are of intrinsic value and because peer assessment can help to develop the objectivity required for effective self-assessment.
- Students should be encouraged to bear in mind the aims of their work and to assess their own progress to meet these aims as they proceed. They will then be able to guide their own work and so become independent learners (Black et al., 2003: 52–3).

Use of prompts as a precursor to receiving feedback

There are many forms of prompts: organizational prompts (for example, ‘How can you best structure the learning contents in a meaningful way?’; ‘Which are the main points?’); elaboration prompts (for example, ‘What examples can you think of that illustrate, confirm, or conflict with the learning content?’; ‘Can you create links between the contents of the lesson and your knowledge from other everyday examples?’); and monitoring progress prompts (for example, ‘What main points have I understood well?’; ‘What main points have I yet to understand?’).

Teachers and students who use prompts can invoke feedback from many sources. The major effect of such prompts is to raise the amount of organization and elaboration strategies during learning. Nuckles, Hubner, and Renkl (2009) showed that prompts not only allowed students to identify comprehension deficits more immediately, but also invited students to invest more effort to plan and realize remedial cognitive strategies in order to improve their comprehension. It is also worthwhile to consider the appropriate use of prompts depending on where the students are in the learning process (see Table 7.2).

The key with all prompts is not only to get the prompt relative to the phase of learning, but also to know when to remove the prompt – that is, when to fade out, or allow the student to take on more responsibility. A related notion is ‘scaffolding’ – and like scaffolds on buildings, the art is to know when it is needed and when it is time to remove the scaffolding. The purpose of scaffolding is to provide support, knowledge, strategies, modelling, questioning, instructing, restructuring, and other forms of feedback, with the intention that the student comes to ‘own’ the knowledge, understanding, and concepts. Van de Pol, Volman, and Beishuizen (2010) described five intentions for scaffolding:

TABLE 7.2 Examples of prompts

LEVEL OF PROMPT	EXAMPLES
Task	<ul style="list-style-type: none"> ■ Does his/her answer meet the success criteria? ■ Is his/her answer correct/incorrect? ■ How can he/she elaborate on the answer? ■ What did he/she do well? ■ Where did he/she go wrong? ■ What is the correct answer? ■ What other information is needed to meet the criteria?
Process	<ul style="list-style-type: none"> ■ What is wrong and why? ■ What strategies did he/she use? ■ What is the explanation for the correct answer? ■ What other questions can he/she ask about the task? ■ What are the relationships with other parts of the task? ■ What other information is provided in the handout? ■ What is his/her understanding of the concepts/knowledge related to the task?
Self-regulation	<ul style="list-style-type: none"> ■ How can he/she monitor his/her own work? ■ How can he/she carry out self-checking? ■ How can he/she evaluate the information provided? ■ How can he/she reflect on his/her own learning? ■ What did you do to . . . ? ■ What happened when you . . . ? ■ How can you account for . . . ? ■ What justification can be given for . . . ? ■ What further doubts do you have regarding this task? ■ How does this compare to . . . ? ■ What does all of this information have in common? ■ What learning goals have you achieved? ■ How have your ideas changed? ■ What can you now teach? ■ Can you now teach another student how to . . . ?

- keeping the student on target and maintaining the student's pursuit of the learning intention;
- the provision of explanatory and belief structures that organize and justify;
- taking over parts of the task that the student is not yet able to perform and thereby simplifying the task (and reducing the cognitive load) somewhat for the student;
- getting students interested in a task and helping them adhere to the requirements of the task; and
- facilitating student performance via feedback, as well as keeping the student motivated via the prevention of minimization of frustration.

Attributes of students and feedback

The culture of the student

The culture of the student may influence the feedback effects. Luque and Sommer (2000) found that students from collectivist cultures (for example, Confucian-based Asia, South Pacific nations) preferred indirect and implicit feedback, more group-focused feedback, and no self-level feedback. Students from individualist/Socratic cultures (for example, the USA) preferred more direct feedback, particularly related to effort, were more likely to use direct enquiry to seek feedback, and preferred more individual, focused, self-related feedback. Kung (2008) found that while both individualistic and collectivist students sought feedback to reduce uncertainty, collectivist students were more likely to welcome self-criticism 'for the good of the collective' and more likely to seek developmental feedback, whereas individualistic students decreased such feedback to protect their egos. Individualistic students were more likely to engage in self-helping strategies, because they aim to gain status and achieve outcomes (Brutus & Greguras, 2008). Hyland and Hyland (2006) argued that students from cultures in which teachers are highly directive generally welcome feedback, expect teachers to notice and comment on their errors, and feel resentful when they do not.

Asking students about feedback

A search of the literature found no reasonable measure asking students what they thought about feedback. Brown, Irving, and Peterson (2009) had developed an instrument based on their conceptions of assessment model, but it had little predictive value, and they recommended searching further. The instrument that I developed started by reviewing their work, and by asking teachers to interview five fellow teachers and five students, taking scripts from classes, and talking with teachers and students about feedback received. The instrument started with over 160 open and closed questions, but this was reduced to 45 after factor analysis and attention to the value of the interpretations from the instrument.

The first part, 'Feedback sounds like . . .', asked students what feedback sounded or looked like to them. There were three scales: feedback as positive, negative, or providing constructive criticism. The second part related to 'Types of feedback', including feedback as corrective and confirming, feedback as improvement, and frequency of feedback (from teachers and peers). The third part concerned 'Sources of feedback' – the argument being that the most effective feedback is related more to the criteria of the lesson (the learning intentions and success criteria) than individual (compared to prior achievement) and preferably not to social (for example, comparative; cf. Harks, Rokoczy, Hattie, Klieme, & Besser, 2011).

There are marked differences in these scales across teachers and schools: teachers see feedback more in terms of comments, criticism, and correctives;

students prefer to see feedback as forward-looking, helping to address 'Where to next?', and related to the success criteria of the lesson. Regardless of their perceptions of achievement level, students see the value and nature of feedback similarly. The items with the highest relationship to achievement are: 'Feedback clarifies my doubts about the task'; 'Feedback indicates the quality of my work'; 'Feedback helps me to elaborate on my ideas'; 'Feedback sounds like constructive criticism'; 'Feedback sounds like very specific comments'; 'I understand the feedback I get from this teacher'; and 'Feedback provides worked examples that help me to think deeper'. The major message seems to be that students – regardless of achievement level – prefer teachers to provide more feedback that is forward-looking, related to the success of the lesson, and 'just in time' and 'just for me', 'about my work' (and not 'about me'). Higgins et al. (2001) found that students perceive feedback negatively if it does not provide enough information to be helpful, if it is too impersonal, if it is too general, and if it is not formative – that is, looking forward. It is not 'sufficient simply to tell a student where they have gone wrong – misconceptions need to be *explained* and improvements for future work suggested' (p. 62; italics in original).

The power of peers

Nuthall (2007) conducted extensive in-class observations and noted that 80 per cent of verbal feedback comes from peers – and most of this feedback information is incorrect! Teachers who do not acknowledge the importance of peer feedback (and whether it is enhancing or not) can be most handicapped in their effects on students. Interventions that aim at fostering correct peer feedback are needed, particularly because many teachers seem reluctant to so involve peers as agents of feedback. There is a high correlation (about 0.70) between students' concerns about the fairness and usefulness of peer assessment (Sluijsmans, Brand-Gruwel, & van Merriënboer, 2002), and high correlations between student and teacher marks on assignments. Receiving feedback from peers can lead to a positive effect relating to reputation as a good learner, success, and reduction of uncertainty, but it can also lead to a negative effect in terms of reputation as a poor learner, shame, dependence, and devaluation of worth. If there are positive relations between peers in the classroom, the feedback (particularly critical feedback) is more likely to be considered constructive and less hurtful (see Falchikov & Goldfinch, 2000; Harelli & Hess, 2008).

Mark Gan (2011) noted the problems about peer feedback being so prevalent, but often so wrong. He set about asking how we can improve the feedback given by peers. By the end of his series of studies, he placed much reliance on the power of prompts by teachers to help peers to provide effective feedback. As noted above, these prompts included guiding questions, sentence openers, or question stems that provide cues, hints, suggestions, and reminders to help students to complete a task. Prompts (for example, 'An example of this . . .', 'Another reason that is good . . .', or 'Provide an explanation for . . .') serve two

key functions in students' learning: scaffolding and activation. Prompts act as scaffolding tools to help learners by supporting and informing their learning processes. Prompts can be designed to target procedural, cognitive, and meta-cognitive skills of the learner; they can provide new or corrective information, invoke alternative strategies already known by the student, and provide directions for trying new learning strategies. In this sense, prompts can be conceived as 'strategy activators' (Berthold, Nückles, & Renkl, 2007: 566) or aids for cognitive engagement. Part of the art is to help students to engage in 'self-talk' and thus to begin to develop series of prompts that they or their peers can use when they 'do not know what to do next' (Burnett, 2003).

As they move from task to processing to regulation, students can use prompts to monitor and reflect on their own learning approaches, such as problem-solving strategies, enquiry processes, and self-explanations. Examples of reason justification prompts include: 'What is your plan for solving the problem?'; 'How did you decide that you have enough data to make conclusions?' Such prompts help students to organize, plan, and monitor their actions by making their thinking explicit, to identify specific areas that they did not understand and what they needed to know, and to use domain-specific knowledge to reason about the approach that they adopted to solve the problem. Davis and Linn (2000) used the term 'directed prompts' to describe prompts intended to elicit planning and monitoring (for example, 'When we critique evidence, we need to . . .'; 'In thinking about how these ideas all fit together, we're confused about . . .'; 'What we are thinking about now is . . .') or to check for understanding ('Pieces of evidence we didn't understand very well included . . .'). Such generic prompts provide more 'freedom' for students to reflect on their learning, whereas directed prompts may misguide some students with a 'false sense of comprehension'. Students' level of autonomy was found to interact with their use of generic prompts for reflection, with middle-level autonomy students gaining most from the reflection prompts, as they 'were allowed to direct that reflection themselves' (Davis, 2003: 135).

Gan (2011) used the three-level model of feedback (Figure 7.2) to devise methods to coach students to identify what knowledge was required for each level and how to generate feedback that was targeted at that level of understanding. In his control classes, he found that the unprompted or untrained students seemed to adopt a 'terminal' feedback approach, whereby the solution or right answer was provided and praise was used to reinforce the notion of a correct response. This terminal peer feedback approach assumes that students are capable of drawing inferences or making judgements based on the corrective information, and then decide on the corrective action to move from their current state of understanding to meet the success criteria. While it may seem probable for higher-ability students to come up with their own revision strategy, this is most unlikely for lower-ability students. Conversely, the progressive peer feedback approach provides students with a mental picture that breaks down the feedback into concrete steps, allowing students to focus on a specific area on which to

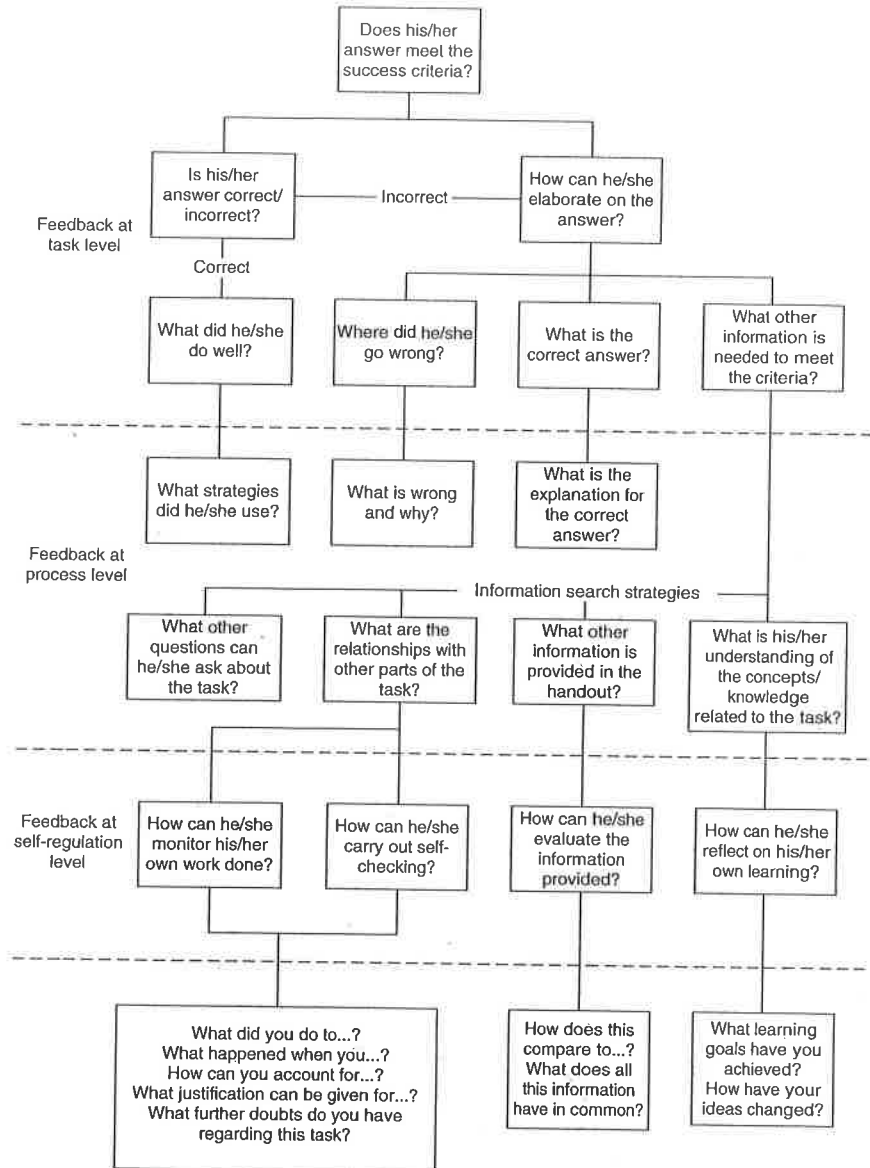


FIGURE 7.2 A rubric to help students to decide on appropriate feedback to peers

work. This organization of learning and feedback may be seen to be reducing the demand on a student's cognitive resources, enabling him or her to draw connections, identify the learning gaps, and take corrective action. This seems a difficult task, so Gan devised a graphic organizer with hierarchical feedback levels.

He used science classes in Singapore and New Zealand to evaluate the effectiveness of this model. It required planning by the teachers to conceive of the task, processes, and desired self-monitoring by students in the content

domain. As importantly, the task had to be sufficiently challenging to prompt the need for peers to give each other feedback. This had the added bonus of helping teachers to articulate their actual learning intentions and success criteria, and this was made easier when teachers then critiqued each other's plans and rubrics prior to teaching. The results of his studies indicated that coaching students to formulate peer feedback at task, process, and regulation levels had a significant effect on the quality of feedback that students provided in their written laboratory reports.

The students began in their pre-test class by predominantly providing task-level feedback to their peers, with hardly any feedback at the process or regulation level. When students were explicitly coached on how to differentiate the feedback at task, process, regulation, and self levels (using the model), they were able to formulate more feedback at the regulation level (from 0.3 per cent to 9 per cent of all feedback at self-regulation level). The interviews showed that the students and their peers regarded giving and receiving peer feedback to be a potentially enriching experience because it allowed them to identify their learning gaps, collaborate on error detection and correction, develop their ability to self-regulate, including monitoring their own mistakes, and initiate their own corrective measures or strategies. A major message is that the positive value of peer feedback requires deliberate instructional support (such as the use of Gan's model) of the three major feedback levels, and associated prompts for each level.

VISIBLE LEARNING – CHECKLIST FOR DURING THE LESSON: FEEDBACK

38. Teachers:

- a. are more concerned with how students receive and interpret feedback;
- b. know that students prefer to have more progress than corrective feedback;
- c. know that when students have more challenging targets, this leads to greater receptivity to feedback;
- d. deliberately teach students how to ask for, understand, and use the feedback provided; and
- e. recognize the value of peer feedback, and deliberately teach peers to give other students appropriate feedback.

Conclusions

As a father, I was aware of the low levels of feedback that my own boys were likely to receive at school. Each night over dinner, the questions 'What did you learn/do at school today?' or 'What was the best thing that you did today (other than playtime)?' were replaced by 'What feedback did you receive from your teachers today?' At least once a day, the aim was that they attended to at least one

piece of feedback if for no other reason than to allow the dinner conversation to move to more interesting matters. It is the critical questions into which students need to be attuned – to learn how to seek or receive feedback about where they are going, how they are going there, and where they should go next.

There is a lot known about feedback, but there is much more to be discovered about how to optimize its power in the classroom. On the one hand, feedback is among the most powerful influences on achievement; on the other hand, it is among the most variable of influences. For feedback to be received and have a positive effect, we need transparent and challenging goals (learning intentions), an understanding of current status relative to these goals (knowledge of prior achievement), transparent and understood criteria of success, and commitment and skills by both teachers and students in investing and implementing strategies and understandings relative to these goals and success criteria. The suggestion is that models of feedback need to consider its multidimensional nature: feedback has dimensions of focus (for example, the three feedback questions), effect (for example, the four feedback levels), propensity (for example, the cultural and personality dispositions of the receiver), and types (see Shute, 2008).

To make feedback more powerful and to ensure that it is received and used, there is a need to know much more about how students set academic mastery goals (more so than performance, social, and certainly avoidance goals), and how teachers and students set targets for learning – because these can then enhance and increase the value of feedback towards these goals and targets. The notion of ‘personal bests’, and challenge, commitment, progress feedback, and student assessment capabilities (Absolum et al., 2009) are central to the effects of feedback, as are understandings about the various feedback strategies and different types and functions of feedback. Inviting students to have a sense of ‘with-it-ness’ with respect to feedback should be a major outcome of lessons.

It may also be important to consider the nature and dosage of feedback. It is likely that it is more effective when provided in incremental steps (and this applies to students, teachers, and administrators). So often, feedback is dished out in a long screed, encompassing so many different ideas and prompts, and thus allowing the receiver to be selective or to miss the priorities, and possibly leading him or her to become more confused. Feedback needs to be focused, specific, and clear.

A number of mediators of feedback and achievement have been identified, including the distinction between focusing on giving or receiving feedback, how the culture of the student can mediate the feedback effects, the importance of disconfirmation as well as confirmation, and the necessity for the climate of the learning to encourage ‘errors’ and entice students to acknowledge misunderstanding – and particularly the power of peers in this process. When assessments (tests, questions, and so on) are considered as a form of gaining feedback such that teachers modify, enhance, or change their strategies, there are greater gains than when assessment is seen as more about informing students of their current status. This is all the essence of formative assessment.

Note that there is no discussion in this chapter on feedback relating to marking or grading. This is because the messages are about 'feedback in motion', primarily assisting all to move forward based on correctives and information that reduces the gap between where students are and where they need to be. Too often, comments on essays or other work are too late, too ineffectual, and ignored. As Kohn (2006: 41) noted: 'Never mark students while they are still learning.' Students see the mark, so often, as the 'end' of the learning. The major reason relating to the nature and structure of these pieces of work that are graded is that they are the outputs of lessons and learning is more likely to occur during rather than after the learning is finished (or 'handed in'). Students soon realize the poverty of the feedback from such work other than a summative grading of the work: they look to the grade, and then to their friend's grades. The comments can provide justification for the grade, but there is little evidence that the comments lead to changes in student learning behaviours, or greater effort, or more deliberate practice – mainly because students see the 'work' as finished.

It should be clear that there are many complexities when aiming to maximize the feedback received by students. Students differ in the receptivity and willingness to understand feedback relative to their cultural backgrounds, their reaction to confirmation and disconfirmation, their experience of handling error, the way in which tests and assessments have proven useful for moving forward, how successfully they have taught to maximize the usefulness of feedback, and the role of peer feedback.

There is an exciting future for research on feedback. That feedback is critical to raising achievement is becoming well understood, but that it is so absent in classrooms (at least in terms of being received by students) should remain an important conundrum. It could be powerful to move research beyond descriptions of types of feedback towards discovering how to embed 'best fit' feedback not only in instruction, but also to help students to seek it, evaluate it (especially when provided by peers and the Internet), and use it in their learning – and towards teachers receiving feedback from students such that they then modify their teaching. This may require a move from talking less about how we teach to more about how we learn, less about reflective teaching and more about reflective learning, and more research about how to embed feedback into the learning processes. It probably requires better understanding of classroom dynamics, and providing ways for teachers to see learning other than merely through their own eyes and reflection, but instead through the eyes of the students.

Shute (2008) provided nine guidelines for using feedback to enhance learning:

- focus feedback on the task not the learner;
- provide elaborated feedback (describing the 'what', 'how', and 'why');
- present elaborated feedback in manageable units (for example, avoid cognitive overload);

- be specific and clear with feedback messages;
- keep feedback as simple as possible, but no simpler (based on learner needs and instructional constraints);
- reduce uncertainty between performance and goals;
- give unbiased, objective feedback, written or via computer (more trustworthy sources are more likely to be received);
- promote a learning goal orientation via feedback (move focus from performance to the learning, welcome errors); and
- provide feedback after learners have attempted a solution (leading to more self-regulation).

She also noted interactions with the level of student achievement: use immediate, directive or corrective, scaffolded feedback for low-achieving students, and delayed, facilitative, and verification feedback for high-achieving students.

Sadler (2008) claimed that in order for feedback to be effective and useful, three conditions have to be met: the learner needs the feedback; the learner receives the feedback and has time to use it; and the learner is willing and is able to use the feedback. So why do students not receive the feedback that teachers claim amply to provide? Dunning (2005) has studied this problem extensively and offers some fascinating explanations. First, for students, feedback is at best probabilistic: there is no guarantee of getting it – especially when it is needed; it is often incomplete – students often cannot know outcomes from alternatives; it is often hidden – and thus the consequences may not be obvious; it can be ambiguous – what is the action that led to the feedback?; and it is biased – it so often includes praise.

Secondly, students (like us all) have biases towards receiving feedback that they want: we seek positive co-occurrences; we create self-fulfilling prophecies; we fail to recognize mistakes in hindsight; we seek feedback consistent with self-image; we accept the positive and scrutinize the negative; we code positive broadly and negative narrowly; we attribute positive to self and negative to anything else; and we misremember feedback.

No wonder giving feedback that is then appropriately received is so difficult.

Exercises

1. As per Exercise 5 in Chapter 6, have a colleague observe your class through the eyes of the students. For example, have this colleague sit in the room, take a script of everything that you say and do, and, most critically, choose two students and note all that they do, react to, and talk about (as far as your colleague can hear). At the end, print out the script and together identify each occasion on which the teacher provided feedback, and *each* occasion when the two students received and acted upon any feedback.

2. Interview five teachers and five students about what 'Feedback looks like and sounds like', and give an example of useful and not so useful instances of feedback. Share these with other teachers who have completed this task. Are there commonalities in terms of corrective or formative feedback?
3. Take a video of one of your classes. Review the lesson and consider where there were opportunities for the students to gain more effective feedback about their progress in the lesson. Practise these opportunities with colleagues and then aim to find occasions in your next classes on which to enact them.
4. After the next administration of a test in your class, detail what you have learned from interpreting the results, what you would do differently, and what you would re-teach. In light of these details, ask whether the assessment served its purpose in providing feedback to you as a teacher. If not, change the assessment to maximize these opportunities.
5. Practise giving each student rapid formative assessment and practise inviting the students to seek feedback about their progress on at least three occasions each during the lesson. Evaluate the value of this intervention.
6. Discuss the following things, which I would argue are true.
 - a. Norm-reference tests are optimized when the students get, on average, 50 per cent of the items correct; criterion-referenced tests are optimized when each student gets 50 per cent of the items correct.
 - b. A teacher is responsible primarily for ensuring that every student makes at least one year's progress for one year's input than for bringing students up to expected proficiency levels.
 - c. Feedback is more powerful when it is sought by the teacher about his or her teaching than by the student about his or her learning.
 - d. Formative interpretations cannot be accomplished without including some form of assessment.
 - e. 'Errors' relate as much to gifted as to struggling students and should be seen as opportunities.
 - f. The major reason for administering tests in classrooms is for teachers to find out what they taught well or not, who they taught well or not, and where they should focus next. If a test does not lead to a teacher evaluating these claims, it was probably a waste of everybody's time and effort.
 - g. The teacher's role in testing is to help students to exceed their expected grade on the test.
 - h. If a teacher prints out the test results, it is probably too late to change instruction!