

The power of in-lesson verbal feedback

So far we have established a culture within which feedback is most effective, and described learning frameworks which give purpose and meaning to the feedback given or received.

This chapter unravels the many interwoven, mostly verbal feedback exchanges which take place, in the moment, during lessons. We begin by looking at the most significant research findings about feedback as it relates to the classroom experience, then focus on student to teacher feedback before teacher to student and students to each other.

Why within the lesson and verbal is best

Our starting point is the importance of feedback happening, where possible, during the learning rather than after. There are many possible analogies which make this blindingly obvious, especially in the context of physical activity. Imagine a coach writing down his tips to the football team rather than talking and listening to the players during the half time break.

A teacher of 11-year-olds sent the following email to us:

I had a real moment of clarity about instant feedback whilst I was on a residential trip with my class. They were abseiling and I was watching and listening to how the leaders were teaching them to abseil. The feedback was immediate and the children responded to it: 'straighten your back; move your feet further apart; feed the rope through'. I suddenly realised how pointless this feedback would have been walking back to the minibus or back at the centre – a missed opportunity.

(Rachael Clargo Winchcombe, Abbey School)

Now imagine a student writing a characterization, handing it in, then getting it back with an improvement suggestion a few days later – compared to a lesson in

which half way through the writing, one student's work is projected for a class analysis of its successes so far and suggestions for improvements. Analysing their own attempts, the class resumes writing, constantly self reviewing for successes and improvement possibilities. Paired collaborative discussion follows, focusing on one person's writing at a time, in which, again, successes are pointed out with reasons given and improvement suggestions are offered.

This scenario will be described in more detail during this chapter, but for now serves to illustrate the potential and power of verbal feedback taking place in 'the golden moment' when the context is alive, the student is 'in flow' and the learning is gaining momentum.

1. Feedback links

In gauging how and when to give feedback, how often and how much, it is useful to see the results of various key studies around the theme of feedback. Student self-efficacy and their trust in the teacher and fellow students is a vital starting point, but our knowledge of how we remember or forget things also helps us in the complex process of determining appropriate feedback. The impact of positive and negative feedback is also explored and distinguishing between feedback as given and feedback as received is, of course, the crux of the matter if we are to impact student learning at all.

Student self-efficacy

Self-efficacy is the term which describes the level of confidence we have in ourselves to reach our goals. This should not be confused with self-esteem, which is how we feel about ourselves as individuals, and has much less impact on our achievements at school. I might decide that I am a nice person (high self-esteem) but no good at school (low self-efficacy) or think I am a high achiever (high self-efficacy) but believe that nobody likes me (low self-esteem). Before we begin to understand student understanding and how to respond to what we think we see, we need to be sensitive to how student self-efficacy affects students' answers to our questions, to their motivation and their effort.

High self-efficacy

High self-efficacious students are more likely to make more optimistic predictions about their performance after initial failure than after initial success. Such failure could be because of criticism, pointing out of errors or insufficient quality, or some form of disconfirmation of how well the student thought of his or her work. These students feel highly able, so negative feedback simply spurs them on and they are likely to even seek it, because they know it will extend their skill level (Bandura, 1997).

Low self-efficacy

Students with low self-efficacy can react negatively to both positive and negative feedback but respond positively to ability feedback ('You are mastering these problems') and effort ('You've been working really hard'). Care is needed, however, as positive feedback about initial success ('Great start – you got the tens column right!') might be interpreted as confirmation that they had a deficiency that needed to be remedied. They might engage to further deepen the skill in question but, in the long term, these students can avoid investing effort in learning if they are told they are making errors or if further tests disconfirm their efforts. Disconfirming feedback is likely to have the greatest negative impact on subsequent motivation for low efficacious students – they are likely to experience negative emotions, show less motivation for a subsequent task and attribute the feedback less to effort and more to their perceived ability (Hattie & Timperley, 2007).

Carol Dweck's work on student's reactions to feedback (2000) revealed that students with low self-efficacy more typically attribute success or failure as follows (ideal scenarios italicized and in red):

	Success	Failure
<i>Internal factor</i>	I did well at this test	I didn't do well at this test
External factor	I did well because the teacher likes me	I didn't do well because the teacher doesn't like me
<i>Stable</i>	I'm good at this subject	I'm no good at this subject
Unstable	I was lucky	I was unlucky
<i>Specific</i>	I'm good at this subject but who knows about the others	I'm no good at this subject but who knows about the others
Global	I'm good at this so I'll be good at everything	I'm no good at this so I'll be no good at anything

Kluger and DeNisi (1996) found that when students are given feedback, they can do one of four things: change behavior, change the goal, abandon the goal or reject the feedback. Clearly we want students to change their behaviors (unless they have achieved the goal, in which case we want them to aspire to a higher goal), particularly by increasing their effort and aspirations rather than ignore the feedback or decide the work is too easy (at least they can find a higher challenge) or too hard (likely to give up).

Underpinning much of this is the level of trust generated between teachers and students. Students need the knowledge that the teacher cares about and likes them, that they are safe, that peers will not disparage them, that they will not lose face

if they ask a question and will be treated with respect. They can then make their learning visible: question, ask for help or share misconceptions. Without this they are already on the back foot when given feedback. Their lack of trust means their engagement with the feedback will be limited, they might choose not to ‘hear’ or interpret the feedback, and their motivation to act upon it led mainly by compliance.

Remembering and forgetting

As so much of our job is helping students to be able to remember a great deal of what they are taught, including any feedback they might receive, it is useful to know what research tells us about memory. Remembering consists of acquiring memories (encoding), putting them somewhere (storage) and finding them when we want them (retrieval). Our working memory is simply, in the present moment, a) what we are paying attention to and b) the ongoing retrieval of related memories which help us makes sense of what we are learning. As humans, our working memory capacity can be quite limited.

Cognitive Load Theory

When our working memory is overloaded, learning is minimal, so knowing how to maximize cognitive load has clear implications for teaching.

Cognitive Load Theory was developed by John Sweller in 1988 (Figure 4.1). The widely accepted model of CLT is that the process of human information processing has three parts: sensory memory, working memory and long-term memory. Information from our sensory memory (everything we see, hear and feel) passes through our working memories and is then mostly discarded, focusing on only what matters at the time (*e.g. at this moment I can hear birds singing, a gardener in*

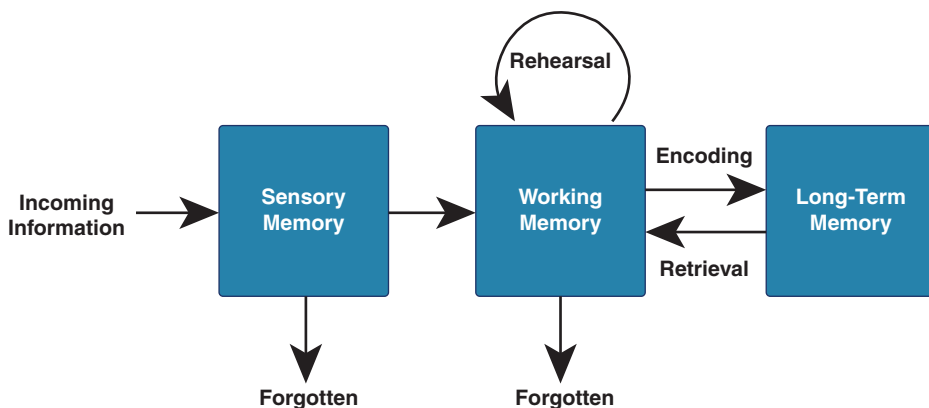


Figure 4.1 Cognitive Load Theory

(Adapted from Atkinson, R.C. and Shiffrin, R.M. (1968), ‘Human memory: a proposed system and its control processes’ in Spence, K.W. and Spence, J.T. (Eds.), *The Psychology of Learning and Motivation*, (vol.2) New York: Academic Press pp. 89–95)

someone's garden, a door closing, my husband typing and a car in the distance, but I am writing these sentences so everything else is discarded while I focus on how to best explain cognitive load theory!).

We can hold between five and nine items (or chunks) of information at any one time. It is very difficult to hold eleven random numbers, for instance, in our working memories. Try 84739013421! If we can chunk any of them into single items, the possibilities become greater (e.g. the code for my town is 01342, which is stored in my long-term memory, which counts as one item in this string of numbers for me, so I now have only the other five numbers to memorize.)

When we process information, we need to learn how to categorize it, then move it into long-term memory (e.g. *dog, cat, animal, buying something in a shop, catching a ball*).

Implications for teaching

- Since working memory has a limited capacity, we should avoid overloading students with additional activities that don't directly contribute to learning. For example, compare Figure 4.1 with Figure 4.2, where the diagram is now represented with the labels listed at the side, which places greater demand on our working memory because our attention is 'split' as we look back and forth between the information.
- When presenting students with information, we need to incorporate visual and written cues as far as possible so that working memory can deal with it more easily. Visual and auditory channels should be combined where possible to extend working memory (e.g. a video clip with narration rather than additional screen text: Mayer & Moreno, 1998). Watching a PowerPoint, for example, while also paying attention to the speaker talking about it can be manageable and useful for most people, but can be hard for some of us (Horvath, 2014).
- Break learning into parts which can be linked. The more connections, forming chunks, the less our working memory is overloaded. Linking items is the beginning of deep understanding.
- Analyzing examples of excellence as a class eases the cognitive load, as the student sees not only how the learning in question has been applied, but also what good learning looks like. The alternative would be to present bits of information then ask the students to do the work: no connections and no way of chunking, and then the cognitive load is heavier. *As a student (SC) in school in the 60s and 70s, history was 'taught' in my school as a set of dates and single liners (e.g. 1066 Battle of Hastings) which we had to copy into our books. A whole exercise book of these had to be learnt for the end of year test. I tried to memorize them but only managed to remember 3 or 4 pages. Looking back, I can see that, had these sets of dates been chunked (e.g. between 1000 and 1066) with linking stories about the historical events, I would have more easily been able to learn and memorize each chunk.* If we can show students how many ostensibly separate items link and make memorable chunks (e.g. all the ways in which Pythagoras' Theorem occur in the syllabus).

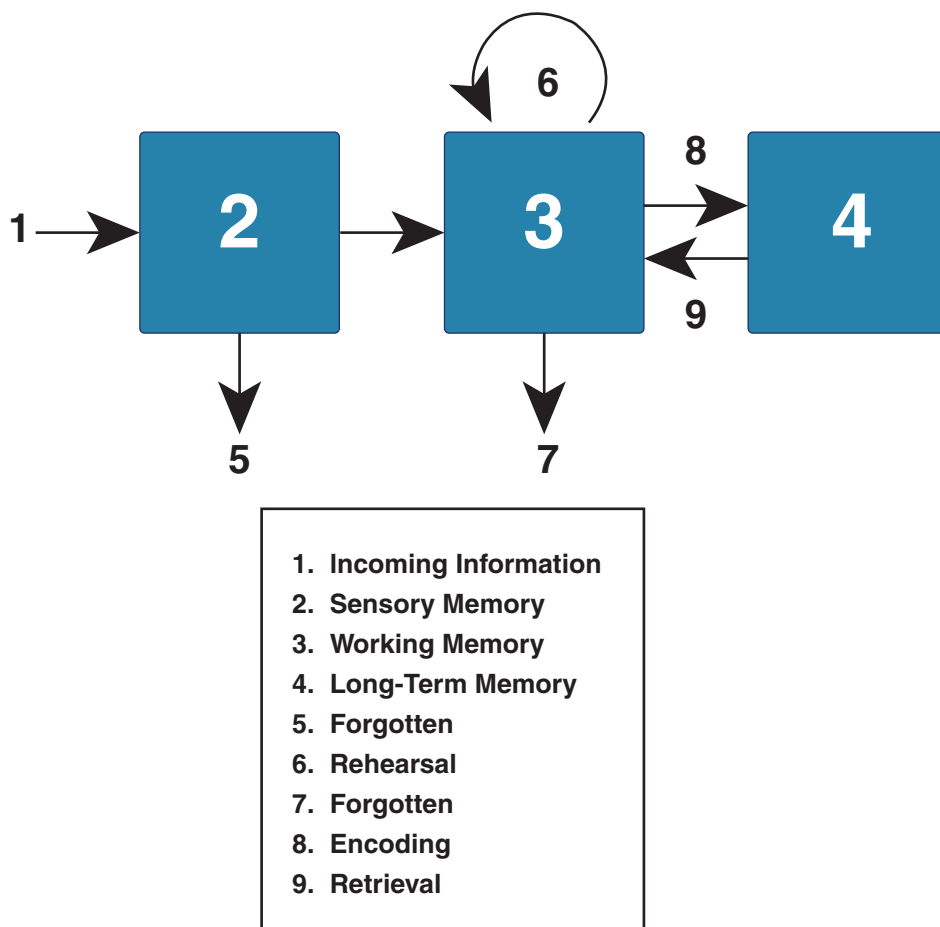


Figure 4.2 Cognitive Load Theory 2

(Taken from 'Cognitive Load Theory – helping people learn effectively' in www.mindtools.com)

we can help to ease the cognitive load. We need both the surface knowledge and the relationships between them to effect learning.

Desirable difficulties and memory

Robert Bjork (1994a) and Bjork and Kroll (2015) expounded the theory of 'desirable difficulties' – that by making information more difficult to encode we can improve our ability to retrieve it later. So by making students 'think hard' about subject content (seeking challenge as the essence of the growth mindset), the more likely they are to remember it. We should also not give too much help or feedback which takes away the cognitive demand of the task. It is common in mathematics lessons, for instance, for struggling students to have the steps broken down when solving a

problem to such an extent that the task is emptied of the mathematical ‘big ideas’ (Brousseau, 1997). Better, perhaps, to ask questions about the student’s efforts so far which give them a way forward without telling them precisely what to do at every step. When breaking down into smaller, easier steps a piano piece, a gymnastics move, the conventions of grammar or a specific mathematical algorithm, we still need to keep the challenge factor alive as well as rooting the small step clearly within the big picture of the whole task.

Forgetting helps us remember

Bjork’s work on memory (2011), has shown us that forgetting is also an important stage of learning, because when we encounter the learning again we are more likely to remember and store it in our long-term memory: *‘Forgetting, rather than undoing learning, creates the opportunity to reach additional levels of learning’*. We might have forgotten or not be able to retrieve vocabulary in a language we haven’t used for years, for instance, but the words are stored and, as we revisit the vocabulary, we find that the act of remembering is much faster than it was the first time around. We appear to also have greater capacity to learn more vocabulary. Perhaps we need to think about things students have forgotten in the same way we think about error and misconceptions: they are evidence, perhaps, of being on the brink of stronger and deeper learning when concepts or skills are retaught. We are not giving feedback which ‘starts again’, but instead rebuilding, with the student’s stronger glue, forgotten ideas – now easier to relearn.

The link with spaced or distributed practice

What we know about forgotten learning is one of the reasons underpinning the finding that *practice spaced out over time* in short sessions is much more successful for learning than *massed practice all at one time*. Having multiple opportunities over time to learn, and being given feedback about our understanding over time, is more likely to cause connections between ideas and stronger associations with what we already know, thus we are more likely to retain the learning in long-term memory.

Distributed practice and interleaved practice

Bjork’s research (1994b) suggests that interleaving the spaced practice helps long-term memory, so that the various skills and knowledge are dipped into frequently, and sometimes in different settings, so that students become used to accessing the relevant information more easily in any situation. It seems that frequent quiz or classroom tests of everything learnt so far is essential in keeping the retrieval mechanisms working, with items mixed (e.g. a mathematics test including all skills covered this year, rather than one area of study).

Context and memory

How students remember things depends on a number of factors, one of which is the context in which it was placed. Meaningful contexts have been an ideal for teachers for decades because we believe that the more we can link concepts or

knowledge to real situations, the more likely they are to be understood and remembered. One teacher of 9-year-olds covered map reading skills every year, studying maps then getting the students to find their way around the playground using different maps made by the teacher to a place where they would find ‘treasure’. As part of a learning team of teachers experimenting with formative assessment strategies, she involved the students, for the first time, in planning the activities to fulfil the learning intentions she had presented to them for a unit on map reading. The students suggested that they should be given maps to find their way around the town, something the teacher reported she would never have considered, but found a way to make it happen, putting the students in groups with volunteer parents. All started off in the local park and went in different directions following their maps, to the local cinema, in which they all watched a film together. The students did not know the intricacies of the town and were only allowed to use their maps to find their way, so meaning and purpose were combined. Their motivation was enhanced, according to the teacher, by the fact that this was *their idea and they were the ‘teachers’ of their own learning*.

The teacher, at a feedback session with the team of teachers, said that this event, and the associated map reading skills, were remembered by the students months later. Context matters, although we need to make sure that what students store in their long-term memories is the learning as the lasting memory!

Such real life contexts are hardly possible for every lesson in a school day, but meaningful, real life contexts are possible with some planning. In a lesson (see more detail in Chapter 2) in which school weights were wrapped up, estimated then revealed to 7- and 8-year-olds, a reality check was given when the teacher simply put up a photo of a polar bear and told the class that it weighed one ton, a weight many had guessed their kilogram weight weighed! A photo of an elephant followed (7–10 tons), then a bag of sugar (1kg), then a credit card (5g). Thus, context, purpose and meaning come together with what might have been a set of meaningless measures.

When to give less feedback

We also know that too much feedback too often and too soon before students have time to follow ‘stuck strategies’ can turn students into feedback junkies, too reliant on advice and therefore less likely to do well when left to their own devices. Judicious withholding, delaying and reducing feedback can boost long-term retention and lead to more sustained learning (Soderstrom & Bjork, 2015). This ‘holding back’ is more effective after the students have gained the ideas or information (the surface phase) and are moving into relating and extending ideas (the deeper phase). It is the optimal time to encourage the students to follow ‘what to do when you are stuck strategies’, go into the pit of unknowing (Nottingham, 2017) and let them wallow in error. At the right time after this learning pit, it might be necessary to provide a shower of clean new learning and check

the students' understanding and provide appropriate 'where to next' or 'how to improve' feedback.

When to delay feedback

Delaying feedback can have great benefits as it functions as a form of restudy when retrieval strength is low. When *higher achievers*, for instance, provide correct responses, delaying feedback can sometimes increase its strength (they won't see the work as over and might be motivated to check their answers for accuracy). For *lower achievers* it pays to provide immediate feedback, as the cognitive demands can be too high if the feedback is delayed (Li, Zhu & Ellis, 2016). Trying to remember the context, the problems and the processes involved at a later time creates unnecessary difficulties, so immediate feedback is more appropriate.

When feedback follows too quickly after or during learning, and this feedback is either not understood or not enacted by the student, this can reinforce errors, as students associate whatever they did with the feedback they were given, even though they did not hear the feedback! When students see mistakes as an important part of the learning process, they are more likely to hear and value the feedback.

Giving is not receiving

Teachers might claim that they give a great deal of feedback, but the more appropriate measure is to determine what kind of feedback is actually received (and this is not very much). Most teacher feedback is presented to groups or the whole class, which encourages students to often believe that the feedback is not about them – hence the dissipation of well-meaning feedback. Carless (2006) has also shown that teachers consider their feedback far more valuable than the students receiving it. Students unfortunately often find feedback confusing and un-reasoned. Sometimes they think they have understood the teacher's feedback when they have not, and even when they do understand it, they might not know how to use it (Goldstein, 2006). Higgins et al. (2002) argues that:

Many students are simply unable to understand feedback comments and interpret them correctly.

Much depends on students' understanding of the meaning and nature of feedback; whether the feedback provider is perceived as powerful, fair and trustworthy; and the emotions (rejection or acceptance) associated with the context, level of investment and manner of the delivery of the feedback (kind, helpful, specific compared to hurried, impatient and too general perhaps?). The message is always to check to understand how students interpret the feedback that is provided: 'What did you understand from what I just said? How would you use this feedback in your next learning step? Is there more you want from me right now to help in your learning?'

2. From student to teacher

What matters

The feedback teachers receive *from* students is our first and most important focus. The teaching/learning dynamic becomes synthesized when students are able to communicate their needs to teachers, and when teachers takes account of everything in front of them which constitutes feedback from the student: body language, behaviour, motivation, apparent understanding, misconceptions, avoidance tactics, strategies used and so on. It is hard to accept that sometimes misconceptions or bad behaviour are the result of mismatched tasks to student competence or tasks which are too boring, not sufficiently challenging or unclear, rather than the fault of the student for not being diligent or for being a low achiever, but these are possibilities which must be acknowledged if we are to maximize student achievement.

Look at the responses from a 6-year-old student, from Ross Elementary School, California when questioned by her father, Michael McDowell, about learning and feedback. It would be interesting to know whether the class teacher was aware of her thoughts:

Q: *What makes a great learner?*

A: Someone who takes feedback and puts it where the teacher says. If you don't know a book you should read slowly. Sometimes before I raise my hand I check my work then I can give myself feedback and fix things. Sometimes I don't like feedback from other people.

Q: *How do you feel when you get feedback?*

A: I sometimes feel uncomfortable and sometimes OK with it. Sometimes I think I don't want that feedback.

Q: *What happens to your brain when you make a mistake?*

A: It grows.

Q: *When is the best time to have a growth mindset?*

A: What I usually do when I make a mistake I don't say 'Oh no!', I say 'Yay! My brain is growing!'

Effective feedback consists of three teacher components as seen below. This forms a continuous cycle of finding out and subsequent feedback, most effectively during lessons, but includes findings from post-lesson information (see next chapter). These three components align with a) Where am I going? b) How am I going? and c) Where to next? How can it be improved?

Teacher	Student
a) <i>checking to see if the students understand the nature of the learning task and are able to evaluate whether the learning they are doing is good enough,</i>	Where am I going?
b) <i>a constant quest to understand students' understanding, rather than to assume, then to</i>	How am I going?
c) <i>facilitate appropriate feedback as a result of those findings.</i>	Where to next? How can it be improved?

These three stages make the process of finding out and giving feedback sound deceptively easy, but, because learning is neither linear nor perceptible (only performance can be seen, although encouraging students to think aloud helps them and their teachers know where they are in the learning cycle) and progresses at different rates with inevitable times of forgetting, it is anything but. Students are unique individuals with different levels of self-efficacy, so we are constantly balancing students' individual needs with the needs of the task; a remarkable achievement considering the number of students in the average class. Current performance can be a highly unreliable guide as to whether learning (i.e. long-term retention and transfer of skills and knowledge) has happened. When we are eliciting current understanding, the first thing to accept is that we cannot ever actually get inside the student's brain and see what they understand. We can only approximate by what we see and hear as a result of our questioning ('What could you do first?' rather than 'So first you have to ...') and the expectations of the task. A question like 'How many different ways can you draw shapes with an area of 24 sq.cm?' will reveal more of the student's thinking and understanding than 'Find the area of a rectangle measuring 8cm by 3cm'.

We do the best we can, gradually building up skills and competences, evaluating frequently and spacing the learning rather than teaching 'massed' blocks which get forgotten more easily than if the skills are frequently revisited.

The following sections describe ways in which teachers have used effective strategies to find out what students are thinking and what they do or don't know during the course of a lesson, bearing in mind that we suggested that lessons begin with some kind of discussion probe at prior knowledge before proceeding (see previous chapter). Some of the strategies here are simply gathering techniques (such as eavesdropping) whereas others involve both receiving and then giving feedback in the moment, as well as the feedback being acted upon (as in mid lesson learning stops).

Strategies for uncovering student understanding

Questioning by teachers

Asking good questions of the whole class and then of individuals while they are working, during continual ‘walkabouts’, is the teacher’s main aid to establishing current knowledge or the depth of student understanding while it is happening. Once students are engaged in some independent work, questions can be asked *of individuals* such as these:

- Tell me/show me what you have learnt so far
- Tell me what you’re going to do first
- What do you mean by? (key question, even if the teacher thinks s/he knows what they mean by it)
- Why do you think...?
- Give me an example of what you mean (key question as often reveals misconceptions)
- Can you develop on that? Tell me more...
- So why is this one better than that? (key question if concrete example available)
- How could you change this to make it clearer?

The more you probe, the more is revealed, so ‘*What do you mean by...?*’ is a simple way of getting to the heart of student understanding. Such questions should aim to elicit a longer reply by the student than the length of the teacher’s question. Many answers given by students are correct but don’t reveal the level of their understanding. For example, the answer ‘connectives’ or ‘numerator’ might be right, often picked up by knowing it’s the right word to say, but ‘*What do you mean by a connective/cosine?*’ or ‘*Give me an example*’ as a follow up to either answer will reveal the student’s current understanding. If this is a constant feature of a lesson, all students, over time, will get a good deal of face to face informative questioning by the teacher and lessons will be more effectively redirected as students’ understanding is continually revealed. ‘*So why is this one better than the other one?*’, used when students have examples of good and not so good in front of them, helps focus them by referring to concrete examples. A student struggling to explain how one of the two given balanced arguments could be improved, for instance, can be directed to a specific comparison of say, the use of percentage to back up claims in each, where the improvement need is now more obvious.

These enquiring questions by teachers to seek feedback about their students’ understanding can be powerful. Much more so than the typical ‘What am I thinking?’, ‘Who knows the answer to this factual question?’ and other typical questions that are common in many classrooms. We know that many teachers ask 150+ of these knowledge questions a day with 90% mainly about the facts and less than 3 seconds’ response time needed. There is very little feedback to teachers because of asking this kind of question, except to confirm that the one student who was asked to respond to the question either knows the answer or doesn’t. Instead, what is needed are questions, such as the above, which assist us in evaluating their impact, and give guidance for where to go next in the learning.

With random talk partners, 30 seconds, say, can be given for students to discuss any questions directed to the whole class, and some form of randomizer is used to determine who answers, the damaging ‘hands up’ culture is removed. Thus ‘wait time’ is extended to include articulation of the thinking.

Questioning by students

To be an independent learner one has to be able to ask questions and continue to ask questions in the quest for new learning and understanding. By equipping students with question stems they can ask each other or teachers, we are not only gathering key information about their current understanding but encouraging independent and deeper thinking. Marty Nystrand (2006) found that the most powerful student questions were ‘**impact questions**’. By this he meant

- a) **questions where what counts as an acceptable answer is not pre-specified** (e.g. *What do you think would happen if...*),
- b) **uptake questions, where the teacher incorporates students’ responses into subsequent questions** (e.g. *So, taking Mia’s point, does this change anything?*) and,
- c) **the extent to which the teacher allows a student response to modify the topic of discourse** (e.g. *We agree with Finn that we should also think about...*).

In each case the student is given the opportunity to express what they do and do not know, and allows the teacher to hear the current level of knowing and understanding by the student.

Will Ord, an expert in ‘Philosophy for Students’, suggests the following questions for teachers and students alike, following a surface to deep journey:

Clarification (surface)	Reason and evidence (surface consolidation)	Implications and consequence (deep)	Explore alternative views (deep consolidation)
Can you explain that?	Why do you think that?	What would be the consequence of that?	Can you put it another way...?
What do you mean by...?	How do we know that?	How would you test to see if that is true?	Is there another point of view...?
Can you give me an example of...?	What are your reasons for...?	What follows (what can we work out) from what you say?	What if someone suggested that...?
How does that help...?	Do you have evidence of...?	Does that view agree with what was said earlier?	What is the difference between that view and...?
Does anyone have a question to ask about that idea?	Can you justify your opinion?		What would someone who disagreed with you say?

(Will Ord, from ‘Thinking Education Limited’ www.thinkingeducation.co.uk)

Eavesdropping

Talk/learning partners can make students' thinking more transparent as they are given many opportunities to articulate their thinking. Partner discussions, after good teacher questions, present golden opportunities for the teacher to listen in on those often-illuminating conversations before asking random students to share their thoughts with the class. Misconceptions noted lead to 'on the hoof' changes to the lesson. Without this opportunity to hear what students are thinking we might carry on the lesson with misconception being built upon misconception.

Avoiding assumptions

Because of teachers' impossible task of being able to watch every student for every minute of a lesson, inaccurate assumptions are often made when 'visiting' students during a lesson, especially with young or with struggling students, because they rarely speak up to correct a teacher's wrong assumption. The dilemma is that to keep some sort of order in our classrooms, students are taught from an early age to listen, pay attention and not to interrupt the teacher – great for order but not for honest student feedback. To allow for more impact questions and for students to indicate they may not know or understand, it is first necessary to build trust, not only between the teacher and students, but also among the students. Errors thrive in a trusting environment and are stultified in a non-trusting environment. Video evidence captured for Clarke's video platform revealed two examples of inaccurate teacher assumptions:

Example 1

The class of 7-year-olds is asked to show 37 on a place value mat using 10 sticks and ones. We see Student A immediately placing 3 tens in the right place, then counting his ones but stopping as he runs out of units. There are not enough ones on the table for all the students. His neighbour, Student B, also runs out of ones and asks if he can borrow one of Student A's. The first student has by now become bored, has picked up all his ten sticks and happily hands over a unit to his friend. At this point the teacher arrives, sees the first student's empty mat and begins to carefully explain to him how to lay out 37...

Example 2

The class of 6-year-olds is working on 'student initiated mathematics'. One student has chosen to write out her $\times 9$ table. As she writes, she counts on 9 on her fingers each time. She writes $1 \times 9 = 9$, $2 \times 9 = 18$, $3 \times 9 = 26$, $4 \times 9 = 35$ etc., with all now wrong from 3×9 onwards. The teacher talks to her about how she

could check 3×9 and they agree she will get paper plates and counters to share out. The camera follows the student for the next few minutes and we see her using one of the plates to pile up some counters and then laying out the other 3 plates to do her sharing. When the teacher arrives she sees 4 plates, all with counters on them and assumes the student is working out 4×9 instead of the agreed 3×9 . She sweeps all the plates away and gets the student to start again.

In neither instance, do we see the student explaining to the teacher what has happened. Instead we see teachers making assumptions by what they see in front of them. Why doesn't the first student say 'We ran out of counters. I know how to set out 37'. Why doesn't the second student say, 'I was using this plate to carry the counters?' If the camera could capture so much just following one student each time, how many more times are similar things happening? As it is impossible to be everywhere at once, it seems that there are two possible solutions: firstly, that students need to be shown, modeled perhaps, how they are given permission to tell the teacher when they have misread a situation; secondly teachers can pre-empt this scenario by first asking 'Can you tell me what you've done so far?' The main message is 'do not presume': seek the feedback from the student about what they think is going on. If one of our prime aims is to get feedback from students and therefore learn more about their current understanding, we need to encourage perhaps bolder responses from them so that they are more accurately represented.

3. From teacher to student and students to each other

Royce Sadler (1989), in his 'closing the gap' construction, states that the first stage of feedback is to possess a concept of the goal or learning intention, discussed in the previous chapter, which also looked at success criteria and analysis of worked examples. The next stages are as follows:

To compare the actual level of performance with the goal

To engage in some appropriate action which leads to some closure of the gap.

Taking this to mean not just at the end of the activity, but during, we see this manifested, in a classroom setting, as students articulating to their peers, and to the teacher, their understanding of the task and how it relates to the success criteria so far. This can be taken further and formalized, so that all are included, during mid lesson learning stops. Commonly, a random student's work, still in progress, is projected, analyzed and discussed by the class with feedback given about successes and possible improvements. Students then give feedback to each other based on the whole class modeling and analysis.

Establishing learning intentions and success criteria gives the framework within which teachers look for current understanding or misconceptions, although, as pointed out in the previous chapter, this does not mean that demonstrated excellence unrelated to the learning intention or success criteria should be ignored. Feedback thrives when the students are aware and have co-constructed the criteria of success and can then see how they are going and what to do next to move towards success.

At the self-regulation level (student able to self-assess, stay focused and so on), the commitment to goals is a major mediator of the effectiveness of positive and negative feedback. Van-Dijk and Kluger (2000) demonstrated that positive feedback increases motivation relative to negative feedback for a task that students '*want to do*' and decreases motivation relative to negative feedback for a task that students '*have to do*'. Thus, when we are committed to a goal we are more likely to learn because of positive feedback, but when we undertake a task that we are not committed to (and hence '*have to do*'), we are less likely to learn through negative feedback. We need to be driven, as we used to say. When students are committed to the goals, feedback can trigger

an internal comparison process, which determines how individuals react to feedback. Upon receiving negative feedback, individuals become more dissatisfied with their previous performance, set higher performance goals for the future, and perform at a higher level than those who receive positive feedback or no feedback at all.

(Podsakoff & Farh, 1989)

Positive feedback can enhance both free-choice behaviour (i.e. when students could return to or persist in the activity) and self-reported interest in the activity (Deci, Koestner & Ryan, 1999)

Feedback in the moment

This section describes possible practical scenarios for peer coaching, then moves on to mid lesson feedback stops, specific improvements and collaborative peer marking.

Although teachers move around classrooms continually asking questions or giving feedback when they are not explaining from the front, the last twenty years have been the subject of finding more efficient ways to ensure all students get feedback, from the teacher, and their peers, while they are in the process of learning. The very essence of formative assessment or feedback is the ability to react to the learning during the learning so that it can be enhanced before it is too late. We need to help students to seek, receive and use feedback, teaching them to check their efforts against success criteria and consider exemplars analyzed at the beginning of lessons or during mid lesson learning stops. Feedback happens in all directions and students are activated as learning resources for one another.

Peer feedback

Students need to know that they can seek help from other students, but we need to teach them how to engage in peer cooperation and collaboration in the most effective way.

An unsupported environment often leads to students seeking and gaining incorrect help, which they might not realize is incorrect. Ryan and Shim (2012) distinguished between: a) adaptive help seeking (*asking for help with the learning, such as an explanation or an example*) and b) expedient help seeking (*asking for help which gets the task done, usually the answer*). As students encounter the fast pace of secondary education and early adolescence, expedient help seeking increases. If we are to create independent problem solvers, time invested in discussing and modeling the essential feedback component of adaptive help seeking, is more than worthwhile.

Nuthall (2007), as a result of his extensive exploration of students' private classroom conversations, concluded that students live in three different, interacting worlds when they are at school:

- **The public world:** this is what the teacher sees and manages. Students mostly follow the rules and customs of the classroom, structured by the learning activities and routines.
- **The semi-private world:** ongoing peer relationships. This is the world in which students establish and maintain their social roles and status. Transgressing peer customs can have worse consequences for a student than transgressing classroom rules. This is the world in which adults are usually unaware of clique formation, teasing and bullying.
- **The private world of the child's own mind:** knowledge and beliefs change and grow; individual thinking and learning takes place and home and school spill over into each other.

The significance of these worlds links with the effectiveness of feedback. Our awareness of these findings can increase our sensitivity to when, where and how we give feedback. In the case of peer feedback, Nuthall found that students' conversations within the classroom were often about completion of the task (*'How many have you done?'*) and, if at the surface stage of learning, often contained misleading or incorrect feedback.

The optimal time for peer feedback is after the students have the ideas (the first two stages of SOLO) such that they are ready to make connections and relations between ideas. When still learning the foundations, it can often be more effective to re-teach the concepts than engage in peer feedback. There is little value of other students reinforcing wrong ideas and concepts. But when asking the students to play with ideas, explore relations between ideas and extend their thinking, peer feedback can be most powerful.

When students are consolidating deep learning, the power of working with others is most apparent. This involves skills in seeking help from others, listening to

others in discussion and developing strategies to ‘speak’ the language of learning. It is through such listening and speaking about their learning that students and teachers realise what they do deeply know, what they do not know and where they are struggling to find relationships and extensions. An important strategy is when students become teachers of others and learn from peers, as this involves high levels of regulation, monitoring, anticipation and listening to their impact on the learner.

(Hattie & Donoghue, 2016)

One way to enhance peer feedback is via peer coaching. Slavin, Hurley and Chamberlain (2003) outlined four mechanisms of cooperative learning which maximize feedback among students:

Motivation: students help their peers because it is in their own interests to do so if the rules and expectations for cooperation are well structured, leading to greater effort.

Social cohesion: students help each other because they care about their pairing or group, hence more effort.

Personalization: higher achieving students help lower achieving students and vice versa.

Cognitive elaboration: explanation forces students to think more clearly and consolidate their own understanding.

An example of the development of peer coaching in one school follows, building on these ideas.

Peer coaching in Langford School, Fulham

The idea of peer coaching was first launched in the school with input and video about basketball coaching followed by much discussion and the co-construction of success criteria for the elements of good coaching, as follows:

What makes a good learning coach?

- They help you reflect against the success criteria.
- They don’t tell you the answer. Instead they ask questions and make you think.
- They suggest strategies, (e.g. word choice), help you focus on particular elements of the success criteria to improve your learning.
- They are specific, helpful and kind.

The students were then given examples of peer coaching across the subjects, with lots of modeling around projected examples.

Peer coaching was then introduced in mathematics lessons with a further co-construction of what the success criteria would look like for a good mathematics coach, then the same for English lessons. These were the result of modeling and learning stops:

Prompts for being a good learning coach in English

- Is there anything you feel you need help with?
- What impact on the reader do you want to achieve?
- Do you think you are achieving this?
- How successful do you think you have been against the success criteria?
- How can you include this aspect of the success criteria?
- You could use a simile/metaphor etc. here. Can we think of one?
- Can you think of a better word instead of _____?
- Could you think of any adverbs to put before any verbs in your writing?
- Could you ask the reader a question in your writing?

Prompts for being a good learning coach in mathematics

- Have you followed the success criteria?
- Can you demonstrate that this is the right answer? Explain how you know.
- Would a whiteboard help you?
- Could you draw a diagram?
- What is the rule for (e.g. rounding numbers)?
- How do you know this number is (e.g. divisible by 2/prime/a factor of 32)?
- Let's talk through an example and go through the steps.
- Ask me questions and interrupt me if you don't understand.
- Now can you do this example on your own? Talk me through it.

Students know that they have to ask questions first in the coaching process and, if their partner can't get to the answer on their own, they need to explain, or work together to seek the answers.

Students are encouraged to use whiteboards and diagrams on paper to help their explanations and in their working out.

Every week they have a new random partner who they work with, peer coaching each other. Sometimes someone will say *'I really understand this so I can explain it to someone else'*.

Peer coaching in the school is now linked with the three learning zones (*see Chapter 2: panic zone, learning zone, comfort zone*). Students coach each other when marking

home learning activities and in mathematics lessons and are very keen to help their learning partners or others in the class. The quality is regulated by regular ‘what went well/what didn’t go well’ discussions after lessons in which coaching has figured.

Students’ and teacher’s comments about peer coaching in mathematics lessons with random partners in Langford School

10/11-year-olds

Coaching is when a fellow student asks you questions to help you understand a question you are confused about. These questions should eventually lead you to the answer of the question. What you should not do when coaching is give the student you are coaching the answers. The student would not understand how they got to the answer and in a test, if a similar question came up they would not be able to understand how to get to the answer, and you would not be able to give it to them. When a person is coached, they feel a sense of accomplishment and are appreciative to the person who coached them. The coach will feel happy that they helped someone.

(Shannon)

Coaching is when your learning partner is stuck on a question and they need your guidance so you help them making sure they understand how and why you did those steps. I think it helps my learning because sometimes in mathematics I struggle and I need coaching to help me understand why and how I have gotten the answer wrong. I like being coached because I get the opportunity to learn from my mistakes and I like coaching because I like it when I get to see others getting their own opportunity to learn from their mistakes and the satisfaction of knowing you helped someone learn from their mistakes is amazing. A good learning coach doesn’t tell their learning partner the answer.

(Amandeep)

A good learning coach doesn’t tell them the answer but leads them to it by asking questions. A good learning coach doesn’t give up when the student doesn’t get the answer right. A good learning coach doesn’t distract the person they are coaching by talking about unnecessary things.

(Mia)

Maddy Cooper, their teacher

The students are more in charge of their learning and the learning is more active. They have become learning resources for each other.

Sentence stems

Sarah Stevens and Paul Bloomberg, from The Core Collaborative, San Diego, devised the following peer conversation stems (Figure 4.3). The ‘next steps’ box

encourages further thinking and discussion. The more we give students the words to use to become learning resources for one another, the more enabled and proficient they become.

PEER CONVERSATION STEMS

ADMIRATION

- "I like what ___ said because..."
- "That's a great point, because..."
- "When you said...I understood ..."
- "This is interesting because..."
- "That's a great point..."
- "I agree with ___ because..."

QUESTION

- "Could you explain a bit more please?"
- "Could you show me?"
- "One question I have is..."
- "What do you think?"
- "I still have questions about..."
- "This makes me think"
- "I noticed that..."

INSPIRATION

- "What if..."
- "This makes me think..."
- "I wonder..."
- "I would like to add on"
- "Who else could we ask about..."
- "To add on to that..."

PERSPIRATION

- "Can you tell me more about..."
- "Could you please elaborate more on..."
- "Tell me more."
- "Could you give me an example?"
- "How do you know?"
- "If you did know the answer, what would it be?"

CLARIFICATION

- "So far we have said..."
- "I think the author is saying..."
- "So you are saying..."
- "Could we agree that..."

CLASS CREATION

COMMUNICATION: WHAT ARE NEXT STEPS...

THE EMPOWERED LEARNER SERIES

WWW.THECORECOLLABORATIVE.COM

Figure 4.3 Peer conversation stems

Mid lesson feedback stops: feedback for every student

Sadler's second and third stages of closing the gap – that students need to '*compare the actual level of performance with the goal*' and '*engage in appropriate action which leads to some closure of the gap*' – is again the focus of this section. The sections above have focused on ways in which students and teachers can get 'underneath the understanding' in order to facilitate effective feedback about their performance against the goal. Ongoing and mid lesson learning stops are integral to enabling the process of self-review, a striving to improve during the process and for students to see again examples of what excellence looks like, *thus providing feedback for everyone at the same time*. These are powerful pauses in the learning process, because they embody 'deliberate practice': specific identification of excellence and how, with examples or modeling, improvements can be made. This goes a long way to ensuring that feedback is given, received and then acted upon.

Teachers can stop at any time during a lesson and ask the class to analyze students' ongoing work projected on a screen, thus comparing their current learning with someone else's, after whole class analysis of excellent examples at the beginning of a lesson, or series of lessons. Random work is chosen, so that everyone is focused, not knowing whose work will be picked. Anybody's work can be discussed if the same process is used, whether the highest or the lower achiever is the author/mathematician/scientist or the like. The routine tends to be as follows:

1. The piece is projected on the screen. Ask the class to read through the piece first, look at it if art work, study it if mathematics and so on.
2. They decide, in pairs, what are the best bits, reflecting the success criteria and/or which elements have the greatest impact if narrative writing. As discussed in Chapter 3, a piece might have very few technical aspects but be brilliant in other ways. Students give their opinions about the best bits and these are underlined and analyzed as to why they are so good.
3. The class is then asked if there are any parts that could be improved or made even better, thinking of the purpose of the task and related success criteria. This might include vocabulary or punctuation changes for English, more justification or generalization in Science, points of error in Mathematics.

We don't want to improve things just for the sake of it. I once witnessed two students changing one really good sentence into a short sentence, taking out the good adjectives, simply because the success criteria listed short sentences for effect for a scary story. Students needing to develop 'a nose' for quality by exposure to wonderful sentences and phrases in excellent texts, so that they feel the quality rather than itemize it.

This process models for students how to analyze and edit their own work and to collaborate to discuss and improve each other's work, identifying effective elements then giving ***specific suggestions for improvement***.

What are ‘specific improvement suggestions’?

Ron Berger’s famous ‘Austin’s Butterfly’ YouTube clip (2013) has received global appreciation of ***the value of meaningful and specific feedback*** (e.g. *The wings need to be more pointy and more triangular*), ***rather than general feedback*** (e.g. *Try to make the wings look better*). Many teachers have shown this clip to their classes, emphasizing the importance of deliberate practice and specific improvement suggestions. Perhaps the greatest message of the video is the power of the collaborative approach, the public critique with clear guidelines given as to how the young student should give their comments so that Austin feels empowered rather than deflated. For those unfamiliar, here is a summary of the lesson, held in ANSER Charter school in Boise, Idaho, with a class of first graders (5/6-year-olds):

Austin chose a scientific illustration of a Western Swallowtail butterfly to copy (Figure 4.4) to make into a note card, something which was a whole school event, the finished note cards being printed and eventually sold in the community. Without sophisticated art and fine motor skills he began his first draft by looking at the photo, then putting it to one side as he drew the butterfly image he had in his head.

The teacher, Berger, then placed Austin’s drawing (Figure 4.5) next to the photograph and, with the whole class, Austin was encouraged to think like a scientist and to observe carefully and record his observations. Austin’s peers were asked to give him advice (helpful, specific and kind) about how he could change his drawing to more closely resemble the photo. First they focused on wing shape and when this was correct they moved on to wing pattern. The class had created a rubric for what quality would look like for both aspects:



Figure 4.4 Western swallowtail

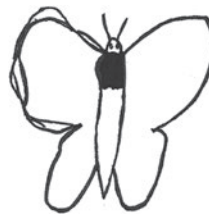


Figure 4.5 First draft

Butterfly shape

Self-critique	Does not meet expectations	Almost meets expectations	Meets expectations
Does your butterfly fill the whole paper?	Does not fill even half the page.	Fills about $\frac{3}{4}$ of the page.	Drawing comes to almost 1 $\frac{1}{2}$ inches of edges.

Self-critique	Does not meet expectations	Almost meets expectations	Meets expectations
Are the butterfly wings and the body in proportion to one another?	Wings and/or body are not in proportion.	Wings and body are somewhat in proportion.	Wings and body are closely in proportion.
Are the wings symmetrical?	Wings are not symmetrical.	One pair of wings are closely symmetrical.	Both pairs of wings are closely symmetrical.
Does the body include an abdomen, thorax, head and antennae?	Body has only 1 part and may have antennae.	Body has only 2 parts and may have antennae.	Body has 3 parts and antennae.

Butterfly pattern

Self-critique	Does not meet expectations	Almost meets expectations	Meets expectations
Observed markings <ul style="list-style-type: none"> ■ Eye spots ■ Borders ■ Stripes ■ Scallops ■ Veins ■ Splotches 	Did not include observed markings.	Includes some observed markings.	Includes most observed markings.
Accurate drawing of markings	Did not accurately draw most markings.	Accurately drew some markings.	Accurately drew most markings.

It is worth pointing out at this stage, that these rubrics are typical of closed learning intention success criteria, as outlined in the previous chapter. Because it is a closed skill (to be able to copy this drawing/closely observe) the criteria are closed and compulsory. For a piece of writing, by contrast, a set of criteria do not operate in the same way – they are not compulsory but instead are a toolkit of possible strategies, and, on their own, unlike the butterfly criteria, do not guarantee quality. Nevertheless, the improvement suggestions for a piece of writing can be equally specific (e.g. ‘You could say your heart was thumping instead of you were scared’: giving the author ideas and stimulus).

The first graders first suggested that Austin should make the wing shape more pointy, more triangular and less round and that he should include the swallowtails at the bottom. He was pleased and went off to create draft 2 (Figure 4.6). The



Figure 4.6 Second draft

students next told Austin that this was much better but they reminded him that he had forgotten that butterflies have an upper and lower wing on each side.

At draft 3 (Figure 4.7) he was again praised for his progress but the students said that the upper wings had become round again, so he had to make the upper wings more pointy again.

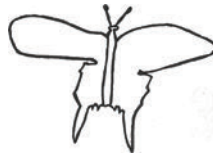


Figure 4.7 Third draft

At draft 4 (Figure 4.8) the group told him he was now ready for the pattern. He carefully copied the pattern and produced draft 5 (Figure 4.9). He was then told he was ready for color and by matching the colors from the photograph produced the final draft (Figure 4.10).



Figure 4.8 Fourth draft



Figure 4.9 Fifth draft



Figure 4.10 Final draft

(Student artwork by Austin. 'Austin's Butterfly'. Courtesy of ANSER Charter School in Boise, ID, part of the EL Education network. View online at *Models of Excellence*. <<http://modelsofexcellence.eleducation.org/projects/austins-butterfly-drafts>>)

Not only was the finished product an example of beautiful work, it also signified the transformation of Austin as a small student drawing to a beginning scientist/artist.

The point of looking closely at what happened in ‘Austin’s Butterfly’ is to see how important the specific and clear feedback is in illustrating deliberate practice in action and its impact on the development of the finished product. Had the feedback been less specific (e.g. ‘*You could make the wings better*’), it is likely that Austin would not have achieved this level of quality. More examples of Ron Berger’s work can be found at www.modelsofexcellence.education.org.

If we apply those specific improvement suggestions to student writing, for instance, it is clear that simply asking for ‘a better sentence’ or ‘more evidence’ is often not enough to really make a difference. It involves more effort to think of possible words, phrases or to give examples of what a student might include, but, without this, students would be justified in stating that if they had known how to improve it, they would have done it in the first place...

Self-improvements

After mid lesson learning stops, where some student work has been critiqued and analyzed, students are usually desperate to do some self-review and make improvements on their ongoing work, influenced and possibly inspired by the class discussion. It can be frustrating to be advised by a fellow student about errors or modifications which the student could have spotted if given the chance on their own first.

Being forced to share partially completed or unedited work can make learners feel vulnerable in terms of the way their work will be viewed. By insisting their work is self-edited first, this will ensure that the feedback they receive points them in directions that they could not have discovered themselves and is key to them feeling confident about the work they are sharing.

(Costa & Garmston, 2017)

Cooperative feedback discussions

At this point and/or when the learning is deemed finished, peer feedback can be a valuable source of sharing ideas for further improvement. In the past, the general interpretation of peer-marking or peer assessment has been the swapping of students’ work. The student becomes a teacher, working on his or her own, making comments on the work about what they liked and what could be improved. Having seen many examples of pieces given comments by students in this way, the general impression has been that their comments tend to be superficial and relatively unhelpful. *Cooperative feedback*, in which the author has the last word and makes the improvements as a result of discussions with a learning partner, however, is an entirely different and more productive experience, a testament to the power of structured collaboration. Training students involves the following steps:

1. Both students read and discuss one of their pieces together, so **one book on top of the other**. The student whose work it is has control of the pen and ultimate say, unlike the swapping books scenario.
2. Together they decide the best bits, which they might disagree about, but reasons are given, and those bits underlined.
3. Then, together, they talk about improvements that could be made and the author makes them on the piece, there and then, writing the improvement often in a different color. As the available space for improvements will be limited, many schools leave the left-hand side of students' books blank, so that improvement can be written with no limits and retain legibility. No comments are written on the piece by either student, because this would take away precious time when the actual improvements could be made. Again, the author has the last word on the choice of improvement.
4. The students then go through the same process with their partner's work.
5. With older students and more complex work, they might then separate and attend to their improvements alone after the cooperative discussion.

Observations and video evidence of this process have revealed that:

- a) *When the author reads their work out loud, pen in hand, they see their errors immediately. In the case of mathematics, the equivalent would be talk through their steps and their thinking, in line with the success criteria, with their partner.*
- b) *Students have more natural conversations, interrupting each other or asking for clarification and so on, than when they are in a dialogue with a teacher.*

Becoming teachers for each other is a complex business so needs modeling and coaching. We need to make clear to students that their partner is only there to give them ideas, not to dictate and this should be modeled (e.g. 'Thank you – that's made me think of another idea').

The cooperative improvement process can be used across all subjects. Instead of one 'book' on top of the other, they have one piece of mathematics, one piece of art work, one technology model and so on between them, so that they are not distracted, mid-conversation, to look at their own work.

This three-step practice of mid lesson stops followed by self-review then cooperative feedback discussions leads to students working much harder than they used to, compared to mainly uninterrupted work during lessons, with books handed in for copious marking by the teacher, given back at a later time when the feedback is too late to do anything about and is limited to written comments only. Of course, there are times when students should not be interrupted in their thinking, but

when we are skill building, constant review is more helpful than waiting till the product is finished then needing to go back and redo it.

Feedback and feedforward

Stonefields School in Auckland, uses the terms ‘feedback’ and ‘feedforward’ to draw a distinction between what has been successful and what could be improved (www.stonefields.school.nz), although it should be noted that the term ‘feedback’ is usually defined as including both.

Figures 4.11 and 4.12 are examples of some of their resources.

Danielle de la Porte from Ross School, California, created the following feedback sentence stems for students to use when they were engaged in paired cooperative discussions about how each other’s work or learning had been successful and how it could be improved.

Possible Feedback Sentence Starters for oral discussions

Positive comments

I really enjoyed/liked _____ aspect because _____

I was impressed with _____ because _____

I found _____ part interesting/creative/informative

Constructive comments

I thought more detail/emphasis/creativity _____ could have been applied to this part. For example _____

One aspect that I thought could be improved was _____.

To improve it I would suggest _____

The power of scheduled 1–1 conference sessions with students over one piece of work

A thousand words can be spoken between two people in a short time, with great impact because of the personal connection as well as the chance to truly understand what is being discussed, compared to the limitations of written feedback.

Apply Understandings Take action to give the writer **feedback** and **feedforward** on the following features of writing:

- Purpose
- Audience
- Vocabulary
- Sentence Structure

Choose one piece of writing which you wish to read and critique. What has the author done well? What would you consider adding, changing or removing?

How Kites Fly

A kite is an object made from a light material stretched over a frame. When a kite catches the wind it will lift off the ground and fly.

A kite uses wind to make it fly because it is heavier than the air.

Wind traveling over the surface of the kite is split into two streams of air. One stream of air goes over the kite while the second stream of air goes under the kite.

The upper stream creates an area of low pressure above the kite. The lower stream hits the kite at a shallow angle and creates an area of high pressure.

The high pressure area has a pushing effect while the low pressure area has a pulling effect. The combination of push and pull creates enough force to lift the kite into the air.

Kites have been around for thousands of years and are used for military or scientific purposes and for leisure.

Example 3

Why tsunamis occur

A tsunami or tidal wave is a wave that is several meters high. A tsunami can get as high as 30 meters high when it reaches land.

Tsunamis are often caused by earthquakes beneath the sea. They may also be caused by underwater landslides, volcanic eruptions or other movements in the earth's crust.

These movements push some areas of water towards other areas of water. The fingers of water are pushed outwards from the center of the disturbance.

The waves travel very quickly over long distances without losing any of their energy. The waves are not very high, not all sea in the deep water but when they reach the shallow near land they squeeze close together, slow down and their height increases rapidly.

Tsunamis can devastate coastal areas. The 2004 Boxing Day Tsunami killed over 230,000 people in 14 countries.

Example 4

How Paper Is Recycled

Paper that has been used can be recycled.

After that, the workers pour the pulp into paper-making machines that make the new paper.

Finally, machines make the new paper into products like writing paper, paper bags and paper towels.

Paper is recycled so that it can be used to make other paper products.

Example 5

Figure 4.11 Applying understandings at Stonefields

Making Meaning Collaborate with a buddy and give each other feedback and feedforward, referring to the success criteria.

Ask your buddy to type your feedback here.

I like how you...

I think you could make your writing better by...




Figure 4.12 Buddy feedback at Stonefields

There is an increasing burden on teachers in many schools where there is an expectation that every piece should be responded to in some over detailed way. Because of this constraint, some teachers and schools are reducing the amount of times they write an improvement suggestion and replacing this with face to face 5–10 minute discussions with each student over a piece of their writing. Feedback so far suggests that this has greater benefits even if it can only be fitted in occasionally, than written improvement suggestions without that interaction. Clearly much can be said during such an exchange, not only about the learning, but also in developing the relationship between the teacher and student. Teachers typically say that students are very appreciative of the personal time allotted to them and feel valued because of this.

Maybe even a 3–5 minute talk together over a piece of writing, focusing, say, on the first few sentences, will have greater feedback benefits than a page of written comments. The power of face to face, personal, caring conversation with one student about the intricacies of how they might improve should not be underestimated. We believe these positive, constructive interactions are likely to be remembered by students for years to come.

Example of the possible discussion points in a face to face dialogue

The following piece of high level writing by a student from Herstmonceux School in Sussex is the first part of an unedited characterization. The success criteria were co-constructed by the class by analyzing a previous student's excellent characterization of a pirate. Notice the use of example phrases from that analyzed piece next to the success criteria to keep the meaning clear.

L.O. To write a character description (Author's intent – 007 character) – excerpt

Michael Striker was standing opposite Buckingham Palace waiting for his Rolex wristwatch to finally hit seven. He was a young man around 20 years old with a peculiar scar on his left cheek thanks to a gas explosion which was a gift from his last mission. His hair was wirey and a rich brown hat almost covered one of his beetle black eyes.

Michael was well built with broad soldier-like shoulders and a well-toned torso (as a result of his ruthless fitness regime). He wore a well pressed tuxedo and a bow tie, a bit like his hero 007, stylish and smart. Also he had a great sense of humoer like the time he stole the head teacher's wig and hid it from her whilst he was a student at Eton.

Character description success criteria

- Describe the face/hair/voice (e.g. tarry pigtail, scar on cheek).
- Describe the body (e.g. big, broad shoulders).
- Describe the clothes (e.g. soiled coat, stained apron).
- 3rd person (e.g. he was, she is...).
- Describe their actions (e.g. plodding heavily: show not tell).
- Use a back story to help show their personality (e.g. he had a great sense of humor).
- Likened to something (e.g. similes – ‘sour as a gooseberry’).

The impact of the piece on the reader is to provide an effective characterization, with the context of a 007 agent. Thinking of the impact on the reader helps direct any improvement suggestions:

Our feedback needs to be specific, helpful, kind and task rather than ego related, naming those parts where the impact on the reader has been successfully achieved: *‘I like that you use the Rolex to show, not tell, how rich and successful he is. I also like the use of “finally” in the first sentence. It tells us that he has been waiting for a long time, rather impatiently, and for what? The reader’s interest is alerted’.*

We might then suggest simply looking at how the punctuation could make the writing punchier, such as a dash between ‘explosion’ and ‘a gift’, removing the words ‘which was’. We could ask if his name needs to appear – would it create more 007 impact if he remains anonymous? Could there be a sentence after the information about his watch waiting for seven, something which helps the reader see that he is on a dangerous mission perhaps? Would it have a sharper feel if ‘was standing’ became ‘stood’ and then similar verbs altered in the same way? Do we need wrist watch as well as Rolex? We would ask for the author’s opinion, making clear that it is their decision each time, but getting him/her every time a suggestion is made to read that part aloud, to see if it does improve the writing or not.










Rebecca Tovell, a teacher of 6-year-olds at Peterhouse School, Norfolk, describes below how she organizes 1–1 conferences with her class.

1:1 feedback

For my weekly timetable, I have arranged a time slot on a Friday afternoon for me to be able to give feedback to each and every child on a piece of work that they have produced. During this time, I am able to meet with half of my class and spend roughly five minutes with each of them. The following week I will meet with the other half of the class. I normally only provide feedback on written work but previously I have feedback on math too.

Feedback structure

- The child and I talk about their feelings when doing the activity.
- I ask the child if they would like to read their work out loud or if they would prefer me to. We would identify any mistakes during this time.
- We discuss whether they achieved the learning objective and if they completed it independently or with adult support.
- The child and I use a green highlighter to identify the things they did well out of these symbols:

 <p>capital letters</p>	 <p>finger spaces</p>	 <p>punctuation</p>
 <p>vocabulary</p>	 <p>conjunctions</p>	 <p>letter formation</p>
 <p>spelling</p>	 <p>presentation</p>	 <p>makes sense</p>

- We underline any amazing sentences in green highlighter as well as draw a love heart at the end.
- We discuss what their next step should be and highlight the symbol in pink.
- When there are any spelling mistakes we talk about how to spell the word. Then I write the word in their book for them to copy. We also do this with any incorrect letter formation and sentences that do not make sense.

Impact

- In my last class I had twenty-nine out of thirty children who were able to write independently.
- Many of the learning gaps in children's writing were quickly closed.
- The progress from the start of (6-year-olds) to the end of the year was amazing. For example, a child with special needs who didn't achieve the expected standard in writing during their time in kindergarten, by the end of this year had securely met the writing criteria expected.
- Children enjoy marking their work with the teacher.
- It has helped to develop their self-esteem and build positive relationships with teacher.

Marking groups: 1–1 discussions within a group

Andy Silvester, from Crowmarsh School in Oxford, focuses on fewer pieces of writing in more depth with his class of 11-year-olds, ensuring that he has quality discussions with students in groups of four sharing their writing at each stage and discussing successes and possible improvements. The progress in students' books is evident on every page, as there are at least three drafts of every piece. Andy explains how he organizes this approach:

Marking groups

The overarching theme in my class is the central question, 'How is this piece of work significantly different from the last?' Everything in class is ultimately judged against that question meaning that the students are constantly challenged to justify their decisions and to find new ways to improve.

Summary structure:

A small group of students take it in turns to read a piece of work, discussing it and analysing it against set success criteria while the teacher guides conversation and marks the work. Targets are set for improvements and the group rotates round to the next piece of work. At the end of the discussion, students immediately edit their work in light of the new targets and assess the impact on their writing.

System in more detail

Prerequisite

Teaching takes place as normal, usually whole class. The shared class text is usually used as some form of stimulus alongside a good deal of discussion, teacher modeling, examples of good ones etc. to establish success criteria.

Marking groups

Structure

Once the work is underway, groups are set up in a rather fluid way, mixing abilities together in a way that I know will draw the best benefit for those involved. Groups range from 3–6 with 4 being ideal.

Process

Stage 1 – set up

To begin, the task is discussed and the success criteria analyzed so that the group know what evidence might look like. Each child then chooses a particular element to look out for, e.g. effective use of openers, variety of sentence structures, the impact of the opening sentence, whatever is relevant to the task at the time.

Stage 2 – professional check

The first student's work is then displayed in front of the group and given the professional check which looks at the layout and general presentation. Is it appropriate for 11-year-olds?

The work is then read out and analyzed a section at a time, with students chipping in with comments particularly related to the criteria they choose to look out for in stage 1.

Stage 3 – analysis

Through discussion such as this and guided by the teacher, the group establish what they like about the work and a couple of targets needed to improve it. These are recorded at the end of the work and the group rotates to the next student.

Each time a student is given targets, they will then look out for those elements in the following pieces of work (see stage 1), judging the impact when they are present or absent as well as obtaining tips on how to achieve the target through example or discussion.

Timings: I would usually allow about 10 minutes per student.

While this process is taking place, I am not only facilitating the discussion, but also closely following along making notes either mentally or shorthand on the grammar and structure of the work which may not be so important to the rest of the group, but which will help me to inform personal targets at the end of the work in stage 3. This is recorded on the ongoing assessment sheets devised within the school meaning that the assessment system is up to date and an integral part of planning for next steps.

Stage 4 – edits

Immediately following the marking group, the students return to their desks and begin to edit their work in line with the advice they have been given, which in my mind is just as important as the advice that has been given in the first place. Advice followed by action creates habit and change.

Students often 'bolt on' to a marking group and are encouraged to do so if they feel it would be of benefit to them. They often do this to help them get past a sticking point by collecting some new ideas or because they are working on a target but need more guidance to achieve it. As a bolt on they are not directly involved in the conversation but are welcome to ask questions and respond to the discussion although their work will probably not be directly analyzed.

Stage 5 – self-assessment

Self-assessment is a key part of the process which can take two formats:

- The first is to complete the edits and then to assess the impact of the changes, explaining how and why the work is significantly improved.
- The second is to incorporate the edits into their self-assessment by identifying an element that needs to be improved, explaining how that could be achieved, editing the work and then explaining the impact.

The self-assessment is a key element to the whole structure that helps me as a teacher to understand the depth of their understanding regarding the target which in turn helps to guide future planning and personal target setting.

Summary

At the end of this process the entire class will have been through a marking group at least once for each piece of work but quite possibly twice if time runs well (once while it has been underway and once at the end) and quite possibly returned as a bolt on at some later date. I consider that the marking has been completed and so do not take books away from the class for marking. Ever.

The process is time consuming and requires a rethink as to how the timetable is constructed. Typically, a full cycle of marking groups from the beginning of the work to the end of the self-assessment phase could take a good couple of weeks. I find that I complete fewer total pieces of work throughout the year than by taking the traditional approach, but consider that the depth of the learning and the level of improvements far outweigh this.

The examples (Figures 4.13 and 4.14) from two students illustrate the power of the marking groups approach:

The context was a short analysis of the novel ‘*Daughter of the Sea*’ by Bernie Doherty. The focus of the teaching was to develop sophistication in writing by developing a more cinematic approach, starting off with broad details before becoming more focused.

Student 1

~~W~~
Who is the main character?

Introductions

① Daughter of the sea is a quite straight forward book, however when it comes to unpicking who the main character is it comes to quite a tricky conclusion. The reason for this is because Berlie Deberly has described two characters in a very similar way, making it extremely ~~difficult~~ difficult to decide.

① Daughter of the sea ^{has} a very complex story line and so when it comes to deciding who the main character is, it comes to a very tricky conclusion. The reason for this is because ~~Berlie Deberly has described two characters in a very similar way,~~ making it extremely hard to decide. This decision is also extremely hard as ~~there~~ there are three or four characters at different times moving the ~~story~~ story forward.

⊗ Berlie Deberly [⊗] has developed two characters in similar ways and so they have a similar background story.

Standard Intro Epn
Before Christmas

It could be argued that Elien is the main character but others may argue that Georgia is.

Figure 4.13 Student 1

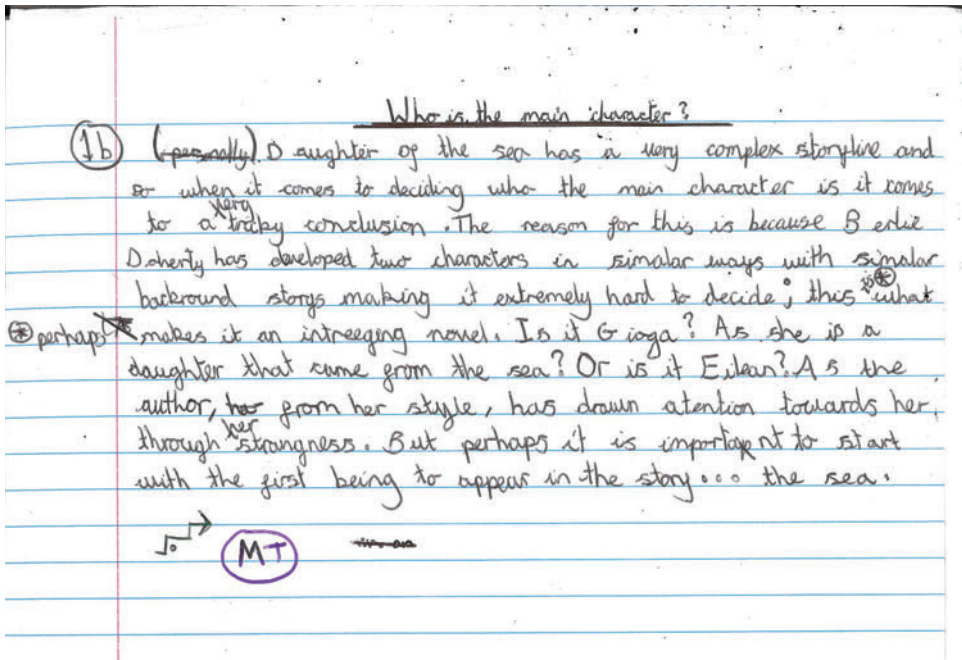


Figure 4.13 (continued)

Transcript

Drafts 1 and 1a were completed in a small mixed ability group, sharing ideas.

Draft 1: **Daughter of the Sea** is a quite straight forward book, however when it comes to unpicking who the main character is it comes to quite a tricky conclusion. The reason for this is because Bernie Doherty has described two characters in a very similar way, making it extremely difficult to decide.

Draft 1a: **Daughter of the sea** has a very complex story line and so when it comes to deciding who the main character is, it comes to a very tricky conclusion. The reason for this is because Bernie Doherty has developed two characters in similar ways and so they have a similar background story, making it extremely hard to decide. This decision is also extremely hard as there are three or four characters at different times moving the story forward.

MT (Marked together) in a marking group with the teacher then takes place with the following advice given:

■ **Contextualize the characters to explain why they were options**

Draft 1b (final): **Daughter of the Sea** has a very complex storyline and so when it comes to deciding who the main character is it comes to a

very tricky conclusion. The reason for this is because Bernie Doherty has developed two characters in very similar ways with similar background stories making it extremely hard to decide; this is what perhaps makes it an intriguing novel. Is it Giona? As she is a daughter that comes from the sea? Or is it Eileen? As the author, from her style, has drawn attention towards her through her strangeness. But perhaps it is important to start with the first being to appear in the story...the sea.

A second MT session followed in which the finished product was shared and celebrated.

Student 2

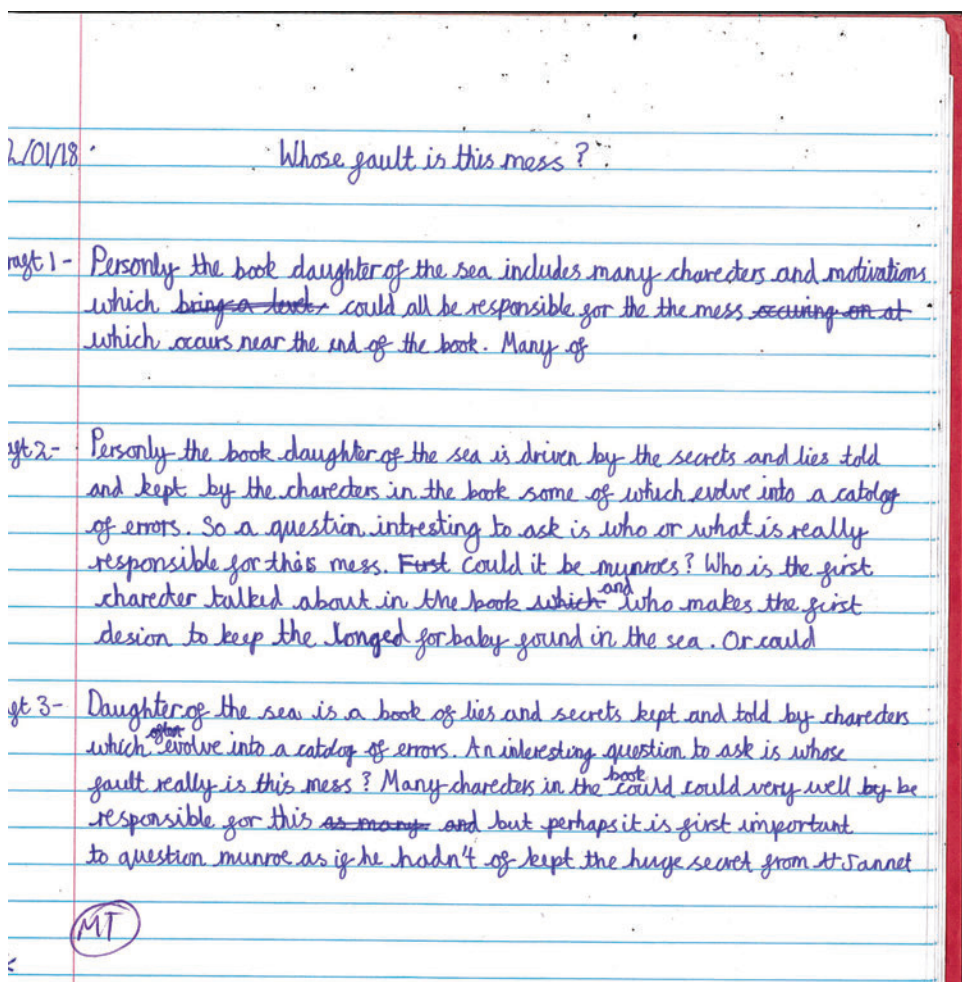


Figure 4.14 Student 2

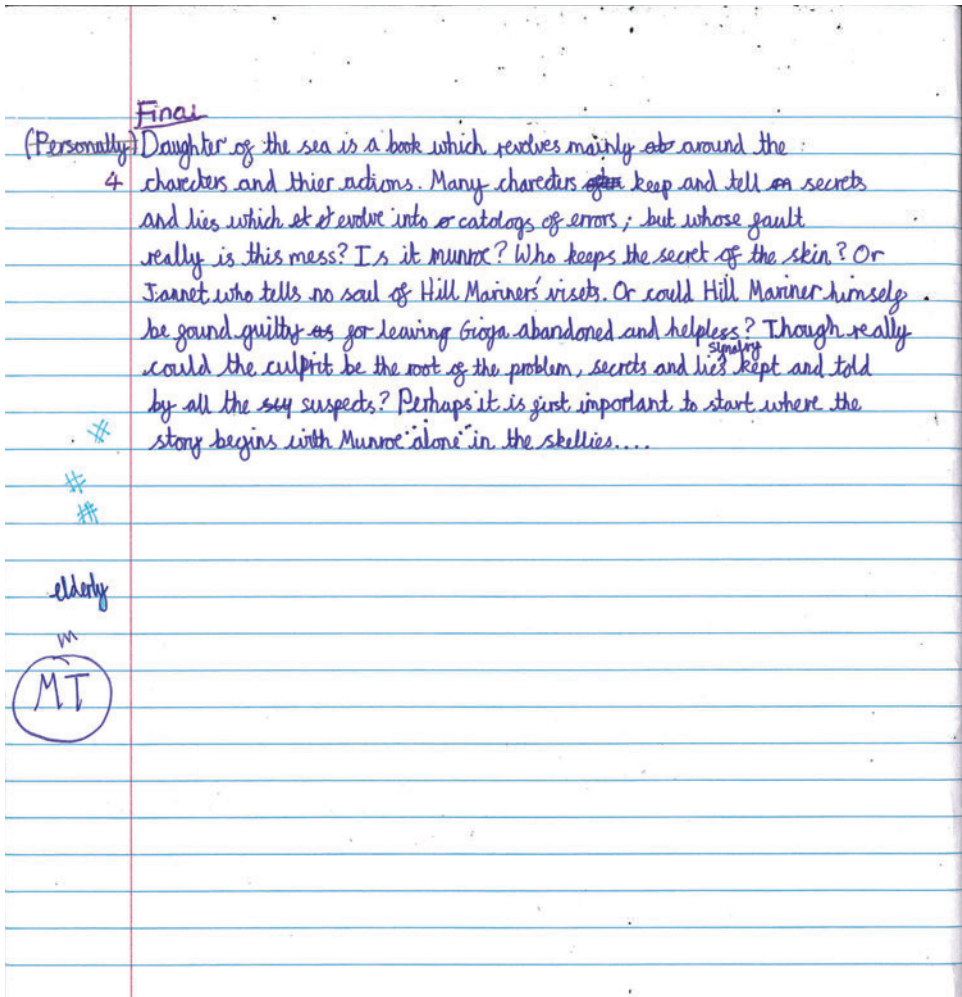


Figure 4.14 (continued)

Drafts 1, 2 and 3 were completed by the student with increasing independence. At MT she received feedback from the students and the teacher in a marking group. Advice given:

- contextualize characters to explain why they were options,
- consider creating a link to the next paragraph.

Her final paragraph was then written independently.

One of the key features of Andy's writing lessons is that as each draft is completed, he photocopies them and places them in a hanging plastic wallet in the

classroom. Students are encouraged to take these out of the wallet to read each other's drafts, thus seeing multiple examples of excellence and different styles, word choices and so on. Notice the influence the two writers have had on one another above, with both ending 'Perhaps it is important to start...' and including questions to intrigue the reader.

4. Conclusions

a) Principles

The short answer to this myriad of research findings and classroom strategies is that we need to want to know our students and their learning, to have them trust us and know that we have their best interests at heart. Feedback cannot be led by a simple formula, because students are all different and need different approaches. There seem to be, however, some fundamental principles of in the moment feedback to aim for, within the knowledge that in the moment feedback has the greatest impact:

- Encourage challenge and struggle as the norm when in the learning process.
- Make learning purposeful where possible.
- Point out misconceptions and use them as opportunities for self-correction.
- Provide feedback opportunities between students.
- Make all feedback task related (learning intention, success criteria) rather than ego related (how smart they are).
- Don't give feedback too quickly, too often or at the expense of the cognitive demand...allow more struggle, climbing out of the pit, and less reliance on it... but know the student.
- Give and encourage feedback which is just right for each student (not too easy, not too challenging).

b) Timing

The timing of any learning and feedback strategies is a crucial component in determining their level of success. The following table summarizes what we know works best:

Stage of learning	What is needed
Lesson/unit start	<ul style="list-style-type: none"> ■ Students' confidence in understanding and valuing the lesson/s. ■ An overview of what success might look like. ■ Related learning intentions and success criteria.

Stage of learning	What is needed
Acquiring surface learning	<ul style="list-style-type: none"> ■ Know how to summarize, outline and relate the learning to prior achievement.
Consolidation of surface learning	<ul style="list-style-type: none"> ■ Engaging deliberate practice, rehearsing over time and learning how to seek and receive feedback.
Acquiring deep understanding	<ul style="list-style-type: none"> ■ Planning and evaluation, monitoring own learning strategies.
Consolidating deep understanding	<ul style="list-style-type: none"> ■ Know how to and engage in self-talk, self-evaluate, self-questioning, seeking help from peers. ■ Transfer learning to new situations, which involves knowing how to detect similarities and differences between old and new.

Whether and how students respond to our feedback is, of course, the only thing that matters, or we could simply be wasting our time. As Dylan Wiliam says (Wiliam and Leahy, 2015), *‘The most effective feedback is just feedback that our students actually use in improving their learning’*.

Key points

- The level of student self-efficacy affects the way in which they receive feedback.
- Tasks should have a level of ‘desirable difficulties’ to maximize achievement.
- Forgetting helps us remember better when the content is revisited.
- Spaced, not massed learning is more effective.
- Sometimes less feedback is more, to encourage more problem solving and use of ‘stuck’ strategies.
- The more meaningful the context the more likely the learning is to be remembered.
- Student to teacher feedback is most important and consists of a) Where am I going? b) How am I going? and c) Where to next?/How can it be improved?
- Searching questioning and listening to paired student discussions reveals student understanding.
- Don’t assume you know what is happening when asking a student about their work – seek feedback from the student about what they think is going on.
- Misconceptions and slips should be treated differently.
- Students should be activated as learning resources for one another.
- Peer coaching needs training and modeling.

- Mid lesson learning stops, in which student work is projected mid flow for class analysis for successes and improvements, giving specific suggestions, is a powerful tool for a) enabling instant feedback for all and b) modeling the process which students in pairs can then carry out.
- Knowing the best time to give feedback is key to its success (e.g. when consolidating deep understanding is optimal time for peer discussions).