

**EPFL**

# Goals of this video



## You should be able to:

- Identify how effective feedback is compared to other teaching approaches
- Describe the three elements of the Hattie and Timperley model of feedback
- Distinguish between task and process feedback
- Identify how feedback can be made more effective

Today's video looks at the question of feedback or what is sometimes called assessment for learning. Now people mean different things when they talk about feedback; sometimes we mean 'I told that person what they did wrong' and we call that feedback. Is that what feedback means in an educational sense? How much does feedback have an impact on learning in an educational sense? And what type of feedback has the best impact on learning? Those are the questions which this video is intended to address. So first of all, by the time we're finished you should be able to identify what the evidence says about how effective feedback is as compared to other teaching approaches. Secondly, you should be able to identify a particular model of feedback and this is a model, which was developed by two researchers Hattie and Timperley in their review of the research evidence about educational feedback, which they published about ten years ago. Thirdly, I want you to be able to distinguish between feedback at the level of the task and feedback at the level of the process and I want you to be able to identify which of those is most important or most effective. Finally, I want you to be able to identify based upon the research evidence how feedback can be made more effective in an educational sense.

Notes

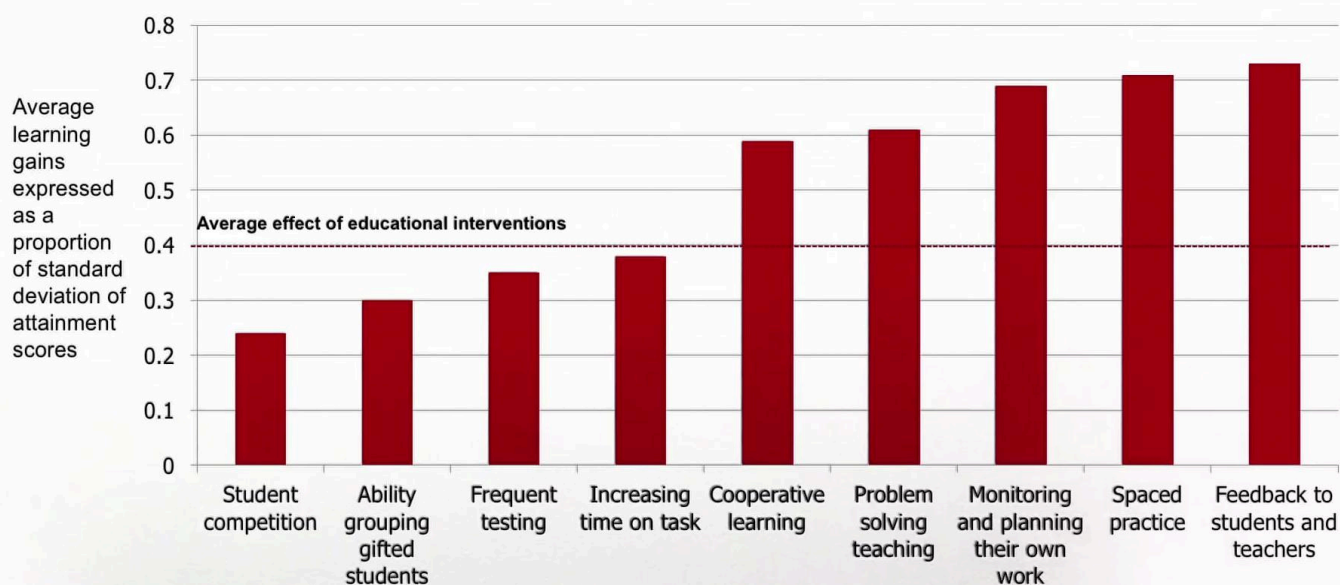
Summary



0m 04s

# Evidence about teaching effectiveness

Meta analysis of average effect sizes (Hattie, 2009)



So this is something you've probably seen before. What we have here is a bunch of different types of teaching method and we're able to compare the effectiveness of them because we have meta-analyses of research on all of these educational methods. These meta-analyses were gathered together by John Hattie in a book which he published in 2009. So all of these methods are compared in terms of the extent to which they impact upon the learning gains of a class and to make sure that those are comparable between studies, those are standardized in terms of learning gains as a proportion of the standard deviation of attainment scores. So what you will have seen previously is that some techniques or methods turn out to be more effective than the average. Here's the average of all educational interventions, it's about four tenths of a standard deviation and you see the things like cooperative learning and problem-solving learning actually tend to be more effective than the average and so what I want to draw your attention to is over here. It turns out that when we look at teaching related factors, feedback is one of the teaching related factors, which is most effective, which is the strongest positive effect on students' learning.

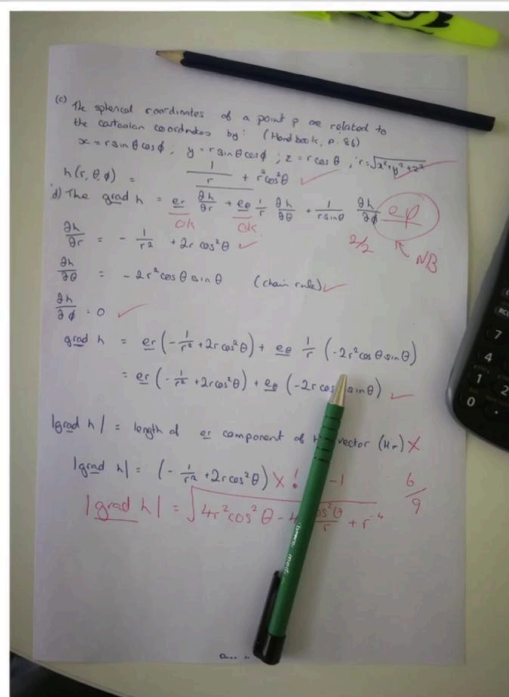
Notes

Summary



1m 21s

# Not everything constitutes effective feedback



But what exactly do we mean by feedback in an educational setting? You can think of different ways in which teachers can give feedback to students. So for example, in a lecture the teacher can ask questions the students can find out whether or not they've got the answer correct and that gives them a type of feedback. In exercise sessions, you can look over someone's shoulder and tell them "well that's right, that's wrong" and again that gives them a type of feedback. Maybe as in the example here, the students will submit something and they'll get some marks written on it often in red pen, often with X's and tick marks, sometimes with grades alongside it and that perhaps constitutes a type of feedback. Which of these types of feedback are most effective? Are all of them effective? Are any of them effective? That's what we want to address now.

Notes

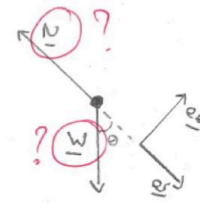
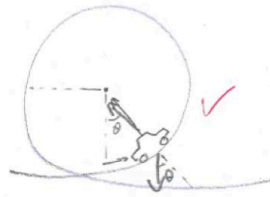
Summary



2m 36s



- A child pushes a toy car along a track and lets go. The car travels along the track and through a vertical loop-the-loop. The car's position on the track can be described by angle  $\theta$ , measured anti-clockwise from the vertical. The radius of the loop is  $r$ . Assume friction and air resistance is negligible.



$$\sum \underline{F} = m\underline{a} = mg \cos \theta \underline{e}_r - |N| \underline{e}_r - mg \sin \theta \underline{e}_\theta \quad ?? \checkmark$$

$$\underline{a} = -R\dot{\theta}^2 \underline{e}_r + R\ddot{\theta} \underline{e}_\theta \quad \checkmark$$

$$m(-R\dot{\theta}^2 \underline{e}_r + R\ddot{\theta} \underline{e}_\theta) = mg \cos \theta \underline{e}_r - |N| \underline{e}_r - mg \sin \theta \underline{e}_\theta \quad \checkmark$$

$$-mR\dot{\theta}^2 = mg \cos \theta - |N|$$

$$\ddot{\theta} = \frac{g \cos \theta}{R} + \frac{|N|}{mR} \quad \times \ 6/10$$

What should this student work on improving for future exercises?

In order to better understand feedback, it's useful to look at an example so let's look at this example here. This is an exercise question which can be given to a student and alongside it is the students answer to the exercise question. It might be worth pausing the video for a second and just reading through the question so as you're familiar with the terms the question. In this case, the students answer has been taken up, it has been marked and it's now being given back to the student. Now remember the purpose of feedback is for the student to learn from it. So the question in this case is based upon the feedback they've got, what should the student work on improving for future exercises? I suggest you, pause the video now take a piece of paper and write down - put yourself in the position of the student - and write down what it is that you think the student should learn from this feedback in order to improve and future exercises.

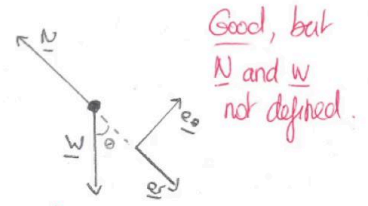
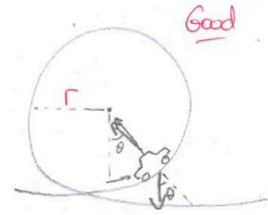
Notes

Summary



3m 28s

- A child pushes a toy car along a track and lets go. The car travels along the track and through a vertical loop-the-loop. The car's position on the track can be described by angle  $\theta$ , measured anti-clockwise from the vertical. The radius of the loop is  $r$ . Assume friction and air resistance is negligible.
- Describe the equation of motion of the car in the radial direction in terms of  $r$ ,  $g$ ,  $m$ , the magnitude of  $N$ , and  $\theta$ .



Link from this to equation below not clear (but correct).

$$\sum \vec{F} = m\vec{a} = mg \cos \theta \underline{e_r} - |N| \underline{e_r} - mg \sin \theta \underline{e_\theta} \quad \checkmark$$

watch vector notation  $\underline{a} = -R\dot{\theta}^2 \underline{e_r} + R\ddot{\theta} \underline{e_\theta} \quad \checkmark$  Good, your logic is clear.

$$m(-R\dot{\theta}^2 \underline{e_r} + R\ddot{\theta} \underline{e_\theta}) = mg \cos \theta \underline{e_r} - |N| \underline{e_r} - mg \sin \theta \underline{e_\theta} \quad \checkmark \text{ yes.}$$

transcription error  
Steps here not made clear

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$$-mR\dot{\theta}^2 = mg \cos \theta - |N|$$

Do one thing at a time from line to line -

$$-\dot{\theta}^2 = \frac{g \cos \theta}{R} - \frac{|N|}{mR}$$

$R=r$ , so:

$$\dot{\theta}^2 = \frac{|N|}{mr} - \frac{g \cos \theta}{r} \quad \leftarrow \text{answer in the terms required: } r, g, m, |N| \text{ and } \theta$$

So here's a second example of feedback to the same student based upon the same exercise and let's ask the same question again. Based upon the feedback, which is being given here, what should the student work on improving for future exercises? If you put yourself in the position of being the student, what would you see here that you should work on to improve for the next exercise. Again, maybe pause the video in order to write down that list.


Notes

Summary



# Good feedback 1: Clarify the goals

Good



Good, but  
N and W  
not defined.

Link from this to equation below not clear (but correct).

$\sum F = m\ddot{a} = m\ddot{a}_r = m\ddot{a}_{\theta}$   
 $\ddot{a}_r = -R\dot{\theta}^2 + R\ddot{\theta}$  ✓ Good, your logic is clear.  
 $m(-R\dot{\theta}^2 + R\ddot{\theta}) = mg \cos \theta - |N| - mg \sin \theta$  ✓ yes.  
 $-mR\dot{\theta}^2 = mg \cos \theta - |N|$  Transcription error  
 $-\ddot{\theta} = \frac{g \cos \theta}{R} - \frac{|N|}{mR}$  Steps here not made clear  
Do one thing at a time from line to line.  
 $R=r$ , so:  
 $\ddot{\theta} = \frac{|N|}{m r} - \frac{g \cos \theta}{r}$  answer in the terms required: r, g, m, |N| and theta

So let's look at this feedback and try and identify what are the characteristics of good feedback. I'm not suggesting this feedback is perfect but certainly, it has some of the characteristics of good feedback.

Notes

Summary



4m 59s

## Good feedback 1: Clarify the goals

*Good*

*Good, but  $N$  and  $w$  not defined.*

*Link from this to equation below not clear (but correct).*

*watch vector notation*

$$\sum F = m\ddot{a} = m\ddot{a}_r = m\ddot{a}_\theta = m\ddot{a}_\phi$$

$$-mR\ddot{\theta} = mg \cos \theta - |N|$$

$$\ddot{\theta} = \frac{g \cos \theta}{R} - \frac{|N|}{mR}$$

*transcription error*

*Steps here not made clear*

*Do one thing at a time from line to line*

*answer in the terms required:  $r, g, m, |N|$  and  $\theta$*

- Feedback should clarify what is required for a good answer
- Use the right method
- Calculate correctly
- Communicate well
- Focus on process, not just task
- Link from diagram to equation
- make steps clear/ do one thing at a time
- answer in the terms required

One characteristic of good feedback as it should clarify for the student what is required in a good answer. Typically, in scientific domains, in engineering domains, for many of the exercises students will do, there are three basic criteria for a good answer. First of all that they will use the correct method, secondly that they will calculate correctly and thirdly, that they will communicate well. Here you can see for example that the tutor has identified communication as an issue, they've talked about using the correct notation here you. Certainly, you will also see that they have identified here that the students' logic is clear as they move between these three different points. You'll also see that they've highlighted for them where the logic is not clear. So this feedback here clarifies that communication is an important criteria. If you look back on the list you wrote down after looking at the first piece of feedback, you can ask yourself 'does communication come through as an important criteria in that first set of feedback?' You can also find examples here where the feedback highlights the importance of correct calculation and of using the right method.

Notes

Summary



5m 10s



## Good feedback 1: Clarify the goals

*Good*

*Good, but N and W not defined.*

*Link from this to equation below not clear (but correct).*

*watch vector notation*

$$\sum F = ma = m\ddot{a} = m\ddot{a}_r = m\ddot{a}_\theta = m\ddot{a}_\phi$$

$$-R\ddot{\theta} = -mg \cos \theta - |N|$$

*Good, your logic is clear.*

*Transcription error*

*Steps here not made clear*

*Do one thing at a time from line to line.*

*answer in the terms required: r, g, m, |N| and  $\theta$*

- Feedback should clarify what is required for a good answer
- Use the right method
- Calculate correctly
- Communicate well
- Focus on process, not just task
- Link from diagram to equation
- make steps clear/ do one thing at a time
- answer in the terms required

a second characteristic of good feedback is that it doesn't just focus in on how the student did in this particular exercise but tries to give them in a more general sense a set of ideas, which can be applied to other exercises. So for example, we will see here that the feedback includes the instruction that it's useful to do one thing at a time as they go from line to line. This is not just to help them in this particular exercise but as an idea which can potentially help them in exercises more generally. Also, the teacher points out that they should answer in the terms required and then cites the terms required in the question. Again, it's highlighting for them a more general principle which they should be able to apply not just to this exercise but the exercise is more generally.

Notes

Summary



# Clarifying what is a good answer



Component	Weight
Use the right approach/ method to solve the problem	Up to X/10
Calculate accurately each step	Up to Y/10
Communicate your thinking clearly	Up to Z/10
Total	10

Example of a simple grading rubric

So a key idea in giving feedback to students is that we help to clarify for them what is important. what's implied in that is that you as an assistant need to know what is important, you need to know what this teacher set of priorities are. For some teachers, maybe having the correct answer will be the key issue and that will get the heavy weighting of marks in the exam. For other teachers, having the correct method will be the key issue and that will get a heavier weighting come the exam time. You need to be aware as to what is this teachers priority is and help to communicate that to the student. If you're not aware of it then maybe one of the things you need to do is ask.

Notes

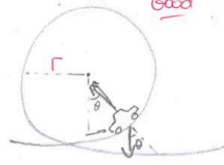
Summary



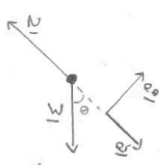
## Element 2: How have you done?

- Both positive...
  - "Good"
  - "your logic is clear"
  - "Yes"
- ...and negative
  - "Watch vector notation"
  - "Transcription error"
  - "Steps not made clear"

*Good*



*Good, but N and w not defined.*



*Link from this to equation below not clear (but correct).*

$$\sum F = ma = mg \cos \theta \underline{e_r} - |N| \underline{e_r} - mg \sin \theta \underline{e_\theta} \quad \checkmark$$

*watch vector notation*

$$\underline{a} = -R\dot{\theta}^2 \underline{e_r} + R\ddot{\theta} \underline{e_\theta} \quad \checkmark \text{ Good, your logic is clear.}$$

$$m(-R\dot{\theta}^2 \underline{e_r} + R\ddot{\theta} \underline{e_\theta}) = mg \cos \theta \underline{e_r} - |N| \underline{e_r} - mg \sin \theta \underline{e_\theta} \quad \checkmark \text{ yes.}$$

*Transcription error*

$$-mR\dot{\theta}^2 = mg \cos \theta - |N|$$

*Steps here not made clear*

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$$-\dot{\theta}^2 = \frac{g \cos \theta}{R} - \frac{|N|}{mR}$$

*Do one thing at a time from line to line.*

*R=r, so:*

$$\dot{\theta}^2 = \frac{|N|}{mr} - \frac{g \cos \theta}{r} \quad \leftarrow \text{answer in the terms required: } r, g, m, |N| \text{ and } \theta$$

A second component of good feedback is that in addition to telling the student what a good answer would look like, it also tells the student how well they've done. Here you can see that there is a mix of both positive feedback and more negative feedback. So for example, you can see that in a number of places the tutor has written that the student has done something which is good or where the student is told that their logic is clear. In addition to that, you'll also see more negative feedback: watch the vector notation, here you've made a transcription error, here the steps are not clear. The point here is to try and give some sort of balance to the feedback.

Notes

Summary



## Good feedback 3: What changes are needed?



- How to make sure feedback makes a difference?
  - Use the past to plan for the future
  - May help if the student processes the information themselves ("ask, don't tell")
- "What do you need to do better in the next question like this"?

A third element in good feedback is that it doesn't just tell the student how they performed on this exercise it also helps them to plan for improving their performance into the future. So a key issue in feedback is the way in which we take information from the past and use it into the future. you put yourself in a position of a student who getting feedback, but feedback on an exercise which they completed a week ago. They've seen a lot of things in that last week and their mind is on future exercises not on what they did in the past. How can you get them to look at what they did in the past with a view to identifying how to improve for the future. One useful thing to remember is that you've already told the student the information, what's needed now is for them to process that information for them to think about it. So therefore, it's sometimes an idea not to tell them how to improve but to ask them how can they improve.

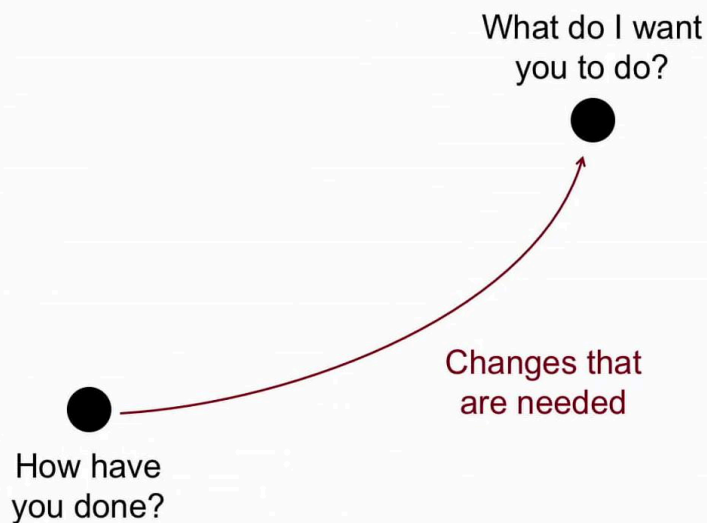
Notes

Summary



8m 34s

# The Hattie and Timperley feedback model



A useful question in this context is: "what do you need to do to do better on the next question like this?" Okay from this example we can start to see what are the elements of a good feedback model and these are the elements which are identified in the Hattie and Timperley feedback model. First and foremost good feedback identifies for the person what it is they need to do, what does a good answer look like. Secondly, it identifies for the person what they have currently done, where are they right now, it does so giving them a mixture of the positive and the negative. Thirdly, good feedback helps them to see how they can close the gap between where they are and where they want to go. Ideally, the student will generate this information for themselves, they'll identify for themselves how to close the gap.

Notes

Summary



9m 39s



# The Hattie and Timperley feedback model



What do I want  
you to do?

"Feedback at the process level appears to  
be more effective than at the task level"  
(Hattie and Timperley, 2007 p. 93)

How have  
you done?

are needed

Another key element in the Hattie and Timperley model is to remember that feedback at the level of the process tends to be more effective than feedback at the level of the task. Feedback about how to do problems tends to be more effective than feedback simply about what you got right and wrong in this particular problem.

Notes

Summary



10m 25s

- “There is considerable evidence that providing [short] written comments ...is more effective than providing grades” (p. 92)

- A little feedback seems to be as effective as lots of feedback (p. 85)

### The Power of Feedback

John Hattie and Helen Timperley  
University of Auckland

*Feedback is one of the most powerful influences on learning and achievement, but this impact can be either positive or negative. Its power is frequently mentioned in articles about learning and teaching, but surprisingly few recent studies have systematically investigated its meaning. This article provides a conceptual analysis of feedback and reviews the evidence related to its impact on learning and achievement. This evidence shows that although feedback is among the major influences, the type of feedback and the way it is given can be differentially effective. A model of feedback is then proposed that identifies the particular properties and circumstances that make it effective, and some typically theory issues are discussed, including the timing of feedback and the effects of positive and negative feedback. Finally, this analysis is used to suggest ways in which feedback can be used to enhance its effectiveness in classrooms.*

**KEYWORDS:** feedback, assessment, student and teacher learning.

Although it is often mentioned in articles about learning and teaching, surprisingly few recent studies have systematically investigated the meaning of feedback in classrooms. In this article, we begin with a conceptual analysis of the meaning of feedback and a synthesis of the evidence related to the power of feedback to improve teaching and learning. We then propose a model of feedback that is used to identify the circumstances under which feedback has the greatest impact. Specifically, the research evidence related to the different types of feedback and their effectiveness in terms of promoting student learning are discussed, the different ways students deal with feedback are described, and the relationship between assessment and feedback is provided. Finally, the model, together with the evidence underpinning it, is used to show how feedback can be used to enhance classroom learning and teaching.

### The Meaning of Feedback

In this review, feedback is conceptualized as information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding. A teacher or parent can provide corrective information, a peer can provide an alternative strategy, a book can provide information to clarify ideas, a parent can provide encouragement, and a learner can look up the answer to evaluate the correctness of a response. Feedback thus is a "consequence" of performance.

81

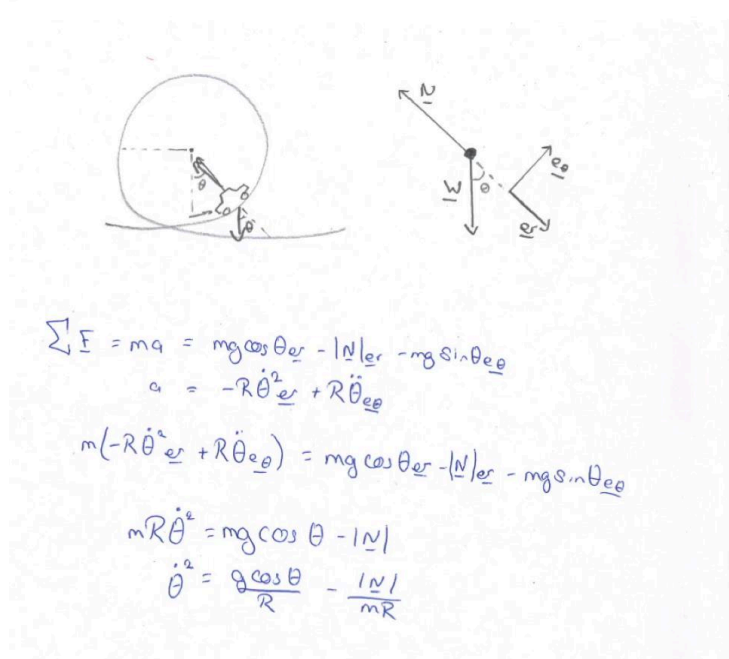
There are a few more points, which are worth making based upon Hattie and Timperley's review of the evidence about educational feedback. The first is that there is considerable evidence that providing short written comments is more effective than providing grades. If you provide grade, students will often look at the grade and ignore everything else. If you provide short written comments without a grade, then in order to find out how they did, the students will have to read the comments and think about them, weigh them up in order to identify how they have performed on this exercise, that in itself will be a more useful learning activity. Another point which Hattie and Timperley identify is that a little feedback turns out to be as effective as lots of feedback and that's quite useful to know. Because in a situation where you have lots of different students, it may be hard for you to give a lot of feedback to all of them.

### Notes

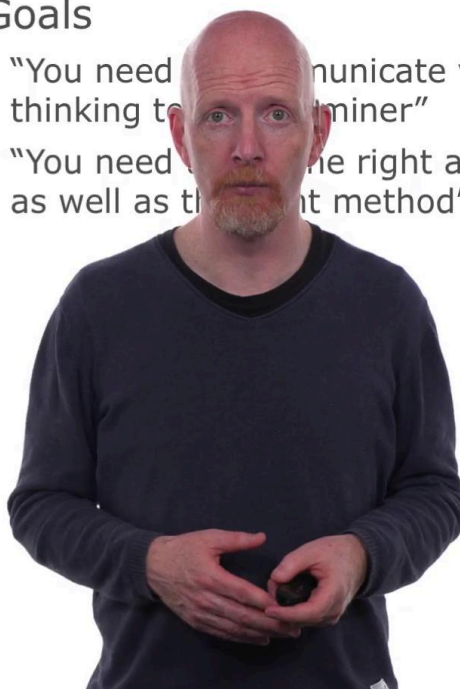
### Summary



# Three sentence feedback



- Goals
- "You need to communicate your thinking to the learner"
- "You need to give the right answer as well as the right method"



So far we've looked at situations where you're giving written feedback to students based upon an exercise they've submitted. But actually, it may be that most of the opportunity you will have to give feedback to students will come in the exercise sessions where you will be giving them oral feedback. Well the point here is that exactly the same three principles apply and so here I want to suggest to you the idea of three sentence feedback. When talking with a student, you can give them feedback about their performance in three sentences. It may take 30 or 40 seconds, it doesn't have to be a major performance, it can happen very quickly but nonetheless, it can have all of the characteristics of good feedback. So your first sentence in the three sentence feedback should be to help the student clarify what is the goal; what is it that they're supposed to be able to do.

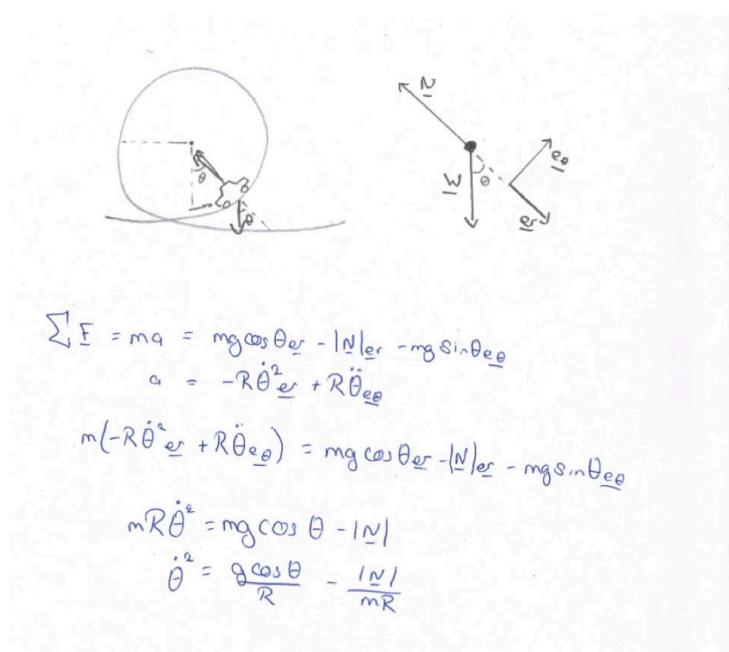
Notes

Summary



11m 38s

# Three sentence feedback



## Goals

- "You need to communicate your thinking to the examiner"
- "You need to get the right answer as well as the right method"

## Current Position

- "The logic is clear from line 1 to 3, but not from the diagram to line 1, and not from line 3 to 4."
- "Most steps are correct but you made a transcription error"

So examples of goals type sentences that you can give are; "you need to communicate your thinking to the examiner", "you need to get the right answer as well as the right method". That communicates the student what the goal is.

Notes

Summary



12m 27s

# Conclusion



- Feedback is demonstrated to be effective
- Not all feedback is effective
- Feedback answers three questions:
  - What do we expect from you?
  - How have you done?
  - How can you improve?
- Useful to focus on process (not only task)

Then you can communicate to the student how they have performed. "If you look here your logic is clear as you go from line 1-3 but your logic isn't clear as you go from the diagram to line 1 and it's not clear as you go from line 3-line 4". This gives the student a current position and it gives them a balance between positive and negative elements. Finally, you can focus them in on improvement. What do you need to do better for the next question? Ask them the question which orientates them towards the future which orientates them towards improvement. This 3-sentence feedback can be used in exercise sessions and can be very effective and very quick. So in conclusion what can we say know about feedback? Firstly, feedback is demonstrated to be effective; we know that feedback turns out to be more effective than many other types of teaching so that's useful it's something we should use. Secondly, not all feedback is effective. Only certain types of feedback actually have a solid impact on learning. So what do we know about the types of feedback that have a solid impact on learning? Well Hattie and Timperley's model tells us that actually feedback that has a solid impact on learning tends to have a number of different characteristics.

Notes

Summary



12m 42s



# Conclusion



- Feedback is demonstrated to be effective
- Not all feedback is effective
- Feedback answers three questions:
  - What do we expect from you?
  - How have you done?
  - How can you improve?
- Useful to focus on process (not only task)

First of all, it addresses three questions. It asks where do I want the student to go? Secondly, it asks where is the student now; in other words how far are they away from where I want them to go and thirdly, it asks how do they get from where they are to where they want to go. Finally Hattie and Timperley's work tells us a few more interesting things about feedback that we shouldn't forget. For example it tells us that feedback at the level of the process turns out to be more effective than feedback at the level of the task usually. Secondly, it tells us that feedback should avoid damaging a person's self-esteem, they shouldn't feel bad about themselves after we've given them feedback and thirdly, it tells us that feedback which is given in the form of comments turns out to be more effective than feedback where it is given with both a grade and with comments.

Notes

Summary



14m 03s