Research for Teachers

Hattie's concept of visible teaching and learning

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Which teaching and learning experiences make the most difference to students?

There is a great deal of research about what makes a difference in the classroom, but of greatest importance to teachers is knowing which teaching and learning experiences make the most difference. One study set out to find out just that:

Hattie, J. (2009) *Visible learning: A synthesis of over 800 meta-analyses related to achievement*, Routledge, London

Hattie looked at more than 800 meta-analyses about influences on learning. Each meta-analysis had reviewed studies that gave evidence about the impact on student achievement of a particular intervention. Hattie synthesised the findings from related meta-analyses and converted them into a common measure (an effect size). He developed a way of ranking all the various influences and innovations in these meta-analyses according to their effect sizes, from those that had very positive effects to very negative effects on student achievement, creating a 'barometer of influence' which ranged from -0.20 to 1.0. Hattie found that the average effect size of all the interventions he studied was 0.40 and therefore decided to judge the success of innovations and influences relative to this 'hinge point'.

Hattie identified six main areas that contribute to learning: the student, the home, the school, the curricula, the teacher, and teaching and learning approaches. He worked through each of these categories of influences to evaluate which specific innovations and influences were above or below the hinge point. With the exception of the school, all of these six had considerable influence on student learning outcomes.

But Hattie did not merely detail lists of the relative effects of the different influences on student learning. He also set out to identify the message underlying them. He found that the key to making a difference was making teaching and learning 'visible'.

Hattie explained how visible teaching involves teachers deliberately intervening to ensure changes in their students' thinking. This requires teachers to be clear about the learning intentions, know when each student is successful in attaining those learning intentions, have knowledge of the students' understanding, and provide a progressive development of challenging experiences and opportunities for students to develop learning strategies based on surface and deep levels of learning. It also requires teachers to use feedback from students that reveals

what they know and understand; to provide direction, but also step back when they see learners are progressing towards success criteria.

What learners do is important too. When learning is visible, students are active; they are involved in determining success criteria, setting higher expectations, being open to different ways of acquiring knowledge and problem-solving.

This TLA research summary explores Hattie's model of visible teaching and learning in some detail. It examines too the characteristics of effective teachers and effective teaching strategies as well as approaches Hattie identified as having only a small effect on learning. It also outlines some of the important contributions from students, parents and the school. Five independent practitioner case studies are provided to illustrate some of the key messages in the study.

Overview

Why is the issue important?
There is a great deal of research that shows what makes a difference in the classroom. The difficulty for teachers is identifying not just 'what works', but 'what works best' through seeing the relative effectiveness of different influences and interventions. Of greater value still however, for experimenting with researched practice, is understanding the underlying principles about why some innovations are more successful than others.

What did the study find out?
Hattie's study explored the influences that had the most and least impact on student achievement. The influences that had the largest effect related to the teacher, and teaching and learning approaches. He proposed a model of 'visible teaching and visible learning' which identified the most significant factors of the effective approaches. Visible teaching involves:

- making learning the explicit goal
- sharing challenging learning intentions and success criteria
- planning interventions that deliberately encourage mastery of these intentions
- seeking and giving feedback; and
- adapting teaching as a result of feedback from learners.

Visible learning involves students:

- being committed and open to learning
- being involved in setting challenging learning intentions and success criteria; and
- seeking feedback for learning.

Hattie also found the elements of the classroom environment which facilitated learning. From his model he identified six signposts to effective teaching and learning.

How did Hattie arrive at his conclusions?
Hattie identified six main areas that contribute to learning: the student, the home, the school, the curriculum, the teacher, and teaching and learning approaches. He worked through each of these categories of influences to evaluate which specific innovations and influences had the greatest impact on achievement. From these he developed his model to highlight and explain the most important aspects of the influences.

How was the research designed to be trustworthy?
Hattie carried out a synthesis of more than 800 meta-analyses about influences on learning. Each meta-

analysis had converted the effects of each study included in it into a common measure (an effect size). Hattie developed a way of ranking all the various influences and innovations in these meta-analyses according to their effect sizes. From these rankings he was able to identify the most significant influences on pupil learning and develop his model.

What are the implications?
The research showed, for example, the importance of teachers:

- making learning visible to students; and
- gaining and using student feedback.

It also showed, for example, the importance of school leaders:

- collecting evidence about the impact of teaching approaches and strategies in their school; and
- identifying aspects of classroom practice that have a positive impact on student learning and considering with colleagues why they are effective.

What do the case studies illustrate?
The case studies complement and illustrate aspects of Hattie's model of visible teaching and learning. They show for example, how:

- a teacher found out about students' prior knowledge in science and used his findings to develop activities that challenged and built upon the students' ideas; and
- teachers at one school set out to make teaching a more active and visible experience for the students through making learning objectives and success criteria clear, using active approaches to teaching and learning, and raising expectations.

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Study

What did Hattie mean by visible teaching and visible learning?

Hattie argued that visible teaching and visible learning are necessary if all learners are to achieve at the highest possible level. By this he meant that the teaching must be visible to the student and that the learning must be visible to the teacher. In this way, teachers start to 'see learning through the eyes of the student' and students 'see themselves as their own teachers'.

Visible teaching
In visible teaching, teachers take an active role in promoting learning, but this does not mean that they are didactic and simply tell students what they should be learning. Visible teaching involves:

- making learning the explicit goal
- sharing challenging learning intentions and success criteria
- planning interventions that deliberately encourage mastery of these intentions
- seeking and giving feedback; and
- adapting teaching as a result of feedback from learners.

Challenge and feedback play a central role in this process. The teaching interventions need to be challenging enough to bring about a change in students' thinking. When the challenge levels are high the learner is more

likely to seek feedback. In order to provide this feedback, teachers need to find out from the students about the learning that has occurred. This information enables them to give informed feedback and where necessary intervene to alter the direction of learning. Hattie highlighted how the feedback to the teacher about what the students can and cannot do is more powerful than the feedback the teacher gives the students.

You may like to read case study 1 which illustrates how a teacher gained feedback about student learning and used this to develop ideas for future practice.

Hattie illustrated the concept of visible teaching through an outdoor learning example. He explained how when teaching a student to abseil, the instructor sets a challenging goal and demonstrates how to achieve this by using a harness, tying the rope effectively and descending correctly. The student then attempts to implement the learning. Whilst doing this the student will seek and receive a great deal of feedback. When the student reaches the ground there is a high level of excitement and no doubt that the challenging goal has been reached.

Visible learning
According to Hattie, for many students, success at school relates to adopting a surface approach to learning in which they reproduce taught material in order to maximize their achievement in assessments. However many teachers believe that the goal of their teaching is enhancing deep learning. Hattie argued that in fact true learning requires a balance of surface and deep learning. The surface learning of ideas and facts is balanced with deeper learning which requires higher levels of thinking, a process where learners construct ideas and develop their conceptual understanding.

Visible learning involves students being committed and open to learning. It also involves them taking an active role. This includes being involved in setting challenging learning intentions and success criteria, and seeking feedback for learning. As students do this they develop their belief in themselves as learners and engage in self-monitoring, self-evaluation and self-assessment. They start to become their own teachers.

You may like to read case study 2 which illustrates how teachers at one school set out to make teaching a more active and visible experience for the students.

What makes teachers effective?

Hattie's work showed that teachers influence student achievement to different extents. When he explored what it was that made the difference, Hattie found the factors with the largest effect sizes were the quality of the teaching and the nature of the teacher-student relationships. Teacher expectations and teacher professional development had medium effect sizes. It is teachers using particular teaching methods, who have positive student-teacher relationships and who have high expectations for all students who are more likely to have above average impact on student achievement.

Quality teaching
All the meta-analyses relating the quality of teaching to student attainment use student ratings of teachers as the assessment of teaching quality. Quality teachers as rated by these students are those who challenge, who have high expectations, who encourage the study of their subject and who value surface and deep aspects of their subject. For example, one mathematics study found that the important elements of quality teaching were:

- teachers challenging students - encouraging them to think through and solve problems either by themselves or together as a group
- high expectations - encouraging students to place high value on mathematics
- monitoring and evaluation - getting students to think about the nature and quality of their work; and
- helping students construct an understanding of the language and processes of mathematics.

Teacher-student relationships

Hattie's study showed the vital importance of building a positive student-teacher relationship. To build this relationship, teachers need to be able to listen, show empathy and care, and have a positive regard for their students. In classes with person-centred teachers there was greater engagement and more respect of self and others. There were also fewer resistant behaviours and higher achievement outcomes. You may like to read the earlier TLA research summary **Carl Rogers and classroom climate** which discusses ways of developing positive inter-personal relations, and the value of doing so, in more detail.

Expectations
Hattie reported on Dweck's research that has shown there are differences in classes where teachers believe that achievement is difficult to change because it is fixed and innate compared to teachers who believe that achievement is changeable. You may like to read the earlier TLA research summary about her work - **Promoting students' persistence in meeting challenges**. Hattie also reported on other research that showed that when those teachers in the study held lower expectations, they did so for all the students in the class. Based on this evidence, Hattie argued teachers must stop over emphasising ability and start emphasising progress - that: 'steep learning curves are the right of students regardless of where they start'. They need to 'stop seeking evidence to confirm their prior expectations, but seek evidence to surprise themselves, find ways to raise the achievement of all', and be evidence-informed about the talents and growth of all students.

Professional development
One study which Hattie included used effect sizes to ascertain which professional development activities had the greatest impact. This found that the activities that had the biggest effect on student achievement were ones where:

- the teacher learning opportunities occurred over an extended time
- external experts were used when appropriate
- teachers were engaged in deep learning about ways to improve student outcomes
- teachers' assumptions were challenged; and
- the school leadership supported the professional development.

You may like to read the earlier TLA research summaries **The impact of CPD in the classroom, Teachers' professional learning** and **The role of the specialist in CPD** which explore these effective features in more detail. You may also like to read case study 3 which shows how teachers were engaged in sustained professional dialogue about teaching and learning.

Which teaching methods are most effective?

Hattie found that some strategies used by teachers had a significant impact on student achievement; that 'what teachers do matters'. It is essential not only that teachers select the most effective strategies, but also that they understand the connections between them and how they relate to, and impact on, each other. He concluded that strategies in which the teacher took an active rather than a purely facilitative role were most effective. The most critical strategies for visible teaching and learning were those that emphasised:

- learning intentions
- success criteria
- feedback; and
- directive teaching methods.

Learning intentions
Hattie looked at the effect sizes of several strategies that focused on learning intentions such as concept mapping (0.57) and setting (challenging) goals (0.56). He concluded that successful learning is dependent on clear, learning intentions that describe the skills, knowledge, attitudes and values that the student needs to learn. Although learning intentions should be challenging it is important the student is supported in achieving

them.

Success criteria
Strategies focused on sharing success criteria that help students understand the criteria that will be used to judge their work and determine whether the learning intentions have been achieved (for example, whether students used at least five effective adjectives to create the feel of the jungle) had effect sizes of between 0.53 and 0.58.

Feedback
Hattie found that feedback was one of the most significant influences on learning with an effect size of 0.73. He emphasised that the most powerful feedback is that given from the student to the teacher because it allows teachers to see the student's learning. It makes learning visible and facilitates the planning of next steps. The feedback that students receive from their teachers is also vital. It enables students to progress towards challenging learning intentions and goals.

Directive teaching methods
Hattie found that the most powerful teaching directly addressed the learning intentions. Effective ways of doing this included:

- reciprocal teaching (0.74) which explicitly teaches students cognitive strategies such as summarising, questioning, clarifying and predicting
- problem-solving teaching (0.61) which involves teaching students to determine the cause of a problem, identify and select alternatives for a solution, design an intervention plan and evaluate the outcome; and
- direct instruction (0.59) which emphasises the role of the teacher in modelling and guiding learning, and giving and receiving meaningful feedback.

How do schools contribute to effective learning?

Hattie found the most powerful effects of the school relate to features within classrooms such as:

- classroom management
- peer influences; and
- adapting curricula to be more appropriately challenging (for example, through acceleration or differential curricula for gifted students).

Classroom management
The effect on achievement from well-managed classrooms was 0.52 and on heightened engagement was 0.62. Some of the most effective influences for ensuring well-managed classrooms and reducing disruption were:

- teachers who identify and act quickly in response to potential behavioural problems while retaining an emotional objectivity (1.42)
- interventions that indicate to students that their behaviour is appropriate or inappropriate (0.91); and
- 'tangible recognition' which includes strategies in which students are provided with some symbol or token for appropriate behaviour (0.82).

Teacher-student relationships were powerful moderators of classroom management (0.87). Fostering a climate of high cooperation (where there is concern for the needs and opinions of others and a desire to function as a member of a team) was particularly important. You may like to read case study 4 which discusses ways in which students were encouraged to cooperate with each other resulting in improved attainment and behaviour. You may also like to read the earlier TLA research summary Raising achievement through group work which explores ways of promoting cooperation among students.

Peer influences

The effect of students' peers on their learning was considerable with an effect size 0.53. Schools can utilise these influences by involving students in helping, tutoring, providing friendship and giving feedback to their peers.

Making the curriculum challenging
Hattie found that changes to aspects of the curriculum can have a significant impact on student learning. He attributed these changes to the inclusion of effective teaching strategies in particular curricula programmes. This is illustrated by creativity programmes that overall had an effect size of 0.65, but when they emphasised direct instruction, they had an effect size of 0.80.

The most effective curricula experience for gifted and talented students was acceleration with an effect size of 0.84. This compared to 0.39 for enrichment and 0.30 for ability grouping. Acceleration involves progress through an educational programme at faster rates or younger ages than is conventional. Enrichment activities broaden the educational lives of some groups of students. In the TLA research summary Supporting gifted and talented students you will find greater treatment of enrichment and acceleration than it is possible to go into here. In particular, in that study, the researchers explored the benefits and challenges of both approaches in the round, taking into account issues beyond attainment, including emotional development. Hattie did not provide evidence relating to emotional development, but he did explore the social effects of acceleration. One meta-analysis found that students' attitudes to school were unaffected by acceleration; another found that the social effects were very small, but positive.

Which contributions from the student and the home are most important and why?

Students and their home environment exert some powerful influences on achievement. But, Hattie argued, there are many opportunities throughout school to influence some of the most important influences - for example, parental expectations, parental engagement in their child's learning and the effects of socioeconomic status (SES).

The influence of the student
What students bring with them to the classroom each year is very much related to their achievement in previous years. But although the overall effect size is high at 0.67, Hattie found that on average, prior achievement will lead to gains in achievement on 48 per cent of occasions. This, Hattie argued, means there is much that schools can influence beyond what the student brings from prior experiences and attainment.

Hattie found the overall relationships between achievement and many personality variables was close to zero. The key personality factors that did have a significant impact on achievement were a willingness to invest in learning and to gain a reputation as a learner, and openness to experiences. Anxiety, unsurprisingly, has a negative effect (-0.43). Consequently, Hattie argued, teachers need to consider methods to reduce anxiety as it can be a significant barrier to learning.

The influence of the home
With an effect size of 0.57, socioeconomic status is a notable influence on students' achievement. Hattie suggested that the effects from socioeconomic resources are more influential during pre-school and the early years of schooling. One study , for example, showed that students from lower SES groups start school having spoken on average around 2.5 million words, whereas for those from higher groups, this number is around 4.5 million - demonstrating the remarkable difference in what students bring to school. The earlier TLA research summary Parental involvement showed the importance of encouraging conversations between parents and their children at home through, for example, setting interactive homework tasks.

Of major concern to Hattie was that parents from lower socioeconomic backgrounds do not know the language of schooling and therefore cannot effectively support their child. Therefore he believed that schools should help parents develop this language. You may want to read case study 5 which illustrates how a school helped parents develop the language of learning.

Parental expectations are important too. Overall, the higher the hopes and expectations of parents with respect to the educational attainment of their child, the higher the student's own educational expectations and ultimately the greater the student's academic achievement. High expectations are assisted by greater parent-student communication and the student's control over their own studies. Parents engaging actively in their child's learning is key. For example, teaching children specific literacy skills was twice as effective (1.15) as listening to children read (0.51).

Which contributions did Hattie identify as having a small effect on learning?

Hattie found that certain contributions had only a small impact on student achievement. He argued that schools should avoid these interventions (those with small effect sizes) and focus their efforts on activities that had a greater impact. He also noted that effect sizes should not be the only criteria used when making educational decisions; the financial impact should be taken into account too.

Gender
The nature of the relationship between gender and achievement is an area of concern for many teachers. Hattie's synthesis of meta-analyses found only very minor differences between males and females. Gender differences were virtually zero in verbal ability; there were small differences in mathematics and very small differences in science. There was more variation within groups of boys and within groups of girls than there were differences between boys and girls. Consequently, Hattie argued that the difference between males and females should not be of major focus for teachers and schools; the way to tackle differences in achievement is to focus on effective pedagogy for all pupils.

Small classes
The value of small classes is a hotly debated topic. Contrary to popular opinion, Hattie found that reducing class size had little impact on student achievement as it had an effect size of only 0.21. He argued that this is due to teachers not adapting their teaching style to optimize the opportunities presented by having fewer students. With smaller classes teachers can co-work with the students as they construct understanding together, whereas the researchers found that the teachers adopted the same teaching role and strategies as they did for larger classes. As reducing class size is also extremely expensive Hattie cautions against its promotion as a strategy to raise student achievement.

Teaching test taking
Hattie found that many interventions which specifically focused on preparing students to take tests had very little impact as the average effect size was only 0.22. Short-term programmes were particularly ineffective, whilst those which were longer and had a broader emphasis on cognitive skill development were more effective in increasing achievement. Simply practicing tests or being given instruction in how to take tests had less impact on achievement than more focused practice and instruction.

Some curricula programmes
Whilst Hattie found that some curricular programmes were of benefit to students, others had very little impact on student achievement. For example whole language programmes, in which reading is entirely taught through contextual activities, had an effect size of only 0.06. Whilst this approach may be of use in later years, Hattie argued that in the early stages students need to be deliberately taught reading strategies - phonics instruction, for example, had an effect size of 0.60.

What did Hattie conclude from his work?

Hattie identified six signposts to effective teaching and learning.

- Teachers are among the most powerful influences in learning.
- Teachers need to be directive, caring and actively engaged in teaching and learning.
- Teachers need to be aware of what students have understood and to construct meaningful experiences from this. They

also need to have sufficient subject knowledge to provide meaningful and appropriate feedback to enable every student to move progressively through curriculum levels.

- Teachers need to know the learning intentions and success criteria of their lesson, know how well they are attaining these criteria for all students and know where to go next in light of the gap between students' current knowledge and understanding.

- It is not knowledge or ideas, but the learner's construction of this knowledge and these ideas that is critical.

- Leaders and teachers need to create environments where error is welcomed as a learning opportunity and where learners feel safe to explore knowledge and understanding.

The messages in Hattie's book relate these six signposts to effective teaching and learning rather than endorsing particular methods. He suggests that it may be possible to use these signposts and other messages about what makes the largest difference to teaching and learning to improve many of the methods that may not, on average be above the 0.40 hinge point. For example, team teaching has a very low effect overall (0.19), but if team teaching is undertaken with more attention to the feedback from students to the teachers, greater regard to effective feedback between the teachers and using appropriately challenging goals etc, the effects may be much greater. It is less the methods per se, than the principles of effective teaching and learning that matter.

How was the research designed?

Hattie set out to find out about the impact of different factors on student learning. He looked at the evidence from over 800 meta-analyses which encompassed 52,637 studies. These recorded the impact of different factors from the home, student, teacher, teacher strategies, curriculum and school as effect sizes. He found the average effect size for each contribution (resulting in 146,142 effect sizes) and ranked these according to their impact. He estimated that his study included approximately 236 million students.

Hattie developed a scale (or barometer) to help interpret the effect sizes and compare the different contributions. He argued that it is important to determine what works best rather than what works. His barometer included negative effects (-0.20-0.00), developmental effects (0.00-0.15), typical teacher effects (0.15-0.40) and a zone of desired effects (0.40+). Hattie found that in a typical year the average teacher would have an effect size of between 0.15 and 0.40. He therefore argued that it was important to look for innovations with effect sizes greater than 0.40 which he termed the hinge point. Interventions above the 0.40 hinge mark would have an impact that was greater than that of an average teacher.

He did not merely create lists of the most effective contributions to student learning but developed an explanatory model. From his data about the aspects with effect sizes in the zone of desired effects, he developed a model of visible teaching and learning with six signposts.

Some implications for teachers and leaders

Teachers may like to consider the following implications relating to Hattie's model of visible teaching and learning:

- Hattie's model stressed that learning needs to be made visible to students. Could you invite a colleague to observe a teaching episode and discuss afterwards the ways in which you approach, for example, making learning intentions and success criteria clear, involving students in creating success criteria, planning learning activities that directly relate to the learning intentions and giving feedback?

- Hattie's model emphasised that the most powerful feedback is that given from the student to the teacher. How do you gain information about the learning of the individuals in your class? One possible way of gaining this information could be to ask all the class to sketch a graph to show the results of a science experiment, or the emotions of a character in a book which can be quickly held up for you to scan. Which strategies are most effective for gaining a picture of students' skills and understanding? Discussing with a colleague the way in which you use feedback to inform your teaching could be a helpful next step.

- Hattie found that teacher-student relationships were extremely important. Developing relationships requires skills such as listening, empathy, caring and having a positive regard for others. It also involves creating an environment where it is acceptable to take a risk. Could you gain feedback from your students on their views of the climate you create in your classroom?

- Hattie noted the importance of teachers having high expectations of their students.
He argued that teachers must 'stop seeking evidence to confirm prior expectations, but seek evidence to surprise themselves'. You may like to share with a colleague 'critical incidents' where a student has surprised you with the level of their learning. Can you identify any students for whom setting out to be surprised would be a helpful next step? Would doing this in collaboration with another colleague help you to widen the scope for being surprised?

School leaders may like to consider the following implications:

- Hattie's meta-analysis showed that some teaching strategies were much more effective than others in raising student achievement. Could you spend time with your leadership team collecting evidence about the aspects of teaching that have the most impact on student outcomes and about which approaches could be reduced to make room for other, more effective ones?

- Hattie found that some approaches, such as teaching to the test, had very little impact whilst others such as using feedback had a very large effect size. Does your school focus its attention on the contributions that have the greatest impact on student achievement?

- Whilst Hattie argued that it was important to identify contributions that had large effect sizes he also emphasised that it was important to understand why they were effective in terms of their relationship to his model of visible teaching and learning. Could you work with your staff to identify why an aspect of classroom practice that has a positive impact on student learning is effective in your school? You may like to provide teachers with a copy of the signposts to effective learning to facilitate their discussion. These signposts can be found in the 'What did Hattie conclude from his work?' section.

- Many schools have emphasised the importance of student-centred learning. Some teachers may believe that Hattie's findings about the value of direct teaching contradict this. Would it be helpful to involve staff in clarifying what Hattie meant by direct instruction, such as having clear learning intentions and taking an active role in driving the learning forward rather than didactic teaching from the front?

- Hattie argued students need to work in an environment where they are able to make and learn from mistakes. If teachers are to become as effective as possible they also need to feel that they can talk about their teaching and see errors or difficulties as critical learning opportunities. Which strategies do your leadership team use to create this learning climate? How do you gain feedback from staff about their perceptions of the climate and how safe they feel to make mistakes?

Gaps in the research

Gaps - of basic premises, related issues, methods, analysis and/or interpretation - that are uncovered in a piece of research also have a useful role in making sure that future research can fill in the gaps and build cumulatively on what is known. If research is also to inform practice, it needs to be convincing to teachers, and to take account of their views of its adequacy; so practitioners' interpretation of the gaps and follow-up questions are crucial. We think the following kinds of studies would usefully supplement the findings of this research:

- further research into the full impact of acceleration programmes on student achievement, social and emotional development in a range of different cultural and school organisation contexts

- further research into the role of gender on learning. (Hattie found gender had little impact on achievement yet the gender gap is a concern for many practitioners and policy makers)

- a review of non-meta-analyses to provide complementary qualitative evidence

- more detailed research into the relationships between the different contributions

- case studies of how teachers make their teaching visible - for example, how they respond to student feedback; and

- further work exploring methodology around comparing effect sizes across different studies and their interpretation.

What is your experience?

Do you have any evidence regarding making teaching and learning visible? Do you have action research or enquiry-based development programmes that are designed to explore what schools and teachers can do to effectively support learning, such as investigating students' or teachers' perceptions of the extent to which they feel comfortable about making mistakes and using these as learning opportunities? We would be interested to hear about examples of effective approaches, which we could perhaps feature in our case study section.

Your feedback
Have you found this study to be useful? Have you used any aspect of this research in your own classroom teaching practice? We would like to hear your feedback on this study, which we can share and use to inform our work. Click on the link 'Tell us what you think' on the left to share your views with us.
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Case studies

We have chosen five independent case studies to complement and illustrate aspects of Hattie's model of visible teaching and learning. The five case studies describe how:

- a teacher found out about student learning and used the findings to develop ideas for future practice
- teachers at one school set out to make teaching a more active and visible experience for the students
- teachers were engaged in sustained professional dialogue about teaching and learning
- a teacher effectively managed the behaviour of Year 10 students through getting them to cooperate with each other and how their attainment improved as a result; and
- a school helped parents develop the language of learning.

Case study 1: Finding out about student learning: using feedback to inform teaching

We chose this case study because it shows how a teacher at one school found out about student learning in order to plan future practice. Hattie's research showed the importance of adapting teaching as a result of feedback from learners. The school involved was a primary school located in a fairly prosperous and culturally-diverse residential area. The teacher set out to find out about Key Stage 2 students' prior learning in an aspect of science before carrying out teaching. In this way it was possible to develop activities that challenged and built upon the students' ideas. The teacher concluded that previous teaching had not taken into account the students' prior learning and therefore had been ineffective in addressing misconceptions.

How the teacher gained feedback
The teacher was particularly interested in students' models of understanding of the senses. Each student in Year 3-6 (335 in total) was given sheets depicting a seeing, hearing and smelling clip-art scenario. They were asked to 'use lines, arrows and words to show how you see, hear and smell'. Using lines and arrows in this way was a common feature of SATs tests at the time. The students worked on their own to complete the task, after which a sample of 30 were interviewed.

What the feedback showed
The drawings and annotations suggested that students had five models for understanding hearing, seeing and smelling. These were:

- the receptor; nose, eyes and mouth

- outreaching; an active seeking- out of stimuli

- sensing-as-instant; a belief that stimuli and events interact simultaneously

- clashing-arrows; a meeting of outreaching and stimuli somewhere outside the body; and

- arrows-both-ways; a dynamic interaction between stimuli and receptor.

Examples of responses from the students that illustrated these five models were:

- the light bounces off objects into your eye
- the nose smells the vinegar and the smell goes to our mouth
- the sun shines on the flowers and that way our eyes can see the flowers
- sound will come out of the whistle and that way you can listen to the sound; and
- our nose smells the vinegar and tells us.

The teacher found that the students' models were totally different for each of the senses; they were driven by the context. Very few students who used the receptor model for one sense used it for all three. Additionally the outreaching and sensing-as-instant models were particularly prevalent.

Next steps
The teacher suggested that the students' ideas needed to be challenged and that gathering supporting evidence was a good way of doing this. This would enable their scientific models to become more robust. In order to do this it was important to take their existing models (such as outreach) into account.

The teacher felt that a possible activity for developing the students' thinking about the sense of smell would be to use a pipette to place vinegar in a balloon and ask them to consider whether they could smell it. He thought this might lead them to believe that is not possible to outreach to a smell when there is an obstacle in their way. After this, balloons could be filled with vinegar and inflated. The teacher thought the students might be surprised to find that they could now smell the vinegar. With further thought and scaffolding, the teacher thought they might suggest that gas particles escape through holes in the balloons' walls and move towards an understanding of the nose as a receptor.

In order to develop their understanding of hearing, the teacher thought students could observe a slinky. He felt that once they had been told that sound waves travel through the air in a similar way to the way the coils move in a slinky they will begin to realise that they do not need to outreach with their ears.

As seeing seemed to be the most problematic sense, the teacher thought it may be best for students to first develop their understanding of smell and sound. Once they have done this, he suggested getting the students to wear blindfolds in a darkened room and switching on the lights and asking the students whether they can see anything. If they say that they can't because the blindfold is acting as a barrier, then the teacher could ask them whether they can see anything through the sides of the blindfold and challenge them to explain how this can be possible if the blindfold acts as a barrier. With their blindfolds off and their eyes closed, the teacher could ask them why they can tell whether the light is on. The teacher felt that taking part in these activities could lead students to realise the limitations of the outreach model and move to a receptor model.

The teacher's conclusion
The teacher concluded that it was important to find out about students' ideas and use this feedback to construct meaningful learning experiences.

Reference
Cuthbert, A. (2006) *Do children have similar models of understanding for seeing, hearing and smelling?*, NTRP, Coventry. Available at: www.ntrp.org.uk

Case study 2: Making teaching and learning more visible

We chose this case study because it shows how teachers at one school (a smaller than average 11-16 comprehensive school serving a rural, economically-mixed area) set out to make teaching and learning a more active and visible experience. The three English teachers focused particularly on higher-ability boys (many of whom they felt were underachieving) studying for GCSE English. The boys were taught as a single-gender group. The teachers made learning more visible through making learning objectives and success criteria clear, active approaches to teaching and learning,

and raising expectations.

Clear learning objectives
The teachers felt that boys worked better when they understood the big picture. Consequently each lesson was put into a wider context. For example, each teacher set out to ensure the boys understood how the skills they were developing in the classroom related to the exam they would be sitting, such as showing how a speaking and listening task related to the skills required for the GCSE paper involving analysis of texts.

Clear success criteria
The teachers set out to ensure that the boys understood how they would be assessed on what they had learned to that point. Sometimes they used toolbars created by the class. For example, the boys used a toolbar as a checklist, which they ticked as they listened to a presentation. This was a popular activity as the boys were eager to find out who had ticked which key feature and whether their own assessment matched the teacher's. The boys were also involved in peer marking linked to the success criteria while the teachers used comment-only marking which provided the boys with guidance about where on the grading system they were working and what they had to do to take them to the next grade on one piece of work.

Active teaching and learning approaches
The teachers used ICT as a means to improve writing skills and help boys take ownership of their own learning. Examples included getting the boys to make comments on each other's work using the comment facility in Microsoft Word which focused the boys on analysis and allowed changes to be made easily and getting the boys to create Microsoft PowerPoint presentations. Drama was used to explore ideas and themes. One example was the use of a set of key words and phrases from a part of the set novel still unread which the boys were given on strips of card in random order. In groups of three, the boys had to produce a drama-based presentation that gave a flavour of the character using these words. There was a lot of laughter, but the final product showed an understanding of the author's craft that more conventional analysis may not have achieved so simply.

Raising expectations
The teachers were keen to change the boys' attitudes to doing well in school. They set about raising the boys' expectations through the teacher holding high expectations for them, competition, team work and peer pressure.

- Discussions between the Year 11 group and their teacher were focused on how each one could attain an A* grade at GCSE.
- The boys (particularly the highest achievers) tended to raise their game when they were in competition with one another.
- Activities such as setting the boys the challenge of teaching the rest of the class a section of a poem in pairs, which would then be peer assessed were effective at improving achievement - students who made little effort in their presentations initially, worked harder as they saw others produce better examples, and as the group's expectations for good quality work rose.

The difference made by the strategies
The teachers noted an increase in motivation among higher-attaining boys in Year 11 and a considerable lessening of the anti-academic achievement culture after implementing the strategies described above. Parents also gave positive feedback on their children's progress. Questionnaires showed that the boys were particularly motivated by the physical activities, such as drama and group work, and the use of humour.

Reference

Horwood, M. (2006) *Raising boys' attainment in English through single gender teaching and Assessment for Learning strategies*, NTRP, Coventry. Available at: www.ntrp.org.uk

Case study 3: Creating a professional learning community

We chose this case study because it shows how staff at one school were involved in professional development activity which incorporated many of the activities Hattie found had the biggest impact on student achievement. They included teachers being engaged in deep learning that occurred over an extended time and the involvement of external experts.

The newly appointed head of geography at an 11-18 comprehensive school wanted to develop the use her colleagues made of thinking skills activities. With the help of an external consultant, she involved them in creating a range of thinking skills resources to deliver a three-part lesson effectively. As a result, department meetings became a forum for sharing ideas and good practice, and discussing teaching and learning, which her colleagues enjoyed. They also felt that the new approach was having a positive impact on student learning - the students were achieving more, were more aware of their own achievements, and knew what they needed to do to improve.

Starting point

At the start of the project, the geography department at the school consisted of two NQTs, a history teacher who was brought in to teach geography and a new head of department who had only been teaching for four years. There were no schemes of work or up-to-date resources, but the department did benefit from a very experienced local authority foundation consultant.

The situation provided an ideal opportunity to change the historic structure and organisation of the department. The teachers began with an audit of the department's resources, teachers' skills and what was or was not already being facilitated in terms of the expectations of the National Curriculum.

The audit showed that the teachers lacked knowledge of thinking skills or the skills to deliver them in the classroom. It was also identified that there was little continuity across the department due to a lack of schemes of work at all Key Stages. There were also too few resources other than recently purchased geography textbooks and teachers' books.

How the teachers' use of thinking skills was developed

To begin with, the head of department wrote schemes of work with guidance from the consultant that related to the Thinking through geography series of books. The schemes of work focused on the aims and objectives for each lesson, and the geographical knowledge, skills and understanding required by the National Curriculum. These schemes of work were written a half-term in advance and immediately established a basis of continuity in the department.

Once a shared set of objectives had been established and was being used by teachers on a daily basis, the consultant organised a twilight training session on starters and plenary debriefing sessions, which was attended by all staff in the department. This session gave staff the opportunity to take part in a variety of activities, and they received a booklet of suggested activities. Staff were then tasked with including a starter activity in every lesson they taught and recording it, so it could be included in the revised schemes of work at the end of the year. Later they were expected to include a plenary activity too. Having to do this encouraged the teachers to share resources and ideas both formally, through department meetings, and informally on a daily basis.

During this time, the consultant began to work with the two NQTs on how to teach using thinking skills activities. This was achieved through team teaching with a particular class over a period of a half-term. The staff then shared what they had learned with the more experienced staff in the department, on a formal and informal basis. Copies of the Thinking through Geography and More Thinking Through Geography books were bought for all staff in the department so that they could begin to read about thinking skills for

themselves, and try some of the ideas in the books as and when appropriate. During this time, the organisation and structure of department meetings changed. It became a forum for sharing ideas and good practice, and discussing teaching and learning.

How the teachers' learning was consolidated
At the start of the following academic year, a collective decision at a staff meeting was made to abandon assessing students' ability to retain geographical information and to start to determine students' level based on a specific thinking skills activity during each unit of work. The head of department created 'must/should/could' prompt sheets for each thinking skills activity used to assess student attainment so that students would know exactly what was expected of them if they were to achieve their predicted level of attainment or beyond. Throughout the year, staff continued to try different thinking skills activities with their classes, and share their successes and failures on a formal and informal basis.

The impact the CPD had on staff
The teachers:

- regularly used thinking skills activities to deliver the aims and objectives of their lessons as their knowledge and experience of delivering these activities increased
- were more focused on facilitating learning rather than delivering information
- created a range of resources to effectively deliver a three-part lesson
- started to focus on teaching literacy skills through geography in order to improve students' ability to communicate their geographical findings; and
- enjoyed working in a department that was centred round teaching and learning.

The impact the CPD had on students
The teachers also felt that the students:

- were more challenged
- were able to express themselves in a variety of ways
- were achieving higher levels
- knew what they had to do to reach and hopefully exceed their target levels
- were more aware of their own achievements; and
- were achieving more and knew what they needed to do to improve.

Reference
Pinnington, H. (2006) *Creating a professional learning community through thinking skills*, NTRP, Coventry. Available at: www.ntrp.org.uk

Case study 4: Managing student behaviour effectively

We chose this case study because it shows how a teacher set about improving the behaviour of 12 Year 10 students through getting them to cooperate with each other in teams. Hattie's research showed that well-managed classrooms had a large positive effect on student achievement and engagement. The 12 students were at risk of failing to meet their predicted grade in PE GCSE. Some of them were showing signs of disaffection, such as disruptive behaviour or reluctance to actively participate in the lesson. Over the year, the students became more focused and engaged during lessons and most reported that they enjoyed PE lessons more. Their attainment improved too - nearly all the students either achieved or exceeded their predicted grade in the end of year exams.

How the teacher organised her PE lessons
The teacher used three main strategies to give the students a clear sense of direction and make her lessons run smoothly:

- working in teams with a specific role for each student
- a points system; and
- a punctuality revision quiz.

At the start of each lesson, the equipment monitor from each team collected a team sheet. The teacher awarded each student points for attendance, punctuality, correct kit and completed homework, which the team recorder recorded on the team sheet. Students with incorrect kits lost points for their team. The teacher also awarded three discretionary points for exceptional effort, a 'champagne moment' (outstanding performance) and sports personship which were also recorded on the team sheet. The team with the most points at the end of the week won and the results and the winning team's picture were placed on the sport education notice board. Recording such indicators of success helped the students to evaluate their own performance in the lesson and identify target areas for improvement.

With the punctuality revision quiz, the teacher aimed to encourage the students to arrive early, help them with their revision and create a more focused start to the lesson. As the students arrived at the lesson she gave them a numbered card, which the team recorder noted on their team sheet. Whilst they waited for the other students to arrive, the students revised their notes from the previous lesson. When all the students had arrived, the teacher asked them quiz-style questions, giving the students who had arrived first the easiest questions. The team recorder noted those students who answered their question successfully and added a point for each correct answer to their lesson total.

The effect the approach had on the students' behaviour and attainment
Student attainment improved over the year and there were fewer incidents of poor behaviour:

- detentions decreased from 18 in the first term, to two in term three
- incorrect kits for lessons decreased from 15 in the first term, to two in term three
- failure to hand in homework decreased from 24 in the first term, to six in term three
- punctuality increased (one student commented how students ran to the lesson!); and
- five of the target group of students achieved their target grade, and four students exceeded their predicted grade in the end-of-year exams.

The students clearly enjoyed the lessons and showed a greater sense of responsibility and accountability as reported in the following quotes:

'People were more mature instead of just messing about ... it makes your team more well behaved'.

'Some people would have chosen not to participate and not be bothered ...but if you've got a role, you have to do it and go from there and keep participating'.

Reference
Holland, E. (2006) Sport Education: A vehicle for the inclusion and performance of your underachieving and disaffected pupils, NTRP, Coventry. Available at: www.ntrp.org.uk

Case Study 5: Helping parents develop the language of learning

We chose this study because it shows how one school helped parents to develop the language of learning. It demonstrates that as parents develop this language they are more able to support their children, leading to improved attendance and achievement. The project took place in a middle school that had around 400 pupils on roll, of whom 95 per cent were from the local Asian community. Many pupils entered school with a reading age well below average. The school undertook their parent partnership project in response to:

- staff concerns about the lack of visible parental involvement

- recognition that some parents felt unable to support their child; and

- the views of some pupils that their parents could not help them because they were not fluent speakers and readers of English.

How did the school identify the parents' needs?
To begin with, the school wrote a letter (available in several languages) to all families of pupils in Years 5 and 6, inviting them to take part in an 'exciting partnership' designed to help improve their child's reading and enjoyment of books. Around 50 parents (35 per cent of the Key Stage cohort) responded to the letter. Teachers, helped by a bilingual member of staff, interviewed these parents and their children in school, in their home or in a local community centre. The interviews explored:

- opportunities in the home for reading and learning

- what parents needed from school to help them support their children; and

- how the school and parents might work together.

The teachers found that the majority of parents did not believe that they could have a role to play in their child's learning because they were unable to read and write in English themselves. The school also found that although parents said they were satisfactorily informed about their child's progress, in reality they had little understanding of the actual processes.

How did the school support the parents?
The school decided to organise gatherings in the parents' homes - inviting groups of mothers to look at a wide range of books to try to increase their ability and confidence to share and explore books with their children. The school identified several key households to work with and as targets for establishing good relationships. Then the school borrowed a large selection of books from the school's library service. At each book session, three members of school staff, including a bilingual member of staff, sat with a group of mothers, and looked at and discussed the books. Ten gatherings were arranged in total, attended by around 100 parents. The school also produced a partnership project newsletter that contained information about books suitable for Year 5 and 6 pupils that could be bought at local bookshops or borrowed from the library as well as about school events, and school staff took several groups of parents on a library visit.

What was the impact of the project?
By the end of the project:

- the school had an improved relationship with Asian parents - many Asian parents had been involved in a dialogue about using books and supporting children's learning

- parents had become more actively involved in their child's school education - attendance at school meetings and consultations increased from 25 to 50 per cent and more parents came into school to ask questions

- parents had improved their knowledge and understanding about using books - they learnt how the school used books, how to use books themselves with their children and how to use the library

- pupils' library use had increased

- staff had gained greater insight into the limits of pupils' home literacy and the parents' need for information and practical support

- pupil performance in the end-of-Key-Stage tests had improved by 17 per cent in English, 10 per cent in mathematics and 27 per cent in science over the previous year; and

- attendance had improved - the number and length of visits the children made abroad during term-time was reduced.

The school felt that a number of factors contributed to the success of the project, including:

- women gathering at each other's homes for a 'women's' event was a traditional activity and therefore not threatening

- being in a large group with a common language helped the women feel less threatened by their lack of English; and

- the rolling programme meant that a large number of staff could be involved.

Reference:

Offord, J. (1998) *The Highfield parent partnership project*. Copies of the report are available from: Bradford Education, Flockton House, Flockton Road, Bradford, BD4 7RY

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Further reading

Related research

Marzano, R. (1998) *A theory-based Meta-Analysis of Research on Instruction*, Mid-continent Regional Educational Laboratory Aurora, Colorado. Available at:
www.eric.ed.gov/ERICWebPortal/detail?accno=ED427087

Related TLA research summaries

- Carl Rogers and classroom climate
- The impact of CPD in the classroom
- Teachers' professional learning
- The role of the specialist in CPD
- Raising achievement through group work
- Parental involvement
- Learning how to learn through AfL strategies
- Improving learning through cognitive intervention

Summaries of research

Teachers' and students' roles in formative assessment

Getting engaged: possibilities and problems for home-school knowledge exchange

Improving the quality of pupils' talk and thinking during group work

Training parents to help their children read

Resources

Petty, G. (2009, second edition) *Evidence-based teaching: A practical approach*, Nelson Thornes Limited, Cheltenham

The website of the Assessment Reform Group

Professionalism and Pedagogy Commentary

Research taster: What's in their heads: how can we find out about students' conceptions in science?

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Appraisal

Hattie, J. (2009) *Visible learning: A synthesis of over 800 meta-analyses related to achievement*, Routledge, London

Robustness

This book is based on a synthesis of more than 800 meta-analyses (i.e. a meta-meta-analysis) about influences on learning, in order to find the key influences on student achievement. The advantage of a meta-analysis is that the effects in each study are converted to a common measure (an effect size) so that the overall effects can be quantified and compared.

Hattie started by collecting 134 meta-analyses and proposing a set of common themes as to why some influences were more or less influential than others. He then supplemented his initial collection with more meta-analyses which he coded. He constructed a database with a line for each meta-analysis that summarised and categorised the study, and noted the effect sizes and standard errors.

Between them, the 800 meta-analyses encompassed 52,637 studies and provided 146,142 effect sizes about the influence of some programme, policy or innovation on academic achievement in school. The effects covered most school subjects (although most were reading, mathematics, science and social studies) and all ages. The effects were based on many millions of students and covered the main areas of influence - from the student, the home, the effects of schools, teachers, curricula and teaching methods and strategies.

Hattie created a 'barometer' to weigh up the relative effects of different practices in order to find what works best. The barometer ranged from negative to high impact on student achievement. It indicated reverse effects (-0.20-0.00), developmental effects (around 0.00-0.20) teacher effects (around 0.2-0.4) and the 'zone of desired effects' (0.40-1.20). Hattie identified 0.40 as the 'hinge point' for what leads to successful learning based on the premise that as teachers typically attain 0.20-0.40 growth for their students per year, they should be seeking greater than 0.40 for their students' achievement gains to be considered above average, and greater than 0.60 to be considered excellent.

Relevance

There is a great deal of research that shows what makes a difference in the classroom. The difficulty for teachers is identifying not just 'what works', but 'what works best' through seeing the relative effectiveness of different influences and interventions. Of greater value still however for experimenting with researched practice, is understanding the underlying principles about why some innovations are more successful than others.

Applicability

The overall message of the book is that it is 'visible teaching and learning' by teachers and students that makes the difference. This occurs when:

- learning is the explicit goal and is appropriately challenging
- the teacher and student both (in their various ways) seek to ascertain whether and to what degree the challenging goal is attained
- there is deliberate practice aimed at attaining the goal
- feedback is given and sought; and
- teachers actively participate in the act of learning.

Inherent in this model is that teachers see learning through the eyes of the students and that students see themselves as their own teachers. When talking about feedback, Hattie made the distinction between the

feedback to the teacher about what students can and cannot do, and feedback to the student. The former is more powerful than the latter. This necessitates a different way of interacting with students - for example, it is important to create a classroom climate in which 'errors' are welcomed as they are key levers for enhancing learning. It is also important to have appropriately challenging goals as then the amount and directedness of feedback is maximised.

The book identifies six main areas that contribute to learning: the student, the home, the school, the curriculum, the teacher and teaching and learning experiences, but that teachers are among the most powerful influences. To enhance learning, Hattie states teachers need to be aware of what every student knows and understands to be able to construct meaningful experiences for them and to provide meaningful feedback. They need to know the learning intentions and success criteria of their lessons, know how well they are attaining these criteria for all students, and know where to go next in the light of the gap between students' current knowledge and understanding and the success criteria.

Hattie also identified contributions that had a low impact on student achievement, such as small classes, gender, teaching test taking and some curricula programmes, and suggested that schools focus their efforts on activities which have a higher impact.

Writing
Though detailed, the book is written in an engaging style and the key findings are well signposted. Chapters cover the method Hattie used to create his meta-meta-analysis, the overall message of his work about visible teaching and learning, and the respective contributions to achievement from the student, the home, the school, the curricula, the teacher and approaches to teaching and learning. The appendices detail all the meta-analyses included, listed by the chapters in the book where they are referred to, and list the influences in rank order. The book is illustrated throughout with pictures of barometers showing the significance of the effect sizes reported for key influences and innovations.