

The Skills Gap – Teaching students to think

By Bryan Greetham, author of Smart Thinking.

1. The Problem

The problem that we as teachers confront is best defined by viewing it from three different perspectives. Like any business, in order to survive, universities must compete successfully with other universities in attracting students by convincing them that by enrolling at this, rather than any other university, students will acquire the skills and qualifications they will need to open up the careers of their choice.

Students, for their part, face an uncertain future with unemployment among graduates high around the world and fierce competition for every vacancy. To compound the problem, many now face much higher fees and a burden of debt that they will carry well into the future. So, understandably, they ask themselves whether it is worth studying for a degree at all and, if they decide that it is, which university is likely to ensure that they graduate with the skills that employers need.

The third perspective is that of employers. Overwhelming evidence from the Confederation of British Industry, the Chartered Institute of Personnel and Development, UNESCO and the World Bank reveals that employers around the world are reporting that they are struggling to find graduates who have the skills they need, while they are being overwhelmed by applicants with good degrees, but who cannot think.

In its 2012 'Report on Skills Gaps' UNESCO declared that most employers found graduates were 'not employable'. The sort of skills they lacked, according to the Chartered Institute of Personnel and Development's report of 2012, were the 'higher

level creative skills': the abilities to think creatively and conceptually, and to make good decisions.

To cope with this problem, it is estimated that up to 75 per cent of medium to large sized organisations and 95 per cent of FTSE top 100 companies are now using psychometric tests during the recruitment process, rather than relying on a conventional degree to choose the right candidates to interview. They report that a degree is no longer a good indicator of someone who has the right thinking skills.

For instance...

In 2012 the law firm Herbert Smith announced that applicants for their training contracts would be tested on their reasoning skills. Those who succeed will then be trained how to think. They explained that they were introducing the test, partly because they had had a 50 percent increase in the number of applicants over the previous year for training contracts, and partly because, they said, that too many students with a 'good degree' cannot 'think like a lawyer'. That is, they cannot think 'critically, analytically and conceptually'.

Similarly, in 2015 Ernst and Young, a multinational accountancy and professional services company, announced that they would choose which applicants to interview based entirely on their performance in online tests. This follows the announcement by PricewaterhouseCoopers, rated the top graduate employer by the Sunday Times for the past 12 years, that they would ignore A level grades. Ernst and Young explained that 'It found no evidence to conclude that previous success in higher education correlated with future success in subsequent professional qualifications undertaken.'

2. The Challenge

Most of us would no doubt agree that if there is one thing that university education should teach all students it is how to think. Yet despite this, universities around the world have never done this well, if at all. We have all been inducted into education systems that emphasise the importance of teaching students *what* to think, not *how* to think. Teachers are appointed on the grounds that they are authorities in their subjects; the gold standard in knowledge. So it is natural to assume that their role is simply to pass on this knowledge.

And, by the same token, students accept that it is their role to listen carefully to what their teachers tell them, make sure they understand it, record it accurately and consign it to memory, so that they can pass exams by recalling it faultlessly. And we tend to endorse this system even though we all know that nobody learns how to think like a scientist by learning scientific facts as nobody learns how to think like a historian or a lawyer by learning facts about these disciplines.

Despite all our attempts to encourage students to analyse and critically evaluate the arguments they hear and read, the overwhelming momentum of syllabuses, modes of assessment and the need to ensure our course yield good results is to convince students that all they need to learn is how to recycle received opinions: to imitate authority and reproduce what they think their teachers think they ought to think.

As a result, much of our teaching results in the development of just the lower cognitive skills to understand and recall. For the most part students see no place for the higher cognitive skills to analyse, synthesise and evaluate, to think creatively, solve difficult problems and generate ideas. It's not surprising, therefore, that the

World Bank found that 'Skills gaps are particularly severe in the higher-order thinking skills' and it recommended that education institutions should 'refocus the assessments, teaching-learning process, and curricula away from lower-order thinking skills, such as remembering and understanding, toward higher-order skills, such as analyzing and solving ... problems, as well as creativity.'

Teaching these skills

This is the challenge we all face. How can we redesign education and learn to teach these skills? It calls for a radical reorientation of the way we teach. It means accepting uncertainty in our teaching, thereby surrendering some of the control we have as the source of right answers, so that we can teach students how to think conceptually and creatively, to solve difficult problems and come to their own well-reasoned decisions.

Some universities have argued that their students already develop these skills in their courses, or through work experience or voluntary work. But the overwhelming evidence from employers around the world shows that this is simply not the case. Very few students are likely to learn through work experience or voluntary work how to,

- create and analyse concepts,
- synthesise ideas to reveal new insights and ways of tackling problems,
- generate their own original ideas,
- then structure them and make connections to reveal their deeper significance,
- or learn methods of solving problems by adapting these structures
- and by using analogies,
- how to assess risk

- and make their own decisions rationally under conditions of uncertainty, rather than relying on their intuitions and first impressions, or be paralysed by hesitation.

These skills need to be taught, rather than just left in the vague hope that somehow students will acquire them by themselves.

3. The changes we need to make

Studies have shown that those students, who are reluctant just to recycle the ideas they are given, searching instead for new and better answers to problems, are three times more likely to drop out of university than those who are content to accept what they are told. Today, we are all aware of just how much our world has been fundamentally reshaped by these unconventional, creative minds. Those, like Mark Zuckerberg, Steve Jobs and Bill Gates, whose insights and revolutionary concepts have transformed the way we live, developed their potential for original thought only after dropping out of university.

To develop these abilities to generate new ideas we have to tackle three underlying problems that limit our ability to encourage and develop creativity.

1. A single best answer and a single best way of doing things

We encourage our students to believe that there is a single best answer to every problem and a single best way of solving problems through the application of set techniques and conventional logic, which students must learn and then apply to every similar problem. A teacher's role is simply to reveal and explain these techniques and then get students to apply them over and over again. In this

relationship students are reduced to mere imitators, learning and practising the methods they have been taught and recycling their teacher's opinions, along with all the associated beliefs, values and attitudes.

However, those who have made important breakthroughs in whatever field, from John Nash to Steve Jobs, from Darwin to Watson and Crick, have *designed* the solutions, not *found* them by simply applying set techniques and conventional logic. Although, in retrospect, they often describe their thinking in terms of assured logical steps taken with a clear view in sight, in reality, theirs is a messier, often illogical, path to the truth. Many times their ideas appear to be stabs in the dark, followed by false dawns and disappointments, until a sudden insight finally lights their way.

To develop our students' higher, creative, cognitive abilities we need to strengthen their confidence in their own ideas and creativity. To do this we need to lay down new core assumptions to reshape the context in which they will do their work, relinquishing the idea that they are mere imitators and recyclers of received methods and ideas. At the heart of this there are two fundamental assumptions:

1. We don't have to be right at each step.
2. There is no single way of getting to where you want to be.

Then they can begin to develop the confidence to cope with uncertainty, to generate their own ideas and begin to think creatively as they design solutions to problems. And, then, at last they will begin to realise that there is value in their own ideas.

2. *Fear of failure*

We tend to assume that students only develop the motivation to improve their work by fearing that they are likely to fail if they don't. But in terms of their higher cognitive abilities, the effect is quite the reverse. They not only don't improve them, but the fear of failure prompts them to abandon them altogether, resorting instead to the safer, regressive forms of learning, the lower cognitive abilities that carry less risk. They memorise what they have been told and prepare themselves to reproduce it accurately. In other words, they play it safe and become surface-level processors just imitating and reproducing what their authorities tell them, even though it might make no sense to them. They learn to repeat the arguments their teachers give them and reproduce what they believe to be the right answers, confident in the belief that this will be enough for them to pass.

Ultimately, this produces a kind of illiteracy. In their written assignments they struggle to express ideas which are not theirs in a language they do not command. They are not expressing *their* ideas, but what they think their teachers think they ought to think. As they see it their role is not to make the idea their own, but just to wield it accurately. And no-one, not even the most accomplished writer, can write well when she is expressing ideas that have no meaning for her. She will struggle to give shape to the ideas; her fluency of expression will break down; her sentences will no longer mean what she meant them to mean; she will become illiterate.

3. Assessment

No matter how much care we invest in designing courses to achieve clear learning objectives, it is not these that have the greater influence over the quality of learning we achieve with our students, but the way we assess them. Essays are good at assessing a wide range of higher cognitive abilities, but in the main they are used

just to assess how well students have understood a topic: the lower cognitive abilities. This has a significant impact both on our teaching and on student learning.

Recently, a young law teacher at a UK university was told by his course leader to change his teaching style. His students had complained. Apparently, he had been asking them 'to think too hard', rather than 'simply giving them the answers'. As he said, 'they do not seem to care whether the students can think. Better to take the easy route and let me provide the answers so that the students pass the exams.' This seems to be the experience of many teachers. They know that they have to produce good results, so they pass on hints of what's likely to be on the paper, along with the points students will have to include in their essays to achieve a good grade.

For their part students analyse past papers, limiting their work just to the typical questions that always come up and the hints from their teacher as to what will be on the paper. This often means learning answers by rote, if this is what it takes to do well. Their success is more a reflection of their ability to reveal the underlying agenda in the curriculum and the patterns of recurring questions, along with their lower cognitive abilities to remember the points they must include, rather than any serious fulfilment of the learning objectives of the course.

Impact on the quality of learning

Inevitably these issues have a serious impact on the quality of learning, forcing students to rely exclusively on their lower cognitive abilities, while they resort to surface-level processing of what they read and hear. They understand that their results depend upon identifying and presenting clearly what they believe to be the right answer – what they believe their teachers want them to think.

This, in turn, shapes the way they read and process ideas. They are aware that they no longer have to think deeply about the meaning and implications of what they read. They are not engaged in deep-level processing: evaluating it critically, analysing concepts, synthesising ideas and playing devil's advocate. They are not grappling with the deeper issues, evaluating the author's arguments against their own network of beliefs and values. As their minds are already made up about the right answer, there is no need for them to suspend their judgement, which is the key to developing these higher cognitive abilities.

Their search is just for material that will support the answer they believe to be right. They are merely scanning the text in search of quotable passages and material that will support their preconceived view. If there are arguments and evidence that contradict this, they will ignore them. As they see it, their role is to present the 'right' answer that they think their teacher wants in the strongest, most convincing, way.

If they present arguments in their work that they don't understand or don't agree with, that is irrelevant to what they believe they have to do. They see no point in being creative or in challenging what they have been told is the right answer. That has nothing to do with education and its learning objectives as they see it. It should come as no surprise, therefore, to discover what employers worldwide are discovering, that degree success has little to do with the ability to think and, ultimately, with success in a profession.

4. Practical steps

Changing students' perception of themselves

In chapter 13 of *Smart Thinking* I describe the transformative impact a teacher can have on a student once she has convinced him that he has important and valuable ideas of his own: a genuine contribution to make to his own learning. Although he might have been quiet and unresponsive at the back of the class, he suddenly bursts into full bloom with interesting ideas that he develops with confidence and courage. At this point genuine creative thinking starts. Students become obsessed with ideas and eager to share them. They are tenacious and resourceful. They have the courage and confidence to ask the most disarming, naïve questions full of insights that throw the most surprising light on the most complex problems.

The importance of emphasising the unique and valuable contribution students make to their own learning is vital not just to developing creative thinking, but to the development of all higher cognitive abilities. At the heart of this there are two key principles:

1. Suspend your judgement

To develop these we must suspend our judgement. The moment we assert that something is certain, a fact, all discussion, analysis and creative thinking about alternative solutions come to an end. There is nothing more to discuss and, therefore, no opportunity to develop our thinking skills. If we don't use these abilities, we don't develop them. If you want to develop your backhand in tennis, play lots of backhands. If you want to improve your skills to discuss issues, discuss lots of issues.

Therefore, the development of these abilities calls for teaching methods that allow for complexity, uncertainty and multiple solutions. It calls for students to design their own solutions, generate their own ideas and decide for themselves how they

will find the answer. Students then become involved in deep-level processing of what they read and hear. They are involved in active processing, in contrast to the passive learning that they so often experience in lectures as they search for knowledge, which they then set themselves merely to memorise and recall.

2. What is known is shaped by the act of knowing

To convince students that they can make a uniquely valuable contribution to their own learning it is necessary to show them that our thinking shapes what we know: it is not neutral, a mere tool, the influence of which is universally the same for whoever uses it. As I said previously, the role of students is diminished to that of passive, surface-level processors by the assumptions that there is a single best answer to every problem and a single best way of solving problems through the application of set techniques and conventional logic, which they must learn and then apply to every similar problem.

For our own part, as teachers, to develop these higher cognitive abilities we need to be more open minded: we need to base our teaching on the premise that each student is likely to have their own way of solving a problem; to have their own way of analysing a concept from which we can all learn. We need to accept that students will generate their own original ideas and structure them differently to reveal new, unexpected meaning. All of this involves a willingness to reward diversity: to accept that with the exception of certain formal subjects, like logic and mathematics, there are not right answers about much of what we teach, exclusively owned by those who teach. There are just different judgements and interpretations of inconclusive evidence; different justifications that are more or less convincing than others.

Changing students' perception of Higher Education

All of this comes back to the transformative impact a teacher can have on a student once she has convinced him that he has important and valuable ideas of his own; that all students have a unique and valuable contribution to make. It reaffirms the two fundamental assumptions:

1. We don't have to be right at each step.
2. There is no single way of getting to where you want to be.

All of the doctors and nurses at the General Hospital in Vienna in 1847 knew what Semmelweis knew, but he alone was able to design a solution to the problem of puerperal fever and achieve what is considered by many to be the greatest single advance in the history of medicine, which opened the doors to the developments in bacteriology that were to come.

Einstein, too, knew no more than anybody else, when in 1905 he wrote his four ground-breaking papers. He did no experiments of his own and discovered nothing new. All he did was think differently. He challenged established concepts, like absolute space and time, created new, revolutionary concepts, like relativity, and forged unexpected connections between ideas, like mass and energy, producing insights that were to transform our thinking. Like Semmelweis, his own unique form of thinking brought about the breakthrough, which others had been unable to see.

To achieve this transformation in the way students view creativity and the uniqueness of their own thinking we have to reduce the anxiety that comes from the fear of failure. We are risk averse: we are intimidated by the fear of failure and avoid creativity and problem solving. Instead we revert to regressive forms of learning, just reproducing what we are told are the right answers. Evidence shows that as soon as normally creative and innovative students step into colleges and universities

they become dependent learners, simply reproducing what they are told are the right answers, even though in their normal lives they might exhibit all the characteristics of autonomous learners, taking risks, seeking out information for themselves, learning new skills and confidently taking on new projects.

To avoid this it's important to do two things. First we need to develop positive attitudes to creativity and conceptual thinking, and the ability to cope with uncertainty. Students need to be convinced of the importance of this to the learning process, to developing their higher cognitive abilities and to acquiring the employability skills that employers need. Second we need to motivate students to be creative, risk takers; to have the confidence to tackle difficult problems and back their own judgement. We have to strengthen their perception of themselves as autonomous thinkers, who can create new concepts, generate original ideas, design solutions to the most difficult problems and take rational decisions under conditions of uncertainty.

Changing the role of teachers

Inevitably, achieving all of this will involve re-examining the way we teach and the way we ourselves were taught. We will need to accept that we can no longer continue to function as just authoritative dispensers of knowledge and right answers. To develop the higher-cognitive abilities of our students we need to become guides, facilitators, helping them find their own insights and the most effective ways in which they can develop their thinking skills.

Along with this we need to develop teaching methods that embrace uncertainty and creativity; that involve suspending our judgement so students can use their higher cognitive abilities and, in the process, begin to develop them. These are significantly

more complex aims than merely dispensing knowledge, so our lessons and teaching material must match them, helping our students cope with uncertainty, find their own solutions to problems and their own way to understanding.

5. Lectures

Nowhere is the challenge of these changes more obvious than in the traditional and ubiquitous lecture. The most pervasive problem in university teaching is passivity. As students sit through lectures their learning experiences are largely out of their control. Consequently, their higher cognitive abilities remain untouched and undeveloped. All they are required to do is listen carefully, understand and write accurate notes quickly. There is no deep-level processing.

Yet, despite their limitations, lectures can be used imaginatively to do more than just transmit knowledge. To develop the higher cognitive abilities of our students we can use our lectures to present complexity, uncertainty and problems that have multiple solutions, which call upon students to design their own solutions, generate their own ideas and decide for themselves how they will find the answer.

As many lecturers know, one effective way of doing this is to make the lecture interactive, or a significant proportion of it. This can be done in a number of ways, for example by presenting students with a carefully designed exercise in which they must analyse an open-ended problem, design and discuss among themselves possible solutions, come to a decision and then report back.

For instance ...

In an hour's lecture the first 10 minutes could be used to set up the exercise and the following 20 minutes for their work in groups of, say, eight to 10 students. This gives the teacher the rare and valuable opportunity to encourage them to use and develop their higher cognitive abilities as he or she moves from one group to another monitoring their progress and offering suggestions and encouragement. After the group work they then spend the next 20 minutes reporting back in their groups.

Metacognition

The final 10 minutes can be used by the teacher to get students to reflect on the important metacognitive implications of what they had done. They need to learn the habit of frequent self-evaluation that promotes greater awareness of the way they use their abilities and where they need to work most. The importance of this lies in the opportunity it gives us to help students focus not so much on the product of their deliberations, the answers and solutions they have arrived at, but, more important, on the process: the abilities they have used and the type of thinking that they have done.

To set this up effectively we need to make clear that they are doing a different form of thinking: a more complex form involving a wider range of higher cognitive abilities. A good thinker is able to think about her thinking while she thinks. Yet it is always surprising just how little students understand about the significance of what they have done and the abilities they have used. In this exercise they will have developed not only their creative and conceptual abilities to analyse a problem, generate ideas and design solutions, but also to assess risk, make decisions, collaborate with others and present their ideas effectively to a large group of people.

Importantly, such metacognitive reflection needs to be done in a context that assures students that their concern should not be focused on the possibility of failure, but on how well they have used these skills. Their abilities and how they use them are more important than being able to remember and reproduce arguments that they have heard and read. They need to be confident that if they come to a different conclusion than the teacher, but still argue their points effectively, persuasively and consistently with good use of evidence, they will still earn good marks.

6. Seminars and tutorials

Smart Thinking examines in detail most of the key employability skills, along with the sort of psychometric problems that employers use to assess them. The most effective ways of helping our students develop these skills are, first, to design courses that teach each of them and, second, to integrate them within our teaching in seminars and tutorials.

1. Courses in employability skills

The most effective of these courses take students through each of the stages that they have to work through, while getting them to work on material that has been carefully designed using real life examples. In our teaching, the methods and material we employ must guide students as they work through each stage, while allowing them to use the material in their own way. In *Smart Thinking* I have outlined the different methods for developing these skills with the sort of material we might use. On the companion website and the Smart Thinking website, in the student zone, you will see additional material you could use and adapt for your own purposes.

The stages students need to work through and, hence, the structure of these courses, are all examined in detail in *Smart Thinking*. This includes the following:

Concept creation – see Chapter 4

Conceptual analysis – see Chapter 5

Synthesising ideas to reveal new insights – see Chapter 6

How to generate original ideas – see Chapter 9

Structuring ideas to reveal their deeper significance – see Chapter 10

Problem solving – using analogies – see Chapter 11

Problem solving – adapting structures – see Chapter 12

Risk assessment – see Chapter 16

Decision-making – see Chapters 15 and 17

As we help students work through each stage of the methods outlined in these chapters it is important to monitor their progress, giving them feedback that guides and encourages their efforts, while all the time stepping back from what might amount to instruction. This runs the danger of encouraging them to believe that there is a single right answer to the tasks they are set, which we will eventually reveal.

We have to make clear that there is not just one answer to the problems we set them. As they analyse a concept they are likely to see different things than we have seen. They will be aware of different ways and different contexts in which it is used, which give rise to different implications. Although we might be convinced about the solution we have designed for a problem, we are likely to be surprised by the inventiveness and creative imagination of our students, who design different and, perhaps, more effective ways of solving it.

Equally important, we need to ensure that students are focused as much on the process of thinking as on the product. At the end of each lesson, it is important to set aside time for metacognition, when students are encouraged to think about how they think. Self-reflection of this type helps them identify what went well in the tasks they were given, what didn't go so well and how they can change things for the better. Like an athlete working to improve his or her performance, they will identify their weaknesses and what they need to work on.

2. Integrating the teaching of employability skills into our courses

The teaching of employability skills is unlike the teaching of similar skills, like reading, note-taking and essay writing. Although study skills like these and employability skills are both generic, the application of employability skills in particular professions involves adapting them to the specialist demands of each profession.

Problem solving or concept creation in the legal profession is likely to pose different challenges than it would in history or economics. As a result, while a university's record in developing employability skills might be excellent overall, it could vary widely from one department to another, if some departments fail to accept the challenge of integrating these skills into their teaching.

Indeed, the teaching of these essential skills should inform all our teaching and learning. It is not enough just to teach students the core knowledge of a subject; we must also develop their higher cognitive abilities to create and analyse concepts, synthesise ideas, generate ideas, solve problems, assess risk and make decisions.

Unavoidably, this poses more complex problems for teachers that many may not have confronted before. It requires more thought, effort and planning to prepare lesson plans and material. As we have seen, it also requires different epistemological assumptions about there being right answers to the problems we set and a willingness and confidence to suspend our judgement as we prepare our students to generate their own ideas, design solutions to problems and come to their own judgement as to what would be the best decision.

This means, of course, that it is not just our students who must develop their creativity. We must also invest our inventiveness in writing material and in devising effective ways in which we can help students develop these abilities.

For instance ...

A lecturer teaching professional ethics on a media and journalism degree might well adopt the strategy of setting students reading on a topic, like 'Privacy and the Public Interest', getting one or two of them to do presentations and then following this up with a discussion and final presentation by the lecturer.

However, this is unlikely to develop conceptual, creative and decision-making skills, unless a strategy is deliberately planned and implemented. In this case, instead of the presentations, the lecturer could get the whole class to analyse the concepts 'privacy' and 'public interest', recording their ideas on a whiteboard as they shape and re-shape them.

Then they could be presented with a problem to solve involving these concepts. In small groups, using trigger questions, they would generate their

ideas, produce their own solutions and report back. The lecturer would then guide them as they reinterpret and adapt their solutions, getting them to assess the risks involved, until they arrive at the most effective answer.

It is relatively simple to teach the core knowledge of our subjects, but to develop abilities like creativity and conceptual thinking is much more complex. I hope that *Smart Thinking*, along with the websites, will give you material and ideas that you can use in this.

As you devise your own material and lesson plans it is worth reminding yourself of two guiding principles. First, we have to ensure that students are actively involved in real life problems. And, second, our aim is to ensure that this is self-directed and independent learning: students must be given the freedom of deciding for themselves how best to tackle the problems we set them.

Knowledge and uncertainty

Although none of this should obscure the value we rightly place on the importance of our students understanding the core knowledge of our subjects, we have to use this in a way that embraces uncertainty and creativity, so that we develop the skills of our students to cope with problems not seen before. Smart thinkers who have developed their higher cognitive abilities to think creatively and conceptually are flexible in their thinking, open to new ideas, have the ability to adapt, see new ways of doing things and have the courage and confidence to face the unexpected. That should be our goal, rather than educate our students just to reproduce orthodox ideas and responses.

