How do you teach creative thinking in response to problems?

Open-ended problems

How do you teach students to generate ideas in response to *problems*? Not just a particular kind of problem that, once you have solved it once or twice, you can then do again by repeating a set of learnt process, but *problems* in a more general way. And further to that: how do you teach students to think creatively in response to problems that don't have a definite solution to them, or that haven't yet been solved?

For instance, how can we teach students to propose meaningful proposals about the problems of plastic waste, climate change, or teenage mental health? Or to venture a little further outside of the box, how can we teach students to think creatively about problems like the following:

1. We throw away most pens once we have used them
2. Humans globally only live to an average of around 70 years
3. Surgeons have to have steady hands to perform operations
4. Lots of common fonts are difficult for people with dyslexia to read
5. Schools aren't perfect

Unlike learning how to decode a particular kind of graph in order to extract information, or balancing a simple equation in order to find the value of X, there is no set method that can be used to address any of these problems, and no set solution either. The skills needed for this kind of problem-solving need to be broader and more widely applicable, but also valuable and effective.

Skills from our Creative Thinking Certificate

Having spent two years teaching the certificate and seeing what can work in the classroom with Year 10s, here are some of the ideas that we found helpful when developing our Creative Thinking Certificate:

1. **Specify**. This is a simple, highly impactful way of enabling students to make progress when thinking about the solution to a problem. When a student or group of students

approaches you saying, “We want to solve the problem of transport in the difficult conditions of Iceland,” respond to them saying, “OK, but which type of transport, and which type of conditions?” From there the student might narrow their transport focus to ‘bicycle’, and their conditions focus to ‘very cold weather’. It then becomes much easier to start generating ideas. How could a bicycle be designed in order to keep a human being warm? A covering, perhaps, or a heater? How might this work?

2. Problematize your problem. This is another form of ‘specify’. Ask students to step away for a moment from coming up with solutions to their chosen problem, and instead to make a list of the narrower sub-problems within their topic. Taking the example of bicycle transport in cold weather again: a student might problematize this problem further by thinking about wind-chill on a bike-rider’s face, or their cold hands, and develop ideas that respond to these more clearly defined issues.

3. Problematize your solution. This sounds similar to number two, but is actually quite different. Once students have generated a particular idea, ask them to step away from it and discuss or write down all of the issues that remain with it. If our cold-weather-bicycle group have designed a clear, lightweight shelter to go over their bicycle rider’s body and head, they may not have considered how the design will affect aerodynamics, or how it will be attached conveniently to the rest of the bicycle. Given these problems, how could we improve the solution?

4. Make it meaningful. This one is based on experience and may not have the academic clout of the others, but the simple fact of encouraging your students to choose a problem topic that is meaningful to them can have an enormous impact on not only the enthusiasm with which they work but also the quality of their thinking. A student who really *wants* to solve the problem of, say, how a wellbeing restaurant can be designed to have an indoor garden, will be more naturally inclined to think about a range of ideas, and to think through those ideas carefully.

5. Use X to solve / propose Y. When we started using this formula in the teaching of our Certificate, it was a huge breakthrough! Y represents the chosen topic area, and X the way in which the students will solve it. For instance, *I am trying to use greenhouse architecture to create a wellbeing restaurant set in an indoor garden.* When students use the formula in this way, they immediately have to think about how they will apply research in the attempt to solve their problem, rather than pulling ideas out of the air.

6. Subtraction. Following the work of Jacob Goldenberg *et al*, another brilliant way to encourage students to develop a product or an idea is to teach them theories from Systematic Inventive Thinking, including the skill of ‘subtraction’.[1] What happens if I look at my topic and *take something away from it*? If I take full stops out of a poem, how might that influence the way I write? If I take the legs away from a table, how else could I support the table-top? Suspending metal ropes from the ceiling, perhaps? Or having microscopic table legs in the floor, that can be lifted like a rising bollard?

7. Multiplication. This is another theory from Systematic Inventive Thinking, and again is particularly useful for developing ideas, for instance design products. Which existing element within a product or idea could I replicate, and what effect might this have? For instance, what possible benefit might there be to having two light sources in a lamp? Or what might be the implications of a kitchen knife being sharp on both edges?

8. Addition. A final thought, again taken from Systematic Inventive Thinking: what happens when I *add* something to the object or idea I am working on? For instance, what would happen if I added a dishwasher function to an oven? What happens if I add a second screw-on lid to a water bottle, so there is a lid at both ends? After playing with

adding something to an idea or product, students can then reflect on whether and how the addition might be of use.

A resource to help with teaching these skills to students is available in the PowerPoint for our Certificate in Creative Thinking, which you can find by clicking **here.**