



Modernising design & technology
The revised importance statement leaves no doubt that new and emerging technologies are an important feature in design & technology.
David Barlex suggests how teachers can respond to this challenge in the classroom.



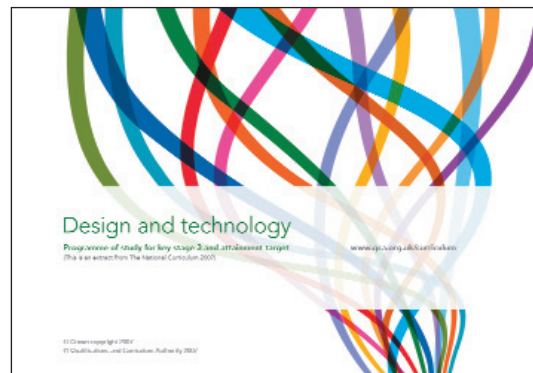
Engaging with new technologies

The revised *importance statement* for design & technology leaves us in no doubt that new and emerging technologies are an important feature in our curriculum:

They (pupils) learn to use current technologies and consider the impact of future technological developments.

This article will consider the following important facets of responding to this imperative.

- Finding information about new technologies
- Generating case studies about new technologies
- Critiquing the impact of new technologies
- Using new technologies for conceptual design



Finding information about new technologies

Where do you look for information about new technologies?

The **MIT Technology Review** provides a wide range information on new technology on a daily basis five days per week

Emerging Technologies Update (Mondays through Fridays), Technology Review's daily e-mail newsletter delivers summaries of top stories and blogs. You can choose among articles about breakthroughs in nanotechnology, genetics, and energy, analyses of the social impact of the latest Web-based applications, Q & As with industry leaders.

There are also weekly updates:

Energy Update (Mondays)

From solar technology and biofuels to more efficient ways of burning fossil fuels and building nuclear power plants, this update identifies the most promising energy technologies--many of them ready now.

Biotech Update (Tuesdays)

From giving mobility to spinal-cord patients to the detection of cancer at the molecular level, work at the frontiers of biotechnology is rapidly transforming how we diagnose, treat, and recover from diseases. Technology Review tells of biomedical advances that are changing our world.

Biztech Update (Wednesdays)

New technologies are the most important source of new wealth and opportunity. The Biztech Update explores the startups, markets, and stocks that are shaping the global economy.

Nanotech Update (Thursdays)

Tiny solar cells cheaply integrated into building materials, ultrasmall electronic memory that stores vast amounts of data, and diagnostic devices able to detect single viruses – these and other nanotechnologies nearing commercialization are described in the Nanotech Update.

Infotech Update (Fridays)

What will life be like when your computer understands what you say? When your cell phone becomes your wallet? This update provides details of new developments and identifies the challenges and opportunities they present. And it is free. Simply visit this url to register:

www.technologyreview.com/cust/newsletter.aspx

Admittedly the MIT Technology Review has a US focus but the technologies described and discussed are will almost certainly have global impact. You can also log on to www.wired.com to get a different view of new and emerging technologies also from an American perspective. And for a UK perspective you can visit: www.newscientist.com/news.ns

And for fun it is worth looking at the latest science fiction films and associated books and comics. The Bat Belt, which can hoist our hero out of harms way, is in fact a reality now given recent developments in batteries and small but powerful dc electric motors!





Generating case studies about new technologies

It is possible to use the information on ‘new technology’ websites to develop case studies to use with your classes. If your pupils are to gain insight from these case studies it is important that they have a consistent structure. The structure used for the Design Council Millennium Product Profiles case studies is appropriate. It provides a framework for reading the product considering the following

- Needs and wants
- The user
- Production
- Performance
- Trade
- Use
- Disposals



This can be easily adapted to meet the requirements of introducing pupils to considering products based on new technologies. You can find full details in the teacher handbook on the [Design Council](http://www.designcouncil.org.uk) website.

It is also important that you embed devices in to the studies to make the reading active. Pause for thought (questions to be considered whilst reading, helping the reader to move through the text but not requiring a written answer), Questions (to be answered in writing using the information in the text), and Research (activities requiring the reader to access information outside the case study) and become regular features of case studies. DART (direct action related to text) can be incorporated into the questions e.g. underlining words related to a particular topic, using those words in sentences to explain a topic.

It is possible to use this approach to structure case study writing by pupils working in teams with each team responsible for researching and writing about a particular aspect.

Critiquing the impact of new technologies

You can introduce pupils to two techniques they can use for the constructive criticism of new and emerging technologies. These strategies can be used across the focus areas for considering the impact of technologies past, present and future.

A first step in critiquing a technology and its applications is to look at the needs that the applications meet. To do this, the pupils need a conceptual tool for identifying and analysing needs. The PIES approach provides such a tool. PIES is an acronym and stands for the following needs:



People need food, water and air to breathe. We need to keep warm and be protected from the weather and to take regular exercise. These are physical needs. We need to be mentally active, learning new things and being stimulated. These are intellectual needs. We need to feel safe and secure. We need to feel that others care about us and to have ways of expressing our feelings. These are emotional needs. Most people like to spend time with their friends, talking and sharing joint activities. These are social needs. Pupils can be invited to consider the needs of people in various situations: in a hospital ward, in a hotel room, on a train journey, at a bus stop, at a railway station and at an airport. Pupils can then be required to identify products that meet these needs.



In this way the pupils can learn about the relationship between needs and products. It provides pupils with the means to interrogate both situations and product. They can ask of situations they observe, “What are the needs of people in this situation?” and “What products do they use to meet these needs?” They can ask of existing products “What needs will be met by this product?” and “In what situations are people likely to have these needs and hence use these products?” The approach can be extended by asking pupils to explore the differences between needs and wants. This can be done by means of two short vignettes that describe how the needs of people in very different situations are met. This leads pupils to appreciate that what we want and can hope to acquire to meet our needs is determined to a large extent by the nature of the society in which we live. Your pupils can use the PIES approach to identify the needs and wants that might be met by new technologies and their applications and hence establish a view as to the worth of those applications.

You can download resources to support pupils use of PIES from the Nuffield secondary design & technology website www.secondarydandt.org/data/files/srts-1-6-context-354.pdf.



Strategy
Evaluating outcomes – winners and losers

What to do

- 1 Choose one of the following products:
 - electric car
 - jet nozzle
 - compact disc
 - Lycra
 Write the name of the product in the middle of the target chart.
- 2 Write down those people directly affected by the product in the spaces in the inner ring.
- 3 Write down those indirectly affected by the product in the spaces in the outer ring.
- 4 Highlight the winners in one colour and the losers in another.
- 5 Use the colour balance to help you decide whether or not the product is a good idea.

What to write

- If you think it's a good idea, write down how you would persuade the losers to agree with you.
- If you think it's a bad idea, write down how you would persuade the winners to agree with you.

Student's Book:
 Reflects and focuses page: 49

Items available:
 All ready

You will learn:
 How to evaluate a design by thinking about how it affects people.

You will need:

- Your workbook
- Pencil
- Sharp

For the winners and losers target chart.

Winners and losers is a simple yet effective device to enable pupils aged 11 – 14 years to consider impact beyond intended benefit. It involves identifying all those likely to be affected by a product or technology and deciding whether this affect will cause them to be winners or losers. Pupils use a target chart composed of three concentric circles to identify those affected by the product or technology and highlight winners in one colour and losers in another. They can use the colour balance to decide whether they think the product or technology is good or bad in terms of a winner/loser balance. The work can be extended by two further activities.

First, require pupils who think the product/technology is a good idea to write down how they would persuade the losers to agree with them. Second, to require pupils who think the product/technology is a bad idea to write down how they would persuade the winners to agree with them. You can use the winners and losers approach to discussing the impact beyond intended use of new technologies and their possible applications.

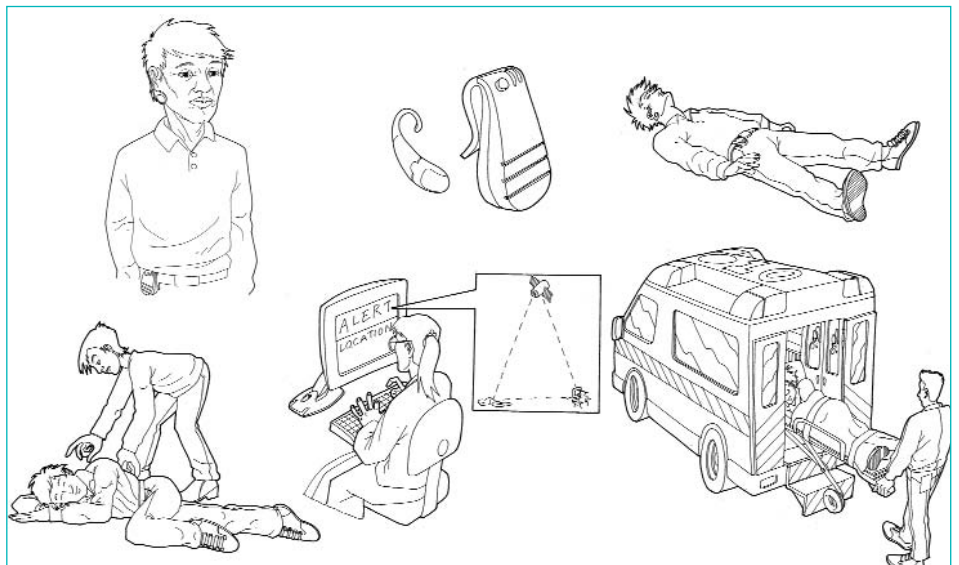
You can download resources to support pupils use of winners and losers from the [Nuffield secondary design & technology website](#)

Using new technologies for conceptual design

Young Foresight is a recent design & technology initiative in England. It is a recommended in the National Strategy for design & technology. It challenged orthodox approaches to teaching design & technology in the following ways, Students design but do NOT make products and service for the future using new and emerging technologies in their design proposals. They write their own design briefs. They work in groups and are supported by mentors from industry. The students have to present their proposals to their peers, teachers and mentors and to adult audiences at innovation conferences.

Removal of the requirement to make what has been designed allows the student to conceive ideas for products that are not limited by their personal making skills and the tools, materials and equipment available in the school. It also enables them to consider applications of new and emerging technologies that are not accessible to schools. However the students are required to justify their design proposal in terms of four features; technical feasibility, being acceptable to the society in which the product will be used, meeting clearly identifiable needs and wants, and the nature of the market into which the product will be sold.

If any one of the considerations is omitted it is likely that the resulting design concept will be flawed. The detail with which the students describe and justify their proposals indicates that they are products of worth and capable of manufacture albeit not by the students. This opportunity to be creative reflects the creativity of the designer in the world outside school where the designer is seldom required to manufacture her design proposal although of course she has to ensure that it can be manufactured.



On the [Young Foresight](#) website there is a resources section from which you can download free of charge a wide range of print materials to support pupil activities. You can adapt the Young Foresight materials for use in your situation with any new and emerging technology that intrigues your pupils.

Here is an example of a design that a group of pupils developed in response to a pupil's father who had epilepsy. The group used a range of technologies – a pressure sensitive conductor (QTC) to detect the tremors in the jaw muscle that signal the onset of a fit. This signal then used Bluetooth technology to alert a transmitter worn on the belt which used mobile phone technology plus GPS to alert the nearest hospital to send an ambulance to the aid of the father. The belt was also to be fitted with an audio device which gave passers-by the information that help was on the way and what to do to make the father comfortable.



Identifying the opportunities for considering new technologies

The imperative in the importance statement to engage young people with the impact of future technological developments is echoed and reinforced by several statements in the cultural understanding section of the Key Concepts in the new programme of study for design & technology.

These are:

- a Understanding how products evolve according to users' and designers' needs, beliefs, ethics and values and how they are influenced by local customs and traditions and available materials.
- b Exploring how products contribute to lifestyle and consumer choices. And in the Critical evaluation section of Key Concepts there is further emphasis through the following statement
- c Exploring the impact of ideas, design decisions and technological advances and how these provide opportunities for new design solutions

In revising your current curriculum offering to meet the requirements of the new programme of study you have plenty of justification within the revised orders for including a consideration of new and emerging technologies. There is no shortage of information about such technologies and through the use of case studies which involve active learning, involving pupils in writing such case studies, enabling pupils to use the PIES and winners and losers strategies, and engaging pupils with conceptual design utilising new and emerging technologies you will be able to both meet the new requirements and modernise your design & technology curriculum.

This article is one of a series available on the Nuffield Secondary D&T website.

www.secondarydandt.org



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Embedded links in this article

QCA

<http://curriculum.qca.org.uk/subjects>

Design Council

www.designcouncil.info/educationresources/profiles.html

Nuffield secondary design & technology

www.secondarydandt.org

Nuffield PIES resources

www.secondarydandt.org/data/files/srts-1-6-context-354.pdf

Nuffield Winners and losers resources

<http://www.secondarydandt.org/data/files/srts-37-41-eval-outcomes-358.pdf>

Young Foresight

www.youngforesight.org



For further reading on key issues influencing the teaching of design & technology, see the recently published:

Design & technology for the Next Generation

a collection of provocative pieces written by experts in their field, to stimulate reflection and curriculum innovation.

Available from the educational publishers CliffeCo at

www.dandt-thebook.com