

# Productivity and creativity

## Can we teach our old ICT topics?

The answer to this is yes! There are few, if any, topics from the old ICT curriculum that don't appear in the new computing curriculum.

At key stage 1 pupils should be taught to: 'use technology purposefully to create, organise, store, manipulate and retrieve digital content'.

At key stage 2 pupils should be taught to: 'select, use and combine a variety of software (including internet services) on a range of digital devices'. They design and create digital content as well as **programs** and systems, and they accomplish given goals, including 'collecting, analysing, evaluating and presenting data and information'.<sup>1</sup>

See pages 50–51 for more information on reusing old ICT units when planning a computing scheme of work.

*How can we make ICT activities more meaningful for pupils?*

David Jonassen and others coined the term 'meaningful learning'. They were thinking particularly about learning activities that involved using technology, but the principles can be applied more broadly. Jonassen's list<sup>2</sup> was:

- **active:** pupils should *do* something
- **constructive:** pupils should *make* something
- **intentional:** pupils should have some *say* in what they do or how they accomplish something

- **authentic:** link to pupils' direct experience, including that of school: look for connections with other areas of the curriculum
- **cooperative:** look for activities where pupils can learn with and from one another.

For example, pupils could work together to create and then analyse the results from an online survey of other pupils about their views on the breadth of the school's curriculum, choosing for themselves how they might present the results of their survey.

*How should pupils go about project work?*

It's important to find a balance between getting things done in the time available and developing good working habits for extended projects.

It's probably best to mix a range of short activities with more extended projects in which the processes of planning, implementing, revising and evaluating are fully explored. Working through the stages of a project in detail is good experience for this sort of work elsewhere.

Look for ways to get pupils involved in managing projects. This can include deciding what programs and equipment they'll need to use. The project management skills involved in creative media work are very similar to those required in software development.

*What digital tools should pupils work with?*

The programmes of study are quite careful not to specify particular digital media. Technology currently

44 <sup>1</sup> National Curriculum in England, *Computing Programmes of Study* (Department for Education, 2013).

<sup>2</sup> Jonassen, D. H. et al., *Meaningful Learning with Technology* (Upper Saddle River NJ: Pearson, 2008).

available in most schools can be used for work across a very wide range of media including: text, images, sound, animations, video and 3D. Ensure that your pupils experience working across this full range. A PowerPoint presentation is likely to include text and images, and perhaps video, audio and animations.

Also aim to ensure that your pupils work on a variety of devices and are able to draw on web-based services, tablets, smartphones, digital cameras or other systems rather than just using traditional Windows PCs in their IT work.

### How can creativity be taught?

Sir Ken Robinson defines creativity as ‘the process of having original ideas that have value’<sup>3</sup>: creative work should be original, and this should at least mean that it’s a pupil’s own work, not something where they’ve simply filled in a blank or copied something. Creative work should also be of value: at the very least to the pupils themselves, but also to a wider audience.

As well as originality and value, creative work also implies that the pupil has made something. An emphasis on creativity recognises how powerful the process of making things for others is as a means to learning.

In the classroom, help pupils to become masters of the software tools and digital devices they use, helping them to develop confidence, competence and independence. Then encourage them to use them, playfully or experimentally, as a way of helping them express their own insights and ideas.

### What can pupils do with data?

The computing curriculum includes a requirement for pupils to work with numerical **data**. This is an important application of computer systems and seems likely to become even more so in the future.

There’s much you can do to provide pupils with an authentic experience of working with both small and large datasets. Pupils can generate interesting sets of data, or access large, open data repositories.

Online survey tools, such as Google Forms or Excel Online, allow pupils to design and deploy quick opinion polls or surveys, and then analyse, evaluate and present the results. Choosing topics of genuine interest to pupils, perhaps concerned

with aspects of school life, can make activities like this much more engaging. Pupils should think about privacy and ethical aspects of such surveys. Good practice includes principles of informed consent and anonymity; the latter is particularly important as otherwise data protection legislation would apply when processing personal data.



### Classroom activity ideas

- Carry out activities that draw on automatically generated data, perhaps using sensors (e.g. a Scratch script to record the level of sound in class; see Further resources).
- Organise your pupils to analyse some *big* datasets made publicly available on the internet. Help them to use n-gram viewer to search for the occurrence of words or phrases in the vast number of books that Google have digitised and see how this changes over time (see Further resources). Analyse how search term popularity has changed over time, e.g. look at the relative popularity of searches for ‘Britain’s Got Talent’ and ‘The X Factor’ over time in searches performed in the UK using Google Trends (see below).
- Discuss the ethical implications of data processing (i.e. what others do with our data). Ask pupils to think about the detailed profile which internet, email or search engine providers build up through analysing each user’s activity, as well as to what uses this information might be put.



### Further resources

- ‘A picture is worth a thousand words: what we learned from 5 million books’ lecture, available at: [www.youtube.com/watch?v=5l4cA8zSreQ](http://www.youtube.com/watch?v=5l4cA8zSreQ); see also n-gram viewer: <https://books.google.com/ngrams>.
- Classroom sound monitor on Scratch, available at: <http://scratch.mit.edu/projects/20968943/>.
- Google forms ([www.google.co.uk/forms/about](http://www.google.co.uk/forms/about)) or Excel Surveys (<http://blogs.office.com/2012/11/16/excel-surveys/>) for creating online surveys.
- Jonassen, D. H. *et al.*, *Meaningful Learning with Technology* (Upper Saddle River NJ: Pearson, 2008).
- Monte Carlo Method, available at: [http://en.wikipedia.org/wiki/Monte\\_Carlo\\_method](http://en.wikipedia.org/wiki/Monte_Carlo_method).
- Robinson, K., *Out of Our Minds – Learning to Be Creative* (Capstone, 2011).
- Using Google searches to predict flu: [www.youtube.com/watch?v=uEt8NuqBvPQ](http://www.youtube.com/watch?v=uEt8NuqBvPQ); see also Google Trends: [www.google.com/trends/](http://www.google.com/trends/).

<sup>3</sup> Robinson, K., *Out of Our Minds – Learning to Be Creative* (Capstone, 2011).