



Digital technologies in the classroom

In recent years reference to 'digital technology in the classroom' (DTC) can be taken to mean **digital processing systems** that encourage active learning, knowledge construction, inquiry, and exploration on the part of the learners, and which allow for remote communication as well as data sharing to take place between teachers and/or learners in different physical classroom locations. This is an expanded notion of technologies that recognises their development from mere information delivery systems and also clarifies their role in classrooms in contrast to their wider use across schools and learning centres.

What other terms are associated with digital technologies in the classroom?

Term	Definition	Example	Benefit(s)	Risk(s)
Bring your own device (BYOD)	learners bring their own technology into the classroom for use as part of the learning activity	mobile phone is used to browse the internet as part of a research activity	greater range of technologies available and lower cost to institution	difficult to control and monitor usage some learners may have better devices than others lack of teacher understanding/ training
E-portfolios	learners and teachers create an electronic catalogue of work that tracks their learning journey. This is usually online and often uses multimedia files	a student portfolio of artwork is presented online through an e-portfolio. This includes scans of their sketches, photographs of displays and visits to galleries, written reflections, narrated videos of the artist (learner) at work and an audio logbook	provides a way of quickly and seamlessly presenting a wide variety of material in different formats including details of process	data security and confidentiality lack of teacher understanding/ training
Flipped classroom	learners discover new content before the lesson from online videos or resources and then apply this knowledge in more personalised work in the classroom	learners watch a video at home about how sedimentary rocks are transformed into metamorphic rocks. In class they work in groups to collaboratively create a diagram explaining this process of transformation	more time for activities that promote deeper understanding and reflection	learners do not understand or are not able to access the flipped material flipped learning is not appropriate misunderstandings arise that are not addressed in class lack of teacher understanding/ training ensuring resources are up-to-date



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Personal Learning Network (PLN)	a PLN is an individual's loose collection of links with other people or resources. The aim of such a network is to facilitate an exchange of ideas that supports learning	links can be through, for example: online interest groups for example on Twitter and/or online and face-to-face courses	access to a wide range of perspectives and expertise beyond the confines of the physical institution	data security and confidentiality accuracy of information access to the network lack of teacher understanding/ training
Virtual Learning Environment (VLE)	a VLE is an e-learning education system that is web-based, but modelled on conventional face-to-face education. It provides access to courses, course content, assessments, homework, links to external resources etc	Moodle Blackboard	easy way to collate and organise courses and information flexibility of access	software can limit course structure high level of maintenance

- **Interactive Whiteboards (IWB)** allow images from a computer to be displayed through a digital projector, onto a large (usually wall-mounted) board. Users can interact with the content on the board using fingers or a stylus.
- **Software Applications (Apps)** are designed to operate on mobile devices such as smartphones and tablet computers.
- **Web 2.0** refers to the second generation of the World Wide Web. Web 2.0 includes features and functionality that were not available before, for example. podcasts, blogs, wikis, RSS (Rich Site Summary – used for updating regularly changing web content), social networking and tagging.
- **Emancipatory practice** is that in which an individual student's ideas go beyond the learning prescribed by the teacher/syllabus as they draw on knowledge gained outside formal education to construct understanding. For example, in music lessons learners can use their own knowledge and expertise of playing instruments or using technology to construct their own recording environments (perhaps using their mobile phone). They can then bring in ideas that they have created at home or in instrumental music lessons.

What are the benefits of digital technologies in the classroom?

- The potential benefits of DTC are that it can foster **dialogic** and **emancipatory** practice.
 - Dialogic practice is that in which students are active, engaged and empowered participants in a conversation from which learning emerges. For example, learners working on a maths modelling programme can start to have conversations about what they see on a computer screen without having to rely on terminology that they may not yet have (look at 'that', what happens if you do 'this?') The teacher can then add the appropriate language into the conversation as the project develops.
- Different technologies can improve learning by **augmenting** and **connecting** learning activities. For example, in a geography lesson two classes in different schools may link up via the internet to explore cultural differences in relation to a particular global issue such as pollution or energy supply. The groups could work together to understand not just the issue itself but its impact on communities and individuals by talking to real people. In situations where bandwidth is limited this could be done at a whole class level via video or even over email or SMS (Short Message Service) messaging.
- Digital technology can often also be exciting for learners and offers a potentially more **engaging alternative**. At the same time it is important to be aware that some learners may be less confident in learning with digital technologies and steps need to be taken to ensure equality of access.
- Digital technology offers **immediate feedback** for both the learner and the teacher.



What are the challenges/criticisms of digital technologies in the classroom?

- A lot of time and resources are currently being invested into technologies and applications that have yet to be proven to be effective or efficient when compared to more traditional classroom learning contexts. Teachers and schools need to think carefully about when, why and how to use technologies as well as evaluating their **efficiency** and **effectiveness**.
- There is a '**digital divide**' – the divide between those who have access to digital technology and the internet, and those that do not.
- Implementing and then maintaining technology is **costly** particularly as systems can quickly become out of date.
- There may be problems with the **existing infrastructure**, for example internet connections may be inconsistent and/or slow.
- **Safety** for students and teachers is a key challenge with prevention of cyber-bullying, the hacking of personal information, access to illegal or banned materials and distractions from learning (such as social networking and mobile phone use) all being high on institutional agendas.
- Some uses of technologies can be **harmful**. For example, poor posture and eyestrain are common problems when working at desktop computers for prolonged periods. Also Repetitive Strain Injury (RSI) is a risk that occurs from the repeated actions necessary to control mobile devices.
- Evidence suggests that at the moment the potential of digital technologies in the classroom is not being realised. A report on digital technologies from the charity Nesta in the UK notes, "What is clear is that no technology has an **impact on learning** in its own right; rather, its impact depends upon the way in which it is used" (2012:9).

Practical tips:

How can schools support the use of digital technologies in the classroom?

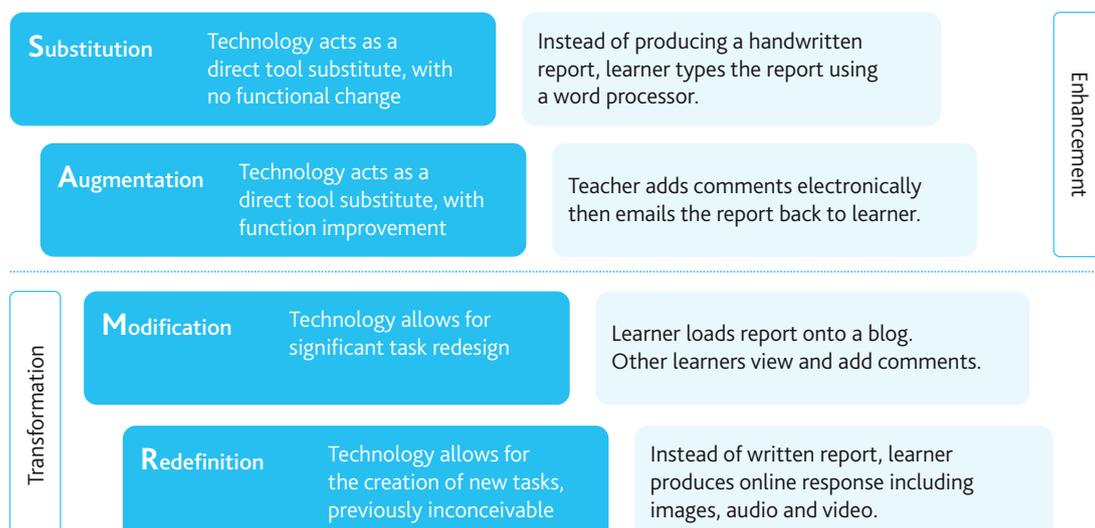
- Schools can allow teachers and learners the **freedom to explore** potential new uses of devices and systems as well as combinations of technologies into novel digital environments. For example:
 - Raspberry Pi is one way to encourage teachers and learners to create technological solutions to problem-based tasks (see www.raspberrypi.org).
 - the Scratch programming interface is a further way of encouraging learners to create their own environments and has been used to develop understanding in a wide range of subjects (see scratch.mit.edu).

This will help to foster the effective dialogue and emancipatory practice that is a component of deeper critical understanding.

- Teachers and learners should be encouraged to **share their practice** with each other in the classroom and more widely.

How can teachers support the use of digital technologies in the classroom?

- Teachers can make the best use of technology in the classroom by developing their awareness of a range of digital technologies and considering carefully both **how and why they can be used** to support students' learning. Effective selection of software and devices is only part of the story. The consideration of what learning will be achieved and how the technology may help is fundamental to its effective deployment.
- The **SAMR** (Substitution, Augmentation, Modification, Redefinition) model developed by Dr Ruben Puentedura is a useful reference when considering the implementation of technology in the classroom. The model (see below) shows the stages that adopters of educational technology often follow as they integrate their teaching and learning with technology.



Why are digital technologies in the classroom relevant to Cambridge?

DTC fosters active learning and this in turn can enable learners to attain higher grades based on their enhanced understanding (see Education Brief on active learning). It enables schools to link more effectively with Cambridge, for example it supports the examination process through computer-based and online assessment processes and improves the efficiency of contact with examinations centres. Cambridge also supports schools that wish to prepare learners for the modern international world and the new technological possibilities available.

How is Cambridge supporting schools with digital technologies in the classroom?

- As part of the suite of professional development qualifications offered by Cambridge, teachers can undertake a certificate and/or diploma in Teaching with Digital Technologies. These are designed to help teachers use digital technologies effectively and appropriately in supporting their students' learning.
- In the Cambridge Primary and Cambridge Lower Secondary programmes, suggestions are given on how digital technologies can be utilised in the classroom. We also provide online materials and an online platform to help teachers and learners prepare for our Cambridge Global Perspectives qualifications



Where can you find more information?

- Beetham, H. and Sharpe, R. eds (2007) *Rethinking Pedagogy for a Digital Age: Designing and Delivering E-Learning*. London: Routledge.
- Cambridge professional development qualifications for Teaching with Digital Technologies: www.cambridgeinternational.org/pdq
- Luckin, R., Bligh, B., Manches, A., Ainsworth, S., Crook, C. and Noss, R. (2012) *Decoding Learning: The Proof, Promise and Potential of Digital Education*. London: Nesta. www.nesta.org.uk/library/documents/DecodingLearningReport_v12.pdf
- Dr Ruben Puentedura's Weblog: www.hippasus.com/rrpweblog
- Wegerif, R. (2012) *Dialogic: Education for the Internet Age*. London: Routledge.
- Useful websites: Edudemic: www.edudemic.com, Association for Learning Technology: www.alt.ac.uk
Futurelab at NFER: www.futurelab.org.uk

Acknowledgement: Dr Phil Kirkman

Learn more! If you would like to know more about Cambridge Training please email info@cambridgeinternational.org or visit www.cambridgeinternational.org/events or contact Customer Services on +44 (0)1223 553554

