

CLEAPSS
Design and
Technology

Future minds

Tomorrow's world explored today

Vision edition

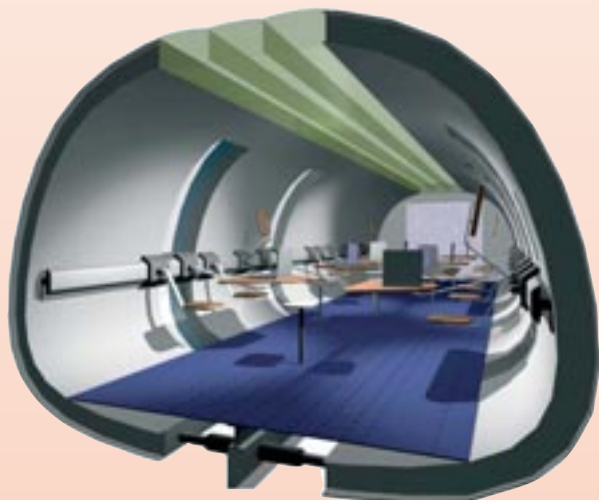


Autumn 2020

CLEAPSS D&T e-newsletter

Welcome to this rather special edition of *Futureminds*.

Over the past year or so, CLEAPSS has been working with various agencies, including the DfE, the HSE, Awarding Organisations, DATA, Ofsted and others, looking at the facilities needed for the safe and effective teaching of D&T. We have drawn on our experiences from training, audits, and other school interactions, to come up with some ideas for the future, both in terms of the subject content and the facilities needed to deliver an exciting and engaging curriculum for Design and Technology.



As we emerge from the greatest economic and social restriction in modern times, it seems apposite to take this discussion to a wider audience.

What started as a consideration of the safety implications of larger or smaller rooms, and what sort of equipment would be needed in them, has developed a broader focus on the future of D&T in schools.

This edition of *Futureminds* has been thrown open to contributions from teachers, suppliers, and various support groups, in order to capture a broad view of the future. We asked contributors to offer their vision of the future, what do they think D&T will look like in 5, 10 or 20 years. Some have concentrated on D&T, others have widened their perspective to take in how education, or the delivery of lessons has been changed, perhaps for ever, by the constraints of the pandemic restrictions. We plan to build on this in the next edition of *Futureminds*, so readers wishing to add their voice to the discussion, are warmly invited to get in touch: dt@cleapss.org.uk

What will schools look like in the future?

<https://www.youtube.com/watch?v=JZlgYIXzu58&list=PLN1wzaqsSp2egyZQJoqnNOZDE7BPqsj5p&index=25&t=0s>



This is one of a number of links to video files that you will find throughout this special edition

Background

The latest D&T National Curriculum, GCSE and A Levels allow for flexibility in the teaching and assessment of D&T, and mitigate the potential for a negative impact of schools having different quantities and quality of facilities and resources. For example:

- Schools with a wealth of equipment and resources, may enable pupils to access a broad and engaging curriculum, and make lots of different products.
- Schools with less equipment and resources, may restrict pupil's opportunities to work with a wide range of materials and make fewer artefacts.

Under the new curriculum, pupils in either scenario will have the same opportunity to engage with D&T, because the curriculum is not based upon the products, equipment or resources available to them.

We have no way of predicting what the next iteration of the National Curriculum will bring, but it is unlikely that it will be based upon products or specific materials.

To facilitate the teaching of a broad and engaging curriculum, teachers will need to



focus upon key concepts, rather than the product the pupils make, or the material available to them from the store. This will have an impact on the facilities a school will need. It will also require a new teaching approach, the more theoretical or experimental areas of D&T becoming the main thrust of the subject teaching, whilst 'craft' activities may be more likely to be delivered through extracurricular clubs or cross curricular programmes such as RSE (Relationships and Sex Education).

In addition to these changes, there are many other pressures on the D&T facilities:

- **The money**
 - Smaller groups sizes mean teaching the subject is expensive
 - Equipment and resources are more expensive than other curriculum areas
 - There are annual costs for servicing and maintenance of equipment
- **The teachers**
 - Too few teachers are being trained
 - Recruitment and retention of staff is often difficult
 - There is little ongoing support or access to subject-based CPD

- **The pupils**
 - Apparent poor progress compared to other subjects, in terms of outcomes at GCSE (School leaders tend to prioritise subjects that show greater progress)
 - Poor take up of textiles in D&T leading to textiles being moved into art and becoming creative textiles.

In response to these, and other, pressures, some schools are closing, or downsizing D&T departments, limiting teaching to KS3 only, or limiting option groups at GCSE. Others are combining D&T and art to produce Art and Design departments. Although this may seem a sensible move in terms of managing a creative curriculum area, there are fundamental differences between the *design* in D&T and the *design* in Art and Design. In D&T, students are expected to work within tight constraints imposed by the context of the design problem, whereas the art students do not.

However, in some schools D&T is still flourishing. Teachers around the country are producing fantastic outcomes for their pupils, at KS3, GCSE and A Level.



The changing context for D&T

Most national education systems are dominated by public sector services with, necessarily, tight budgets. They also face the same challenges as industry, as new technologies, new ways of working and new sources of competition take hold. Education is now global, virtual and more competitive.

Virtual and online worlds are providing access to learning and training anywhere, anytime from anyone. Universities, colleges and schools are putting lectures on YouTube and other social platforms, and these are proving a great success with some learners. NASA is using online gaming as a way to train astronauts. *OhmyNews* the Korean online amateur news site provides journalist training in return for contributions.

Risk-taking and innovation are difficult at the best of times. In public sectors where public accountability is the rule, innovation is even more difficult. However, if education providers at every level are to take advantage of the new opportunities, a change in thinking will be needed.



The CLEAPSS proposal for future D&T accommodation

The CLEAPSS proposal for the future of D&T accommodation is based on a substantial central facility and surrounding teaching spaces. The enhanced central facility offers specialised equipment intended for use by trained technical staff. It will also provide sufficient storage space to accommodate a wide range of equipment and resources to be deployed into the surrounding teaching spaces.

The teaching spaces are intended to be multipurpose and to be larger than existing material-specific rooms. Important safety management would be dealt with, at least in part, by adjusting the level of supervision. This could mean including additional adults in particular lesson(s) or reducing the numbers of pupils in the space for that lesson (or series of lessons).

This differs markedly from the traditional approach of defining the level of supervision by restricting the numbers of pupils that a space can accommodate. Such an approach applies a blanket judgement about the level of supervision required across all lessons in a particular material area, regardless of the activity taking place. Spaces are inflexible and at risk of not being fit for purpose much of the time.

The World Economic Forum, The COVID-19 pandemic has changed education for ever. This is how. <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>



Features of this proposed arrangement include:

- The future department will need servicing by well-equipped storage and preparation area(s).
- The prep areas will be the domain of skilled technical support.
- The teaching rooms would be designated as 'Design Studios' or 'Makerspaces' rather than workshops/graphics rooms/textiles/food rooms etc.
- Supervision levels will need to be built into the planning and risk assessment of specific activities rather than being reflected in the design of the room. Lessons would be planned to ensure that pupils can access a practical activity, when appropriate, under adequate supervision.
- In schools where there is an intention to deliver engineering, catering or other vocational pathways, there would need to be significantly different facilities.



The design studio

Each design studio would have a larger pupil capacity than existing workshops, and:

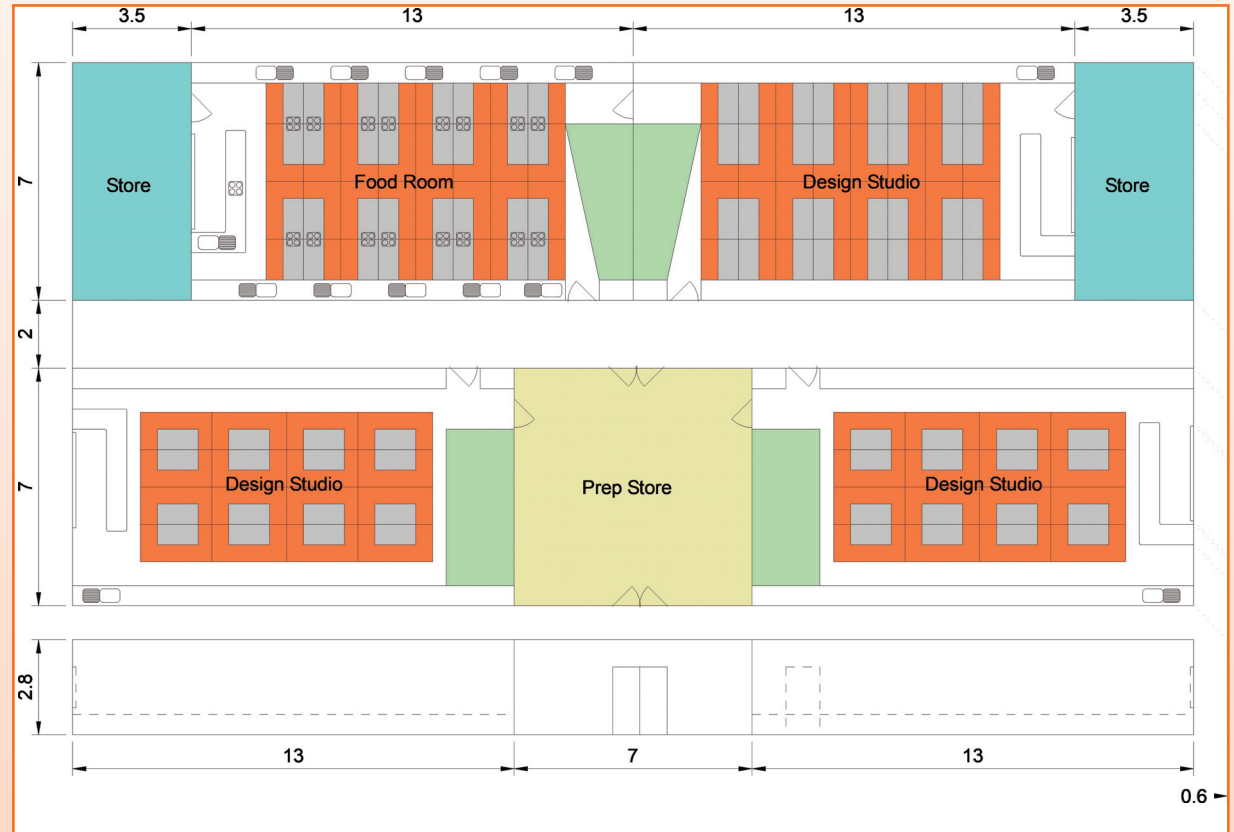
- teacher facilities including, projector, PC, printer, demonstration bench
- side benching with power supplies
- work tables with space for pupils and their equipment which can be multifunctional and moved easily to enable different room layouts
- access to computers, with large screens suitable for CAD work (preferably not laptops)
- adequate local exhaust ventilation (LEV), for removing fumes from glues, paints, soldering, casting metals, 3D printers, laser cutters
- display areas for stimulus materials such as artefacts, imagery
- access to hot and cold water and adequate washing facilities



The central facility, (including prep room and store)

The equipment to be located and used in this room, for preparing resources for teachers' use would include:

- extraction/ventilation
- adequate PPE/aprons/safety equipment
- a large washing sink for screen printing screens
- large format colour printing
- material cutting facility, plan table
- circular saw, panel or table
- floor-standing bandsaw
- a folder and guillotine for metals
- grinding/sharpening facilities
- workbench with vices (wood and metal)
- racking for materials
- storage trays for small equipment/tools/materials



In addition to the above, the room would need to hold equipment to be deployed on demand into the design studios. Such equipment has to be portable or moveable. 'Moveable' equipment would need to be mounted on suitable trolleys which can be positioned and locked in place when in use. Such equipment would include:

- purpose-built trolleys with larger 'fixed' equipment, which should be able to be positioned in allocated spaces in the studios, and where they can be locked in place and hooked up to controlled power supplies and other services.
 - lathe
 - CAM machines
 - casting equipment/kiln
 - testing equipment (electrical/hardness/tension/etc)
 - laser cutter
 - 3D printing
 - metal casting/enamelling kiln
 - drilling
 - sanding
 - polishing/painting/finishing
 - CAM engraving/milling
 - Plastic-bending, forming, plastics oven
 - vinyl cutter, large format printer
 - material joining: mechanical (nuts and bolts/screws/rivets), temporary (Velcro/Sellotape/staples/sewing) and permanent (adhesives/welding/soldering/chemical bonding)
 - card/paper/textile cutting

- electronics, soldering, etching, wire stripping and cutting
- textiles machines, sewing, overlocking
- vinyl cutter, large format printer
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- card/paper/textile cutting
- electronics, soldering, etching, wire stripping and cutting
- textiles machines, sewing, overlocking



We believe these facilities will enable departments to develop a flexible approach to teaching this exciting and innovative curriculum subject.

Design an armchair with VR

<https://www.youtube.com/watch?v=T7Kk6qBP5E>





Lesson scenarios - what could be taught in the proposed facilities?

It's all very well talking about new and innovative facilities, but what would we like to see being taught in a D&T session in these new rooms?

The examples to the right cover a D&T session which can be a lesson, a group of lessons or a block of time. These are not exhaustive, and there are many more, but we wanted to encourage readers to think about what could be taught, given the facilities, the trained technician support, and teaching staff.

There is not a bird box or clock in sight, but that doesn't mean that an individual pupil, might not make a wild animal refuge, or a visual aid for time keeping.



1. Investigation of an existing product, for instance a small hand-held device such as a piece of cutlery, torch, mobile phone

Pupils encouraged to handle the product and carry out an evaluation activity. They could be asked to produce a written critique, a presentation, a verbal report. They would need to consider:

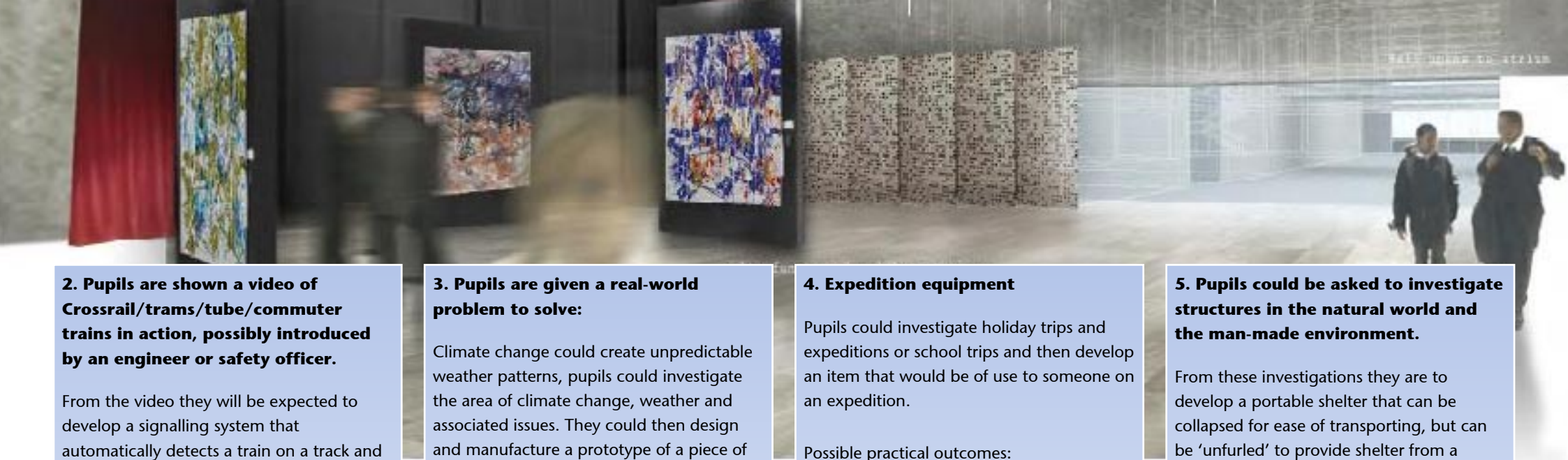
- What material is the main material used, that the user interacts with?
- Where does the material come from?
- How is it formed into the shape used for the object?
- Can they explain why the material is used?
- Weight, size, texture

The pupils can be set a design activity that requires them to consider these points in their own design development. For example, design and make a prototype of a tool for scraping water, ice or paint off a window or surface.

This could be a design exercise, or could lead to a practical outcome.

Pupils could be asked to produce their design as a 3D render using CAD software, they could then carry out stress testing of their 3D CAD model, to show how the properties of the materials differ when shape, size, profile or materials are altered.





2. Pupils are shown a video of Crossrail/trams/tube/commuter trains in action, possibly introduced by an engineer or safety officer.

From the video they will be expected to develop a signalling system that automatically detects a train on a track and warns trains in front or behind if the proximity limits are breached.

The signalling system could be modelled on computer, and tested and improved, until a working prototype is developed. This could then be built as an electronic model, with data being transferred via different methods, wire signals, Bluetooth, Wifi, using simple components or more complex controllers such as Arduino or Raspberry Pi.

The system could be tested and a lessons learned document produced. This could then be developed further as a personal proximity detection system for cyclists, pedestrians or others..

3. Pupils are given a real-world problem to solve:

Climate change could create unpredictable weather patterns, pupils could investigate the area of climate change, weather and associated issues. They could then design and manufacture a prototype of a piece of equipment that an individual could use to help cope with the unpredictability of the weather.

Possible practical outcomes:

- Rain poncho
- Pocket umbrella
- Rain hat
- Sun visor
- Carrier for sunscreen/moisturiser
- Digital timer to remind users to re-apply sunscreen
- Drink carrier
- Warm clothing
- Baby/toddler clothing
- Weather monitoring equipment that sends data to a mobile phone

The pupils would produce a prototype and a promotional presentation (eg a Dragons Den pitch), explaining why their device is a useful solution.

4. Expedition equipment

Pupils could investigate holiday trips and expeditions or school trips and then develop an item that would be of use to someone on an expedition.

Possible practical outcomes:

- Energy bar or drink
- Backpack/bum bag
- Item of clothing that is light and easily packed
- Hard travel case for delicate equipment
- SATNAV device for locating places of interest or GPS location device
- Outdoor sleeping aid/canopy/tent
- Water purification device
- Portable cooking/food preparation equipment
- Bike carrier for mobile phone/drink/luggage

The pupils would produce a working prototype that could be tested in the field, with a detailed testing and evaluation programme. The results of the tests could be used to draw up a design brief for future development..

5. Pupils could be asked to investigate structures in the natural world and the man-made environment.

From these investigations they are to develop a portable shelter that can be collapsed for ease of transporting, but can be 'unfurled' to provide shelter from a particular weather condition or to provide shelter for resting or for protection from the elements at sporting events.

The outcome could be in the form of a scale model. The prototype could be peer-assessed using agreed criteria.





A Design Council Lecture: Where Next for Design? (and what it might mean for you)

Readers may like to read through the following set of slides, the text of which was used in the Design Council Lecture presentation. At the end of the presentation you will see the date that this was first shown. The extract consists of series of headline statement and slides from the presentation, which together give a substantial summary of the main ideas.

Introductory headlines:

- The pace of change continues to increase...and the world of design is no exception.
- If design practice is evolving rapidly, what might be the consequences for design education?
- So. How is design practice changing?
- Design wants to be taken even more seriously.
- Not just....Ikea, Dyson, Virgin, Apple, Samsung, BMW, Tesco, Waitrose, Boeing, ...
- ...but also....chronic worklessness, low carbon future, teenage obesity, terrorism.
- Design is:....holistic, tangible, human-scale, optimistic, iterative...

1. Design is not just problem solving.

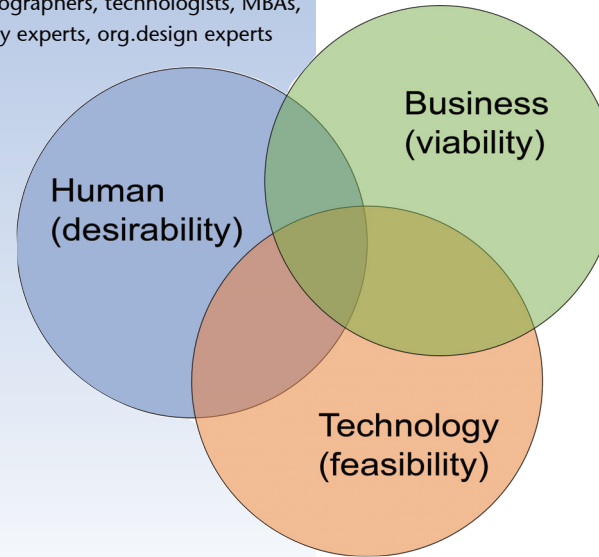
Design's value is in asking great questions as much as finding great answers.

- How can we improve dementia care?
- How can encourage the uptake of insulation in our homes?
- How can we reduce the human and financial cost of violence and aggression towards emergency care staff?
- How can we reduce the incidence of MRSA and c. difficile in hospitals?

Designers more than ever are being asked to write the brief as well as execute it.

2. Design is increasingly interdisciplinary

start here teams of designers, ethnographers, technologists, MBAs, policy experts, org.design experts



3. Design is increasingly systemic

individual artefacts, experiences, services, systems

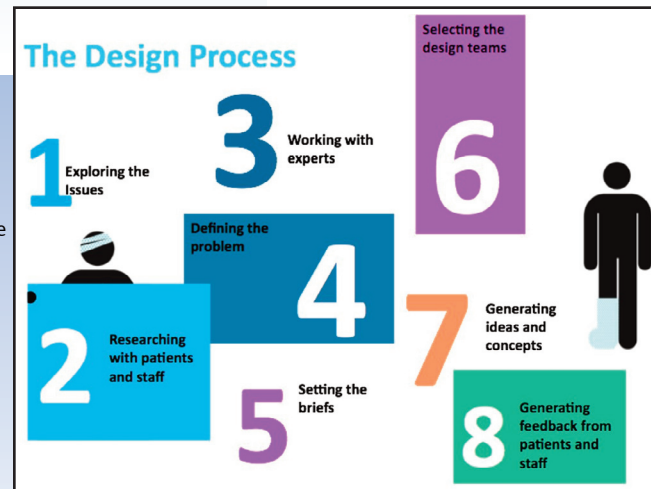
What might this mean? The opportunity is to expose students to big issues whatever their age.

What might this mean? Collaboration has to be at the heart of educational practice

"helping me understand my contribution in context"

What might this mean? Students must learn to think and craft experientially.

So how does this start to play out in practice?



Personal Learning and Thinking Skills (PLTS)

I succeed because I ask questions, I overcome barriers, I reflect on my weaknesses, I work in teams, I am well organised and I participate. I employ the entire PLTS agenda in my work.

We can't "teach" all the knowledge that a student **may** need in their career, but we can cultivate autonomous and proactive attitudes by having PLTS at the forefront of classroom delivery. These are not just skills for design they are skills for life....

PLTS intentions, if fully covered, can reinforce the design process and produce much more valuable "real world" considerations and outcomes for every student, not just the aspiring designers – we can assist students to design their own life....

Discussion

How can we as educators overcome the constraints of the school system with creative thinking in order to employ the full range of PLTS bringing design to life and building life skills with design opportunity for a sustainable future?

Design Council Challenge:

Through a National Design Challenge, bring designers, manufacturers and frontline staff together to see if they can come up with new ideas that would help the NHS improve hospital environments and the experiences of patients.

Deliver the promise of same-sex accommodation and improve patient privacy and dignity.



Patient wear

Design a range of functional patient clothes (which could include daywear, nightwear and footwear) that significantly reduce the risk of physical exposure, cater for differences in patient size, cultural and religious preferences and are appropriate for a range of activities including sleeping, resting, journeys to and from the toilet/bathroom and leaving the ward.



Design a piece of equipment or service that will provide greater physical and emotional security for patients as they move around and wait in areas of the hospital.



Patient transfer



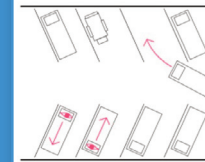
Separating sexes

Design a product or service that effectively separates male and female patients on NHS wards. As well as considering patient needs, the new system should offer ward staff the freedom and flexibility to change designated areas from one gender to the other at short notice.



DH Department of Health

Opportunity ————— Screen divider



Ward layouts

Where Patient benefits Hospital benefits

Day Surgery
Pathology
Oncology
improvised space

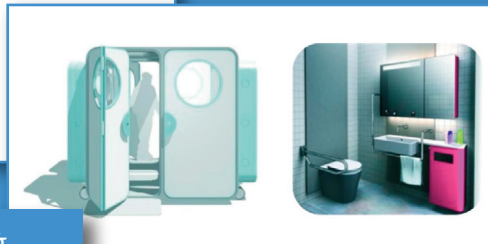
Enhanced privacy
Physical division
Openness

Efficient layout
Flexibility
Easy manoeuvrability
Simple retrofit

DH Department of Health



Design a more dignified toileting and washing experience in hospital – this could include the design of equipment, process and/or staff guidelines that address the issues surrounding the use of commodes or conventional plumbed-in toilets in these facilities.



Toilets & washrooms

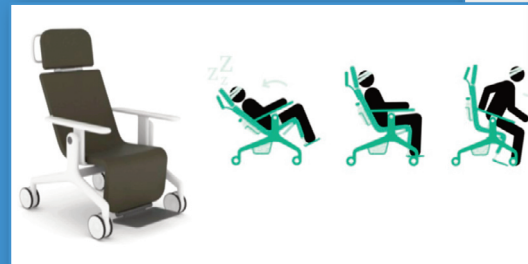
Challenge ————— **Mobility**

Bed / Trolley **Portering chair**

Flat position
Big footprint
Expensive product
"I'm not ill enough to be in a bed"

Fixed posture
Uncomfortable
Understated object
"I'm too ill to be in a chair"

Signage & information



Opportunity ————— Day Chair



Where Patient benefits Hospital benefits

MAU
A&E
Recovery Room
Waiting for Diagnosis
Pathology
Oncology

Comfort
Sense of protection
Easy access / exit
Faster recovery

Sense of protection
Small footprint
Easy to move
Economic
Less transfers

The future of D&T by Tony Ryan, CEO DATA

I have been tasked to ponder on the future of the subject that is very close to my heart. Before doing so, it is essential to look back to where we came from and how we have evolved to where we are today.

I trained to teach a subject then titled Craft, Design and Technology in 1985. This subject incorporated an element of design education, but very much focused on teaching students practical skills that it was felt were going to be in demand as we approached the end of a century that had given us radio, TV, the aeroplane, antibiotics, the computer, amongst other key inventions.

Design and Technology was introduced as a discreet curriculum subject in 1989. It drew together the variety of subjects from the technical and vocational end of the school curriculum and united them under a common syllabus. We were the first country in the world to add a design-centred approach to vocational and technical education; the world watched as we led the way.

Lady Margaret Parkes was asked by the Education Secretary Lord Baker to chair a working team tasked with proposing the curriculum content for a subject to meet the demands of the day. The result, which has gone through a series of changes since, was a subject made compulsory for all students up to the age of sixteen. It would take students through a process from design, through advertising and marketing, to making, with the computer seen as a tool to be utilised to assist this process, and not an end in itself.

Lady Parkes highlighted the strategic importance of the new syllabus stating

“Our approach to design and technology is intended to be challenging and new. The aim of our proposals for design and technology is to prepare pupils to meet the needs of the 21st century; to stimulate originality, enterprise, practical capability in designing and making and the adaptability needed to cope with a rapidly changing society.”

As a young teacher, what I noticed most was how readily students of all abilities engaged with the new subject. This was about solving problems and creating the future. We were no longer looking back to metalwork, woodwork, home economics and handicraft, but were instead looking ahead to a destiny within which technology and good design would play a significant role.

Context took prime position, as we worked to make the curriculum relevant for the students in our charge. I fondly recall one project which brought in architects, town planners, marketing professionals and model makers to run masterclasses as all of year nine worked to design and present their thoughts for a building project on a plot of land close to the school.

These were heady days for the subject as it received strong support from successive governments on all sides of the political divide. Ministers were keen to build and grow on the UK's success in fashion, product design, engineering and architecture. I have heard it said that as a new curriculum subject, the mistake made at this time was that we failed to establish an explicit epistemology; the theory of knowledge behind our subject, our reason to be, and remain, central on a broad, balanced curriculum.



The future of D&T

In 2004 design and technology was removed as a compulsory subject at KS4 and this precipitated a decline that remains to this day.



So, what is it about our much-maligned subject that makes it essential to a modern curriculum and exactly why would it matter if the subject slipped from the curriculum completely? What knowledge, skills, attitudes and values should we be teaching, and what lies ahead for design and technology?

I realise that I am on shaky ground as I attempt to respond to my own question, those far more knowledgeable than I have written extensively and eloquently on this subject. That said, we are all entitled to an opinion, so here goes...

For me, the argument between a knowledge and a skills-based curriculum is a futile exercise; we need both. Knowledge on its own will only ever get anyone so far. It is the ability to contextualise this knowledge and put it to use that makes young people stand out from

the crowd. This is what employers and universities seek to identify through the interview process. This is, perhaps, more challenging than it sounds, as to apply knowledge to context one requires a degree of cultural capital, which, as we know, can be a great academic divider.

Of course, students need to learn and understand a core body of knowledge. Alongside this, we will always be a subject where students use their hands combined with their minds to manufacture, shape and mould raw materials in response to a problem that they have identified and are attempting to solve.

I believe that the relatively recent changes to the GCSE syllabi are a step in the right direction, while at the same time acknowledging that the increased emphasis on the importance of design makes it more difficult (but not impossible) for all students to access learning.

I believe that education exists to prepare young people to confidently take their place in an increasingly more complex, fast-moving, and challenging world. If we have learned nothing else over the last six months, we should have realised that the world's problems require more students with a sound STEM background. Problem-solvers who relish a complex or 'sticky' problem, and possess the ability to view it from a range of different angles until an adequate solution is found.



Our subject does have a future, and I believe that it is a bright one. I believe that the time is right to revisit Lady Parkes' founding work, our subject needs a rebrand and to develop a robust epistemology to take us confidently into the future. This is a challenge that I am ready to meet, and I hope you are too.

The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn. Alvin Toffler, writer, businessman and futurologist

1880s - 1980s

Boys attend woodworking and metalworking lessons while girls attend 'domestic science' lessons

EDUCATION

1988

TechSoft supply first plotters to schools
ICT becomes statutory for all pupils age 5-16

1987

TechSoft UK is born

1982

First computers appear in schools

1989

TechSoft supply first knife cutting machines to schools

1995

TechSoft release 2D Design software

2000

CAD/CAM becomes part of DT National Curriculum.
TechSoft release the CAMM2 milling & engraving machine

2000 - 2010

Government Building Schools for the Future (BSF) investment programme

2004

TechSoft supply first FDM 3D printers to education

2003

TechSoft supply first LaserCAM
SolidWorks and other 3D CAD gains popularity in schools

2009

3D printers become affordable to more schools

2018

Augmented Reality welding becomes popular in education

2023

Government nominates CLEAPSS to conduct UK wide mandatory safety audit of all DT and Science departments

2022

2000 additional DT technicians recruited for departments across UK

2021

DT becomes compulsory and Government increases funding tenfold due to skills shortage in wake of COVID

2024

A review of the 'CLEAPSS Report' results in a Government supported scrappage scheme for all DT equipment. Old equipment is restored, made safe and donated to schools in developing countries.

2025

1500 new schools open across the UK

2027

Increased demand due to widespread home industry results in new GCSE subject in Heritage craft skills

2033

16-year-old female UK student becomes youngest space traveller using craft designed and built in school workshops

2050

Robotic teachers trialled in UK schools.
Nearly all wear out within the first three weeks

INDUSTRY

Laser printer invented by Xerox
1969

Pierre Bézier at Renault develops UNISURF 3D CAD system
1966

Black & Decker manufacture the first cordless power tool
1961

S. Scott Crump develops FDM 3D printing tech
1988

Laser Work AG of Switzerland release first commercially available CO2 laser cutter
1975

First release of SolidWorks
1995

FDM 3D printing patents expire
2009

SolidWorks introduce Augmented Reality tools
2019

Don't ask
2020

The first 'instant' 3D printer reproduces CAD models from recycled plastic in less than 10 seconds
2028

UK bans production of all new petrol and diesel engine cars ahead of planned 2050 deadline
2040

Bandsaw invented by Englishman, William Newberry
1808

First CAD program 'SKETCHPAD'
1958

Johannes F Gottwald patents the 'Liquid Metal Recorder' the world's first 3D printer
1971

TITLE: DT IN EDUCATION AND INDUSTRY PAST, PRESENT, FUTURE?			TechSoft UK Ltd. Falcon House Royal Welch Avenue Bodelwyddan Denbighshire LL18 5TQ	
DESCRIPTION / NOTES: ARTWORK IN 2D DESIGN V3			TEL: 01745 535007 FAX: 01745 535008	
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	CHKD	D. PARRY	DATE	09/20
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DARE TO DREAM

By Mark Nicholson, Head of D&T department, Ashlyns school, Herts.

Well if we are in 'dare to dream' mode it's worth properly exploring our opportunities. I watched a YouTube clip recently where a young American is taking his state education department to court over the fact that although society and the workplace has moved on and integrates technology and collaborative working methods, his classroom still looks and operates the same as it did 100 years ago; powerful stuff.



Just because the technology can enable us to do things quicker by running design and manufacture almost concurrent to each other doesn't mean that students no longer need the skills to explore ideas. For that they still need to practice skills that develop their spatial awareness whether that's by drawing, using modelling materials or a virtual model. Develop the skill that allows them to finally realise an idea and communicate it to someone else. They still need to know how to increase force or speed, what materials would work best and with the least environmental impact, how best to fix parts of their idea together, how to make things as comfortable as possible for the user.

So, what do these design and technology areas look like that helps all this to happen? Well they probably have a lot more technology than they do currently. Like the young American I mentioned earlier, it astounds me that our curriculum areas, bar a laser cutter here and a vinyl cutter there, look like they did in the 1950's. I'm not saying it needs to be all sleek, white, clean air room, computer suites with contrasting accent-coloured huddle pods, but it

could do with a bit of real investment. Money for this sort of change can't really come from the already stretched budgets of schools forced to decide between staffing and capitation. In fact, true investment into schools, as opposed to maintenance, is the limiting factor.

So, heads of D&T will carry on scrimping a few quid together and begging their school fundraising associations for a new shiny machine every now and then in a vain attempt to upgrade the provision for the students that come through their doors. But, in truth, the students have probably got more technology and means of collaboration in their pockets than in their classrooms. There is so much we could do, there is so much that D&T teachers everywhere would gladly throw themselves into. We do after all love a bit of technology. Dare to dream? Dare to invest?

Dare to want students to have the chance to experience truly modern design methods in creative collaboration with their peers, and influenced by experts, getting a true feel for the enormous scope of this subject, to enthuse the next generation who, given the tools and the opportunity, can continue to innovate and maybe solve some of the problems they've inherited. Who wouldn't want that? It would be criminal not to.



My own Ofsted-ready, Curriculum Intention statement reads "we want to promote the idea that students can design products that improve people's lives"; no glib

statement. I believe the subject has always had that at its heart, and the current direction of travel is good, one that pushes for students to seek out problems and solutions.



So am I up for rows of students plugged into VR headsets working together on a project, operating virtual CNC machines to produce an injection mould die that is then

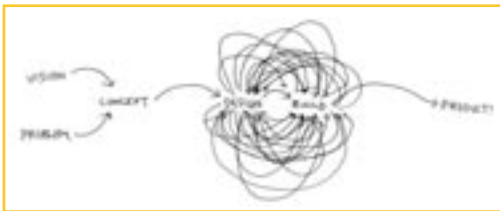
filled with a virtual sustainably-sourced biodegradable polymer, which is then fitted with a virtual renewable-powered upgradeable electronics module that is then tested on virtual patients, prototyped with 'actual' multi-material 3D printing, then crowd-sourced into 'actual' production to help make people's lives better - er yep - I'm up for that.



<https://www.youtube.com/watch?v=dqTT0jTija8>

It's a vision thing

Paul O'Sullivan, Associate Vice Principal,
Stockwood Park, The Shared Learning Trust



As a former head of faculty for Art, Design & Technology and now an Associate Vice Principal, some may say that my past and present professional identities have contradicting values.

There is an expression that the powers that be (whatever that means) don't get Design and Technology. Well, I do. I would also argue that this expression is inaccurate. Everyone in a school, regardless of the culture, context, role or responsibility, all want one thing; to provide a top-quality educational experience that enhances students' lives.

When asked to put this piece together, the broad title was "a vision for the future" when actually my vision for Design Technology, regardless of specialism, has always been the same. I want students of Design and Technology to be world class designers. I like making, but for me the game changer is designing. When I see a class of students I wonder, who is the next Ingvar Kamprad, Gordan Ramsay, Calvin Klein or Kate Spade. I also look at the class wondering which student is going to design another bird box. I am passionate about design and believe that the vision for the future of D&T should be to produce world class designers.

(Anyone reading this and doesn't know who Ingvar Kamprad (above) is, please look him up because I almost guarantee that you own something from his small start-up company)

The natural flow of this piece would be to be talk about *What is Design? How to develop Problem Solving skills?* This is futile because it is not going to give us world class designers. It will give us good designers. I want world class designers, and I want the vision of our future to be about developing problem finders that bring new ideas prototype and new concepts to market. One of my favourite quotes on this is from Steve Jobs:

"People don't know what they want until you show it to them ... Our task is to read things that are not yet on the page."

This means that our role is to provide tasks, challenges and projects that enable our students to read what is not yet written. As teachers and leaders of design, we need to think carefully about the problems we pose our students. McLellan and Nicholl have produced an amazing study "If I was going to design a chair, the last thing I would look at is a chair" which discussed the concept of how product analysis can lead to fixation which decimates creativity and divergent thinking in the design process. The Juicy Salif squeezer by Alessi is an example of divergent thinking and design at its best where form meets function and aesthetics.

My vision for Design & Technology in the future is about an increased emphasis on design and design communication. This will be achieved through an increased emphasis on a variety of design skills including sketching, annotating, physical modelling as well as computer & parametric modelling.



Virtual and augmented reality
<https://www.youtube.com/watch?v=F197-DacGMk>



The art of the possible, or impossible

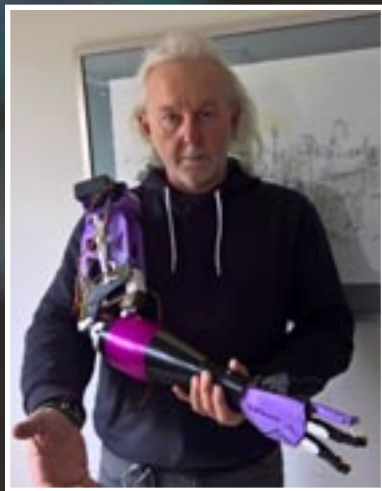
Gemma Down Ex-Hornchurch High School, now
Head of Art and Photography, Maltings Academy

Teaching D&T came as a surprise last year. A welcome surprise I might add, as all of my memories of being taught resistant materials, as it was called then, came flooding back. The smell of the workshop, the noise of the tools and machinery in use and the in-built love for the craft and subject spilling out from the staff.

I am an art teacher by trade, but I found myself drawn in to the magic and history of teaching Design & Technology. It's not so dissimilar to art. In some ways this is correct but in others it isn't. Teaching it is how I learned that D&T is an individual subject, that works harmoniously with others within the school.

Uptake was always positive, results were always strong, however I discovered that keeping D&T as an option was deemed unnecessary in the school.

With promises of bringing it back in a few years, mirrored with the hierarchal desires to sell off machinery, it made me realise that the subject wasn't as revered as I first believed. It is, instead, thought of as a dusty, antiquated relic, holding the school back from teaching to a 21st century hymn sheet, created by those who do not appreciate the importance of a rich curriculum, where skills and craft are deemed unnecessary in society.



Exam boards have not listened to the cries of dismay from frustrated teachers, when they are given specifications that don't allow for the scale of making they were previously used to. I could see this was an issue when I was teaching D&T, and have seen a lot of specialist teachers moving over to 3D art as a more accessible option.

I however feel it is important to stand your ground, and support what you love. Giving in and letting go doesn't always go in your favour and it concerns me that this is another nail in the D&T coffin. There must be another way to keep the flame of D&T alive.

There appears to be a huge influx of programmes on television lately involving upcycling, reinvention, restoring. Maybe if we tap into this, there will be more success. Have more involvement with outside craftspeople, create more opportunities for apprenticeships, competitions, and have a more fluid workshop environment. I think keeping a grasp on the traditional skills of D&T are vital, but pairing them with elements that would make a viable difference and contribution to society is really important. No more making frames for mirrors or iPod speakers that instantly get thrown away, but understanding how to restore and reuse current products, in order to protect our living planet from further destruction.

I believe that over time there will be a resurgence and awareness of the importance of the skilled practical subject that is Design & Technology, maybe with a new government. But there needs to be changes to bring D&T back into the limelight and that, I think, needs to reflect the current make do and mend culture which is very much alive in society.



The future of education

Phil Cotton, Head of Department, Design and Technology and Art. Ladybridge High school.

The past six months has been a roller coaster for education. What we took for granted was suddenly taken away from us. Education as we knew it, might never be the same again. If you had said to me 12 months ago there would be a global pandemic and every school in the UK would be closed for 6 months, I would have bet my house that it wouldn't happen.

The classroom was always an oasis of safety for children and teachers. A place where learning thrived and futures were made. A detachment from the 'real world' where knowledge was developed and inquisitive minds were formed. Now, life has been turned upside down and schools are the last piece of the puzzle to open up again. What was taken for granted as a safe and secure environment, now comes with inherent risks that need to be strictly managed. I personally don't think people really understand how different education will be when we return in September. Schools will not operate as normal and the 'new normal' will require some very innovative approaches in the classroom.

But here's a thought about the future of education in our current climate. Will the classroom survive under COVID-19 if the transmission rate cannot be contained? The whole concept of children and adults

attending school every day, and returning safe, is enshrined in our society. We would never entertain a situation where attending school could potentially inflict life-threatening harm on people. But here we are, about to test that concept out. If the classroom ultimately can't be safe then what will the future of education hold for us?

Reflecting upon the past 6 months, could a hybrid model emerge where students learn remotely for some subjects and only attend school for subjects they couldn't learn remotely? I teach Design and Technology and practical subjects have taken a battering with COVID-19. D&T, food, art, PE, science, etc, cannot be taught effectively remotely. Where a practical skill needs to be developed it can't happen from a student's house. They need to be in the correct environment with the correct equipment, otherwise effective learning cannot happen. But what about subjects that are not practical? What about English, maths, languages, humanities? Could they be taught effectively remotely? I know head teachers and SLT would balk at that idea, as they are seen as the core of education, especially with the short-sighted EBacc policy. However, if the transmission rate cannot be controlled in the classroom, theoretically those subjects that are taught primarily via a teacher lecturing to a class, could be taught remotely and children would need only attend the school premises for practical subjects.

Amazons city of the future

<https://www.youtube.com/watch?v=ZjraUKJRt8>



The future of education

Elon Musk: City of the Future
https://www.youtube.com/watch?v=L054Xd97_rk

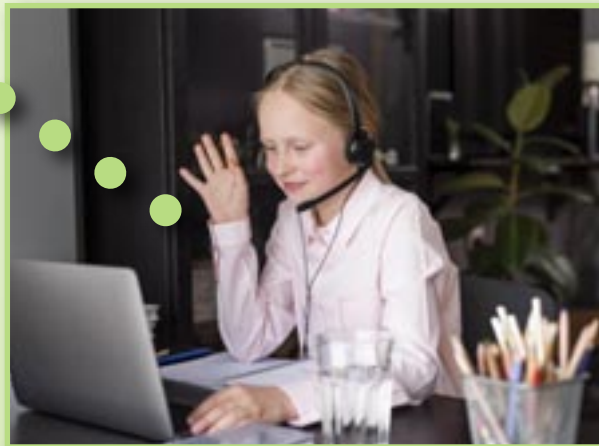


We have found ourselves in a situation where many private schools, and state schools in affluent areas, have managed to continue high quality remote learning with very little impact on student progress in many subjects. Live lessons have been the norm where whole classes attend zoom lessons and the ergonomics



of a teacher's chair is more important than ever. Students have the essential equipment at home e.g. laptops and internet, with parents who are probably working from home and able to monitor their children's progress. In this scenario a student's ongoing education won't have been impaired that much, apart that is, from their practical-based learning.

However, this throws up another situation. What about students in deprived areas, from poorer backgrounds who don't have access to the technology or the support at home. They do not have laptops or Wifi, and may only have a smart phone with limited data. COVID-19 has thrown up a new educational phrase 'data poverty', that I did not even know existed. Could there now be a case where children from deprived backgrounds have priority in attending school, when the more affluent and supported children can continue with remote learning? Controversial I know, but the gap between the more affluent students and PPG (Pupil Premium Grant) is now bigger than ever. Would this ever be a scenario society could accept?



This brings me back to the hybrid model of education. Could the future of school be where students are physically in a classroom for some subjects and taught remotely for others on a carousel model? Many would say nonsense, but Harrow school has just launched '[online A-levels](#)'. It's an 'online school where tradition meets innovation'. Imagine the prospect here. A student can attend one of the world's most prestigious schools for £15,000 per year and gain a set of A levels having never attended a class in person. This is the concept of an online degree filtering down to high school level. Now online degrees are becoming ever more the norm. When the COVID lockdown started all universities went to online lectures and some may never return to face to face working. Online degrees work, and are mostly accepted by society, unless it's a degree that requires a practical element, such as dentist, doctor, vet, nursing, engineering. Which brings me back to the original point, do pupils following non-practical subjects really have to attend school, in person?

What we are seeing with Harrow school is an experiment, the start of a concept that could send shock waves through education. What was previously deemed ridiculous, is now accepted as a viable method of education.

I am already trying to come to terms with a return to school where assemblies will be via zoom, parents' evenings will be delivered via a remote link, and the traditional head teachers morning briefing will be pre-recorded.

D&T

in a COVID-19 Pandemic.

Phil Holton, Pearson.

The world may never return to the seemingly distant normality of life before COVID-19, but the impact of the pandemic has yet to be realised in the UK education system. The year ahead presents little in the way of normality, with considerable unknowns facing schools, teachers and students, all of whom will be navigating the challenges with the best intentions of our young learners at heart.



At Pearson, we have been working tirelessly to create a package of support that is ever iterating in light of customer needs. For the subject of D&T, both our GCSE and A level qualifications will provide the opportunity to deliver the Non-Examined Assessment (NEA) in new ways. The result of the Ofqual consultation affords all awarding bodies equal scope to change the expectations of manufactured prototypes. Where the making of a final outcome would have reinforced knowledge and demonstrated application, students will be encouraged to evidence this in ways that remain within the restrictions that are in place at their school, in their local area, or within national level guidance, such as that supplied by CLEAPSS.

Throughout the autumn term, we will be working to communicate the opportunity of Ofqual's agreed changes. Switched-on teachers are already thinking about navigating the challenges in ways that not only give students the very best chance of success, but also shift significantly how they will encourage students to be designers through the NEA. Industry has been able to streamline over many years in order to reduce the cost of design and to increase levels of both efficiency and innovation. Teachers however, will be looking much closer to home, and will want to achieve equal and fair access for students, irrespective of their backgrounds and abilities, and commit to a level of course delivery that may well need to adapt and change over the academic year.

A key change that we anticipate teachers will adopt, is the one that allows students to make a "proof of concept" in place of a final functional prototype. Made prototypes have been assessed on their quality and accuracy in the current and numerous previous versions of D&T qualifications. A large amount of evidence relating to material selection and tool/equipment application is also produced through this making journey. COVID-19 will likely mean making becomes more difficult, ill advised, or potentially impossible. Industry has long recognised that proving the concept is sufficient to validate that a design brief can, or will, be met by a new solution. The perfect example for this is Google Glass (a wearable computer with screen, mounted in spectacles). The first proof of concept was made from a coat hanger, fishing wire, hairbands and a whiteboard. The reason? The designers were using materials that they had to hand. It was important to prototype at the speed at which

they were thinking, as this maximised their rate of learning. Once the proof of concept gave the design team the confidence that they were on the right track, refined prototypes used modelling wire and clay to create the right "feel", which is important when designing something to be worn every day. If our students are sitting in non-specialist spaces, like a classroom, or potentially working remotely, from home, having the confidence to grab what is around and prove that their ideas will work must have equal value to making a high-quality prototype in a workshop. Hopefully, future adaptations to D&T qualifications will recognise the value of this approach, as we give young learners the skills to innovate and problem solve in place of manufacturing or building skills that have held considerable value for D&T qualifications in the past.



Augmented Reality in education

<https://www.youtube.com/watch?v=5AjxGqzqQ54>





D&T

in a COVID-19 Pandemic.

Working remotely from home, will have a dramatic impact on the current cohort's ability to learn about materials, tools, processes and equipment, because they will have less hands-on experience of making functional products that a user can take out into the real world and test. Making things in a workshop remains a highly valuable learning experience for our young learners, irrespective of the fact that they are increasingly less likely to use these skills in a future career. The key challenge for teachers is in bringing the practical learning to spaces not designed, or intended for it. This generation of young learners, known as generation Z, are the most digitally and technologically smart of any generation. This is not solely because the technology has become financially accessible by the time they reach their teens, but because they have grown up learning to be more selective, creative, unique, and native with this technology than the generations who came before them. For the process of design,

access to technology and being a digital native allows students to approach a design process with innovation. Where users can be engaged remotely, concepts can be tested virtually, and iteration can happen using tools and apps that reduce the incline of the initial learning curve. If anything, bringing the solution into a physical manifestation may be the most restrictive stage of the NEA, given its need to physically be handled and scrutinised in a world of social distancing. Though equal access to devices suited for an education setting was still an issue when lock down was started, this resulted in additional government funding for laptops for the most disadvantaged learners. The personal devices that already sit in the hands of students offer features, apps and tools that previous generations could have only dreamed of.

Whilst optimistically wanting the new academic year to be full of fruitful creativity, design and innovation, it may be more realistic for this cohort to respond in their NEA by exemplifying characteristics of resilience, adaptability, and acceptance of the limitations that they continue to face. But, through this year, students and teachers will identify ways to work efficiently, approaches that flex and stretch to accommodate even the most dire of situations, and evolve new norms that may well create a blueprint for future cohorts of students to follow. Our role in awarding our qualifications will be to recognise all of this, in every version of the NEA we assess, and do everything we can to support teachers through their journey. Shifting baseline syndrome, in which over time knowledge of things is lost due to the changing world in which we live, suggests that we may forget how traditional D&T education was. We may become accustomed to a post-pandemic qualification which

streamlines the design process, working rapidly with what we have to hand, proving our skills in new and unique ways, and resulting in innovation in all environments. At Pearson, we intend to be thought leaders in this area, and we are fully invested in design education in the UK for this current and all future generations.

We wish every teacher and student the very best for the academic year ahead, and hope they are able to stay safe and continue to learn in the subject of Design and Technology.



TRANSFORMING OUR TEACHING AND LEARNING

Dawn Foxall,
Textiles Skills Academy

COVID-19 pandemic continues to cause disruption and uncertainty. How are we responding, and what do we need to do to ensure a sustainable future for the Arts and Design & Technology?

2020 has been a challenging year for all of us. And it's not about to stop, as we enter another phase of uncertainty when schools and colleges re-open and a second wave of cases may be ahead.

Transformations are emerging from the initial chaos. Some businesses and organisations are taking full advantage of the disruption, making more effective use of existing technologies and developing new. We have also seen individuals transforming by making changes in patterns of behaviour and the ways they work and socialise. The underlying worry is that this pandemic is not a one off and that our 'normal' world will be less secure and stable in the future. Possibly little or none of our previous logic and thinking can help us.

Education is one of those areas which has had to transform and adapt quickly and dramatically. Enforced new ways of delivering learning to both students and teachers has meant massive learning for all of us involved in education. We have duly learnt how to get around Zoom, or other live video technologies, and adapted or completely rewritten schemes of work and lesson plans and rearranged our working lives.

Some of us, particularly working with arts and design subject areas, are having to adapt to non-specialist classrooms, not able to use specialist equipment, or working on clean-down rotas for rooms and equipment. None of this is conducive to practical teaching and learning. Practical lessons have to be given a completely new vision, but we are creatives and we can do this.



There has been support from some education organisations, and especially CLEAPSS which has been extremely supportive at providing workable solutions to COVID-19 restrictions. Schools have had to use their initiative and do what works best for them under the ever-changing guidelines.

The **Textiles Skills Academy** is a teacher support group and CPD deliverer. We needed to rise to the challenge of developing online courses and began to create online Training Rooms for Textiles Teachers. These Training Rooms run via a Facebook platform and are a fast and easy way of putting together relevant knowledge, visuals, downloadable guides, video tutorials and lots of other resources, so they can be easily accessed by teachers. Those who do not have a Facebook account can easily set one up and once in the Training Room, teachers recognise the format and understand how to access and download what they need.

We have launched 6 textiles teacher Training Rooms so far, and developing more as we get feedback. Live *Zoom* sessions with participants, is part of the training, and throughout the lockdown period teachers from as far as Puerto Rico and Jersey have been able to join us, whereas previously this was impossible." To "We have launched 6 textiles teacher Training Rooms so far, and developing more as we get feedback.

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TRANSFORMING OUR TEACHING AND LEARNING



Online courses are also being developed for student access, which will enable those who need to isolate, or cannot attend class for some reason, or those where location is an issue, can still access the learning resources they need.

These online courses are a game changer, as we begin to understand that this is the start of how our new world will look. In my opinion It was always going to happen, the pandemic has just accelerated the process, forcing us to change the way we work, learn and socialise. Online training can also be more cost and time efficient. Cover is not needed, the training can be completed at home or at school, and to the user's timescale.



Online training will never completely replace face-to-face workshops, as we miss the human interaction and networking, but for now they will enable us to still get access to the training we need.

The Training Rooms:

Within Each Training Room teachers work through units and are able to ask questions to each other and/or the trainers, through the discussion pages. There are also regular Zoom sessions with the course trainer, where teachers can communicate live with each other and ask questions. We have also designed a course specifically for teachers who are facing working in non-specialist classrooms and/or with restricted resources and equipment. The techniques on this course are accessible and will adapt to a scheme of work for students of key stages 3, 4 and post-16, and to student use at home.

For more information please visit the website:

<https://www.textileskillsacademy.co.uk/online-events/>

Beyond the Pandemic

COVID-19 has given us an opportunity to rethink what matters most in education, and what we need as a society. So far, the initial response has been reactive and adaptive, but we could be looking at a transition phase towards hybrid schooling (virtual and physical). This transition could allow for the arrival of a pedagogical moment and an opportunity to completely revise our current teaching/learning methods, rather than simply hoping to return to what was before. This will be the challenge.

There needs to be ever stronger links with industry, to ensure the education we are delivering is appropriate to support the needs of a very changing landscape. Particularly in retail, where we see different ways of consumerism developing, changing habits and the different needs from society.

Having traditionally utilised teaching, which relied heavily on direct instruction and memorizing, we need more interactive methods that promote critical and individual thinking for the innovation-driven economy we live in today. Being more practical subjects, art and design are by nature, interactive and can readily support developing a hybrid system of educating which involves mixed online and face-to-face teaching, that will draw on both physical and virtual spaces. Future education will incorporate methods of online delivery, changing the way students access resources, enabling completion of tasks set in school.



TRANSFORMING OUR TEACHING AND LEARNING



There is a whole other discussion that needs to be had around the lack of access to high-speed broadband, or digital devices and the increasing distance between the wealthier and low-income communities. This has to be tackled as we move into a more technology driven forms of educating/learning.

The pandemic has also highlighted the need to develop networked school communities and create a stronger educational home-school culture. We have seen collaborative networks, both formal and informal, emerging online and off. Networking is essential at every level of education, from teacher groups to student collaborations. Online groups have been a massive support to teachers, who have gone from forming new alliances for manufacturing PPE, to giving advice and ideas on changing situations, rules and restrictions.



Networks can bridge gaps not filled by formal organisations. They can focus on specific areas of knowledge where individuals can mentor, or support each other. Informal networks may develop effective bonds of trust.

Textiles Skills Academy manages a 4000+ *Textile Teachers Centre Facebook* group. As with other *Facebook* networks, this really has come into its own, being an incredibly supportive resource and communication hub throughout the lockdown. Teachers have supported themselves and found new ways of delivering and sharing ideas and resources. A mentorship scheme is also set up within the group, enabling individuals to access or offer one-to-one support.

Networks offer opportunities for collaboration and working in partnerships, and to facilitate peer-learning (such as sharing experience, information, challenges, ideas, solutions and knowledge) and encourage student/teacher learning experiences.

Despite the incredible challenge of the COVID-19 pandemic, we have been given an opportunity to transform the education system. We can evolve and change the overall purpose, content and delivery of education in the long term and prepare our education system to deal with future pandemics and crisis. This in collaboration with our networks, including overseas experiences and knowledge.

For more information please visit the website:

<https://www.textilesskillsacademy.co.uk/online-events/>



Reimagine Learning that can Change the World:

<https://www.youtube.com/watch?v=ZT3QpUfEg1Q>



My vision for the future of Design and Technology

Michael Noonan, head of technology, Queen Elizabeth's School, Barnet

When pondering on what the future holds for the subject of Design and Technology, I think it vital to first consider what we have achieved as a subject, especially in recent times. Faced with the austere reality of teaching a practical subject remotely without the use of our facilities, I witnessed both at a departmental and national level an incredible amount of innovative teaching and learning methodologies.

These ranged from innovative resources like those being written on behalf of the Oak National Academy, to the use of technology to achieve learning outcomes thought previously impossible outside of a classroom or workshop. Few other subjects could have had the potential to suffer as much as D&T during a period of exile, but it is my firm belief that the superb efforts of Design and Technology educators nationally have resulted in a surge in interest, and a realisation by students just how relevant designers and engineers are in improving the quality of everyday life.

When taking on the job of head of technology almost four years ago, I was faced with the challenge of improving an already academically strong department (albeit interest in the subject seemed to be on the wane). I saw our main battle as being in the minds of both students and parents. Families wanted their children to have the best possible chance of success in future life but did not see the relevance of what was perceived to be an 'old-fashioned' subject. I'm sure we've all heard the usual quips such as "it'll be great for them to have some DIY skills in life", "this could make for a great future hobby", and the dreaded "isn't D&T JUST furniture making?" (not that there's anything wrong with such a noble trade). Battling the stigmas attached to what should be perceived as one of the most academically rigorous and challenging subjects was our main challenge, and I believe the lessons we learned from engaging in this can help to illuminate the pathway to

establish a flourishing subject.

The first prong in our department's plan of attack was to really emphasize the relevance of the skills and experience which D&T could offer. Revamping and rethinking how we offered the subject of Design and Technology paid a critical role in this, firstly through underscoring the importance of design thinking and creativity to future careers. At all times when engaging in a design or make activity in the department, the focus shifted from 'we are learning these skills which are important', to 'these skills are critical to any future designer, engineer, architect or computer scientist'. No action came without a qualifying statement, and we always wanted to extinguish the embers of "why are we doing this sir/miss?" before they had the chance to ignite. That creativity is stifled through the proclivity of workplaces to apply too much pressure on meeting deadlines (Thinking on your Feet, report, RADA, 2017) comes as no surprise. The establishment of

an environment which both encourages and celebrates creativity was critical for all teaching staff. Every module and lesson taught in our subject now contains some element of 'design a creative solution to this problem', and always has a focus on solving real-world problems. Applying these skills to initiatives such as the Institute of Civil Engineer's #ICanEngineer challenge, or the Shell Bright Ideas challenge, allowed students gain confidence in their skills and, in some cases, achieve success through doing this.

The use of design 'heroes' was another powerful tactic. Finding examples of recent, innovative users of the very design skills which we were fostering, showed students why they would want to pursue a career in our subject area. Gymshark founder Ben Francis, who began his company through screen-printing in his garage in 2012 (and who's company was recent valued in excess of £1bn) is one of a litany of such heroes, proving that the deployment of the skills learned

in our workshops and classrooms could pave the way for future success. Richard Browning, Simeone Gertz, Josef Pruza and Sundar Pichai are a few other names which regularly ring out in our classrooms as modern models of innovation and creativity to which our students can aspire. Indeed, we also promote the use of peer heroes, through our current 6 Arkwright Scholars across year's 12 and 13 helping to inspire the next generation to achieve such an accolade.

I have witnessed first-hand the effect which partnership with real engineering and design companies has had on our students, especially in helping to give students an extra nudge towards a specific career area. We have been taking part in the EDT's Engineering Education Scheme for over 10 years, and have had some tremendous success with our students in this regard. By pairing Year 12 students with real-life engineering challenges set by firms such as Morgan Lovell and Overbury, students have a feel



My vision for the future of Design and Technology



for the everyday excitement of working with an engineering team. Students are set real briefs to make a difference to worker health and safety, or to significantly improve workflow on site. Engaging with high level professional clients, conducting real-life site visits, producing effective full-scale prototypes and finally presenting to the company's board of directors are powerful experiences which help to re-enforce the student's beliefs that the skills they have honed in our department can pave the way for future success.

Staying ahead of the curve of cutting-edge technology in a subject which has this at its core, is critical in battling the notion of being old-fashioned. The successes of our VEX Robotics clubs, the establishment of a 3D printing club, the sheer joy and enthusiasm of engaging in lively debate in our automotive club, and intertwining programmable boards such as Kitronik's Electronic Game or the Arduino suite of boards with more traditional manufacture projects, have helped to combat any such notions of anciancy in our department.



A reluctance to adapt and change with the times is always a challenge, and, speaking personally, I would have previously viewed my own specialism as being in woodworking and joinery. However, our staff believe that their introduction of, and greater confidence with 3D printing has had a major effect on student interest and confidence. We have cast away the shackles of being viewed as a 'traditional' subject, without losing the core of establishing effective hand skills in modelling and manufacture. 3D printing has become both more affordable and accessible in recent times, with a wealth of valuable resources available online on sites such as YouTube and Instructables. Our advancement of the CAD/CAM suite from a single 3D printer and a single laser cutter in 2017 to 8 printers and 2 lasers in 2020, as well as our heavy involvement with 3D Crowd's manufacture of PPE for frontline workers (for which the department acted as the North London Hub and I as the main London Co-ordinator) has

enhanced the reputation of the department in the eyes of its students. I'm sure that the production of Over 443,000 pieces of PPE at last count by departments nationally (as surveyed through the D&T Association and Sarah Wollerton) has had a similarly positive effect.

A final word on the challenges facing us in the tumultuous times ahead. COVID-19 has proven to be a major challenge for us as educators. Rather than viewing this as a stumbling block for our subject, we should instead view it as the launchpad which can help to reinvigorate our subject. I have seen tremendous outcomes in collaborative learning such as the D&T Isotech Challenge and our own use of forums through our school's Firefly website. I have been able to use remote learning to allow students to 'virtually manufacture' products, through online resources which demonstrate the use of the skills and equipment married with sending through design ideas online and using CAD/CAM to

produce prototypes remotely. I have seen the profound effect which the use of design and technology skills can have on everyday lives, especially at a time when people's needs and wants are rapidly changing. My colleague and I have even managed to continue our DATA CPD virtually through the use of Zoom. Put simply, I have no doubt whatsoever that as a subject we can rise and adapt to the challenges facing us in the future. It is solving problems,



after all, which is at the core of everything we do. In doing so, we can model the habits and skills which we seek to foster in our students every day.





A Vision for the Future
*Fiona MacDonald,
Head of Learning, the Design
Museum*



The Design Museum has a vision for a world where everyone values design, and design is relevant to everyone because it solves global challenges. Learning is at the heart of the museum's DNA, and enabling young people to experience design and the design process from a young age is key to achieving this aim. At the Design Museum, we are proud to offer learning programmes for adults, lifelong learners, design enthusiasts, students of all ages and families. However, we are keenly aware that not all young people have this opportunity. Design education in UK schools is under threat and that there is a crisis in creative education today. Recent figures from the Cultural Learning Alliance show that, since 2010, the uptake of Design & Technology at GCSE has declined by 57% in England alone, and the most recent GCSE figures are even more bleak.

At the Design Museum we believe in the potential of design, as a way of thinking and working, to help bring about a positive future. Design, with its combination of creativity and practicality, offers a unique approach to problem solving. As a discipline that teaches innovation, resilience and thinking outside of the box, we believe that designers, design educators and design students are the best placed people to tackle upcoming challenges. The Design Museum's vision for the future focuses on three central aims:

- Inspiring the next generation of designers, creative professionals and critical consumers to develop design skills, knowledge and a lifelong passion for design in today's complex and rapidly changing world.
- Connecting the professional world of design with the lives of our learners through critical, contextual and creative engagement.
- Providing experiences that enable learners to participate in design processes and the life of the museum so that learning creates individual agency, happens at a deep level and brings about change.

In terms of design education in schools, we hope for a future with more opportunity, a future where the real world of professional design meets classroom learning, in person and online. We hope for a future where teachers are supported to take advantage of current technology to offer a programme of blended learning opportunities, combining classroom lessons, digital engagement with designers and in-person and online access to museums, exhibitions, and collections.

As the UK's only Design Museum, we hope to facilitate this. We hope to act as the go between, between schools and the real world of design. Our flagship learning

programme, Design Ventura, is a good example of how we seek to do this. Design Ventura is a free design and enterprise competition offering students in years 9, 10 and 11 the opportunity to tackle a live brief by a leading designer. Students are challenged to design a new product for the Design Museum Shop. The top ten shortlisted school teams pitch their ideas to a panel of industry experts and the winning team work with a professional design agency to see their idea made and on sale.

The programme offers free online teaching resources, in person and online CPD events for teachers, in-school and museum-based workshops, and webinars with leading designers. Design and business professionals support the programme throughout as volunteers offering industry insight. Participation in Design Ventura has grown year on year, from 61 schools in 2010 to 300 schools in 2019 and, to date, schools have participated from as far afield as Brazil, China, Germany, Malaysia and New Zealand, as well as across the UK. Despite the declining uptake of Design Technology at GCSE, it seems that there is a demand for this type of real-world design and enterprise education.

Today, we are perhaps more aware than ever that we cannot predict the future. However, at the Design Museum, we believe that offering

high quality design education, has a key role to play in shaping what that future may look like, and we remain hopeful about that.

For more information about Design Ventura visit <https://ventura.designmuseum.org/>



Question: What should the future of D&T look like?

Mark Wemyss-Holden, *The Drawing Tool Company*

“Ohh, is this craft / CDT / woodwork / metalwork? I used to love doing that at school.” Nothing ruined a perfectly good parents’ evening like hearing this. We might know better, but clearly some have reason to believe nothing has changed.

How we understand our subject and how others perceive it can differ wildly. I think D&T is about developing a mindset in our students. A way of thinking, embodying certain practical and cognitive abilities, demonstrating sympathies and respecting known parameters, while simultaneously serving up a large dollop of personality, bravery and quite often, a sense of humour. Needless to say, I used a slightly snappier response than that at parents’ evenings. To be a successful design student, we want pupils to think like designers, selflessly and yet with their own characters helping drive their creative decisions. This means encouraging them to blend some of their personality with behaviours and skills that we can influence.

Why then, do people still view D&T in a nostalgic haze of dust and desk tidies? And, more importantly, does our subject actually encourage our students to feel like modern-day designers?

Point one:

When did you last buy a book with a crap cover?

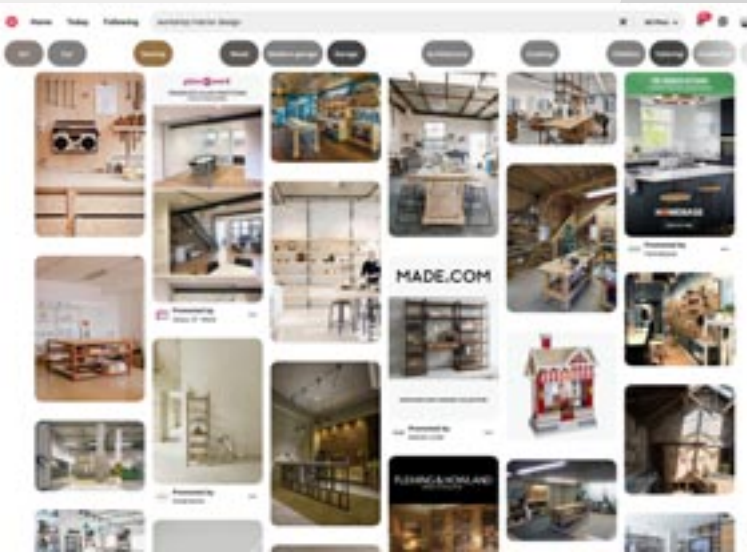
Back at school and college, I remember desperately looking around myself in D&T workshops for inspiration and influence to help me achieve something that resembled an interesting and unique idea. Quite often I’d revert back to the same (only) posters in the room that displayed anything remotely of interest. The work spaces themselves tended to offer nothing more than battered tables, flanked by a handful of choice relics from previous year groups, the harsh glow of a few fluorescent tubes and the suspicion that parts of the room had probably never seen a vacuum cleaner. We need to convince students, teachers,

parents, governors, and to an extent, ourselves, that what we’re selling is legit.

With so much access to slick aesthetics through their various smart devices, our students are more design-savvy and fashion-conscious than ever before. Peddling a dusty old workshop with dated fixtures, crumbling ceilings and faded photos of the original BMW Mini and Starck kettle as a ‘studio’ just isn’t going to cut it anymore. As a homeowner coming to the end of a lengthy renovation project, I have an appreciation for how affordably you can deck out spaces to look like a designer has had some influence on the proceedings. We need to embrace low-cost solutions together with free and accessible interior design ideas (I’m talking about you, Pinterest) to make our facilities FEEL like an environment that promotes creativity, style and function in a suitably up-to-date manner. This needn’t cost the earth. Just a few cans of paint, some masking tape and a couple of days in the holidays can make a massive difference. The point is, D&T needs to LOOK the part. This needn’t be a



Question: What should the future of D&T look like?



showdown to find the most stylish D&T teachers. As a subject, we should help each other by generating and sharing inspiration, ideas and even physical resources centrally, so nobody is left behind in a visual revamp of our subject.

Students working in a stimulating environment, with more of a focussed 'studio' feel, will naturally reflect a sense of their environment in their designs, achieving better outcomes than projects born out of tired workshops still hanging on to their CDT roots. Consequently, aesthetically improved outcomes from our students may just get the attention of those looking in so critically at what they see as an out-of-touch, expensive and ageing subject. The finishing touch? Perhaps we cement in people's minds what we really are by giving those heavily-weathered initials a rest and brand ourselves as simply 'Innovation'...



Point two:

Mmm, this is delicious, but as you've only used a frying pan, I'm afraid it's a 2/10.

This leads neatly on to what we should really be doing in our new, achingly-cool 'Innovation Studios'. A variety of prototyping facilities must be available, either fixed or modular, but our teaching must allow students to understand the value of their use. I remember feeling in some way inadequate if I'd not managed to find a use in my projects for metal lathes, sheet folders, welding rigs and various other tools exhibited on the walls like trophies from our industrial past. Design projects should be encouraged to reflect the real world of design, where prototyping is a means to achieving a proof of concept, not to show that the designer is capable of using every tool and material under the sun. At higher levels, attainment built on demonstrating a wide range of processes / materials favours a more

methodical, less creative path. When this is the case, students (and teachers) are more concerned with racking up a tally of processes, rather than proving an idea has legs using only the necessary prototyping and testing methods.

I designed IsoSketch® in such a way that if it were to be entered for non-exam assessment, I'd probably sink due to a lack of processes and materials used. But that's the nature of the beast with a plastic drawing aid! Should I have tested it in MDF and fabric just to prove that transparent polystyrene was actually the best material? Cut it on a fretsaw and hand-carved one just to show that laser cutting was a superior prototyping method? Thankfully, it works brilliantly, due to the countless teachers and students I tested it on before committing to the final CAD profile.

More independent, potentially live brief, judging of certain projects would

Question: What should the future of D&T look like?

also give teachers an alternative viewpoint, and let students receive focussed feedback about the viability of a concept. From working in the STEM competition industry, I've seen first-hand how desperate big companies are to engage with schools. Attracting a professional designer, engineer or marketer to be a judge is as simple as putting a request on the STEM Learning website (www.stem.org.uk). I'd love to see the originality and effectiveness of an idea, either digital or physical, become the real assessed article, rather than how much stuff was used to get there. My point is, it's clear that the answer doesn't always need spelling out in three different languages. However, with assessment as it currently is, the laser focus that a design project requires can be diluted and blurred as we try to engineer a thorough response to fit criteria that aren't really interested in how clever the actual idea is.

This sums up the second part of my D&T ideal scenario, which is that I think we should be putting a much heavier focus on problem-solving than manufacturing. There are far better

ways to prepare students for a life of tools and materials specific to the problems they will more likely face in the future, such as house renovations, dabbling in basic car mechanics or becoming their own 'genius' by learning their way around a misbehaving electronic device. D&T should focus their attention on how the world can be changed in a positive way by reacting creatively to genuine problems, while keeping a commercial eye on the viability of any proposed solutions.

Point three:

What, you made that yourself? You should take it on Dragons Den!

Business-mindedness, then, is the third prong on my D&T-future trident and one that seems so obvious but so lacking in how the subject is currently delivered and assessed. Would this idea you've spent months deliberating over and studiously developing, actually make any commercial sense in the real world? This HAS to be part of any revision to the way our subject is taught and projects are assessed.

Students need to develop a basic grasp of the costs involved in the design, development and distribution of products, backed by an understanding of how something would need to be manufactured in order to get it to market in the volumes required. I've been in the room when "Oh, you'd probably just injection-mould that in real life" has been proclaimed. Does anyone stop to think how much time and money would be required to design, develop and manufacture the tool that makes that possible? And in what numbers you'd need to produce the item to make that spend worthwhile? And how much marketing budget you'd need to give you a fighting chance of making those sales?! It's a scenario I faced when developing IsoSketch[®], but one I managed to get a handle on with the help of small business networks and supportive manufacturers. Even my product design degree didn't really prepare me for the business side of launching a product, which I now understand is one of the most crucial to success. Really, we're setting our fledgling designers up to fail by simply ignoring this most vital part of the

The International Policy Digest, How will education change in the next 10 years:

<https://intpolicydigest.org/2019/05/01/how-will-education-change-in-the-next-ten-years/>



Question: What should the future of D&T look like?

A day made of glass
https://www.youtube.com/watch?v=6Cf7IL_eZ38



process. The one that ultimately determines whether all your hard work has been worth the effort or not.

I'd love to see live projects where students could actually measure the success of their ideas by seeing some sort of financial return. Selling products manufactured in school for charity (or the departmental budget) as part of a Young Enterprise format would be a very involving, and ultimately valuable, learning experience for students. Many D&T departments are now endowed with the kind of equipment that keeps small-scale manufacturers in business. Rapid prototyping such as laser cutting and 3D printing gives us the ability to produce a modest volume of high-quality items to replicate small batch production runs. Imagine your students' products being marketed and sold to other students in school, with the success of each design being tracked and analysed at the end of a period of sales. It would be a brilliant and natural way to link with other subjects, like business studies, English, mathematics and science. The results

may well highlight the relevance of commonly overlooked areas. Specifically, the need for graphic design and marketing skills to create well-judged branding and packaging, while promoting the right messages. It may well turn out that, as discussed earlier, and over all else, catching the attention with well-judged aesthetics and a memorable punchline is what sells.

In summary:

We have a sensational product, wrapped up in a worn-out paper bag. D&T must be seen for what it is, a hugely relevant subject that can truly make a difference globally, and giving students the freedom to imagine, prototype and test ideas that can make our world better. As much as I loved geography at school and college, I always felt acutely aware that the world was changing and geography as a subject would simply watch and report as it changed. With D&T, I felt the strong pull of a dynamic subject that allowed me to fascinate over how we could make changes ourselves, and

which gave us the time, space and inspiration to put those ideas into some sort of reality. Luckily, I 'got' it.

Some D&T teachers have always delivered the subject brilliantly, and it's those role models we should look to now for the real nuts and bolts of how to teach such a thrilling subject. We know our subject is packed full of value and depth that few, if any, others can match for worldly relevance and future impact. Unfortunately, though, we've fallen out of favour with some big decision makers. We humans are fickle creatures when it comes to being convinced that something is worth our attention, so if change is on the horizon for D&T, let's start by packaging and advertising our brilliant, highly-valuable product a little better, and see if we can turn those falling sales figures around. It's time to take a lesson from within and truly innovate.



Letter racks

Anneli Lombard, head of Creativity, acting head of D&T, Hinchingsbrooke School, Cambridgeshire

For 38 years a letter rack has sat in my mum's kitchen, still used for letters, she is of that generation. I made this in year 7 (well it was the first year then) in woodwork. I can't remember when, how or if I learnt anything, just that it still exists, is used, and loved.



A day made of glass 2
<https://www.youtube.com/watch?v=jZkHpNnXLB0>



Design & Technology has changed over the last 4 decades; woodwork, metalwork and technical drawing, CDT. It is a subject that must keep evolving as the world around us does. Responding to the developments in technology by building on the past, not obliterating it.

We must remember that the creative design process remains the same whatever materials and techniques we use. Of course, CAD/CAM is hugely important but technology must not be allowed to side-track us from the fundamentals of designing and making, it should enhance it. From Isambard Kingdom Brunel to Arne Jacobsen to James Dyson (pioneers of technology), the materials and technology may have changed but the design process has not. Humankind has moved from the agricultural age, the industrial age, through the digital age and we are now in the conceptual age. That is what we need to



prepare our students for, and we can do this with or without IT facilities. We are looking for independent, creative thinkers and problem solvers.

Our departments' ethos must have this at its heart, exploration, curiosity, creativity, innovation. It should underpin all our decision making, curriculum writing, content and delivery both now and in the future, whether that is 5 years or 50 years' time. It is our responsibility to educate students who understand that failure leads to progress, that an interest in the world around us helps us empathise and understand what is needed (for example, the huge effort by D&T departments during the COVID-19 crisis), that taking risks is a necessary part of development. Let's support them in gaining 'creative confidence'.

All young children are inherently creative. You only have to watch pre-schoolers at play to know children love to build, make, design and come up with their own ideas. Creative being the key word. They don't want to make the same as their friend, they want to express themselves, make their own version or their own completely new outcome. This is what D&T should be encouraging and facilitating.

Yes, students need material skills, CAD/CAM skills, understanding of machinery and equipment, there is nothing I like more than a

The world in 2050: future technology
<https://www.youtube.com/watch?v=0a9aWdcCC4o>



Letter racks

beautifully crafted piece of wooden furniture, but do we really need to teach them by all students producing the same outcome, with a few minor elements (often surface techniques) they have creative control over? No, we don't.

They need skills to develop solutions, outcomes that work for them. That will never exist again in exactly the same form, because they have their own way of seeing the world around them and their own way of responding to it. Not 300 Year 8 wooden square boxes that all look basically the same with minor details that are different, but 300 Year 8 containers of different shapes and sizes, made using the same techniques and materials. Some may not be the best finished example, or indeed may not work, but the students will have learnt more in the process. D&T should not be a subject focused just on the outcome, but on the journey.

I know my letter rack has at least twenty partners out there almost exactly the same (if more have survived this long), maybe some of them are still treasured by parents. But is that enough? What I wish is that it had been unique to me, my ideas, my innovation. Not a letter rack but a way of storing & organising post. Who knows what I would have come up with? Or maybe it would have failed and not exist? But I can guarantee I would have learnt more and still remember the process.

As designers we should never know the outcome before we have started.

The excitement is the journey, the discoveries, the unknown.

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Websites:

IDEO - <https://www.ideo.com/eu>

Design Thinking for Educators from IDEO:
<https://designthinkingforeducators.com/>

Books:

The Art of Innovation by Tom Kelley
Pub by: Profile Books Ltd

Creative Confidence by Tom Kelly & David Kelly
Pub by: William Collins

Making and Drawing by Kyra Cane
Pub by: Bloomsbury Publishing Plc





My Vision

Claire Young, Curriculum Team Leader,
The Costello School, Basingstoke

When asked to write about your vision for the future of the subject you have been teaching for nearly 30 years, you are bound to reflect. When I started teaching in 1991, Design & Technology was the toddler of all subjects. It wasn't woodwork, metalwork, or home economics it was Design & Technology, or as it was at my first school, Craft, Design & Technology. As a CDT teacher, I was clear about the future of the subject and was able to combine traditional skills with creativity and DESIGN. We were a core subject and had loads of curriculum time. As I think back, I wonder how we move forward. It's not clear to me what 'they' have in store for the subject, but I do know my vision is achievable.

I feel that the subject has lost its identity and, therefore, that we must start marketing ourselves better and get, not only our schools, but also parents, to see the subject as something other than woodwork and embrace the subject of Design & Technology.

We should use the changes in the GCSE specification to enthuse and inspire the new designers of our future world. Money and curriculum time are always an issue, as is being in 'bucket 3' but this doesn't mean we have to sit back and accept it.

The environment that the students work in must be a creative place, have visual images, and design classics. Take a look at what Dave Bausor ([@topbrum](#)) from Ely College is doing with his 'D&T Days Gone By' museum, things like this can only inspire and engage students.

The equipment we use, no matter how old, needs to be well looked after. The environment must be a place where students want to be. It must be clean and tidy. If you don't have the latest technology, you need to use what you have, to its full potential.





My Vision

I strongly believe that the craft skills, along with CAD/CAM, need to be embedded in the curriculum so that students know how to use them for their products. How else can they be iterative and creative?

In my utopian vision of D&T, there would be: design studios (not workshops), laser cutters, computers, 3D printers, drawing boards (not desks), workshop equipment, modelling areas, printers; these areas would be multimedia spaces. There would be displays of products and a large range of materials. Lessons would be 2-3 hours, where problem-solving, and rapid prototyping could happen. There would be no rotations or carousels. Class sizes would be about 15 and students would work on projects both independently and as teams, analysing their work.

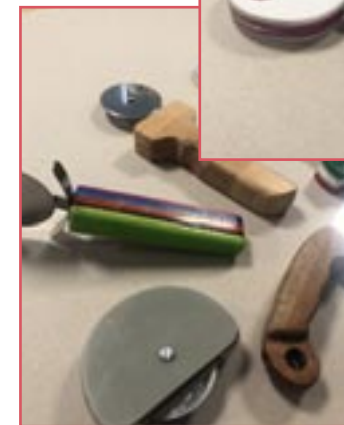
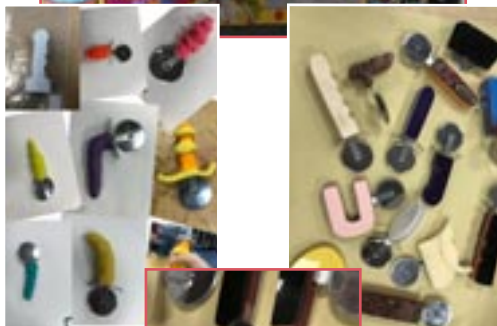
Design & Technology skills would be identified in other subjects. There would be strong links with industry and, of course, students would design and prototype sustainable products.

Some may be able to say this has already been achieved, but I know that some are struggling to get computers, let alone laser cutters.

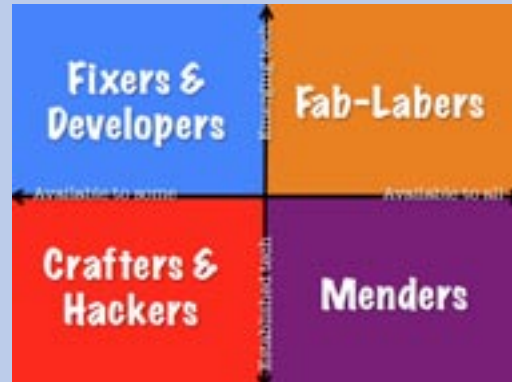
Start from the students, engage them, and then you can lead them to their best.

In conclusion, there are many things that I would like for this subject and I know that there is an opportunity for its development, but I'd like to make a start and help this wonderful subject get its well-deserved credit. I know that 2020 has changed my way of teaching. I am no longer worried about how my voice sounds on a recording, I'm happier with using a visualiser, I am more confident on my use of *Microsoft Teams* and I'm determined to use all of these in the classroom now. Let's seize the opportunity to take D&T forward and make it the subject of choice!

...continued from page 32



Future visions of Design and Technology.



The purpose of this article is to share 4 scenarios for the future. Rather than proposing one vision for the future, putting all of our eggs in one basket as it were, we suggest four scenarios for the future of D&T. To do this, we take into account two key tensions:

- What is taught in D&T. Established technologies (3D printing, laser cutting, using sewing machines and hand tools) or emerging technologies
- Who D&T is available to. All pupils or only some

These technological and democratic tensions provide for four future scenarios.

1. Fixers & Developers

Here the subject is about high tech and emerging technologies that only a few selected pupils have access to. In the teaching rooms, the space is designed for pupils to engage in and learn about design thinking. Creativity for the pupils is to think about how new technologies can be used.

Dr Alison Hardy, Senior lecturer at Nottingham Trent University and host of the Talking D&T podcast, and Matt McLain, D&T Educator, Senior Lecturer at Liverpool John Moores University and Trustee for the D&T Association

Some of the work is around investigating practical purposes for new technologies, but, primarily, the lessons are about using and learning how to use the new technologies. Much of the work is done using simulations and computers to model their solutions. Pupils are being prepared for careers in high tech industries.

2. Crafters & Hackers

D&T is based on established technologies and processes from the previous decades. Here it is recognised that society will benefit from some pupils knowing how to use traditional skills. This is partly because of the resurgence of the need for people to make things. This subject meets the needs of society to 'craft', to be in touch with the resources and to make personal decisions. So, it focusses on human needs and practical function.

Pupils who do D&T in this scenario are becoming equipped for self-sufficiency to be future entrepreneurs who meet local needs, for example, working in, running, and leading hackspaces. This scenario for D&T is about inquisitive, creative, practical pursuits.

3. Fab-Labers

In this scenario D&T is available for all, its content is around emerging technologies and, significantly, the implications of these new technologies on society. Because it is available to all pupils, it clearly has a high status and value for all.

This D&T thrives on debate in the classroom, pupils developing the skills of critical thinking and argument, where they discuss the ethics of new designs, and consider the changes to society, locally, nationally and globally. Much of the work is conceptual and virtual, with pupils modelling future scenarios and exploring the intended and unintended consequences of the new technologies.

4. Menders

Established technologies are dominant in the menders learning spaces. Pupils learn to use tools, equipment and processes. On first view, this D&T is not about global issues. It would appear to be about preparing for domestic home life. The subject content is around the home, processes needed for the home and family life.

However, there is more to it. As we become more mindful of the use of resources (Cradle to Cradle) society has become more interested in reusing, recycling, up cycling, etc, at home. It is seen that, by equipping young people with these domestic, practical life skills, then some of the imminent crises viewed in the future as we run out of resources could be addressed. This D&T is about sustainable education.

Instead of proposing one future scenario we have proposed four because we see that there are values in each one. Taking any of these scenarios prioritises some aspects of the good D&T we recognise today, leaving others obsolete. This will be true for any future vision of D&T. We need to be mindful of this when designing a future for D&T, and be careful of what we wish for.

Talking D&T podcast:

<https://alisonhardy.work.buzzsprout.com/>

Twitter:

https://twitter.com/hardy_alison

Blog: dtgeek.edublogs.org/

Twitter: [@The_DT_Geek](https://twitter.com/The_DT_Geek)

Food will always be a fact of life

— will your future pupils be the ones to feed and inform the nation?

Frances Meek, Senior Education Officer, British Nutrition Foundation

The British Nutrition Foundation's (BNF) education group has recently been working on a new careers resource for schools to be launched via *Food – a fact of life*, and it has led me to think more about the wide range of careers in food, and how these have changed over the years. Careers exist now that wouldn't have been dreamt of when I started my working life!

So, what will careers in food look like in years to come, and will your future pupils be inspired to take a journey in food?

According to DEFRA's Food Statistics Pocket Book, there were 4.1 million people employed in the agri-food chain at the end of 2019, 13% of GB employment. However, there are really two types of careers in food, those that feed the nation and those that inform the nation.



Careers that feed the nation

Farming covers 17.5 million hectares in the UK, which is 72% of the land, and employs 476,000 people. However, we are only 64% self-sufficient for food. There are a variety of reasons for this, including the UK climate, our changing seasons and the fact that it is not economical to grow all crops/produce in the UK. The weather in the UK, and around the world, has a considerable impact on agriculture, and the food produced could alter significantly with climate change. As well as threats to crop yields, climate change may also decrease the nutritional quality of important staple foods. Therefore, 'newer' agriculture careers, such as agronomy (soil and crop science), will become even more important to ensure that the land is able to produce the drought-, flood- and pest-resilient crops that the world will need in the future. Alternatively, will we make more use of the waters around the UK, and the world, and focus more on careers in aquaculture?



Continued on next page...

Food will always be a fact of life

— will your future pupils be the ones to feed and inform the nation?



Careers in 'food'

Organisation

Executive Chef City of Glasgow College
National Chef of Scotland

Name

Gary Maclean

What qualifications do you have?

- HND Professional cookery
- TQFE from Dundee University



Advising

Organisation

Freelance Nutrition Consultant & Writer

Name

Juliette Kellow

What qualifications do you have?

- Biology, Chemistry and Maths with Statistics A-levels
- BSc Hons Degree in Dietetics from Leeds Polytechnic (now Leeds Metropolitan University)



Advising

Organisation

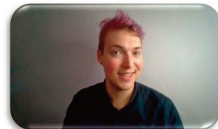
Junior Product Developer – Co-op

Name

Sam Griffiths

What qualifications do you have?

- 3 A-Levels including Food Technology
- BSc Food & Nutrition from Sheffield Hallam University



Processing

As well as the issue of climate change, a question that future generations working to feed the nation will also have to answer is “How do we produce more food with fewer resources, such as land, water and fuel, to feed the growing global population?” Perhaps one of your pupils will be inspired to work towards an answer?

Careers that feed the nation also include food processing. All the roles that are needed to ensure that the ingredients and food that we buy and eat are safe, meet our needs as consumers and offer healthier options. Careers include those in food safety and quality, food science, new product development, nutrition, primary and secondary processing, and technology and engineering.

The Agri-Food Chain



Agriculture



Manufacturing



Wholesaling



Retailing



Catering



Food is also provided for us to buy in small shops, markets and supermarkets, to cook and eat at home, and to enjoy in cafes, coffee shops, restaurants and bars. Also, all those parties, weddings and celebrations that we plan and attend wouldn't be the same without the food and drink provided. Could one of your pupils be a future festivals and event manager or run their own butcher, baker or deli?

All these careers provide fantastic opportunities for young people, but will what you teach excite and inspire them enough to find out more?

Careers that inform the nation

The current nutritional status in the UK is in decline with, in 2018, the majority, 67% of men and 60% of women, of adults in England being overweight or obese, and 20% of year 6 children being obese. There is also a prevalence of

Food will always be a fact of life

— will your future pupils be the ones to feed and inform the nation?



malnutrition, both under and over nutrition. Following the impact of COVID-19 on the nation's health, in July 2020 the government in England unveiled a 12-week plan to help people to become fitter and lose weight. Who is going to help the public become healthier? It will be those working in dietetics, health care and nutrition. Could they be one of your future pupils, inspired by their food and nutrition lessons?

Alternatively, could one of your pupils help keep us safe when eating out in the future by becoming an Environmental Health Practitioner? Eating out of home is on the rise, The FSA's (Food Standards Agency) Food and You Survey (England, Wales and Northern Ireland) reported that almost all respondents (96%) ate out, with 43% doing so at least once or twice a week. Ensuring food is safe to eat will be increasingly important.

How about the next generation of teachers, lecturers, trainers, researchers or educational resource producers? Could you be the one that a new teacher refers to as their inspiration?

Finally, the world of communicating about food. Future generations will be even more adept at social media, more comfortable with advertising, marketing, food writing and blogging. Will one of your pupils be a future food stylist working for a food magazine, television show or PR agency?

Whatever the future brings, we will always need food and drink. As we say at the BNF, food really is a fact of life. Will you be the one to inspire the next, and future, generation to feed and inform the nation?

Note: *Food – a fact of life's* new careers resource includes a colourful poster to download and display, and a range of inspiring career journeys through the world of 'food'. To find out more, go to: <https://www.foodafactoflife.org.uk/whole-school/>

Improving the Quality of Life

Louise T Davies, Founder, Food Teachers Centre

Momentous events, such as pandemics have been known to have significant impact on human society and accelerate changes or shift priorities. So, with D&T lessons at home, this already challenges long-established notions of how learning is organised and how schools may function in the future.

Placed alongside what, I believe, lockdown revealed as vital for survival and growth, such as an appreciation of where food supplies come from, how obesity impacts, how designers can respond quickly and creatively (for example, F1 engineers might help with designing and manufacturing ventilators) and that, given more time at home, some people loved to create, make and craft as a source of personal satisfaction, some of us involved in D&T education began to see a glimmer of hope that our subject might come into its own like never before.

As one of second tier subjects (including PE, art and music) that sit on the uncomfortable continuum between 'hobby' and professional employment, attitudes towards the subject are strongly embedded.

Some years ago, I was lucky enough to be writing the national curriculum with colleagues at QCA (Qualifications and Curriculum Authority). We described how D&T gave young people an opportunity *to intervene to improve the quality of life*. Right now, there seems nothing more important than having young people solve real problems in their own community. Designing products that already exist and simply add to a consumer pile of junk in a few months does nothing to improve credibility.

Design and technological achievements will often, frustratingly, be attributed to science or IT. Science can provide the knowledge and some new discoveries, but it is the designer who researches the needs of the user, ensures that scientific knowledge is used to create a solution to meet those priorities. Well-developed skills in user research clarifies the

real problem and the context for the user. Skills in developing ideas, possibly drawn from unconnected fields or uses, which may yield simple and globally acceptable answers, together with effectively evaluating ideas or products in action (our 'iterative process') are at the heart of the D&T mindset and thinking. Or should be.

Let me give you a food example. To help feed us globally and healthily, scientists propose greater consumption of plant proteins. But scientists fall short when it comes to designing systems and products to make this a reality. So, concept chefs have looked for plants that might mimic the taste and texture of meat. Enter.... Jackfruit, and the phenomenon that is 'Pulled Pork'. Designers experimented with ways of creating a near meat experience, applying street food culture, and adding flavour appealing to the user. However, a designer also evaluates its impact. If successful, what will be the consequences of a large increase in jackfruit production on the food system, farming, communities, and our health. The possible unintended consequences of what seems like a good solution. Does it solve the problem, or create another?



So, my questions to all D&T teachers who are reviewing the subject for the future are:

- How can you create more meaningful opportunities to work on local or global issues which will make a difference to those in urgent need of help?
- Could you increase real user research (rather than superficial)?
- How might students be taught to constantly evaluate products in use, to look for improvements and consequences, rather than seeing evaluation as something at the end.

Providing Flexible Learning Spaces to Support Wellbeing and the Development of 21st-Century Skills.

Matt Evans, marketing manager Technology Supplies Ltd



What is Design & Technology in 2020?

The subject has evolved considerably in recent years. The new Design & Technology GCSE has brought a fresh angle to the subject, focusing on a material-agnostic design process with the addition of some mathematical applications. For those schools and students who have felt this isn't the best pathway, TSL has seen the popularity of alternative GCSE-equivalent courses increase, particularly those which focus on modern design and vocational subjects such as rapid prototyping and robotics.

The link with STEM (specifically, the elements of Technology and Engineering) varies widely between schools. Some are able to fully integrate a multi-subject approach into their curriculum, whilst others take a more project-based approach, often through clubs and other extra-curricular activities. Whilst the consideration of STEM allows for a broadening of design and technology applications and real-world context, the subject has an opportunity to develop students' 'soft' skills in anticipation of a career in industry.



The 'soft' side of STEM education

The design process within D&T provides the most stable foundation of all departments in schools to ignite the nurturing of 21st-century skills. In particular, those related to problem-solving and critical thinking, but without too much of a stretch of the imagination the structures to develop communication skills and collaborative working are well within reach.

The requirement to further develop such soft skills has not come out of the blue. Workplaces in many, if not all, industry sectors continue to evolve, and the pace of change via information technology and operational technology is becoming more evident as the fourth industrial revolution materialises. The applications for big data and IIoT (Industrial Internet of Things, connected devices in the context of industry) means that the requirement of a human workforce will shift away from the need to do things to the need to solve things, through the identification and exploitation of problems and opportunities.

The practical bit – how?

The rapid pace of change in industry places responsibility on the education community (not just schools and colleges) to prepare students for both a successful career and also a rich and fulfilling life experiences.

Here at TSL, our team appreciation of these situations has evolved. Our focus on D&T supplies has changed from an approach to offer as many options to D&T departments as possible, to one which offers *the right* options.

These are presented alongside validated advice, so teachers can trust that their equipment and consumables are education-ready and fit-for-purpose.

Our Projects (installations) division remains the global leader in the provision of D&T and engineering workshops. The success of our mobile machinery solutions continues to grow as the necessity in schools for better utilisation of space grows, and alongside TSL's sister brand, Demco, we now install more than previously D&T and STEM spaces which include flexible and modular furniture to provide zones for student collaboration and presentation. What's more, our workshop solutions consider the entire learning environment. The effect of comfort, noise, light, and temperature on students' ability to develop knowledge and skills, and the impact on learning outcomes and wellbeing.

The future of D&T is optimistic, as long as we, in the education community, continue to understand the evolving needs of industry and students, and find ways to meet both within a strong curriculum and educational approach.



D&T

The Future

Martyn R Hale, Managing Partner, HME



Since its inception in the early 80's the HME brand has been synonymous with progressive change and forward thinking in a stable, but key, sector of secondary education that is Design & Technology 'the making subject'.

Gas fired forges, furnaces and brazing hearths were designed to be gas safe by introducing double solenoids and pressure switches, further, they did not rely on a 'match to light them' as HME were first to offer auto ignition as standard.

It was in the 90's that HME led the development in the design and manufacture of negative pressure fume extractors fitted within the body of the heat treatment machines able to extract fumes 'at source' without being intrusive to the working area [James Dyson would be proud of this achievement].

At the turn of the century HME furthered in the introduction of 3 axis machining by routers despite the continuous development of software operating systems. Thus, HME became well known for their range of British built machines under the brand of UNION with finishing machines, manual/cnc millers and lathes and now CNC routers, laser cutters, low temperature casting machines and integrated dust collector bandsaw.

Although HME still maintain a focus on 'thinking like an engineer' as much as robotics maybe considered the future, we know that someone somewhere must maintain them with wearing parts not to mention the electronics. We strongly believe and support a skills-based economy. Having the knowledge is accepted, but unless you can make it work

what is the benefit? I recall Dr Keen who was the man who built the machine which was used to crack the enigma code, it took Turing and Welchman to solve the code breaking, but Dr Keen, a trained engineer, built the machine.

Today the HME brand is part of an exciting future in Dubai where we have assisted in the design and supply of a new state of the art centre at the American Academy for GEMS Education, where a robotics and AI [artificial intelligence] Centre has been created. Further at the GEMS International school an Aeronautical Centre of Excellence has been installed.

These centres of excellence are of course part of an overall experience in the subject Design & Technology along with Textiles, Graphics and Art rooms and the more traditional machines being supplied under the HME brand. In all cases due regard is given to Building Bulletin 81 and BS 4168 covering health & safety.

It is vital that when parents choose a school anywhere on the globe they understand that the widest exposure to subjects is key. However, it is obvious that only one subject ticks the boxes of Science Technology Engineering Art and Maths, and that is Design & Technology. Further, it must be recognised that all heads of D&T must hold the knowledge on how to safely operate at least 20 different machines, whilst, Importantly, preparing the children of the world for work.

Finally, the most visual success of Design & Technology is shown by an English designer who, working for Apple, led the design and manufacture of the iPod, iPad, and iPhone. A clear stamp on the world scene of the importance of the subject.

<https://www.youtube.com/watch?v=60sIVvXu3oE&feature=youtu.be>



CLEAPSS small print

Over the summer we produced a range of guides on managing D&T under the present restrictions of the pandemic.

In general, the advice across the D&T guides is the same as that in the equivalent science guides.


- GL344 *Guidance on practical work during the COVID-19 pandemic - D&T*
- GL360 *Advice for schools with small numbers of pupils on site*
- GL356 *Guidance for spending all day in a practical room*
- GL355 *Using workshops, food rooms and art studios for alternative activities*
- GL347 *returning to school after an extended period of closure*
- GL348 *practical DT activities for pupils at home*
- GL354 *Managing Practical Work in non-specialist rooms*

The guidance is based upon work we have done with the Department for Education, Public Health England and the HSE.


We also produced a new guide on the use of washing machines: GL001 Use of a washing machine in school.

CLEAPSS regularly receives *Helpline* enquiries about using washing machines in school for cleaning textile items. This guide offers schools sensible and workable solutions on how to use the washing machine effectively, and is not specific for COVID-19. All of these guides can be found on the website, under the 'whats new' section of the administration pages:

<http://dt.cleapss.org.uk/Resources/Whats-New/Administration/>



Exciting and safe practical work in schools and colleges





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GL344 Guidance on practical work during the COVID-19 pandemic - D&T





This guidance is additional to all standard operating procedures across your school and CLEAPSS Guidance in general.

This guide should be read in its entirety, and users may need to read the other guides listed below.

Updated - Various updates including FAQs - 14 Sep 2020 [View Resource](#)

GL001 Use of a washing machine in school





This is a short guide explaining the use of a washing machine in a school.

This is a response to a number of helplines regarding the laundering of textiles in a school.

New Resource - 2 Sep 2020 [View Resource](#)

GL341 Gloves as PPE in D&T, Food and Art



This document explains the differences between different types of gloves and their uses.

New Resource - 19 Aug 2020 [View Resource](#)

HSE

The HSE has recently released the data of fatal injuries in the workplace. There is no Education category, as, in terms of fatal injuries in the workplace, education is a very safe environment.

Over three-quarters of fatal injuries in both 2019/20 and the combined five-year period 2015/16-2019/20 were accounted for by just five different accident kinds. The top three main causes of fatal injury are falls from a height, being struck by a moving vehicle and being struck by a moving, including flying or falling, object. Between them, these have accounted for over half of all fatal injuries each year since at least 2001/02.

This data does not contain the data of deaths from occupational diseases, including COVID-19. Most occupational disease figures are estimates, however asbestos-related cancer can be quantified, there were 2446 asbestos-related deaths in 2018. In each year there are approximately 13,000 deaths from occupational lung disease and cancer. These are estimated to have been caused by past exposure, primarily to chemicals and dust, at work.

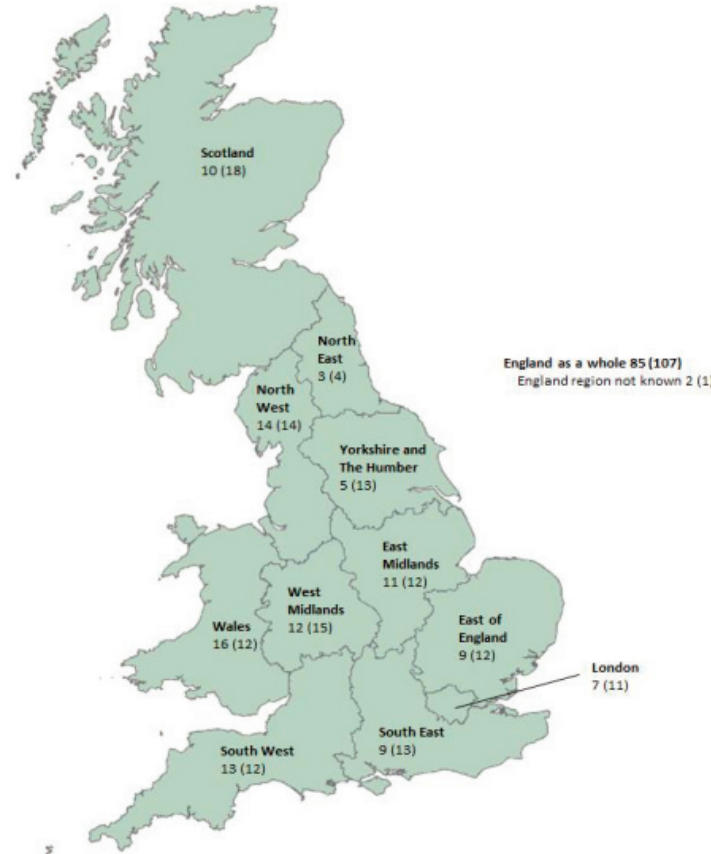
Although there are few, if any, fatal accidents in schools, we must be sure to continue to support staff in avoiding working in a dusty or fume-filled environment. It is essential that schools follow the guidance regarding the use of LEV and other ventilation controls, to help to avoid the long-term health effects that dust and fumes can create.

<https://www.hse.gov.uk/statistics/pdf/fatalinjuries-20.pdf>

Injuries by country within GB

Figure 9 below shows the country or region where the accident occurred for fatalities in 2019/20. The number of fatalities in some regions is relatively small, hence susceptible to considerable variation. Accidents involving multiple fatalities can also affect annual totals. Therefore Figure 9 also shows the annual average number of deaths for the five-year period 2015/16-2019/20 as this reduces the effect of year-on-year fluctuations.

Figure 9: Number of fatal injuries by country and region within GB, 2019/20p and annual average for 2015/16 - 2019/20p (annual average number in brackets)



- The number of deaths in Scotland has seen large fluctuation in each of the last 2 years – with a high of 29 in 2018/19 and a low of 10 in 2019/20. The annual average for the last 5 years is 18.
- There were 5 fatal injuries to workers in 2019/20 in Yorkshire and the Humber, the lowest on record and compares to an annual average of 13 for the 5 year period 2015/16-2019/20.

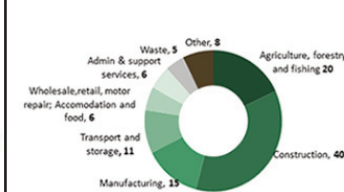
In terms of fatal injury rate, England consistently has a lower injury rate than either Scotland or Wales. However, injury rates are strongly influenced by variations in the mix of industries and occupations and in England there are a greater proportion of people working in lower risk jobs than in Scotland and Wales. The country injury rate does not make allowance for the varying composition of the workforce between these



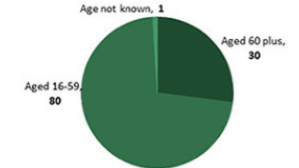
Fatal injuries in Great Britain

111 Workers killed in 2019/20 (RIDDOR)

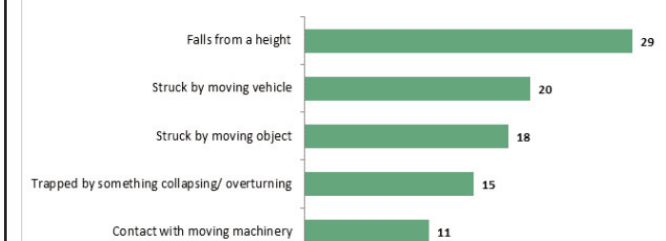
Fatal injuries to workers by main industry



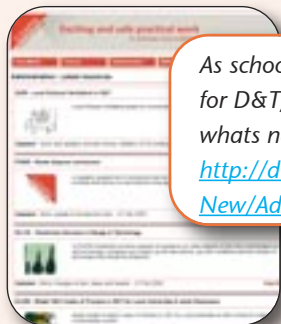
Fatal injuries to workers by age



Main kinds of fatal accident for workers



Some recent tweets



As schools are returning, we have lots of guidance for D&T, food and Art on the website, go to the whats new section under admin:
<http://dt.cleapss.org.uk/Resources/Whats-New/Administration/>



Ofqual confirms changes to GCSEs, AS and A levels next year
<https://www.gov.uk/government/news/exams-and-assessments-in-2021?fbclid=IwAR3X0GmzNLEgEMcwVwHLOuk6y>

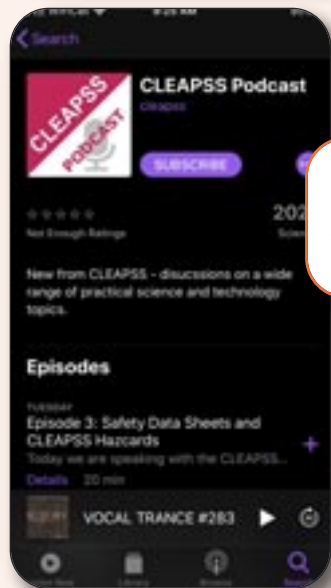
In the D&T world, we also like twix and kitkat (all sizes of both). The nibbling of both ends of the bar can take a bit of practice... Also, tea is by far the preference.



My tattoo was designed by my GCSE graphics group, I got it done in time for their exam a few years ago, nobody complained.



When purchasing gloves for use in D&T, food and art, take a look at the latest guide:
<http://dt.cleapss.org.uk/Resource-File/GL341-Gloves-as-PPE-in-D-T-Food-and-Art.pdf>



CLEAPSS Podcasts are now available in the Apple Podcast App/store. Just search for CLEAPSS and you will find us.

Does this work for the social distancing rules? Could work in large classrooms, but not sure about the corridors!



If you are considering using a liquid resin printer in school or college, you should take a look at our latest guidance:
<http://dt.cleapss.org.uk/Resource-File/GL011-Using-a-Resin-Printer-in-Schools-and-Colleges.pdf>



New guide on the use of washing machines in school:
<http://dt.cleapss.org.uk/Resource-File/GL001-Use-of-a-washing-machine-in-school.pdf>

The next edition of Futureminds – Spring 2021

The spring 2021 edition of Futureminds will feature some follow-up articles from this edition.

We will also have information on the latest guidance for the COVID situation.

If you wish to be a contributor to the next edition, please let us know, either through the Helpline, or via email or twitter:
dt@cleapss.org.uk
[@CLEAPSS_DT](https://twitter.com/CLEAPSS_DT)



Excellent food science information, in a well organised website: foodcrumbles.com all articles include time required for reading.