CLEAPSS Design and Technology

Futureminds

Tomorrow's world explored today

Spring 2021

CLEAPSS D&T e-newsletter

7 amazing technologies we'll see by 2030
https://www.youtube.com/watch?v=AuVHftBiDVw

This is one of a number of links to video files, with QR codes, that you will find throughout this edition

Welcome to the first edition of *Futureminds* for 2021.

With the CLEAPSS office, closed for the time being and staff working remotely, it is easy to feel a little downbeat. However, we can report that we have been able to visit a few schools to do audits, and have also seen lots of interesting ways of engaging pupils without having access to workshops and design studios. As an example you can read about the Engineering Club from Queen Elizabeth School in this edition.

Over the past term CLEAPSS has been working on developing online training programmes. The science team have put together a number of sessions, including a really interesting Introduction to Health and Safety course for technicians. The similar D&T training course should be live later this term. It will be free to members, and will take you through the basic theory related to managing health and safety in a secondary D&T, food or art department.

We have also updated a number of the MRATs and other documents, so do remember to check the 'whats new' sections of the website.

We published our first D&T podcast last summer, explaining how to make best use of the MRATs. For teachers and technicians working on updating their H&S materials, while the pupils are not in school, this would be worth revisiting:
CLEAPSS podcast episode 1

In the last weeks of the autumn term we completed our work on ideas for flexible solutions to furniture and layouts for design studios. This formed the CLEAPSS contribution to the development of new facilities and accommodation for the safe and effective teaching of D&T in schools, which will be incorporated into the next set of school design suggestions from the DfE. With luck, we will see some flexible design studios being built in the next few years. If you missed the work we did on this, you can read about it in the autumn edition of Futureminds.

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Watch How Clothes Are Made | Full Production Process
https://www.youtube.com/watch?v=2F5n0EfttIk

We continue to work with suppliers on developing equipment and furniture that can be used in a more flexible approach to the design of D&T accommodation.

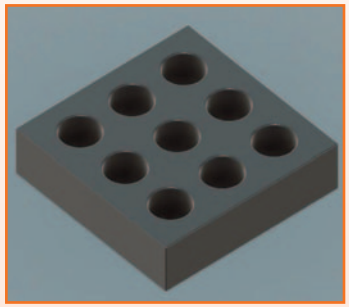
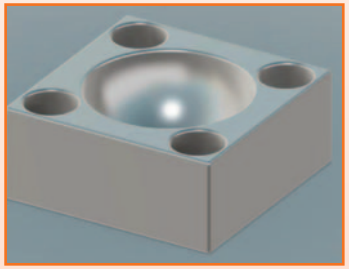
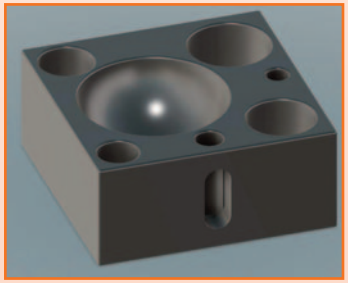
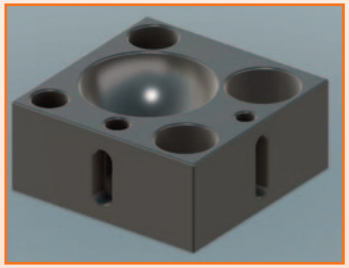
The government has confirmed that GCSE, AS and A-level exams won't go ahead this summer. These will be replaced by a form of teacher-assessed grade, with training and support provided to ensure these are awarded fairly and consistently. Advice from the awarding bodies to teachers is to continue allowing pupils to work on their NEA. Even if this is not assessed by the exam board, it is likely to be an important consideration for the teacher assessments. The requirement that such NEA work must be done in school, has now changed to allow students to work from home. Note though, that the teacher must still be in a position to authenticate any work completed in this way.

In GCSE Design & Technology, candidates are permitted to make mock-ups and/or clear and detailed intentions of prototypes instead of making the final prototype.

We are pleased to have an article from Louise Attwood from the AQA, who has provided a thought-provoking discussion, looking at broader aspects of teaching D&T beyond the final assessment.

Working with science colleagues, we have developed a couple of pieces of useful science equipment. One is a heating block for microscale chemical reactions. In true D&T style, we made several iterations using Fusion 360 to develop 3D images, and then 3D printed models for testing. This led to a final product, manufactured from billet aluminium. This currently awaits final testing, and possibly a modest production run!
We are also working on a new design for a stand, that can be used to hold small or delicate items when being heated. This is in the process of 3D modelling at the moment, and should be ready for testing around half term.

Both of these products have been real solutions to real problems, with a real end user, and would make ideal GCSE products for pupils. We suggest that D&T students consider looking at other curriculum subjects, as there may be some interesting and innovative problems for which could make suitable projects for GCSE or A Level.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World's Future Events By 2100!
https://www.youtube.com/watch?v=BmHZXjEpozI

A couple of years ago, we came across a school in Birmingham that used QR codes to provide information about equipment. We published an article about this in Futureminds 03, in 2016. A ***Helpline*** enquiry we received in January 2021 requested further information on how to do this, as the school was trying to update all of its H&S materials, and using QR codes appeared to offer a good way of communicating information to pupils. If you scan the QR code alongside this item, you will be taken to the original article.

We have recently published a detailed explanation of how schools could replicate such a system using standard software and equipment. The document is available from the website:
http://dt.cleapss.org.uk/Resource/GL039-Setting-up-a-QR-code-system-in-D-T.aspx

Futureminds 03 Autumn 2016

Using QR codes to help manage D&T

by Aled Ballard Head of D&T The Collegiate Academy, Smethwick.

The DT department has recently had some refurbishment. The main workshop has some new equipment and a mix of older equipment. The department is relatively well equipped and has IT facilities throughout.

There are a number of innovative approaches being developed in the department, and pupils are encouraged to take part in competitions such as the Formula 1 challenge. The subject is compulsory at KS3 and KS4 and is very popular at A Level.

In relation to H&S the head of department (HoD) has put in place an online system for monitoring maintenance and organising the work of the technician. There is also an online resource for pupils to access, either in school or remotely. The system is hosted in Office 365 and One Drive.

The system consists of:

- QR codes attached to every piece of fixed equipment and to some portable devices. They are also affixed to cupboards and other storage facilities. The technician or other members of staff can scan the code to get information related to the resource.
- A shared calendar identifies when a maintenance check should be carried out. The calendar can be updated and checked remotely by the HoD.
- The technician receives a reminder on their iPad that a particular piece of equipment is due to be checked or serviced. Scanning the QR code brings up a checklist or maintenance schedule for the item which can be completed by the technician as they carry out the work. The HoD can then check that it has been completed.
- The technician can 'sign off' that the check has been done and the HoD can sign off that he is happy with it.
- If, at any other time, somebody has to carry out any remedial work, such as changing a blade on the band saw, the person doing so can scan the QR code and indicate on the records what has been done, when and by whom.

The pupils can also scan the QR codes, but they access a different resource. They get access to information about the use of the item. This part of the system is used for teaching. Pupils are told in the lesson to look at the online resource and work through the information it contains. Each page has images or video of the item in operation, some text, some aspects of the associated risk assessment and, in many cases, a set of questions that the pupil should be able to answer if they have worked through the rest of the information. The teacher is then able to start the subsequent lesson with an expectation that the pupils are already aware of the important aspects that they need to consider when using the item.

High-risk machines, such as the band saw and circular saw are controlled via a key switch and only relevant trained staff have keys. This is also indicated on the online materials, stating who is allowed to use the machine.

Rooms are controlled by swipe card access and are locked when empty, the power in the workshop is turned off when the room is not in use.

A Level students are allowed to use the band saw if they have completed and passed a training programme. Subsequently, their name is added to the list of approved users. This puts the onus on the student to seek out the training if they wish to use the equipment.

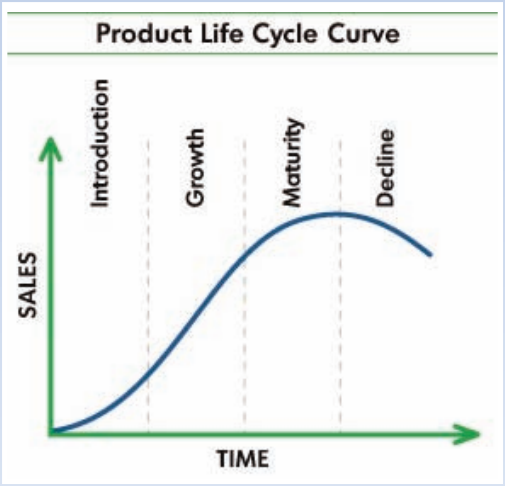
Staff are expected to have relevant H&S references in their lesson plans and project schemes. The HoD has provided risk assessments for all practical activities, but these can be amended by individual staff to meet their particular needs.

The system took around 10 hours of concentrated work to set it up. CLEAPSS reckons that it can be readily managed during a half term break. If you wish to get in touch with Mr Ballard contact him through CLEAPSS.

Providing context

Louise Attwood, AQA

In Design and Technology, we have always been huge advocates for providing context and, therefore, meaning to learning. Our subject is built around the principle that facts alone do not provide the skills we require of our students. Practical application and the unique curriculum which our design and technology classrooms provide, creates the opportunity for students to embark on real life projects where the answer is unknown, they will need to navigate independently, and may hit obstacles that they can't foresee. This experimental, creative way of working, prepares students with the ability to solve problems and respond with educated and thoughtfully designed outcomes These are key skills that are in high demand when considering our hopes for a future workforce.



The success of our design and technology curriculum depends on this contextual learning, and our ability to provide opportunities for students to apply what they have learnt. Such practical, problem solving activities can bring taught information to life, and gives students a reason for learning the facts. When deciding what to commit to long-term memory, the brain asks itself two basic questions: does the information make sense, and does it have meaning? (Sousa 2017 [1]). Allowing students to see where the knowledge, they have been tasked with absorbing, is relevant in real life situations, not only embeds this knowledge for the benefit of learning in Design and Technology, but across other subjects as well.

When discussing the 'wholeness' of the school curriculum, Christine Counsell (see refs [2] & [3]; an ex teacher who currently offers some ITT training and writes online about education), has written about the reduction of content for learners. She suggests that "different subjects hold facts together in ways that **make** them memorable". While reducing content is often beneficial because it reduces the time need to teach, the selection must be well managed in order to reduce the impact on the retention of the knowledge that remains. She argues that "in some settings, certain kinds of surrounding material don't necessarily get in the way; they can, paradoxically, **help** the retention of the core material."

The complexities of curriculum mean that not only will a reduction in content have an impact on other areas of our own subject but on other related subjects. Many more theoretical subjects gain from the design and technology curriculum because of the context it provides.

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Providing context

Louise Attwood, AQA

This is, of course, not to say that content should never be reduced. Sometimes this is necessary for groups of, or individual, learners or indeed in the strange times we find ourselves, for whole cohorts. But our consideration should be not only what is the impact of this gap in learning on the examination, but what is the impact on the retention of knowledge in other areas of the subject.

Teachers, either in senior management or as classroom teachers, need to consider the impact of selecting particular topics, as some topics will have greater relevance and retention for the pupils, as well as enjoyment and the ability to inspire. This can only be done when the teacher has a clear understanding of the topics and their potential impact on delivery 4.

This year has seen unprecedented disruption to our curriculum and changes have had to be made to reflect the global crisis. We are all working in an ever-changing environment, in which our priority is maintaining the best education for our students. Ofqual has had to make some difficult decisions in terms of this year's assessment in order to be as fair as possible to students all around the country. Much of what has changed, relates to how we assess our students at the end of the course. This aspect of education requires a level playing field in order to be valid, and changes to the structures of our qualifications throughout this year have always been about ensuring that all students can access the course, whatever their disadvantage due to the pandemic.

Whilst assessment is clearly important, it is simply a way of measuring success. We must consider our primary role as educators, to provide opportunities for learning to our students. It is important therefore, to focus at a school level on what it is feasible to provide to our individual groups of students. Regardless of the final assessment, the more practical opportunity, the more opportunity for the consideration of context, the more problem solving whilst using taught subject content, the better.

[1] Sousa, D. A. (2017). *How the brain learns.* Thousand Oaks, CA: Corwin, a Sage Publishing Company.

[2] https://www.educ.cam.ac.uk/people/staff/counsell/

[3] https://thedignityofthethingblog.wordpress.com/2018/03/27/in-search-of-senior-curriculum-leadership-introduction-a-dangerous-absence/

[4] https://www.activelylearn.com/post/the-benefits-of-deeper-learning-retention-transfer-and-motivation

With thanks to www.tuvie.com

The need for some joined-up thinking

by Tony Ryan, CEO D&TA

This week saw the release of the DfE white paper 'Skills for Jobs, Lifelong learning for opportunity and wealth'. This paper sets out the government's direction for Post-16 learning, a vision that it is hoped will help prepare students for jobs and life post-pandemic.

Before I talk about the white paper, which I will get to, allow me to share an anecdote that is lingering with me and currently fills every quiet moment. Some of you may be aware that The Design and Technology Association recently started a podcast 'Designed for Life'. This was a venture that had been an ember of an idea for some time, but sprung to life over the summer. We are now thirteen episodes in. It is one of the best ideas that I had last year. The opportunity to talk to industry leaders, designers and teachers about a subject matter that is close to my heart is an honour, and quite honestly, an absolute joy.

Vehicles Of The Future - Future Transportation System 2050
https://www.youtube.com/watch?v=CUS2w4y2Qj4

I listen to a lot of podcasts. I used to listen while I drove up and down the country visiting schools, colleges, universities' and businesses. For obvious reasons, I don't do so much driving these days but instead I plug the headphones in while running or taking long walks as I seek to escape the monotony of endless Zoom meetings.

One of the pods that I have only recently found is Jason Reagin's Design Cast. Jason is an American who has taught overseas for some years and is currently Head of the Creative Design Faculty of a large school in South Korea. I guess what I love about Jason's podcast is the International perspective to design teaching that it provides. We can all get bogged down in English (let alone UK) issues, but it is enlightening to get a perspective on how the rest of the world views and is approaching the teaching of design and technology and wider STEM education.

A recent episode had Mike Bycraft on as a guest. Mike is an educator whom I had not come across before. He is head of the Design and Innovation department of Korea International School https://www.kis.or.kr The school's website describes its educational philosophy as being centred on a commitment to applied learning. Mike talks on the podcast about the support that he receives from the school management and how he is growing the department as a 'Makerspace' at the epicentre of the school and *"is a facility to be utilised by every department to enhance educational opportunity"*. The school website goes on to further explain its philosophy of education, stating that *"The best learning happens through curiosity, problem-solving and invention."*

You can see Mike talk us through his department's work on the following link https://www.youtube.com/watch?v=dRYB0T6qSN8&list=PLiNv6laXVq2Igcf3DftmIJ8YtLmeKCh-7&index=12

So where am I heading with this train of thought one might ask? Here is a large international school with a vision for education that is so far removed from anything seen from this, or any other, government within the UK over the last decade. A school where the philosophy of learning through connecting the curriculum and 'learning through doing' is not just tolerated but is actively encouraged. This in a thriving economy driven by high-tech and expected to see 3.4% GDP growth in 2021 as the economy picks up post-COVID-19.

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Stick with me while I talk through some of the work that Mike and his team are carrying out with middle school students (9-13). Each year group completes at least one "no tech" project, one "medium" and one "high tech" project over the year. The low tech carried on through home learning as students were given a limited amount of recycled cardboard and a measured amount of tape and were asked to design and prototype a chair that would hold their weight. The medium-tech work asked students to design, model and make a crazy golf hole that incorporated mechanisms and electronics. The high-tech project asked students to design, construct and programme a robot vehicle to climb a steep incline carrying out prescribed tasks on the way.

I am not for one moment suggesting that any of these units of work are ground-breaking, you could see similar work in any one of a number of D&T departments across the UK. What is different is a) the join-up with learning elsewhere on the curriculum. While designing their cardboard chairs, they cover related topics within Mathematics and Science and are writing about it in English. And b) The support from the school's leadership and the government is absolute. The department is not working away defying expectations with a reduced budget as so many are in the UK. Design education is at the epicentre of the school both physically and metaphorically.

In Korea, business is incentivised to work with, and support, state and private education. The economy's growth is built on a vision for education where design, problem-solving, and innovation are at the very forefront.

And so, to the release of today's white paper… I think you have possibly guessed where I am going!

There are some positives within the paper:

I am delighted that the government is looking at the progression routes through education, and recognises that the funding of these routes needs attention. There is also recognition that we have for too long 'undersold' the importance of the Technical Vocational Qualifications (TVQs). route to employment and that this neglect is "holding us back economically".

The engagement of employers, putting them *"**at the heart of the system**"* is welcome, as is the concept of a lifetime skills guarantee, although this will not be enacted until 2025. The funding going into the system is badly needed, the FE estate has been neglected for too long, and the £1.5 billion earmarked in the white paper will be required to bring buildings and facilities up to scratch. There is also money to find, recruit, train and employ the next generation of college lecturers, and governance capable of adding a degree of consistency to an area that has traditionally been something of a geographic lottery.

What concerns me most is the lack of join up between pre-sixteen and post sixteen education. The government's concept appears to be that a common EBacc-focused (English Baccalaureate), knowledge-based curriculum starved of any emphasis on skills acquisition, problem solving or creativity is a medicine to be prescribed to all children nationally. The idea that you can ignore skill acquisition until you are sixteen or older is at best, misplaced. Creativity, curiosity and the join up between hand, head and heart is not something that can lie dormant and be switched on like a tap at will.

The DfE acknowledges that the rate of technological change is 'fast quickening'. The education system we have in place has changed little over the years to reflect this societal change. We cannot continue to teach a twentieth-century curriculum and expect it to prepare students for this fast-changing increasingly technological world.

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The need for some joined-up thinking

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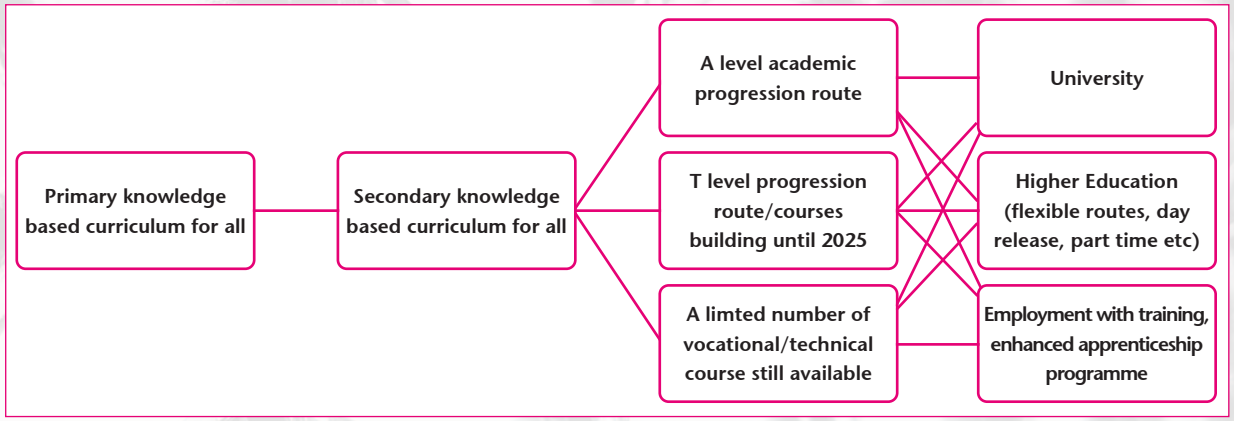
The Secretary of State opens the paper by stating that the "nation stands at a critical juncture" as we seek to recover the effects of COVID-19 on the economy at the same time as we adjust to leaving the European Union. With many in education and business questioning the value of examining the nation's students at sixteen and again at eighteen, and with some of the proposals in this paper showing a shift of mindset, is this not the perfect time to stop, pause and examine the entire education system and its long-term fitness for purpose.

The educational pathways set within this document are clear and are shown here:



It can be seen from the above that the government is set on supporting the introduction of T-Levels (the level three qualification in technical subjects) by reducing the number of alternative vocational qualifications available at Level 3. When all twenty-four T-Levels have been introduced that might be an option, one hopes that until that is the case existing vocational/technical level 3 courses will remain.

With a considerable amount of money being dedicated to HE colleges' development, are we, in effect, seeing the reintroduction of a Polytechnic programme by another name?

One would also hope to see an expansion of courses at Apprenticeship level, including an increased emphasis on Degree Apprenticeships as an alternative to the traditional university route.

In summary, there are positives within this White Paper, but if we are to compete with the German system (mentioned amongst others within the paper as an example of best practice), we have a lot of work to do to determine the type of education system that will allow us to compete with Germany, Korea and other nations who are placing technology, problem solving and design thinking at the very epicentre of their educational systems.

Tony Ryan

www.data.org.uk

What next for design and technology?

By Dr Alison Hardy

In the last edition of Futureminds, I, and many others, shared our vision for the next iteration of design and technology. Matt McLain and I described four ways that D&T could develop, based on a spectrum of high tech to low tech and if it was only available to some children or to all children.

Within the publication there was a wide range of ideas, some blue sky thinking, some drawing on teaching experiences to suggest new or developing ways of teaching the subject.

The introduction to the last edition identified a context for the need for this change, with some challenges laid out for any new curriculum ie resources, staffing, pupils' choices. These are nothing new and will continue. In addition, at some time there may be an influx of new D&T teachers, but fewer jobs as D&T departments shrink.

When. I quickly analysed the articles there were 4 themes:

- **Access to (or not) and use of equipment and resources**
- **Design: design thinking, creativity and designing for authentic contexts**
- **Making: practical and craft skills or using high-end CAM**
- **Skills, knowledge and expertise for future employment.**

But what's next? How do these ideas become the foundation for the next step?

The introduction of the previous edition of Futureminds offers a specification as a starting point. But the specification on page 4 focuses on the features of the environment, the physical department. What about the subject itself?

My suggestion is that what we need is a design specification for the subject.

I have been working with Eddie Norman on this idea for some time now. A design specification for a design and/or technology 2.0, which David Spendlove explores in episode 13 of my Talking D&T podcast. His suggestion is that design and technology 1.0 has failed and so we need to move to the next version:

'... the intersection of the rapid demise of design and technology 1.0 and the spectacular rise of design thinking ... [and that] there is therefore a unique, perhaps once in a decade, opportunity for reorientation of the values that were instrumental within the development of design and technology through adopting and capitalising upon the intellectual and reflective aspects of design thinking and re-visioning them within 'Design and/or Technology 2.0'.

The 2011 curriculum review suggested that D&T should not be part of the national curriculum. At that point, Eddie Norman and I started a conversation about the future of D&T, and wondered how had it come to this sorry state? A subject that had been cclaimed as the new kid on the block, essential to all children's education, was now being

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What next for design and technology?

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questioned as to its value to all, or any, children. There were many reasons why this had happened, and it's not new that we have had to defend the place of our subject in the national curriculum, and in the curriculum of individual schools. (Listen to episode 14 for some views about how D&T came to this point.) If we're not careful this can become another 'woe is me' activity, why are we so neglected? The counter approach begins with conversations like those in Futureminds Autumn 2020, ones that use our experiences, our design thinking to talk about other ways, new ways, challenging ways forward for the subject. But at some point, something needs to be done with these ideas.

Eddie and I suggest that the next step is for us all is to use a 'designerly' approach to design what design and/or technology 2.0 should look like. To do this we have published a book **Talking and Thinking about Design and/or Technology 2.0**, with thoughts from us, David Spendlove and others about taking these next steps, developing a design specification for the next iteration, evolution or reorientation of design and technology.

So, what have we got so far that **might** be included in the specification? From the Futureminds Autumn 2020, these could be headings for the specification:

- **New technologies**
- **Design thinking**
- **Designing**
- **Skills for life**

You might disagree with my interpretation, or suggestions, or have other headings, or some detail to add to these. (I have left off future employment, as to me this is an outcome, an intended purpose of design and/or technology 2.0 – feel free to argue otherwise!) Eddie, and I believe that the specification has to involve you, the practitioners. Those teaching and shaping the subject in the classroom, seeing how these design ideas work in practice. Our idea is to build a body of work for practitioners, co-created with us and others, about what design and/or technology education is, what it looks like and how it can be taught in schools. So, this leads to a call for contributions from yourselves about what children need to know and how they need to know it.

Can you help? If you have listened to a podcast from Talking D&T or read Futureminds or our book, can you suggest headings and/or bullet points for design and/or technology 2.0? If so, please email them together with brief notes explaining them to: **alison@dralisonhardy.com**

The article mentioned above and the book, **Talking and Thinking about Design and/or Technology 2.0**, can be found on the Loughborough Design Press website **http://www.ldpress.co.uk**

DR ALISON HARDY

LOUGHBOROUGH DESIGN PRESS

a new design lab

by: Garrett Spellman, Head of Department, Design Lab, Convent of Mercy School Roscommon, Ireland. (Twitter: @designmakeit) (Instagram: @DesignLab_ros)

TIMELAPSE OF FUTURE TECHNOLOGY: 2022 - 4000+
https://www.youtube.com/watch?v=wD6hyGXRcgk

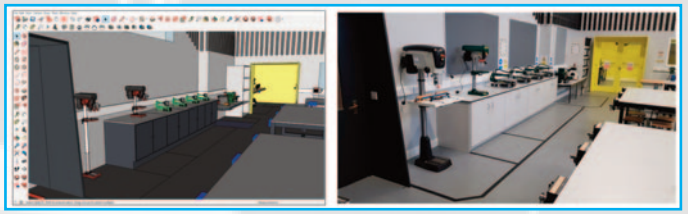
The Design Lab is a new facility at The Convent of Mercy School in Roscommon Town, Ireland. The school is an all-girls secondary, with approximately 500 students. In 2019 the school's Board of Management wished to broaden the school's appeal by adding the subject 'Technology' into the curriculum.

It is a small department with one main workshop area, a preparation room, a small CNC room and a store room. I joined the school in September 2019 as the sole Technology teacher to lead the department. My vision was to create an outstanding facility that provides for the needs of our students, helps to promote the school, and be an asset to our community.

Our new practical facility was built in the area of an old chapel which was part of the original 90-year old school. Albeit a small department, I learned a lot from this build and from other renovations I have been involved in. I wanted to share a number of takeaways that may be of value for teachers currently working in their established departments, or embarking on developing their own new facility.

Planning

Planningis key. I used 3D CAD modelling software to configure the space to suit the challenging area we had. Many iterations were developed and redrafted to get the most from the space



(Fig 1 Planning stage 3D CAD Model of space and finished area furnished with cabinets & machinery)

My advice is during your project, refer frequently to the specifications and guidance documents from your Department of Education, and use CLEAPSS for health and safety guidelines. Reach out to other teachers that have created outstanding departments. They are very willing to lend advice.

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a new design lab

by: Garrett Spellman, Head of Department, Design Lab, Convent of Mercy School Roscommon, Ireland. (Twitter: @designmakeit) (Instagram: @DesignLab_ros)

Brand Identity

I am a keen believer in brand identity. A branded narrative in a department can raise a certain expectation and standard. This approach leads by example and can filter down to students which can motivate and inspire them. By branding your subject, it, in turn, can also help promote the school in the wider community and beyond. The branding of the Design Lab was very purposeful. Ours is an all-girls school and it never had a practical subject like technology, with tools and machinery. Our aim was to brand the facility so that it would be inviting to our students and make them more engaged. There is still a stigma that this subject is too vocational. We wanted to promote an environment of design, creation and innovation rather than a sometimes harsh, non-inviting vocational workshop area. I collaborated with a design agency (Third Mind Design) to develop the vision for our facility. The theme is bright and bold to spur fun, inspiration and creativity. The main space is a grey colour palette and the colours (Cyan, Magenta, Yellow, Black) form part of blocks of colour around the space which are the theme of CMYK (printer toner). This is a nod to the chapel's stained-glass windows. It also denotes that with these colours, as with a printer, a flourish of colours and images can be created. This reflects back to the students that they themselves can be vessels of creativity and innovation.

Custom Furniture/Storage

Technology teachers rarely get the opportunity to develop a department from scratch and mostly inherit it. Either way, I feel it is important to assess the space towards effective and adequate furniture/storage. It is worth redesigning and creating custom storage and work areas. On many occasions I have ripped out ineffective storage and replaced it with better solutions. This has had an overall positive effect, breeds better tool/material management, and respect for the environment you work in. A successful example is a tool wall. By placing tools on the wall, you have full control in one area and management is much easier. By simply colour coding the file handles by type, it can reduce the tidy up time. Furthermore, by having a dedicated storage area for things it will really help reduce clutter.

The Design Lab is still very much a work in progress with lots more to do. I am very grateful for my school's management team for being so supportive of my vision, and other people within the school's community for their encouragement. I am honoured to be able to speak about our department and I hope it can inspire others to develop their own.

ENGINEERING SOCIETY AT QUEEN ELIZABETH SCHOOL BARNET

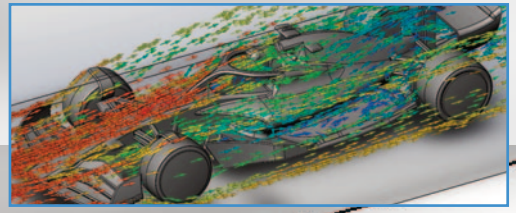
by the Engineering Club Pupils

Engineering club is an extra-curricular activity started by Nirmay Jadhav and Ansh Jaiswal to develop skills related to engineering for students. We launched it to help others understand the common details of engineering, bring some insight into applying for engineering courses at university, and, alongside other pupils, explore our interests in engineering.

The club started with educating about the different disciplines of engineering, and what each one relates to. Despite COVID-19 restrictions, there were two weeks of CAD (computer aided design) sessions using laptops in order to introduce and develop practical skills that will be key while studying engineering. Other times, we worked together to solve questions from ENGAA (ENGineering Admissions Assessments) tests to get to grips with the principles that will be required to apply for a university, and give us all some preparation in advance.

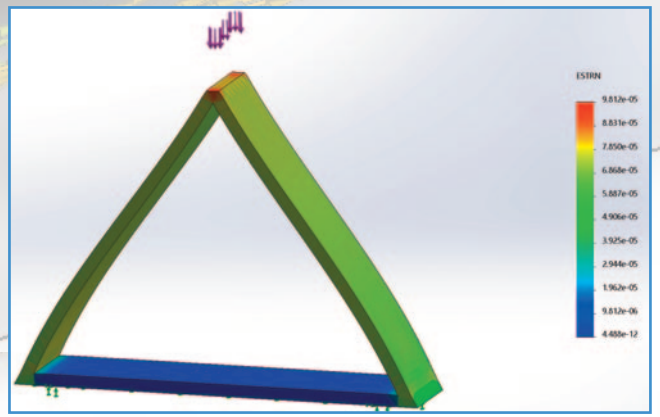
A key session was about mechanical engineering throughout which we discussed why it was one of the most popular disciplines and is most relatable to others. To build upon this overview, we hope to incorporate some practical mechanical engineering with small challenges that can be worked upon weekly as a taster for the career of a mechanical engineer. This will help students to gain a better understanding of which discipline they enjoy most and therefore make a justified decision for their pathway into the future. We will also be working our way through other engineering disciplines students are interested in, so they have a holistic view of all the engineering disciplines and can explore each one to make an informed choice for their future careers.

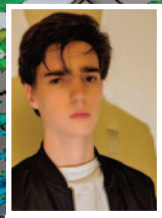
So far, the most enjoyable time that the students had was during the CAD sessions where we went through the basics of how to design and develop models in 3D workspaces with Solidworks (our software of choice). The second week of the CAD course focussed around the simulations that can be done using Solidworks.



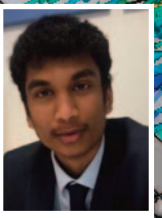
FEA (Finite Element Analysis) is a type of computer simulation that can be done on 3D models to collect data about the performance of a model under external conditions and we tested the load on a prism (above). The other type of simulation is CFD (computational fluid dynamics), which we used as a virtual wind tunnel on the F1 car (below).

We are also planning on organising extra-curricular activities or competitions sometime in the near future, which would not only allow us to do the practical, hands-on aspect of engineering that we all enjoy, but also boost our skills and competitiveness in front of employers and universities. Currently we are thinking of doing an in-school competition where pupils can test their design skills against each other, or even something more open ended, like a CREST award in which students could explore any engineering topic in depth and even create a prototype, or carry out an experiment. The benefit to students wanting to do engineering-related extracurricular activities would be great; not only would they be able to work with and get support from friends, but they would also have access to our school's great technology workshops, and perhaps even 3D printers to support their endeavours.



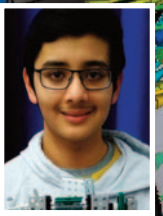


Aiden Smith



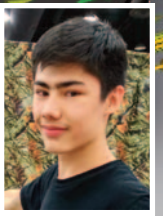
Amudhu Anandarajah

Nirmay Jadhav



Ansh Jaiswal

Varun Vijay Kumar



Alex Woodcock

Medushan Thevadaran

Proud to Teach Food

by Barbara Rathmill, The Food Teachers Centre

Proud to Teach Food seeks to address the recruitment of food teachers across the country. Without a supply of good quality teachers, our subject is at risk.

During the COVID-19 pandemic the Food Teacher's Centre embarked on a campaign to support recruitment by making it easier to find out how to become a food teacher, and enlist the backing of all food teachers to get the word out.

We used teachers own issues to provide evidence of the problems in recruitment:

"Non-specialist KS3 staff, lack of teacher's assistant support, class sizes up to 28 in KS3"

"Lots of positions not being filled…a number of schools that struggle to recruit and have had to take on supply staff"

The results of the survey, and the issues raised, were shared with the Department for Education during a face-to-face meeting before COVID-19.

With COVID-19 many people across the country were furloughed, leaving a wealth of skills and support not being utilised. A website was created to connect people on furlough to volunteering opportunities, which the Food Teacher's Centre was pleased to take advantage of.

We signed up to the scheme, and, with the support and skills from some amazing volunteers, were able to launch a new website page Teach Food – The Food Teachers Centre. We were also able to publish an article (on Caterer.com) highlighting why chefs should think about teaching and supported by case studies from Food Teachers who have transferred from the hospitality and other food-related industries (including Anjna Patel Holtham).

Although some celebrities still say there is no food or cooking in our schools, with 6500+ members of the Food Teacher's Centre the reality is very much the opposite. The team of Food Teacher's Centre volunteers have been doing their bit, but so we recruited Teach Food Champions to further help spread the word.

This campaign will continue to grow with regular messages and updates via Twitter, Facebook, LinkedIn and other platforms.

For more information, please visit the website and our social media pages.

Teach Food – The Food Teachers Centre

www.facebook.com/groups/foodteacherscentre/

www.facebook.com/foodteacherscentreuk

REMOTE LEARNING AND CAD: IDEAS FOR CONTINUED TEACHING OF DESIGN AND TECHNOLOGY REMOTELY

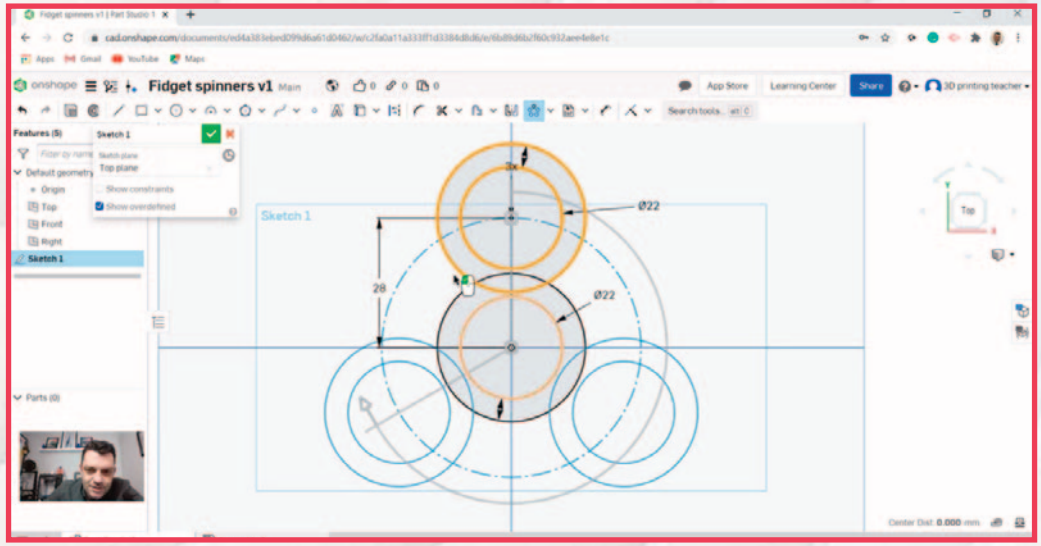
by Phil Cotton teacher and Learnbylayers founder

Just when we thought we had made it through the worst, lockdown is back and more challenging than ever. COVID is wreaking havoc in education, with practical subjects being hit hard. The winter term was the biggest challenge of my teaching career, but we made it through to Christmas. I really did not think schools would close again, but the new variant has effectively shuttered schools until mass vaccination has been achieved.

So where does this leave Design and Technology? Practical subjects have to halt their projects and change direction, creating huge volumes of work, and often scrambling to put together something we hadn't planned for. But we are technology teachers, and we can use technology so we have a head start already. But how can we utilise current solutions to keep learning interactive and engaging? How do we continue to build skills and knowledge, when learners are confined to their bedrooms, and teachers are either delivering lessons from the kitchen table or empty classrooms?

A possible solution is to embrace cloud-based applications, and continue the design process as usual. Rather than physically making initial models, learners can digitally model it. They still need to undertake research, produce design briefs, specifications, material research, design ideas, etc. However, when communicating and developing their design ideas via modelling, they model them in CAD as opposed to cardboard or foam. This is often the norm in lessons anyway and there's no requirement that models are developed in a specific material.

Modern Food Processing Technology
https://www.youtube.com/watch?v=yVPWcnBiFeQ



There are two applications that are extremely powerful for remote learning. They are free to use, cloud based, and don't require students to download any software.

1.TinkerCAD

TinkerCAD is often seen as a simple, basic CAD modelling package, used for starting out when teaching CAD to younger children e.g. year 7 and 8. This is mostly true, however, it can be used to great effect with year 9 – 11 students.

An example being as a substitute for cardboard modelling

In class students may make a couple of cardboard models in a week, that act as a starting point to realise scale and form. Modelling in the workshop is quick and students' knowledge of CAD doesn't restrict this process in school. All students can model in cardboard, and can work independently at it. However, many struggle with parametric modelling without direct 'over the shoulder' supervision. TinkerCAD modelling is an option to substitute cardboard modelling.

Continued on next page...

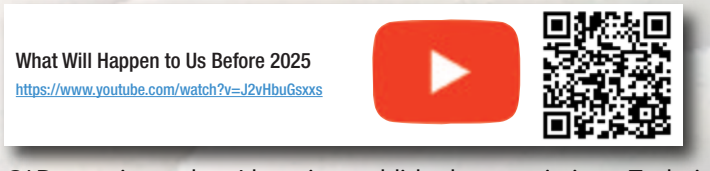
Using TinkerCAD allows students to create quick 3D models of their ideas without previous CAD modelling experience. They can quickly model initial ideas in 3D, and make quick changes with ease. TinkerCAD is so user-friendly that GCSE students will mostly figure it out themselves with very little teacher input. Also, the speed at which 3D models can be created gives learners a feel-good factor, and they can see rapid progress. Within a week of lessons students would be able to create multiple 3D models with ease, allowing them to gain direction with their projects. The tricky detailed parametric stuff can come later.

You can also set up a TinkerCAD classroom so you can view and moderate students designs in real time. Just this week my year 11 students were quickly modelling ideas in 3D and I could monitor them in real time and provide feedback during a live Teams lesson. This enabled me to replicate an in-class experience, where I could give immediate help and advice without them needing to send screenshot of their work. This saved time, and discussions on their ideas could happen in real time.

2.Onshape

After students have created a range of quick digital models, it's time to develop them further. Onshape is a must, it's free, web based, no software to download, students just need to register their school email and they can log in. It's CAD in a browser and it's amazing. Students can collaborate with their teacher so you can see their designs and give immediate feedback. Finally, Onshape can be accessed from any device, with a browser, desktop, laptop, tablet and phone.

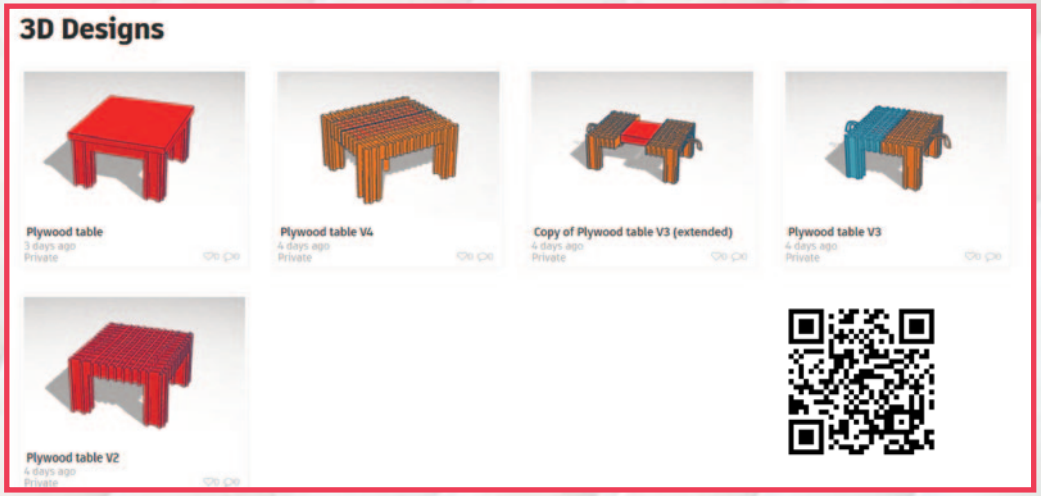
You can teach Onshape using a screen share on Teams, Zoom or Google classrooms. If you have experience with Fusion 360 or Solidworks (Onshape was created by the founders of Solidworks) then making the transition to Onshape is straight forward. If you have no CAD experience then I have just published a 'learn the basics on Onshape' course on www.learnbylayers.com that will take you from beginner to being confident in designing in 3D. The course is self-guided and includes 34 tutorials you can work through at your own pace. With Onshape you can do everything that you can do on Fusion, just in a browser with no need to download any software or deal with updates. Its quickly becoming the go to software by many D&T teachers.



To try and keep some kind of direction during this current lockdown, continuing with the NEA (in a digital format) in the short term is doable. If grades will be decided by teacher assessments, then the May deadline for the NEA won't apply anymore. If we do have a return to school in March/April, there is the potential to still complete a practical outcome (safety permitting) with more flexibility for timings. Technically, we won't be restrained by a deadline and we could allow students to complete their project without the annual stress of meeting the May deadline. I know my students will, after all they have been through, appreciate the chance to make their designs.

To learn more about educational resources for the classroom, visit www.learnbylayers.com

LEARN BY LAYERS 3D ®



Making the most of space with modular workshop equipment

by Nikki McLaren At Spaceguard

Only a short 17 years ago the D&T workshop was my favourite place in school. Now, as a parent of a secondary school aged child, I'm absolutely amazed at the standard of workspaces and equipment being provided to D&T students across the country.

It sounds cliché but 'in my day' things like 3D printers just didn't exist, and I had just one single CAD lesson in my final year. The current depth of education provided is a testament to the efforts of D&T departments and teachers. As I understand it's quite a challenge to keep lessons engaging and well suited to fast changing technology and industry practices.

One of the ways I've been most impressed is the implementation of modular workshop facilities. The variety of lessons taking place in workshop areas has meant that the ability to move and change the layout of equipment and furniture is highly sought after.

A wide range of mobile and modular workbenches already exist for classroom use. These are generally designed to be single standalone units, often on castors for manoeuvrability. However, to fully take advantage of available space, it makes sense to have furniture custom designed and made to measure to suit the existing workshop.

A complete bespoke designed workshop solution for example could include benches with lighting, storage, electrical sockets, ESD worktops, and replaceable worktops. The addition of ergonomic height adjustable workbenches also allows for both the youngest and the oldest students to use the same workbench without any unnecessary stretching or bending.

In addition to workbenches, smart storage solutions are also in high demand. Pigeonhole walls, or units with built in storage lockers give students and teachers safe and secure areas to store ongoing projects.

One major benefit of modular workshop furniture in recent months has been the ease in which benches can be moved apart to allow for adequate social distancing. Whilst we all hope that soon social distancing will be unnecessary, the flexibility offered through modular furniture will remain to be of use in all classroom environments.

At Spaceguard we assist in the design and development stages, taking this right through to manufacture, delivery, and installation. As a small East Yorkshire based manufacturing company our clients are able to talk directly with any member of our team during and beyond the project's duration. We aim to be a one stop solution for all educational workshop needs, having already helped a number of schools, colleges and universities make the most of their limited space by designing bespoke modular workshop furniture.

Please see our website for further information
https://www.spaceguard.co.uk

A concise history of the future of D&T!

Brian Haley, Educational Projects Lead at Flamefast and Ex Head of Technology Faculty at Sanders Draper School.

This isn't about me, but I feel it is important to appreciate a little about my background before you read the following article. I hope it does not disappoint.

Making A Custom Strat guitar With Epoxy and Olive Wood
https://www.youtube.com/watch?v=2X7lA0T_LIQ

For the past 30 years I have been either directly or indirectly involved in the teaching of D&T on a daily basis. Whether it be as a student teacher studying for a BEd in the early 90's, at the 'chalkface' until 2006, as a parent watching my sons study the subject, or as in my current role designing, supplying and setting-up school, college and university workshops.

In all that time the fundamentals of the subject have not changed, although the names may have. CDT, D&T, Technology, Product Design, 'Vocational' subjects. They all have the same basic needs to be successful and the design process is, and always will be, at the heart of the subject.

I am not here to tell you what you already know, and explain the design process to you, but what is important to remember is that to move forward, we need to use what was successful in the past.

The image here shows where we were pre-D&T, with machinery and workbenches ready for practical work. Students were told what to make and how to make it. It was pure make, with not much design going on.

Then slowly teachers developed skills, young teachers came into the profession with new ideas and suddenly the subject came alive! Students were told there is no limit to their imagination, they could mix up the disciplines within the subject, they could 'virtually' design their ideas and they could make mistakes, as long as they were evaluated, and lessons learnt from them.

Who would have thought we could have a plastic box, to hold your food technology project with an electronic alarm to stop you eating all the cookies before you got home. And what's more, all this could be achieved by a single student who would be able to design AND make it all.

Continued on next page...

A concise history of the future of D&T!

Workshops were stripped out or machines turned off and laid-up under dust covers, paper and scissors were purchased in bulk and 'Blue Peter' technology was born. This was soon sent packing when the kids revolted and told us they wanted to use those big, scary looking things under the tarpaulins or wondered what that computer thing was that the kettle was sitting on.

Food processing machines Toblerone
https://www.youtube.com/watch?v=f5BOOVTiTeg

Vocational subjects arrived and we looked at preparing for the world of work. Old school projects that came from 1970's apprenticeships were given modern day updates and made more relevant. Workshops were again redesigned and re-instated to make way for the new way of teaching the subject. Milling machines, large lathes, heat bays were all dusted off and re-established, but put in alongside design benches and CNC machines. Students were taught there was an alternative to dirty overalls if you wanted a career in manufacturing.

Nothing has changed in the principal of teaching Design and Technology, and we have seen the introduction of new technologies that have ignited the minds of youngsters. The introduction of CNC machines, computer-aided design, laser cutters and 3D printers have led the charge of fantastic, exciting and innovative exam coursework. This, of course, is a great thing and can only be of benefit to the subject, as it will entice all types of student, and not just the 'practical types'.

The one constant in all this is that wherever the subject goes in the future, there will always be a need to spark imagination and an ability to make their ideas a reality. Flamefast is currently installing projects across the UK, based on a DfE specification that really does base itself in the more traditional aspect of the subject. We are trying our hardest to break this mould and educate others on what the future could look like. The subject will need to evolve and grow, but what we don't want to do is go back to the wrong 'virtual' world, and a hark back to the 'Blue Peter' minds we once had.

We have come a long way in 30 years. Who knows where we will be in another 30. So, in conclusion, please, when you are looking to develop your subject or environment, always remember that the students need to be engaged to get the best out of them.

Give them something to design that uses their imagination.

Give them something to make to hone their skills.

Give them something to look forward to, so we ensure we have the designers and engineers of the future.

Introducing the Textile Skills Centre: Evolving Education Strategies

by Dawn Foxall (Textiles Skills Academy)

2020 saw many changes in how we work, learn, teach and socialise. Our constantly evolving needs, behaviours and environment have meant developing new ways of teaching and learning and new coping strategies. The Textiles Skills Academy has likewise, developed new ways of delivering training and supporting textile teachers, with online courses, live chats and Q&A opportunities for teachers to learn new skills, discuss their needs and requirements and share resources.

More recently we have put together a team of likeminded education and industry experts and practitioners to further our aims and objectives. We have created the 'Textile Skills Centre' as an umbrella organisation, to support our endeavours and develop programmes, resources and campaigns to deliver these ambitions.

The main aims of Textile Skills Centre are:

- Provide affordable access to textile skills training for all.
- Provide opportunities to encourage textile craft skills and activities, as a means to support mental health.
- Provide and promote unbiased and accurate information to support curriculum development and innovation.
- Support textile teachers (including student teachers) and technicians, through mentorship opportunities and exchange best practice nationally and internationally.
- Support teachers and schools to develop and/or enhance textiles teaching, through training and events.
- Develop and encourage relationships between education and industry.

Within the Textile Teachers Centre Facebook group, we have set up a mentorship programme, which has seen many teachers supporting and being supported through 1-to-1 mentoring. This is an area we feel is of huge importance, and hope to develop further.

One of the more urgent needs we have discussed, is the mental wellbeing of both teachers and students at this current time, and which has been highlighted by teachers and trainers. Throughout this long difficult year, we have seen the resilience of our teachers and students stretched to its limits. Like an elastic band they have sprung back to continue their incredibly difficult work of teaching and learning in an ever-changing environment.

How long can they maintain this capacity to recover quickly and continue during these shifting circumstances and instability?

It is understood that, with a wide repertoire of coping skills, such as stress reduction skills, self-worth and confidence, teachers and students are able to cope more effectively and are better prepared to overcome life's challenges. It is, therefore, imperative that leaders and management grasp the urgent importance of supporting both their staff and students with their mental wellbeing.

The Textile Skills Centre is currently working on a programme of support, with mindfulness experts, for textile/art and D&T teachers. The aim is to give teachers the skills, tools and resources for recognising signs of anxiety and be able to use mindfulness to teach students coping mechanisms.

We will be posting information and updates on the Textiles Skills Academy website and in the Textile Teachers Centre Facebook group.

www.textilesskillsacademy.co.uk

https://www.facebook.com/groups/textileteacherscentre

January 2021

INVITATION TO TEACHERS AND THEIR STUDENTS:

PARTICIPATE IN THE COVID-19 ENGINEERING DESIGN CHALLENGE!

The University of Texas at Tyler University Academy is a system of K-12 STEM Lab Schools located on 3 separate campuses in East Texas (USA). Our students are participating in a COVID-19 Engineering Design Challenge, in collaboration with the Texas STEM Coalition (T-STEM) and the International Council of Associations for Science Education (ICASE).

We invite you and your students to join us.

The COVID-19 Engineering Design Challenge provides students of all ages with a platform to identify and design solutions to challenges and world-wide problems related to the pandemic. Students are encouraged to identify areas of need, brainstorm, design solutions, and communicate their designs to their classmates, families, and community members via online environments or following physical distancing guidelines established by their teachers and/or schools. Participation can include simple classroom discussions and brainstorming sessions or involve individual/group project development.

Teacher instructions for this **Phenomenon-based Learning (PBL)** activity, and a sample student project, are available in the **six United Nations (UN) languages (Arabic, Chinese, English, French, Russian and Spanish) plus Japanese, Portuguese and Turkish** on the project web page. Teachers are asked to respond to a short survey summarizing the work of their students and will be provided with a teacher participation certificate, a certificate template to personalize for their students, a world-wide map displaying the countries represented by Challenge participants, as well as a summary of all design project titles submitted by the end of each round of the Challenge.

COVID-19 Engineering Challenge Dates

Challenge 1: March - December 2020 – More than 350 students from 9 countries!

Challenge 2: January - December 2021 – **Please join us in 2021!**

For more information see https://tinyurl.com/COVID19-Engineering-Challenge and join the fun!

We look forward to learning about the design projects your students create as their engineering solutions to the many challenges related to this pandemic. Thank you for your participation and for your collaboration!

See the website for project ideas

Sincerely, Teresa Kennedy, Ph.D.

tkennedy@uttyler.edu

ICASE, Past President, Representative to UNESCO & North America Regional Representative

NSTA, International Advisory Board Member

Professor, International STEM and Bilingual/ELL Education

College of Education and Psychology; College of Engineering

The University of Texas at Tyler

CLEAPSS small print

At the end of January we released an updated version of GL344, the main CLEAPSS guidance document for delivering practical work under the pandemic restrictions.

Washing equipment and the use of dishwashers has been updated following further research and work with the DfE. Take a look and tell your colleagues across other disciplines.

http://dt.cleapss.org.uk/Resource-File/GL344-Guidance-on-practical-work-during-the-COVID-19-pandemic-D-T.pdf

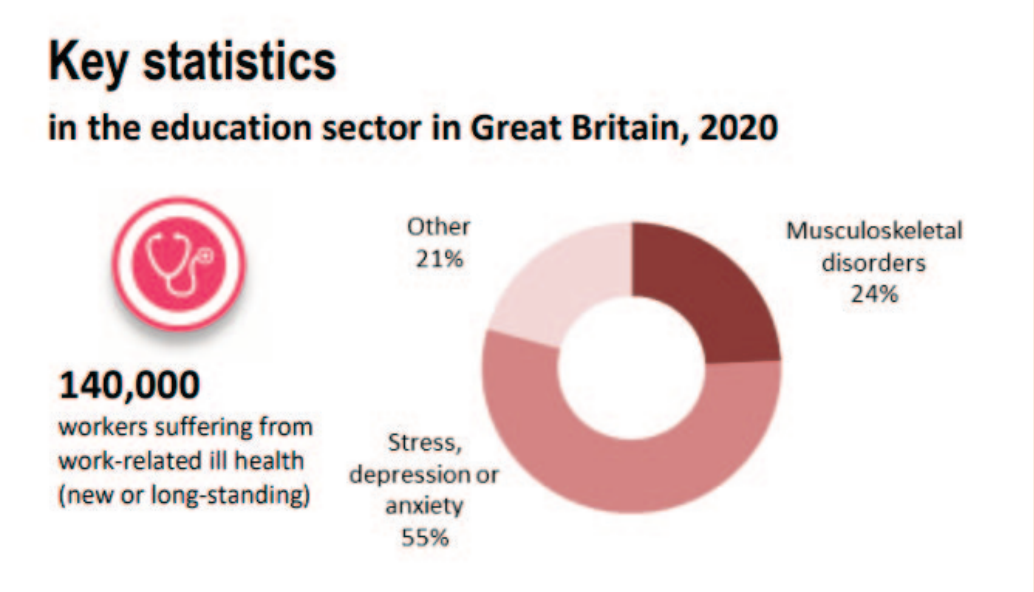
The Health and Safety Executive has released a number of new publications and guidance documents, regarding the change in status following the UK withdrawal from the EU. The document "A short guide to the law and your responsibilities when buying new machinery for use at work" may have a direct effect on D&T departments:

This leaflet is for anyone who is responsible for buying new machinery for use at work to ensure it is safe. It may also be useful for manufacturers, suppliers and users.
It has been updated now that the UK is no longer a member state of the EU, and to reflect revisions made to other relevant UK product law in recent years. Note that the Supply of Machinery (Safety) Regulations 2008 (as amended in 2011) continue in force unchanged even though the UK has left the EU.

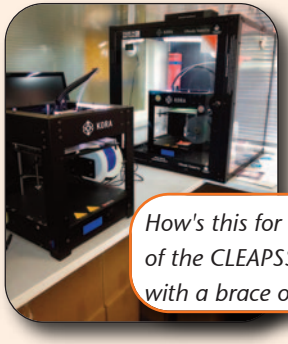
The leaflet mentions the CE mark, which will remain important. However, from 31st December 2021, items may carry UKCA marks, if they comply with UK standards, which may start to differ from EU standards.
When considering purchasing new machinery for a D&T department you must check that it has a conformity mark, either CE, or from 2021 UKCA.

HSE has also released the latest set of annual statistics, with a specific leaflet on education statistics. This covers the year 2019 – 2020.

The data around work related ill-health shows that, in most areas, the number of staff taking time off work is dropping or holding steady, apart from in the area of stress, depression or anxiety, where the number has increased.



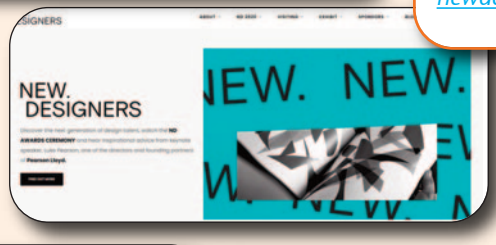
Some recent tweets



How's this for efficient working? Printing both parts of the CLEAPSS electric motor, at the same time, with a brace of machines.

in this week's episode with @CLEAPSS_DT "Ep050 Talking future visions of D&T with Dave Parry" at buzzsprout.com/288393/5552848 #DandT #DTchat #TalkingDandT #podcastniTuf70r-lsayVCw_M3po0dyMHcsBxuAxU

If you need to set some interesting research for your pupils, in #DT take a look at the #newdesigner site: newdesigners.com



Employers have a legal duty to protect their workers. If your business remains open during the current restrictions it is vital that your employees are following the working safely guidance on gov.uk: bit.ly/3f2FWY8 #WorkRight

Thought I would give this a whirl after being inspired by @CreativeSammie. Great whilst students are joining the lesson/taking the register #foodforthought #virtualclassroom #holdingslide #dtchat #edchat

Welcome back to the New Year and new term with many new challenges. dt.cleapss.org.uk

To read about the use of #isosketch in helping pupils sketch ideas for #dt take a look at futureminds01: dt.cleapss.org.uk/Resource/Futur…

There was an article about the #technicalawards in Futureminds02, whatever happened to them? dt.cleapss.org.uk/Resource-File/…

Practical guidance from cibse, including balancing thermal comfort and providing adequate ventilation CIBSE - Emerging from Lockdown

The 3rd edition of Futureminds was published in October 2016, it was, again, packed with articles about #DT and #Art and other practical areas for schools and colleges: dt.cleapss.org.uk/Resource-File/…

In the summer edition of Futureminds

The summer 2021 edition of Futureminds will feature articles from a range of contributors, talking about how this year has given us hope for the future of Design and Technology, food and Art.

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

Disclaimer:

We have included a number of video links in this edition, these are all hosted on Youtube and are not the property of CLEAPSS. All information is meant for educational and informational purposes. Whilst we have checked these links, we have no control over the content.