DESIGN & TECHNOLOGY ASSOCIATION

Reimagining D&T

D&T Association's 'Vision' for the future of the subject in English Schools

Summer 2023

Report contains:

- Context
- The Economic Case
- D&TA Vision for the Future
- Closing Statement

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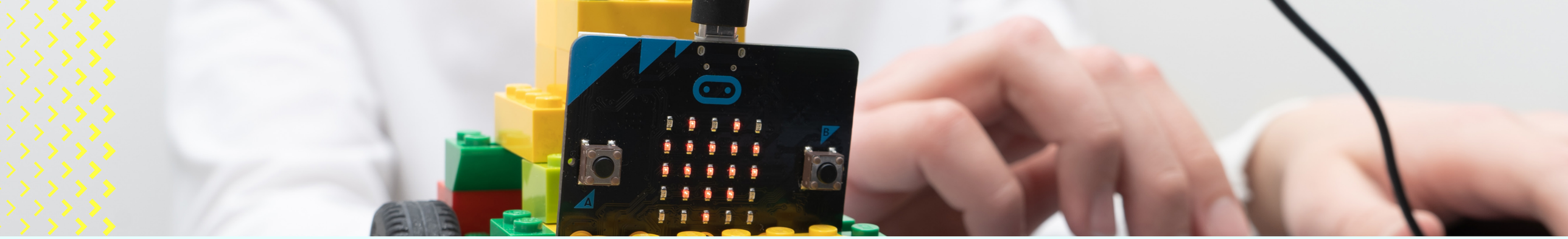


Context

This document results from two years of collaboration, investigation, and research. Design and technology as a subject is in severe danger of being eliminated to the very margins of the school curriculum; it has already been written out of the curriculum in far too many schools nationally. We need to act now to save the subject for future generations of students who can benefit hugely from the knowledge, skills, personal experiences, and attributes that this critical subject brings to them.

We were the first country in the world to see the value of design education by making design and technology compulsory in the school curriculum as part of the 1988 School Reforms. The words of Lady Margaret Parkes, Chair of the working group that helped to introduce the subject to the school curriculum, are as valid now as they were then:

"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."

And yet, while the rest of the world has taken our lead and has run enthusiastically with it, we have allowed the subject to wither to 78,000 GCSE entries last year (over 430,000 in its prime), and just over 10,000 A Level entries (26,000 in its height) and less than 6,500 qualified secondary teachers (just under 15,000 in 2009).

We must act now to transform the subject and save it from almost certain oblivion. As the professional Association for the subject, we have been working with school and Trust leaders, teachers, businesses, and other key stakeholders to reimagine what the subject could be with investment and support in our schools. The launch of this document is an urgent call for action from schools, government, business, and other key stakeholders to gather behind the measures proposed within this vision to create the next generation of problem solvers, creatives, innovators, and visionaries.

Design and technology education as a right for all students and not a privilege for some

Whilst design and technology education is struggling for survival in the state sector, it is positively thriving in the private education sector as its value personally, socially, and economically is recognised.

The D&T Association firmly believes that every student has a right to a broad, balanced, and rich curriculum that prepares them to take their place in a complex and fast-moving world confidently. Design and technology allows students to engage with many of the world's current complex issues; it empowers them to learn how to make a positive impact, thus quelling anxiety and enabling positive action for the greater good. Policy makers currently place low value on student creatvitiy. The argument that curriculum structure and offer are the responsibility of headteachers is false when the measurements used to assess school performance effectively create tiers of subject importance.

The Economic case

Manufacturing: The UK remains the ninth largest manufacturing nation globally, with an annual output of £183 billion, comprising over half of the country's total exports. 2.5 million jobs are provided by UK manufacturing, with average wages higher than the whole economy.
UK Manufacturing, The Facts 2022 | Make UK

Manufacturing: GVA of the manufacturing industry in the United Kingdom amounted to approximately £203.7 billion in 2022.
UK manufacturing GVA 2022 | Statista

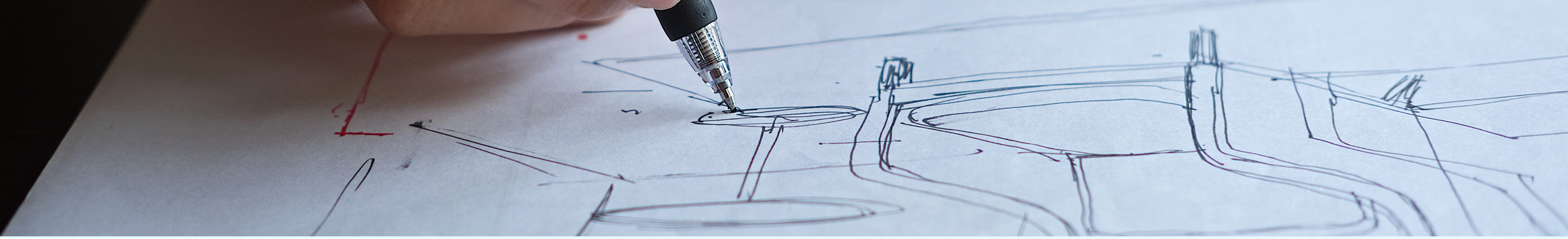
Skills and Jobs Needed in 2030: The core drivers for manufacturing are automation, flexible working, digitalisation, and environmental sustainability, or 'greenification.' In addition to the need for more technical skills in manufacturing, wider skill sets considering these core drivers have been identified. 74% of companies expect demand for cognitive and meta-cognitive skills such as critical thinking, creative thinking, and learning to learn to increase between now and 2030. 65% expect demand for social and emotional skills such as empathy, self-efficacy, responsibility, and collaboration to increase between now and the decade's end. 83% see increases in demand for practical skills including, but not limited to, using new information and communication technology devices.
Engineering UK, Trends in the engineering workforce, Between 2010 and 2021

Engineering: Research conducted by Metro Dynamics has revealed that the engineering profession generates an estimated £645 billion gross value added to the UK's economy annually – equivalent to 32% of the country's economic output.
Royal Academy of Engineering, A hotbed of innovation (Nov 2022)

Engineering: 26% of all UK workers (over 8 million people) are part of the nation's engineering economy, and on average, the annual economic output generated from an engineering job is estimated to be 23% higher than the average job in the UK.
Royal Academy of Engineering, A hotbed of innovation (Nov 2022)

In 2019, the **design economy** contributed £97.4 billion in GVA to the UK economy, 4.9% of total UK GVA. It grew twice the UK economy's rate between 2010 and 2019.
Design Economy 2021, Design Council

The **design economy** is a major employer spanning diverse sectors, from architecture, product design and fashion, to digital design, craft and graphics. In 2020, 1.97 million people were working in the design economy, or 1 in 20 workers in the UK. 1.62 million were designers.
Design Economy 2021, Design Council



Design is growing in importance across the economy. 77% of designers work in non-design sectors, for example, finance, retail, and construction.
Design Economy 2021, Design Council

With over 40% of the UK workforce employed across the design, engineering, and manufacturing workspaces, we simply cannot afford to leave young people's knowledge of, and contact with, these sectors to serendipity. Students need to be made aware of the opportunities available to them and be exposed to the knowledge, skills, and personal attributes required to explore career possibilities across these sectors. This exposure needs to start within primary education, as multiple research studies demonstrate that without these experiences, young people reject possible career choices at a surprisingly young age.

Skills shortages: Open University report produced with the British Chambers of Commerce found that skills shortages are affecting businesses of all sizes and in all sectors, regions, and nations of the UK. The report concludes that young people will need greater guidance and support from employers to be better prepared for work through early business engagement with schools and high-quality industry placements that help to apply and contextualise learning.
The Open University Business Barometer 2022 report

D&TA vision for the future of Design and Technology Education in England

Primary Education

Primary D&T is growing both in numbers and in stature. Secondary teachers are starting to see the impact of the subject growth at primary level. However, there is no doubt that it will take a couple more years for this impact to be fully felt; this gives most secondary teachers time to organise and prepare for what lies ahead.

There is strong support for a CAD/CAM national initiative at primary level. The consensus amongst teachers is that this could be a 'game changer' if implemented successfully.

There is universal agreement that the green economy, circularity, and the importance of design in solving global sustainability goals must be thoughtfully added to the KS1 and KS2 curricula.

There is scope and reason to assist students in developing 'engineering habits of mind' in the primary curriculum. https://raeng.org.uk/media/51llpcve/thinking-like-an-engineer-summary_report.pdf

Students have a right to a broad and rich curriculum at Key Stages 1 and 2 (and beyond). The Ofsted framework strongly supports this, and positive change is happening as a result. Our task is to build on this in a manner that supports primary teachers to achieve more than they first thought possible.

Industry, academia, and government must work together to ensure primary teachers receive relevant professional training to continue teaching the subject to the highest levels. Not STEM, but design, technology and engineering.

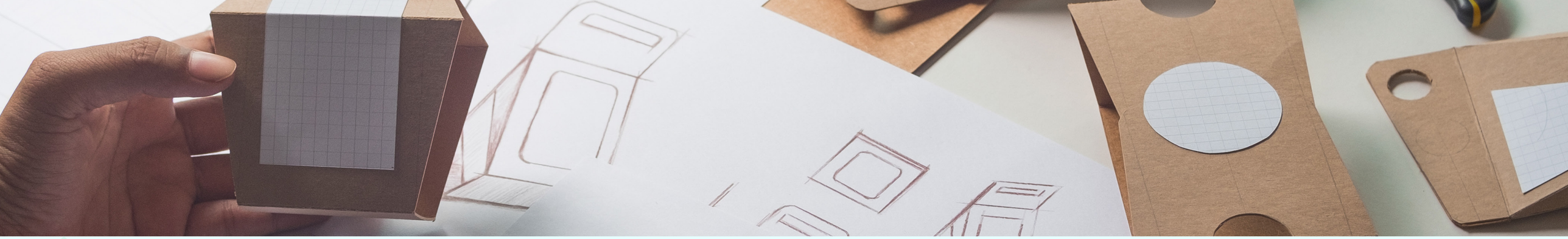
KS2/KS3 Transition

As primary students consistently receive a higher quality design and technology educational experience, to ensure continuity and progression, it will become more essential than ever for structured transition processes to be in place. The Association will work over the next twelve months to highlight best practice in this area.

KS3 Curriculum

Based on what we have seen and heard over the last two years, this is where most of our problems currently lie. Too many schools have settled into a routine of 'making things' where the completion of the end product is the main objective, and insufficient time and thought is devoted to the learning structured within these 'making activities'.

The above accepted, curriculum time has been dramatically reduced in a number of schools limiting the content that teachers can cover in the time allocated.



The carousel curriculum is a fact of life in most secondary schools. Getting around the problems this timetable structure imposes on lessons requires lateral thought and determination, but it can be done. The carousel system is not the problem, but more so teachers use of the time available to them.

KS3 should be about building on the foundations set at primary school and helping young people develop a strong understanding of the benefits the subject can bring them, both academically and personally. Whilst teachers will inevitably have an eye on KS4 and examinations, this mindset should not determine the KS3 curriculum offered.

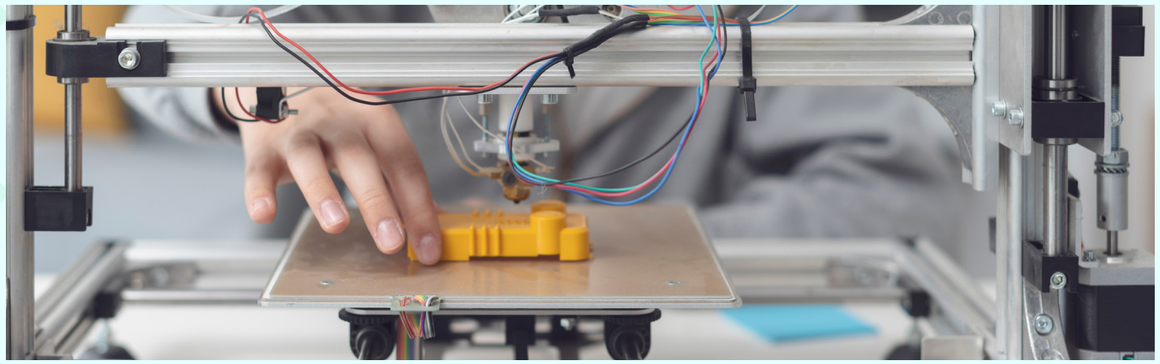
Our subject is strong on the 'human skills' that industry is crying out for from education such as problem-solving, creativity, analytical thinking, grit, presentation skills. We must further build these human attributes into our curriculum; they are imperative to success in life and work.

We need an enhanced focus on progression at KS3. In too many schools, students are asked to complete tasks effectively repeated in slightly differing formats across year groups.

Making is undoubtedly an important aspect of our subject. We must encourage young people to engage head, hand, and heart as they move through the subject. In too many schools, KS3 is task-orientated; we need to move the focus so that making is not simply a consequential outcome, but an integrated part of any iterative design process.

Our consultation has demonstrated universal support for the need to change pedagogical practice at KS3 across the D&T teaching community. Teachers are excited by the close relationships that the Association is building with industry, and most wait in anticipation for the release of our first contextually led problems due this September.

There is acceptance and recognition that whilst KS3 will inevitably be taught by a workforce that lacks deep subject knowledge, we should support teachers to increase their knowledge and experience through CPD and coaching rather than by dumbing down the curriculum, which would consequently reduce subject impact.



KS4 and Examinations

"The NEA (Non-Examined Assessment - A context-led field within which students identify a user, an identified problem, and a brief) is not broken, so please do not try to fix this aspect of the GCSE."

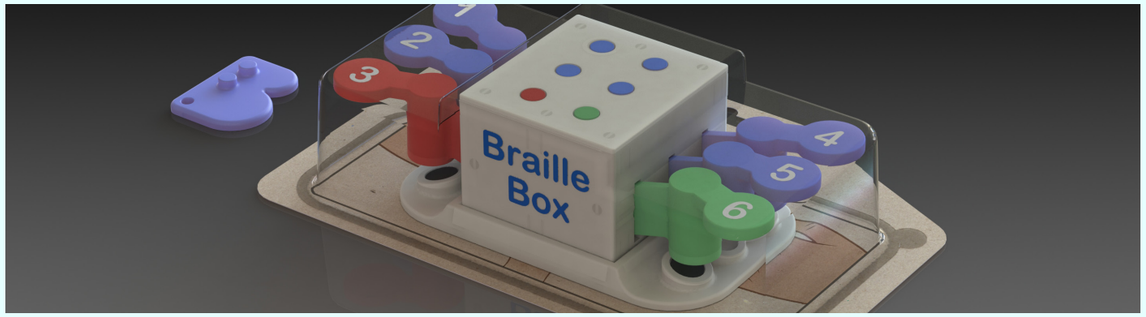
Teachers and their students are now comfortable with the NEA, and very few negative comments (if any) have been made about its inclusion as a core part of KS4 assessment. We should, however, broaden the panel that sets GCSE contexts for the NEA across awarding organisations to include a more diverse and wider informed sector of society, including industry and possibly the Design and Technology Association.

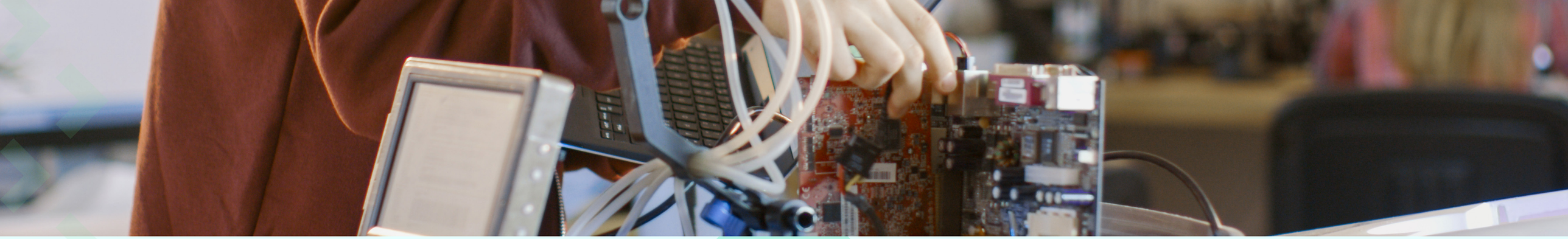
The Design and Technology Association firmly believes that there is too much content in the KS4 syllabi, and this should be reduced to a more manageable level. Currently, the heavy content load forces teachers to leave large sections out of their teaching, hoping that this will not come up in examinations to affect student outcomes negatively. No teacher should be professionally compromised in this manner.

We propose digging deep into content over the next twelve months, determining what content (if any) should be removed, what (if anything) should be added, and which areas require further explanation and clarification for teachers and their students. We have lost teachers to Art & Design who never wanted to go there. The 100% coursework element that applies to Art & Design and the overloaded D&T syllabus content left many feeling they had no option. If we manage to adjust the assessment methodology correctly, it is felt that many will come back.

Many teachers would like the Design Contexts to be released earlier by Awarding Organisations. Year eleven has become all about preparing students for the NEA and the written examination. The nature of this work is turning students away from the subject and deterring them from choosing D&T at A Level.

The Association has proposed a series of alternative assessment methods that could be used at KS4 and has received a great deal of feedback on these suggestions from teachers. As we move towards reform (proposed for 2025), we will work with teachers, awarding organisations, Ofqual, and other interested bodies to suggest alternative ways to assess the remaining 50% of any qualification outside the NEA.





KS5 and beyond to apprenticeships, FE and HE

There is an urgent need to accurately determine FE/HE opinion of the D&T A Level qualification. Is it valued, and by whom? Further in-depth research in this area is required as we need to link A Level work closer to FE/HE courses and business requirements. We have received very little negative feedback from teachers about the structure and knowledge content held within the KS5 syllabus documents. This requires further exploration and needs to be compared with results from the above research.

Across Key Stages

Most teachers accept that a Reimagined D&T would require a 'rebrand' that includes a name change. 'Design, Engineering and Innovation' is a name repeating within the consultations. The Association to build on the research carried out by Barlex and Steeg around the subjects core epistemology. Through this work we will establish and promote an agreed orthodoxy regarding the core of knowledge, understanding, skills and values that underpin school design and technology.

There is some reluctance to let "Food and Nutrition" go from the D&T suite. That said, most accept that the recent Food Centre survey indicates a clear desire by food teachers to have their own set of orders and to work to these, not to a D&T National Curriculum. There is risk involved in this proposed separation. Still, most agree that we (The Association) should assist Food Teachers to walk their own path, even if this almost inevitably means a further reduction in D&T teachers and a reduction in time on the curriculum in many schools.

The Association needs to work with the DfE, CLEAPSS, and other stakeholders to determine what a design studio classroom of the future should look like. Some excellent work has been carried out in this area by CLEAPSS and others, but this work needs to be completed and widely shared across the community.

Key Requests to Government

D&T to receive the same level of bursary as Chemistry, Physics, Computer Science, and Mathematics (currently £27K).

D&T focused recruitment schemes to assist professionals in transferring from business and industry to teaching D&T. Similar to the "Engineers Teach Physics" scheme funded by the Government last year.

The Government to fund CPD for all D&T teachers, specialists and non-specialists. Teacher recruitment is at a crisis point. Even with focused campaigns to raise teacher recruitment into D&T, it is a sad fact that the workforce has been allowed to drop to such low levels that it will take up to ten years to recover. We cannot and should not drop the bar on teaching standards and content but must help teachers to reach a high bar through a structured programme of comprehensive support and training.

The Government to fund an extended trial of the KS2 CAM (additive manufacturing initiative) we have run over the last eighteen months with Create Education. One hundred schools initially, rising to a study of two hundred by the end of 2025. If successful, this CAD/CAM initiative to be rolled out to all primary schools from 2026. The trial of one hundred schools to be the subject of an independent research project to determine its value accurately. The DfE to fund this research project.

The DfE to actively engage with the Association around these recommendations. Allowing us to advance these into working documents, consulting with the workforce as we progress this work.

Closing statement

We live in a complex and fast-moving society. We believe education's role is to adequately prepare our young people to confidently take their place within this society. We need to prepare them for life and employment, both of which are changing rapidly. At a minimum, our subject empowers young people to understand the world they live in and the positive role they can play. We can empower our young people to question and, where relevant, embrace technology and the positive role that it can play in their lives.

At the other extreme, our subject prepares and creates the problem solvers, lateral thinkers, team players, and innovators that business and industry will need to solve the complex problems that the unbridled use of certain technologies has inflicted on the world. We are literally preparing the engineers, designers, manufacturers and innovators of the future.

We need all interested and decision-making parties to now gather behind these recommendations as we seek to adapt and improve our subject into one that sits rightfully at the very core of the school curriculum.

Yewande Akinola MBE:

"Design and technology education is super crucial for shaping the designers, engineers, and innovators of the future. It equips learners with the right skills to be able to think creatively, solve problems, and apply the right principles in practical ways. By integrating design and technology into the curriculum, we help build a generation of thinkers who can bridge the gap between imagination and practical application- turning ideas into tangible solutions. I truly believe that it helps promote teamwork and collaboration and is an essential ingredient for achieving a Sustainable world."

Will Butler-Adams OBE, Chief Executive Officer at Brompton Bicycle:

"Our world is changing at such a speed that we, and the rich biodiversity of our planet are struggling to adapt. This is not the 'scaremongering' from the science community that we ignored fifteen years ago, but the reality we are facing across the world today. Yet the solutions to so many of the world's challenges exist, it is simply a question of making them happen. To do this we need great minds, to imagine, design and create tomorrow's solutions to today's problems. Too often this precious resource is pushed into services, moving money from screen to screen, or constructing yet more complicated legal knots paralysing risk taking and innovation. We are born makers and must nurture and value design and technology as a core tenant of our education system, if we want to live in harmony with planet earth."

Sir Jony Ive KBE HonFREng RDI commented on the initiative:

"We have reached a critical time in design education. Since 2010, the government has embedded a knowledge-rich curriculum across the school system, deprioritizing creative subjects and practical, skills-based education. This is a profound and ignorant mistake. D&T is a uniquely interdisciplinary subject encouraging practical problem solving, collaboration, empathy, and creativity as well as both critical and analytical thinking. Most importantly, it inspires young people to be curious, to trust their own ideas, and equips them to explore solutions to the world's biggest problems. It is crucial that government, business leaders, educators and governing bodies adopt the recommendations set out in this report."

Teacher Comments:

"Great idea to build CAD/CAM capability at Key Stages 1 and 2"

"Would be interested in a secondary offer for 3D Printers either a lease or loan options. Our budget does not stretch that far after standard running costs, are there any for secondary schools? We would be very interested".

"KS3 - All for balanced theory/knowledge/skills/product - We use a theatrical approach - Talk about a particular material and its properties then work with that material for the next lesson (mini task), then move swiftly onto the next, material, at the end of several mini tasks a product is formed."

"Videos from industry great idea for problem solving and keeping it real / contextualised."

"Current ITT structures allow time for aspiring teachers to learn classroom teaching skills, but there is little or no time to acquire practical/machine skills. We are consequentially producing a generation of teachers with limited experience and skillset."

"Before I became a teacher, I worked in the design industry working with a major retailer on their design and development, and I can see the changes being a real positive step going forward."

"I'm looking forward to seeing the Ks3 designers work that we can access in September and like the idea that they are free to everyone regardless of DATA membership."

"I am excited by your proposals and passion for the subject. I would like to be involved with future work if this is possible."

"We have one hour a week at KS3 and a 2-year KS4. Some schools have two hours a week at KS3 and a 3 Year KS4. It makes the playing field far from level."

"I feel the D&TA has the ear of many D&T specialists across the country, as well as industry experts, and example curricula and not just resources would be really useful - especially in an age where curriculum (for the time being at least!!) is the major focus."

"Design is often misunderstood. It is a methodology, a way of holistically, critically, creatively solving problems. It is a way of applying knowledge that no other subject offers. It is a way of teaching real life skills that will support both social and career progression."

"I would like to see more flexibility in assessment content to allow teachers and their pupils to play to their strengths. I accept that a core subject base knowledge is essential, but students and their teachers should be able to 'deep dive' into content/skills that interest them."

"At KS4 even having two exams that are 1hr each would make a really big difference."

"A context approach to KS3 is definitely more impactful, it helps create meaning around the knowledge that is being taught."

"I would recommend that the release date for the NEA is brought forward so that centres are allowed more time to go through theory at the end of year 11."

"The lack of staff and skills is a big issue, but we should not let this impact on our subject by not being able to offer making to our students"

"We must find the balance between meaningful skills, knowledge acquisition and the joy of designing and making."

Because design and innovation matter

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