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A Subject in Search of A Purpose:

The Evolving Identity of Design and Technology Education

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How D&T became a subject

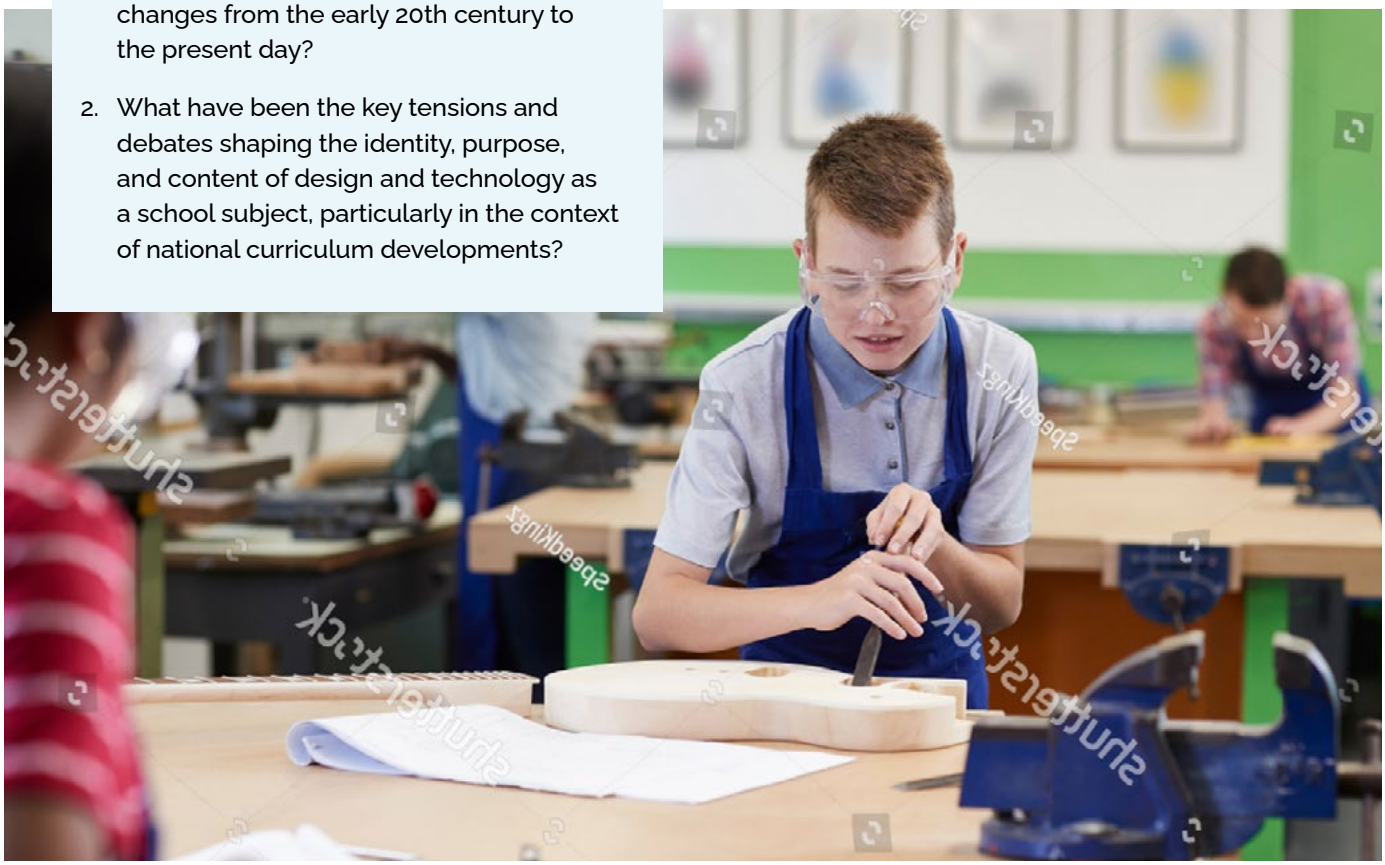
Design and Technology (D&T) is a school subject that has a long history; although not always named "Design and Technology" the essence and (contended) purpose is evident in government policy since before 1904. One purpose has been its role in preparing children for vocational and technical careers. However, according to policy documents, curriculum projects and stakeholders' interventions, this is not its only purpose. In this report, I will show how the subject has been debated and claimed by different interested groups to an end that has left outsiders, and some insiders, confused as to D&T's place in the curriculum.

The main report is a timeline of the history of D&T from the early 1900s to 2016 that shows D&T's changing nature, purpose and value. Drawing on government policy about school organisation and curriculum, and key national and local sociological events, these questions are answered:

1. How has the evolution of design and technology education in England reflected broader societal, economic, and policy changes from the early 20th century to the present day?
2. What have been the key tensions and debates shaping the identity, purpose, and content of design and technology as a school subject, particularly in the context of national curriculum developments?

The history of a subject is not linear nor is there a standard form of a subject's development. Anstead, Goodson and Mangan (2002, p.24) state that "far from being timeless statements of intrinsically worthwhile content, subjects and disciplines are in constant flux". Drawing on government policy about school organisation and curriculum, and key national and local sociological events, this report considers: What happened in government policy and society that necessitated D&T being taught in schools? How has the purpose and value of D&T changed during this period?

There are several threads that run through the subject's history and its creation in the 1988 Education Act as part of the National Curriculum. These can be categorised into school subjects that have influenced the post-1988 D&T aims and content; vocational, technical and domestic education; education philosophies; and gender. The tensions between vocational and academic, different curriculum for boys and girls has continued to inform the visible and hidden intentions of the design and technology.



Defining Technology in D&T Education

To understand the evolution of design and technology (D&T) education, it is' crucial to clarify how 'technology' is conceptualised within the subject. In D&T, technology is understood through four main lenses, as outlined by Mitcham (in Vries 2005):

1. Technology as objects: Tangible artefacts like computers or tools.
2. Technology as knowledge: Understanding of technological principles and systems.
3. Technology as processes: Activities of designing, making, and using technology.
4. Technology as volition: The relationship between humans and technology, including our intentions in creating and using it.

These definitions have shaped D&T's curriculum content, teaching approaches, and perceived educational value. They have also contributed to ongoing debates about the subject's nature and purpose, particularly in distinguishing D&T from other technology-related subjects.

This report examines how these varied conceptualisations of technology have shaped the evolution of D&T in English education.

> **It should be noted that this report only represents policy makers' and influencers' views of D&T regarding the official and planned curriculum; it is not necessarily the curriculum taught by teachers or received by the pupils (Kelly 2009).**

The Name: Design and Technology

Understanding the precise name of the subject is crucial to appreciating its identity and purpose. The subject is officially called 'design and technology' (D&T), not 'Design Technology' or 'technology' alone. This distinction is more than semantic; it reflects the subject's core identity and educational philosophy.

The name was carefully chosen by the working party defining the subject for the National Curriculum prior to 1990 (Department of Education and Science, 1988). They deliberately used 'and' to create a compound noun representing a 'unitary concept':

> ...most, but not all, design activities will generally include technology and most technology activities will include design... our use of design and technology as a unitary concept, to be spoken in one breath as it were, does not therefore embody redundancy. (DES, 1988, p.2)

This name emphasises the interconnected nature of design and technology while implying a concept broader than either alone. It's not two separate parts, but a singular educational idea. The subject's name has implications for curriculum delivery, content, and epistemology. It distinguishes D&T from other technology-related subjects and emphasises its unique approach to learning through designing and making. Throughout its history, D&T's name and position within the curriculum have been subjects of debate. For a brief period, it was even considered a component of a broader 'technology' subject alongside business studies and IT (Wakefield and Hardy, 2023). Such changes reflect ongoing discussions about the subject's nature and purpose.

1904-1944: Origins of domestic and technical education in schools

White (2011) states that D&T is a relatively new subject compared to "traditional subjects", and whilst factually true - a subject entitled "design and technology" did not appear until the 1990 National Curriculum (Department of Education and Science 1990) – others (including McCulloch, Jenkins and Layton 1985; Penfold 1988; Wakefield and Owen-Jackson 2013) argue the subject's origins can be found much earlier.

There had been a growing impetus to include practical, manual and technical education in schools since the mid-1800s to address England's perceived decline as an industrial power (Penfold 1988). The intention was to influence and shape vocational education, training (mainly) boys in craft skills nd girls in domestic skills. This was reflected in policy documents from the 1800s: from 1850 needlework was required to be taught to girls for schools to receive a grant, and in the 1870s girls had to be taught "needlework and cutting out" (Lawson and Harold, 2007, p.324). Then in 1896, all pupils were taught reading, writing and arithmetic (the 3Rs), with needlework for girls and drawing for boys (Lawson and Harold, 2007). This was challenged by trade unions who saw this new focus on elementary education (9 - 13 year-olds) as undermining the purpose of apprenticeships. Consequently, when new legislation was introduced in 1888 (the Technical instruction Bill), it was clarified that schooling in practical and technical education would focus on giving pupils "training of the eye and the hand, in either woodwork, or ironwork, or in other subjects, and by that give them greater facilities for acquiring a trade" (Hart Dyke in Penfold, 1988, p.4). Arguments about the purpose of education, as a training ground for specific trades and employment or as a general education, are not new.

The perceived need to address the England's industrial decline did not disappear and in 1904 *Regulations for Secondary Schools* were created to produce an educated workforce to maintain the country's world economic status. Prior to the 1904, the school curriculum and access to it was fragmented. There was no compulsory secondary education and minimal state involvement in the curriculum. Instead, parliamentary focus had been on retaining a "classical model of education" rather than engineering and science as was focussed on in Europe, teaching religion in non-secular schools, finances and school management. The 1904 regulations stipulated a broad curriculum that was not "unpractical … or over-specialised" (from the 1923 Hadow report in Gillard 2016). A four year subject based course was defined that would lead "to a certificate in English language and literature, geography, history, a foreign language, mathematics, science, *drawing, manual work*, physical training and, for girls, *housewifery*" (my emphasis) (Gillard 2016, 1904 Regulations for Secondary Schools) with the aim to give pupils to access technical and vocational courses at a higher level (Gosden 1984). The "Acland Report" (Board of Education 1913) went returned to Hardt Dyke's focus of a general education and recommended the inclusion of practical work or "handwork", that is "learning by doing" as beneficial to all children and part of a liberal education. According to Acland, the importance of "handwork" was twofold - educational and vocational, to develop mind and character, and prepare for "advance technical instruction" (Board of Education 1913, p. ix).

Both the 1904 regulations and 1913 report endorsed a gendered curriculum; boys were educated for their future vocations and girls given a domestic education. Heggie (2011) believed this domestic education was intended to address the 'servant problem" and impose a form of socially engineered idealised femininity where girls were trained to run a household.

The 1904 curriculum remained in place until the 1944 Education Act, which reconstructed schools and their curricula. Prior to 1944 schools were locally organised with little state intervention, the 1944 Act led to a national three-tier schooling arrangement - the tripartite system.

1944-1962: Tripartite to Crowther (The Alternative Road)

The idea of the tripartite system, with its triple curriculum and three types of schools, was traceable back to the 1943 Norwood report that argued there were three clear groups of pupils who required different curricula and schools (Goodson 1995). Firstly, pupils taught in grammar school pupils learnt for intrinsic reasons and could grasp abstract ideas. The second group studied in technical schools and included those interested in applied science or art. The third group of children dealt more in concrete things and facts, preferring practical knowledge and were suited to secondary modern schools. Grammar school curriculum rarely included practical or vocational subjects, instead specialising in an academic curriculum. The secondary modern curriculum continued to include earlier content from the last century preparing young people for manual, low-skilled work or domestic life. Technical schools were a specialist facility for pupils with scientific and technical ability, and according to McCulloch, Jenkins and Layton (1985), taught subjects later associated with D&T.

The precursor to these new technical schools was the "Junior technical school" (McCulloch, Jenkins and Layton 1985) with a technical curriculum that prepared children for either "artisan or other industrial employment or for domestic employment" (Gosden 1984, p.9) and provided skilled labour (McCulloch 1987). The Technical Schools" curriculum intended to prepare those with aptitude for the increasing employment options in science and technology (Schools Council 1967b; Schools Council 1967a). However technical schools were only a small part of the system, with less than four percent of secondary aged pupils enrolled in 1958 (Gillard 2016).

Although Technical Schools focused on preparing young people to work with new technologies, some educationalists believed all pupils should learn about new technologies so they could make educated decisions about technology, its use and purpose in their lives. This argument underpinned the idea of a liberal education, an education that empowers individuals. Thus, the debates about technology as curriculum content persisted (McCulloch, Jenkins and Layton 1985) as to whether technology was part of a general and liberal education or, a technical and vocational education. Was technology and technological knowledge part of a general education that focussed on truth-seeking and the acquisition of "rational virtues" (Elliot in White 2009, p.127) or part of a specialist curriculum with a utilitarian and economic function? The continuing growth of technology use and manufacture in industry post-1944 led to renewed calls for a curriculum that reflected these changes (Ministry of Education 1962, known as the *Crowther Report*).

"The Alternative Road", chapter 35 in the Crowther Report (1962), was an influential moment in curriculum development for practical and technical education (McCulloch 1984). Crowther (p.391) argued that the academic road was not "the only road by which good minds can travel", the alternative road being non-academic and practical; he called for the rehabilitation of the word practical in education in a non-pejorative sense and "to define it more clearly" avoiding a narrowly technical or vocational interpretation (McCulloch 1984). Nevertheless, the report did not provide clarification and defined practical in different ways: firstly, practical activity in artistic and creative education, where pupils learnt "to do as well as to appreciate" (Ministry of Education 1962, p.392); secondly, using hands and minds to invent – practical exploration and development of ideas; thirdly as a form of teaching. Those arguing for a technical and practical education, including the Association of Heads of Secondary Technical Schools, seized upon the first two definitions, which led to the Schools Council Project in Technology starting in 1967 (McCulloch 1984) headed by Geoffrey Harrison and supported by Don Porter of the schools" inspectorate.

1962-1976: Technological revolution (Wilson) to Callaghan's Ruskin College speech and the Yellow Book

There were socio-political influences for the Crowther reports and Schools Council Project: the scientific and technological revolution of the post Second World War period (McCulloch, Jenkins and Layton 1985), technology as a major influence on modern society (Tawney 1973), and changes in social structure (Schools Council 1967a). Societal changes had led to mass migration to cities due to the growth of complex industries that relied less on a general labourer and domestic help - the typical output of the secondary modern schools. This left young people ill prepared for work in the growth areas of technical and professional work, and unable to find employment. This skill deficit supported Porter's view (Schools Council 1967a, p.17) that parents now recognised the need for a different type of education and would therefore have "a greater demand for it [technology education]". It was in this context, and Tawney's (1973) view of the influence of technology on modern society, that the Schools Council Project Technology began. The Project's aims were wider in scope than employment and responding to industry's workforce needs and were like Hirst's view of a liberal education:

> to help children to get to grips with technology as a major influence in our society and, as a result, to help more of them to lead effective and satisfying lives (Schools Council 1967b, p.12)

Porter and Harrison advocated the "alternative road" as argued by Crowther (1962) but neither saw a need for a new subject that focussed only on technology. Harrison (1984, p.83) thought "many subjects … could be enriched with [a] technological dimension" and could be done through a coherent approach as part of a general education "to make children more generally aware of the impact of technology on society". Porter's (Schools Council 1967a, p.27) argument was more concrete and felt the inclusion of a technological and practical perspective would enable pupils to "think in three dimensions … [and] grapple confidently with practical problems". The argument for not becoming an "exclusive subject" was that it would be "vulnerable to rejection" (McCulloch, Jenkins and Layton 1985, p.147) because headteachers and science teachers would see that timetable space for science could be reduced. While Harrison and Porter concurred about technology in the curriculum, they did not agree on its defined content and knowledge base. Porter (editor of Schools Council 1967a) focused more on craft teaching, whereas Harrison (who had studied engineering at Cambridge University) emphasised "technology" (and its different interpretations (Schools Council 1967b)) and a pedagogy of technological education (Harrison 1984).

On one level, their disagreements appear to be semantical discussions about "technology", "technical" and "practical". Technology was (and still is) an ill-defined term; the historical and social context in which the word is used has a bearing on how it is interpreted (de Vries 2012) in mainstream life and education. In education, some argued technology was a facet of science not an autonomous or independent subject, but others argued the opposite.

With British industry's power in relative decline, the policy context of "the white heat of the technological revolution" referred to by Prime Minister Harold Wilson in 1964 (McCulloch, Jenkins and Layton 1985, p.1), inextricably linked economic growth with educational reform (Jones 2003). Wilson's view that the tripartite system held back the country's economic power and influence led to its dismantling and replacement with a comprehensive education that in theory, according to Jones (2003), provided a parity of access for all pupils and equality of esteem for all curricula. However, inconsistent implementation meant some comprehensive schools grouped pupils according to ability with different curricula for each stream (Jones 2003).

Even though there was national curriculum guidance that was intended to be interpreted locally, in practice the curriculum was influenced by the examination system and disparity continued. Some Certificate of Secondary Education (CSE) courses (the lower tier of

qualification available to secondary school aged pupils) were teacher-designed, whereas universities fixed the content of the General Certificate of Education (GCE) (known as "O level") – a higher tier qualification for those progressing into professional occupations and university. These inconsistent political ideas were symbolic of the national policy and caused a tension between decentralised and centralised education, which is important to consider for two reasons in the context of D&T's development. Firstly, two pioneers of technology in the school curriculum, Porter and Harrison, supported local development of the curriculum content, designed by the teachers, and "link[ing] together elements of the curriculum which have too long appeared separate [through] integration … there is no single way of introducing technology" (Tawney 1973, p.160). Secondly, how teachers interpreted the curriculum content for different groups of pupils reinforced the segregation of pupils because of their ability. This meant the purpose and contribution of (design and) technology to schooling was determined by the teacher's views of what is of value to the child, even though the Schools Council Project Technology provided an over-arching aim. These local interpretations of technology in the curriculum by teachers meant there was no distinct and agreed purpose, which Harrison (1968) alluded to when he discussed the different definitions of technology at the 1977 conference *Technology Through the Subjects*. The second reason – curriculum content designed and implemented in response to pupils" ability – also affected the values ascribed to the subject. If the teacher interpreted different forms of technology education, or its predecessors of craft and domestic education, to be suitable for pupils of different ability levels, then there was no equal access for all. Justification for this inequality was difficult to make and Stewart (1973, p.74) debated the validity of the arguments that "craft contributes to the physical, mental and moral discipline … [and] … benefits the slow learner, giving him confidence"; stating they are based in "outmoded psychology" and insulting to the nature and traditions of qualified cabinetmakers. He argued that craft is an "introduction to the materials and processes of our technological society through design work and creative activity". Stewart justified that craft are of equal status to academic subjects using "scientific thinking" and "intellectual analysis, synthesis and evaluation" (Stewart 1973, p.75), thereby denying the argument of different forms of design and technology education for different ability pupils and attempting to argue its parity with traditional subjects.

The lack of agreement on the purpose of technology education and its value for all pupils as part of a general education continued.

1976-1990: Evolution of the D&T national curriculum: craft, design, technology, and Home Economics

The evolution of Design and Technology in education during the periods preceding the creation of the national curriculum is crucial for understanding its current form. While national educational policy was undergoing significant changes, the subject itself was emerging from a complex interplay of different disciplines and educational philosophies. The transformation of technical and secondary modern schools into comprehensives, along with most grammar schools, into comprehensives had implications for how "practical" subjects were perceived and taught. Despite the move towards comprehensive education, the legacy of separation by ability and access to particular forms of education continued, influencing the development of subjects like Craft, Design and Technology (CDT).

Although grammar, technical and secondary modern schools had disappeared from the education landscape and become comprehensives, with a small but significant number of grammar schools remaining, for many children this was comprehensive education in name only. The ideas of separation by ability and access to particular forms of education continued, with a combination of mixed ability groups in some schools and streaming

by ability in others, and a curriculum tailored to fit the different groups. Some educators had seen the elimination of the tripartite system as an opportunity to develop a relevant curriculum that would be taught to all pupils, a synthesis of the best of the curricula from the three different types of schools (grammar, technical and secondary modern). But, others realised that a "curriculum for inequality" (Shipman in Goodson 1995, p.115) was emerging instead: a dual curriculum, one for the most pupils and a different one for the "others" (Goodson 1995), in other words, those pupils seen as not sufficiently able to gain from a grammar school type curriculum. This disparity was further emphasised in 1972 following the implementation of ROSLA (Raising of the School Leaving Age), which raised the school leaving age to 16 (previously 15) and a curriculum was needed for pupils who were now staying on at school where previously they had gone into work at 15. This trend for a dual curriculum continued until 1976 when Prime Minister James Callaghan's speech at Ruskin College, along with the infamous *Yellow Book*, signalled a change in Labour's education policy (Jones 2003). According to Chitty (in Gillard 2016, "The Yellow Book 1976") there were three notable themes:

> the need to establish generally accepted principles for the composition of a "core curriculum" for the secondary school; the need to make suitable provision for vocational elements within the curriculum; and the need to challenge the view that "no one except teachers has any right to any say in what goes on in our schools".

This shift indicated a move towards centralised determinism in school curricula, implicitly acknowledging different educational needs among children - some academic, others practical. This perspective had significant implications for technology, Home Economics, design, and craft education. Jones (2003) argues that there was also a fourth implicit theme: the British economy. The 1973-75 recession was used to justify a renewed focus on an industry and business-responsive curriculum, echoing similar arguments made in the 1904 and 1944 Education Acts, Crowther's 1962 report, and Harold Wilson's 1964 speech.

In the 1960s and 1970s, significant debates shaped the trajectory of what would become Design & Technology. Educators and policymakers sought to define the role and scope of technology education, with figures like Harrison (Schools Council 1967b) and Porter (Schools Council 1967a) focusing on aspects related to engineering. Concurrently, discussions around "design" and "creativity" were gaining traction (McCulloch, Jenkins and Layton 1985), alongside debates about the place of Home Economics and craft education in the curriculum. A commonality found amongst these different debates was design, advocated by Archer and others (Archer, et al. 1979; Archer 2005) as an essential component of a general education.

The *Design in General Education* report (Archer, et al. 1979) and the Schools Council Design and Craft Education Project at Keele University led by John Eggleston helped them develop curricula activities that also brought the discrete subjects and areas of design, art and craft together. Eggleston's project had a similar context to Harrison's Project Technology: changing employment prospects and employers wanting young people with "initiative, adaptability, even imagination" (Eggleston 1975, p.49). Following a similar argument to Crowther's rehabilitation of the practical, Eggleston's view was that "practical skills are still needed but in a wider intellectual and social context" (p.49), echoing arguments from advocates of Home Economics and technology about the need for these subjects to be part of a general and liberal education. The aim of the Design and Craft Education Project was to enable pupils to take "an active role in [the use of materials] and come to "count for something" in a satisfying and meaningful way", "to participate in society" and achieve "good design" (Eggleston 1975, p.49). A later Design Council consultation, *Design Education in Secondary Education*, emphasised that in design education pupils learnt to "grapple with … problems of the environment, problems of the man-made world" (Keith-Lucas 1980). These four competing subjects - Technology, Design, Craft, and Home Economics - were the forerunners to D&T. With limited curriculum time and space, teachers from these four areas began to work together, exploring common ground and shaping the foundation of what would become a unified subject.

Although CDT had been examined separately they shared a history of integration and cross-subject activity (E.g. Heath 1971). Attempts to justify integration involved finding commonality, like creativity, design and cognitive skills (for example Heath 1971; and Tipping 1982). However, each subject also made individual attempts to justify its place in the curriculum, usually focussing on either its "academic" nature of the subject (see Byrne and Renwick 1984; and Knight 1996) or its contribution as part of a general education (Archer 1976/2005).

McCulloch, Jenkins and Layton (1985) reported that the Association of Advisors in Design and Technical Studies (AADTS) proposed three purposes for CDT. Firstly, the instrumental value individuals gained in making artefacts "through the use of tools and materials and of strategies of planning, communicating and constructing" (Association of Advisers in Design and Technical Studies 1980, p.2). Secondly, pupils make decisions that "will include consideration of the likely social, economic and environmental consequences" (ibid, p.2). Thirdly, and perhaps ambitiously, stating that CDT "is the beginning and development, of a set of enabling skills and knowledge to increase human potential" (ibid, p.2).

While the AADTS defined separately the contribution of "craft", "design" and "technology", Grant and Harding (1982) refuted separating the subject title and proposed that "Design and Technology" should be the core elements in CDT. Although this might appear only semantic there were in the early 1980s over 75 CSE and O level courses under the CDT umbrella, perpetuating the lack of clarity of the purpose of the subject (Grant and Harding 1982). Home Economics was experiencing similar difficulties: "I became increasingly aware that Home Economics has become such a catch-all term that practitioners are hard pressed to have a clear idea of their work" (see Pratt in Knight 1996, p.275).

Between 1984 and 1989, a series of Curriculum Matters booklets were published building on Callaghan's speech; Gillard (2016) suggests these were the groundwork for the National Curriculum. *Home Economics from 5-16* was published in 1985 (Department of Education and Science 1985) and *Craft, Design and Technology* from 5-16 in 1987.

Home Economics outlined a comprehensive analysis of its role in education. It emphasised that the primary aim of Home Economics was to:

> help to prepare boys and girls for some important aspects of everyday living and the adult responsibilities of family life. All pupils, whatever their social, cultural or ethnic background, require to gain (sic) competence and to make informed choices in matters of hygiene, safety, health and diet. In due course, some will earn their living caring for, feeding, clothing and helping to shelter other people, at the same time as they are looking after themselves. Boys and girls need to learn how to organise their time and make use of available resources to best effect in matters to do with homes and households, and, although theory and knowledge are important in developing such competencies, they should be related closely to the performance of practical tasks. (Department of Education and Science 1985, p.1)

As well as developing attitudes and values and the "capacity to make judgements based on a reasonable consideration of evidence about matters to do with running a home, diet and clothing" (p.2) the development of general skills was important and the "practical and investigative nature" (p.3) of the work. HE was categorised into three main areas: home and family, nutrition and food, and textiles. It's worth observing that design activity was specifically mentioned only in the textiles section.

The Craft, Design and Technology booklet outlined the key components of the subject. It defined CDT's primary purpose as:

> to enable pupils to be inventive in designing practical solutions to problems and so bring about change and improvements in existing situations. In CDT ideas are conceived, developed, modified and given shape in artefacts through which the original ideas can then be evaluated. (Department of Education and Science 1987, p.1)

The booklet further elaborated on the three core elements of CDT. Design was described as a process involving:

> defining a task, deciding on how the task is to be done and responding to the consequences of thoughts and actions both as they happen and later when the result is judged. It is directed towards products or systems which are made or effected to meet specified requirements. …. with maturity … pupils are predicting problems which will or may arise as a result of the decisions they are contemplating. … [they will] revise and change decisions. … Gradually they acquire more of the accumulated knowledge and experience gained over the centuries as people have sought to change and improve their lives and build it into their own decision-making process. (p.1)

Technology was characterized as the practical application of knowledge and experience, "concerned

with controlling things or making things work better. … putting their ideas into practice" (pp 1-2).

Lastly, the booklet defined Craft as:

> Craft is the means through which designs are transformed into artefacts. Through a proper concern for craftsmanship, people make things which not only work well but which also look and feel attractive. … In CDT pupils still need to develop good craft standards but craft skills should be set more firmly within the context of designing. (p.2)

This definition of craft was like the Home Economics definition of practical – neither were ends in themselves but part of a programme or context. In contrast to AADTS' work, the CDT booklet went onto say that "although the title *Craft, Design and Technology* may suggest three separate activities, all are constantly interwoven" (p.2). It also describes how the subject utilised skills and knowledge from other subjects, such as art, mathematics and science – other subjects are not referred to in the same way in the HE paper.

The Curriculum Matters booklets for Home Economics and Craft, Design and Technology reveal both similarities and divergences in how these subjects were conceptualised in the mid-1980s. While both emphasised practical skills and preparation for adult life, their focuses differed significantly. Home Economics centred on domestic skills and family life, with design only referred to in the Home Economics subset of textiles. In contrast, CDT positioned design as a core element, interweaving it with technology and craft to solve broader societal problems. These distinctions give an insight into the challenges and difficulties that continue to exist with attempts to integrate them into a single subject within the National Curriculum and more recently as they have diverged.

The Curriculum Matters booklets were not the only influence on D&T's development in the 1980s. Assessment methods, cross-subject initiatives, and vocational education projects were all having a significant impact on shaping the subject's future form within the National Curriculum.

The Assessment of Performance Unit (APU) (a group funded and overseen initially by the Department for Education and Science and later by the Schools Examination and Assessment Council) was considering the assessment of design and technological capabilities (Kimbell, et al. 1991, p.11), Work based on an earlier report from APU *Understanding Design and Technology* (1982) and identified three aspects of technological capability - knowledge, skills and values, which provided a framework for assessment. Interestingly, Archer, Eggleston and Harrison were members of the APU sub-group for this report, and along with Kimbell, Stables and others began to shape the form of D&T in the curriculum through considering the assessment of Design and Technology activity. However, although APU began with focussing on monitoring and assessment this shifted towards curriculum development which can be clearly seen in APU reports (Assessment of Performance Unit 1982; Kelly, et al. 1991; Kimbell, et al. 1991). This included the development of the seminal "APU model of interaction between hand and mind" (Kimbell, et al. 1991, p.20) thus showing the process of design development as to-and-fro between thought and action combining cognition and modelling, something that might have affected later arguments about curriculum content and pedagogy.

Some projects, according to Kelly (1990), were the government's covert means of centralising the curriculum whilst simultaneously implementing Conservative education policies aimed at aligning curriculum development with economic productivity goals. The Technical and Vocational Education Initiative (TVEI), introduced in 1983, is a possible example. Government funded, managed by the Manpower Service Commission (MSC) and like Harrison's and Porter's view of technology education, TVEI was not bound by a single subject. In other words it was cross-curricular, and aimed to increase the opportunities for 14-18 year olds in work-related activities and solving real problems through the application of knowledge and skills (Lee 1996).

TVEI significantly influenced subject time allocations, increasing hours for technology, commercial Home Economics, CDT technology, and information technology, whilst reducing time for domestic Home Economics and CDT craft (Lee 1996). This shift effectively prioritised some of the precursor subjects to D&T over others. The initiative also provided substantial funding to modernise many CDT departments, thus elevating CDT's status and expanding its content. As a result, electronics and computers, including computer-aided design (CAD) and robotics, became integral parts of the CDT curriculum (Simmonds 1986). This development exemplifies

how the school curriculum, the content, reflects new knowledge, and in this example - teaching awareness of modern technological artefacts and incorporating new technologies into design projects, much like the aims of the earlier Project Technology.

The increased use of computers in the workplace was also having a notable impact across the school curriculum, an effect amplified by TVEI's funding for more computers and its influence on curriculum content. Since TVEI, computers, information technology (IT), and D&T have developed a symbiotic relationship, with computers functioning both as technological artefacts within the curriculum content and as pedagogical tools.

This evolving relationship between technology and education occurred against a backdrop of broader curricular changes. Returning to the period of the *Curriculum Matters* publications, it became increasingly apparent that the Conservative government was moving towards a more centralised, subject-based curriculum and subject associations began to play a more significant role in this development (Goodson 1993). In the run up to the 1988 Education Reform Act, the CDT and Home Economics subject associations, Design Technology (DESTECH) and National Association of Teachers of Home Economics and Technology (NATHE) did influence the shape, purpose and content of their subjects, which ultimately led to the single subject "Technology". The associations played a dual role for their members and policy makers, which Knight (1996) exemplifies in his paper about NATHE needing to represent the views of members to policy makers whilst representing a cohesive view of the subject to its members. As already discussed, this was fraught with difficulty because there was no coherent and agreed view from either Home Economics or CDT teachers; the subject associations therefore had to "adopt a strategy of *realpolitik*" (Knight 1996, p.276), at times compromising some of the content many teachers saw as of value and unique to CDT and Home Economics. The compromise was greatest for Home Economics and NATHE, as it became part of the subject "Design and Technology" a title more familiar to CDT teachers and their association DESTECH (see Grant and Harding 1982; Tipping 1980) and the subject's associated journal *Studies in Design and Craft Education* (edited by John Eggleston).

In order to realise the Conservative government's vision of a centralised curriculum, the National Curriculum Design and Technology Working Group was set up in April 1988 led by Lady Margaret Parkes (Department for Education and Science and the Welsh Office 1988, known as the Parkes Report) (DESWO). The interim Parkes Report proposed the unifying subject name "design and technology", deliberately disconnecting it from previous subjects of CDT and Home Economics. The Working Group defined D&T's unique contribution to pupils' learning as developing their "capability to operate effectively and creatively in the made world" (DESWO 1988, p.3) and stated that "the distinctive quality of Design and Technology is the ability of pupils to use their knowledge, in combination with skills, value judgments and personal qualities" (DESWO 1988, p.78), which covered:

- Pupils being able to use existing artifacts and systems effectively.
- Pupils being able to make critical appraisals of the personal, social, economic and environmental implications of artefacts and systems.
- Pupils are able to improve, extend the uses of, existing artefacts and systems.
- Pupils are able to design, make and appraise new artifacts and systems.
- Pupils are able to diagnose and rectify faults in artifacts and systems.

(DESWO, p.18)

Additionally, the report suggests that D&T could also contribute to developing pupils' generic communication skills and personal qualities.

D&T distinctiveness was described through defining its activity which tended towards "knowing how", "action knowing" and "homo faber (man the maker)", and activity that is "always purposeful … and depend[s] upon value judgements at almost every stage" (DESWO 1988, p.4). The Working Group clarified that D&T was broader than CDT. In the same report the Group proffered advice on IT "believ[ing] that IT plays a vitally important part in the modern curriculum and also that IT is an essential component of design and technology … [and] … welcom[ed] this opportunity to offer advice on IT hand in hand with our advice on design and technology" (DESWO 1988, p.64).

1990-1994: Is D&T a subject in its own right?

The 1990 Education Orders (DES 1990) incorporated some of the Working Group's recommendations into a new subject called "Technology" with two components: D&T and IT. Why "Design and Technology" was placed as a component of "Technology" was neither explained nor understood (McCormick 1990) but would begin a generation of confusion over the subject's actual name. No subject in this first version of the National Curriculum, including Technology, had any prescribed aim or purpose (White 2011). The Order also stipulated that all pupils should study D&T from the age of 5 to 16 years old, which demonstrated its importance and relevance to all pupils.

The creation of Design and Technology as a new subject involved overtly combining Craft, Design and Technology (CDT) with Home Economics (HE). This process proved challenging, as it required renaming and reorganising existing material areas into resistant materials, food technology, textiles technology and, systems and control. The merger was not straightforward, largely due to teachers' strong loyalties to their original subject areas. CDT and HE teachers found their professional identities threatened by the change, which impacted their commitment to teaching the new D&T curriculum (Paechter 1995a; 1995b). A notable consequence was the tendency for some HE teachers to retreat into their previous subject subculture rather than fully embracing the new D&T culture. This subcultural retreat has been attributed to the gendered nature of CDT and HE, as well as the predominantly masculine power structures in society at the time (Rutland 2017; Paechter 2003). While there were hopes that combining these subjects would create a more gender-neutral D&T curriculum, evidence indicates that macro and micro political factors prevented this ideal from being fully realised (Paechter 1993).

Neither Government nor subject associations addressed the subcultures of HE and CDT, causing local conflicts and difficulties in the implementation of the D&T curriculum (Paechter 1995b). A pragmatic approach would have been to keep the two subjects separate; Knight (1996) argues this was an option as there had been no indication from the Department of Education and Science (DES) that HE would not remain a subject in its own right in the new National Curriculum. Knight (1996) contends that NATHE took a realpolitik approach to the government policy of a centralised curriculum by joining forces with CDT, in part due to falling membership and financial difficulties.

Very quickly, following its introduction and implementation, the new D&T National Curriculum ran into difficulties. For example, it was complex in both content and assessment (Farrell 1992) and some teachers found the emphasis on designing and making difficult to adapt to (Paechter 1993, Rutland 2017). Paechter's (1993) view was that the emphasis on designing and making was interpreted by some D&T departments as giving more time to the CDT area, inadvertently excluding textiles and HE teachers. This complexity led to the National Curriculum Council (NCC) instigating a review of the 1990 Orders, commissioning David Layton to draw together recommendations.

Layton's (1991) recommendations reinforced the Working Group's (DESWO 1988) view that D&T "empowers people to operate effectively, creatively and confidently in the made world", the development of "non-verbal mode[s] of thought … [as] a distinctive aspect of creative thinking" (p.3) and "our understanding of the nature of technology" (p.4). In 1992, the National Curriculum Council (1992) published a report on the case for revising the 1990 Technology Order, that built on Layton's report. The council recommended keeping the focus on practical and conceptual skills and not reverting to traditional craft skills or the previous subjects of Home Economics and CDT. However, there was a noticeable shift in focus of the amount of time spent teaching pupils about different materials in D&T and a reduced emphasis on human values (Paechter 1993). During the review period, the Engineering Council had lobbied for engineering and construction to have more prominence in D&T, which may have influenced the NCC (1992) recommending that 50% focus of time be spent on construction materials with textiles classified as a construction material.

Layton's report and the NCC recommended changes to the content and assessment were accepted (Department for Education 1992), but once again included no defined aims or purpose of D&T. Further changes were proposed and accepted in Dearing's (Schools Curriculum and Assessment Authority 1994) report to John Patten, then Secretary of State for Education, which also recommended the separation of D&T and IT into two distinct subjects, with Home Economics part of D&T. This separation was significant, as it further solidified D&T's position as an independent subject. The lack of clearly defined aims continued to pose challenges for the subject's identity and implementation. The period from 1990 to 1994 thus represents a crucial phase in D&T's evolution, marked by its formal creation as a unified subject, at least under a single name, in the National Curriculum, but also by ongoing debates about its nature, content, and purpose. These debates would continue to shape the subject in subsequent years, reflecting the broader tensions between vocational and general education, and the challenge of defining a new subject that drew from diverse disciplinary traditions.

1994-2004: From Compulsory D&T to Curriculum Flexibility

The period between 1994 and 2004 saw significant changes in the status of D&T within the curriculum, as well as broader shifts in 14-19 education policy. Higham and Yeomans (2007) highlight that this period was characterised by a gradual retreat from the national curriculum subjects introduced in 1988. This retreat was particularly evident in the case of D&T. Changes were made to legislation in 1996 that meant whilst pupils still had to study 10 subjects in upper secondary school (key stage 4), short courses were introduced in D&T (and other subjects), that meant not all pupils had to study a full General Certificate of Secondary Education (GCSE). This was followed in 1998 by opportunities for some students to disapply D&T, alongside Science and Modern Foreign Languages. A further marker for the significant decline in GCSE D&T came in 2004 when the Qualifications and Curriculum Authority (QCA) (Department for Education and Skills 2004c) announced that D&T, along with other subjects, was no longer compulsory for all 16 year olds to study for the GCSE. Now, D&T became an 'entitlement' subject, meaning it had to be offered in some form to all students, but they did not have to take it.

There was also the development of broader vocational options at Key Stage 4. The introduction of GNVQs (General National Vocational Qualifications) in the mid-1990s, followed by the Vocational GCSEs in the early 2000s, provided alternatives to the traditional GCSE D&T courses. These developments reflected a growing emphasis on vocational education and the perceived need for greater curriculum flexibility to meet diverse student needs. This shift potentially harkened back to the tripartite system and reignited debates about the role of practical education. The curriculum debate was opened even further with the appointment of the Working Group on 14-19 Reform (the Tomlinson Group) in 2003. The government's response to the Tomlinson report, as outlined in the 14-19 Education and Skills White Paper (DfES 2005a), proposed the development of 14 vocational lines of learning leading to specialised diplomas, which would run alongside existing academic qualifications. This decision had important consequences for the status and content of D&T within the curriculum, discussed in the next section.

These developments reflect the complex interplay between subject-specific changes and broader shifts in education policy during this period. The transition of D&T from a compulsory subject to an entitlement one was part of a wider trend towards increased curriculum flexibility and choice, particularly in the 14-19 phase with new vocational qualifications (the diplomas) that some schools would see as an alternative to D&T.

During this period there were three further iterations of the National Curriculum. A revised third version of the D&T curriculum (Department for Education 1995) was

taught in schools from August 1995 and lasted only four years. Following a whole curriculum review the 1995 version was replaced in 1999 with new Programmes of Study and taught from 1st August 2000. For the first time a description of D&T was included, along with a stated purpose:

> Design and technology prepares pupils to participate in tomorrow's rapidly changing technologies. They learn to think and intervene creatively to improve quality of life. The subject calls for pupils to become autonomous and creative problem solvers, as individuals and members of a team. They must look for needs, wants and opportunities and respond to them by developing a range of ideas and making products and systems. They combine practical skills with an understanding of aesthetics, social and environmental issues, function and industrial practices. As they do so, they reflect on and evaluate present and past design and technology, its uses and effects. Through design and technology, all pupils can become discriminating and informed users of products and become innovators
>
> (Department for Education and Employment 1999, p.15)

This statement remained the same in the 2004 revision (Qualifications and Curriculum Authority 2004).

As a purpose statement, it represents and attempt (maybe unknowingly by its authors) to reconcile the various strands of D&T's history. It maintains links to the subject's vocational and practical roots ("They combine practical skills with an understanding of aesthetics, social and environmental issues, function and industrial practices") while embracing a broader, more inclusive educational philosophy. The statement places D&T as a subject that prepares all students for life in a technological society, not just for specific careers ("Design and technology prepares pupils to participate in tomorrow's rapidly changing technologies"). Additionally, it reflects the gradual shift throughout the 20th century from narrow, gendered vocational training towards a more comprehensive, liberal education that still maintains practical relevance ("They learn to think and intervene creatively to improve quality of life").

Also during this period ran several government and industry funded initiatives aiming to develop the teaching of D&T. The subject's association, the Design and Technology Association (D&TA), managed some of these including the CAD/CAM in Schools initiative, and the Marconi ECT (Electronics and Communications Technology) project. These two funded projects, supported by a range of organisations including the Department for Education and Employment, the Confederation of British Industry, the Warwick Manufacturing Group at Warwick University, Marconi Pic and the Institute of Electrical Engineers, aimed to increase teachers' subject knowledge in new technologies. Breckon (2001), then Chief executive of D&TA, claimed the CAD/CAM in Schools initiative modernised the D&T curriculum regarding computer-aided design (CAD) and computer-aided manufacturing (CAM) by providing professional development for teachers and new classroom resources. Concomitantly to the CAD/CAM initiative, the Marconi ECT project aimed to address the skills shortage in the electronics and communications industry (Breckon 2000) by retraining existing D&T teachers. Through influencing GCSE examination content both projects probably increased the prominence of CAD/CAM and electronics in the 2004 National Curriculum and in most versions since then. Both projects bear the hallmark of TVEI focussing on education meeting an economic and industry/skills purpose, leaving an indelible mark on the purpose of D&T. The projects primarily focussed on the material areas of resistant materials and systems and control, and blurring the lines between D&T and IT, which continued to affect the content in each subsequent version of these projects of the National Curriculum for both subjects. Textiles technology and particularly food technology were involved on the periphery, thereby reinforcing Paechter's and Rutland's views (discussed earlier) of the gendered nature of D&T and subcultural retreat of food and textiles teachers.

2004-2011: National Strategies and the 14-19 Education and Skills Act

This next period saw policies that contradicted and confused the purpose and place of D&T in the curriculum: the National Strategy, a new curriculum, and diplomas.

In December, 2004 framework and training guidance for Design and Technology were published by the Department for Education and Skills as part of the Key Stage 3 National Strategy (Department for Education and Skills 2004a). The aim of the National Strategy was to "transform educational achievement" (Department for Education and Skills 2004b, p.1), with teaching and assessment guidance produced for schools for English, maths, science, ICT and foundation subjects, of which D&T was one. Amongst other aims, the D&T guidance aimed to "help teachers to refocus their attention on the teaching of designing skills, developing creative thinking skills and encouraging autonomy" (Department for Education and Skills 2004a). Despite design being a common thread across the subjects that formed D&T, the National Strategy's focus on design skills suggests teachers had not fully embraced this unifying element. These disconnects between D&T's theoretical foundations and classroom practice highlights the ongoing challenges in establishing the subject's identity and purpose.

In 2007, the QCA consulted on a new curriculum for key stages 3 and 4 (Wakefield and Hardy 2023), which led to another revised D&T curriculum with reduced content and a modified statement of the importance of D&T. In the 2007 National Curriculum revision, there was a notable shift in approach to curriculum design. According to Young and Muller (2010), this iteration of the curriculum 'under-stipulated' knowledge content. They argue that this led to a blurring of boundaries "between subjects and between school knowledge and everyday knowledge" (p.19). This change in curriculum structure had significant implications for how subjects, including Design and Technology, were conceptualised and taught in schools, with a shift towards transferrable, generic skills, away from pupils learning a body of subject specific knowledge and skills. This was, in part, driven by a need to slim down the content for more space on the timetable for the core subjects (English, maths, science and ICT) and, as seen with the National Strategy, a greater emphasis on pedagogy.

The 2007 "Importance Statement" for Design and Technology marked a significant shift from its predecessor in both the 1999 and 2004 D&T curriculum. While retaining core elements such as creativity, problem-solving, and practical skills, the 2007 statement introduced several notable changes:

1. An increased emphasis on practical skills, mentioned three times compared to once in 2004.
2. A more explicit focus on contextual learning, highlighting the importance of "stimulating contexts that provide a range of opportunities and draw on the local ethos, community and wider world" (QCA 2007).
3. A broadened scope of issues for students to consider, adding "cultural, health, social, emotional" factors to the existing list.

Despite these changes, the fundamental purpose of D&T remained consistent, with innovation, creativity, and improving quality of life still at its core (Qualifications and Curriculum Authority 2007). The 2007 revision represented a nuanced evolution of the subject's aims, balancing continuity with a more comprehensive and context-driven approach to learning.

Having said that the 2007 curriculum focussed on soft skills rather subject specific knowledge and skills, two national projects for D&T teachers contradicted this: Digital D&T (2008-2013) and Licence to Cook (2007 onwards). Like the CAD/CAM Initiative and Marconi project, Digital D&T aimed to address D&T teachers' skills in using and teaching digital technologies. The 'Licence to Cook' initiative was the only programme that spotlighted food, aiming to meet the government's aim of entitling every child to cook in school, which was in response to the projected rise in obesity (Rutland 2008). Early in the project's implementation, Rutland

(2008) foretold the end of food technology as part of D&T because of the project's domestic and utilitarian perspective of food, rather than the economic purpose of the three D&T projects. Interestingly, these subject-specific initiatives seemed to run counter to the broader curriculum focus on generic skills, highlighting the ongoing tension between developing practical expertise and fostering transferrable capabilities in D&T education.

Outside of the D&T curriculum changes, the 14-19 policy changes were indirectly affecting the confusion over D&T's academic or vocational position and purpose of D&T. As mentioned, the 14-19 policy brought in 17 diploma awards and several related to aspects of D&T National Curriculum content, including hospitality and catering, creative and media, engineering, construction and the built environment, information technology and society, health and development, environmental and land-based studies, manufacturing and product design.

The diplomas reinforced the impression that D&T was a vocational subject, with D&T teachers involved in teaching the new diplomas instead of GCSE and A levels.

Diplomas remained in place until Michael Gove became Secretary of State for Education in the Coalition government in 2010, when he abandoned diplomas, partly as a cost-saving exercise but also to refocus on traditional, knowledge-based academic subjects. This focus on knowledge contradicted Labour's education policies that focused on skill development, which had aimed to redress inequality by focussing on skill progression (particularly transferrable and generic skills), and a personalised education equipping young people for employment. This shift back towards traditional academic subjects posed new challenges for D&T, requiring the subject to reassert its value within a knowledge-focused curriculum landscape.

2011-2023: Focus on a knowledge-rich curriculum

Following the period of skills-focused curriculum development, the election of the Coalition government in 2010 marked a significant shift towards a knowledge-rich curriculum, with profound implications for D&T. An "Expert Panel" was gathered to the review the National Curriculum and in their published report (Department for Education 2011) proclaimed D&T had insufficient disciplinary coherence and should only form part of a basic curriculum, with curriculum content informed by the local context. Therefore, D&T would become a non-compulsory, non-statutory subject; a transformation from its status as a compulsory subject in the first National Curriculum 21 years earlier. This recommendation represented a dramatic reversal of D&T's status, potentially undermining two decades of development as a core subject.

Concurrent with this report was the introduction of the English Baccalaureate (Ebacc), a new performance measure that emphasised the importance of a broad and disciplinary? curriculum (Department for Education 2016). The Ebacc measures pupil's progress in five subjects only (English, mathematics, science, a humanities subject and a language), which excludes D&T. An argument for introducing the Ebacc was to increase the number of pupils following a broad and balanced curriculum (Education Committee 2011) through to the end of secondary school. The five Ebacc subjects were set out as providing the essential knowledge all pupils need as part of a general education; justification for this was influenced by Hirsch's (2006) cultural literacy arguments (ascribed to by Michael Gove 2014), and Young's (2008) views about powerful knowledge (referenced by Expert Panel, Department for Education 2011). The Ebacc marked a clear departure from the previous government's focus on skills and vocational education, privileging instead disciplinary and subjects perceived as being knowledge-rich subjects (Hardy 2017).

When analysing the development of science as a subject, Layton (in Anstead, Goodson and Mangan 2002, pp.23-24) suggested three stages to science's emergence: firstly, the subject is pertinent to pupils'

needs and has utility, secondly it becomes established with a scholarly base with growing academic status, thirdly the teachers are identified as a professional body. But as has been shown D&T did not follow these stages, omitting the second crucial stage two, because as Layton (1993, p.13) noted: "Technology [D&T] does not have a well established role model in higher education"; this absence of a scholarly base may have influenced the Expert Panel's views of D&T in their 2011 report when they posited that D&T had insufficient disciplinary coherence. This lack of a clear scholarly base has continued to pose challenges for D&T's status and identity within the curriculum, making it vulnerable to policy shifts.

At the same time as D&T's marginalisation from the National Curriculum, Information Communication Technology (ICT) (formerly IT) became "Computer Science" and had an increased focus on programming and coding, partly because of pressure from industry (for example see the 2011 MacTaggart lecture given by Eric Schmidt, Google's chief executive, when he criticised the then current ICT Curriculum). Additionally, computer science was recognised as a science and so could be included in the Ebacc; consequently, IT became a subject with higher status than D&T.

The National Curriculum review led to a proposed revised D&T curriculum, published in February 2013 by the Department of Education (DoE) and revealed the depth of confusion about D&T's purpose and content. The proposal excluded programming, electronics and other "modern" content and the "Purpose Statement" was a step back to the past with pupils learning craft skills and making "well-crafted products". Food technology was marginalised in the D&T National Curriculum and replaced under a separate heading within the D&T section entitled "Cooking and Nutrition". Rutland and Owen-Jackson 2015, p.472) argued this new content for food would not be "appropriate for the twenty-first century and [will not] properly prepare pupils for citizenship and employment". Once again, external factors affected the curriculum content for D&T, such as D&T's relationship with ICT, policy makers' differing interpretations of "technology" and "design and technology", and the recurring conflicting economic, utilitarian and democratic purposes of schooling.

After lobbying from D&TA and the Royal Academy of Engineers (RAE), a new version of the D&T curriculum was written by a committee of over 40 representatives of education and industry (compare with McCormick 1990), which removed all mention of craft skills and bore many similarities to previous versions. Accepted with minor revisions by the government, the purpose of D&T retained creativity, innovation became imagination, and whilst not mentioning skills, it was still clearly seen as a practical subject. D&T subject knowledge now linked to engineering, computing and art – previously links were only with science and maths.

> Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.
>
> (Department of Education 2013, p.192)

The new aims of D&T were to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

(Department of Education 2013, p.192)

This back-and-forth process of curriculum development reflects the persistent challenges in defining D&T's core purpose and content, balancing traditional craft skills with modern technological approaches.

In a further twist, legislation in 2013 stated only local authority-controlled schools must teach the National Curriculum, academies were required only to teach a broad and balanced curriculum, resulting in some schools choosing to offer an alternate version of D&T. However, Diana Choulerton (2016), lead Ofsted inspector for D&T, warned schools against veering too far from the National Curriculum as it could have consequences on pupils" progression and achievement at GCSE.

This period from 2011 to 2023 represents a tumultuous time for Design and Technology education in England. The subject faced significant challenges to its status and identity, navigating shifts in educational policy that emphasised knowledge-rich curricula and traditional academic subjects.

2023: Jostling Around the Curriculum

The 2013 National Curriculum for Design and Technology has remained in place longer than any previous iteration. In recent years, there has been a renewed effort to influence curriculum development, reflecting ongoing debates about the subject's purpose and content.

Between late 2022 and early 2023, various stakeholders began circulating proposals for curriculum changes. Most notably, Pearson Education announced plans to launch a new qualification, GCSE Design and Sustainability. This proposal aimed to address the concerning decline in D&T uptake - a 50% fall in pupil numbers from 2009 to 2020, accompanied by a significant reduction in the secondary teacher workforce (Tuckett 2022). while garnering support from various design organisations and creative industries, The Pearson proposal (2023), raised important questions about curriculum development processes. As academics in the field, three of us published an analysis examining the implications of private company involvement in curriculum design (Hardy, McLain and Davies 2023).

These developments catalysed the formation of a coalition, led by the Design Council, which brought together a diverse range of organisations and individuals with vested interests in D&T education. This group included experts from school-based design education, higher education, and industry[1]. Their collective aim was to ensure that any future curriculum changes would reflect the breadth of knowledge and skills required across the educational spectrum and in professional practice. The outcome of this collaborative effort was a report published in June 2024 (Design Council). This document aimed to provide evidence-based proposals for policy changes that a new government might consider, grounded in a comprehensive understanding of D&T's role in education and society with four key recommendations:

1. Refine and renew the D&T subject content for 11-18-year-olds, aligning it to inclusive innovation and sustainability.
2. Develop and implement a funded strategy for D&T teacher recruitment, training, CPD and retention.
3. Consider D&T in any reform of school accountability, performance and inspection measures.
4. Put design at the heart of a reformed broad, balanced and creative curriculum.

In August 2024, the new Labour government, elected as this research was ongoing, announced a curriculum review to be led by Professor Becky Francis. This development underscores the ongoing importance of understanding D&T's historical context and the need for evidence-based approaches to curriculum development.

[1] You can hear the views and thoughts of different members from this group on the Talking D&T podcast.

The coming years will likely see further debates and potential changes to D&T education. It is my hope that this historical analysis will provide valuable context for these discussions, ensuring that future developments are informed by the rich and complex history of the subject. The real challenges facing D&T - including the perceived value of its curriculum and the unintended consequences of education policy reforms - require thoughtful solutions that prioritise pupils' education and the subject's long-term viability.

Conclusion

This report has traced the evolution of Design and Technology (D&T) education in England from its early 20th-century roots to its current position in the National Curriculum. The history shows how D&T emerged from a complex interplay of societal needs, economic pressures, and educational philosophies. From its origins in gendered subjects like 'housewifery' and 'manual work', D&T has transformed into a subject aiming to prepare all students for life in a technological society.

Key themes in this evolution include:

- The ongoing tension between vocational and general education aims
- The challenge of defining 'technology' in an educational context
- The impact of changing economic and industrial needs on curriculum content
- The subject's struggle for status and identity within the broader curriculum
- The influence of gender on subject content and access

Through drawing on a wide range of sources, four consistent purposes of the subject have been seen to remain consistent over the last hundred years:

1. Individuals' and society's economic and domestic needs
2. Responding to the effect of new scientific and technological knowledge
3. As a component of a general education
4. Meeting the needs of pupils of different abilities and interests.

There was a momentary and pragmatic need in response to the centralisation of the curriculum resulting in the National Curriculum in 1990, which Knight (1996) defined as a realpolitik approach - saving teachers' jobs and creating timetable space.

Design and Technology can trace its roots through several different subjects including craft, design, technology, Home Economics and technical drawing. Each of these had their own unique content with some overlap as shown in the Curriculum Matters publications. Their purpose also differed; historically the curriculum for each was gendered, aimed at girls learning skills for domestic service or running a home; boys were trained to work in manual labour or preparing for apprenticeships and occasionally engineering careers. The challenges of merging distinct subject cultures highlight the complexities involved in curriculum reform, demonstrating how teachers' professional identities and established subject traditions can significantly influence the implementation of new educational policies.

The purpose of D&T has subtly changed throughout the six versions of the D&T National Curriculum, although there have been several regular features, including creativity, technological awareness and problem-solving. Creativity and creative thinking were explicitly mentioned in each version, or government commissioned reports (see Parkes report (1988), Layton (1991), and 2007 and 2013 curriculum for examples). From the Parkes report onwards, all official documents have indicated that a purpose of D&T is designing and making products and solving identified problems. However, the reason for children designing and making products has varied, for example in 1999, 2004 and 2007 versions the reason was about "improving quality of life", and in 2013 became part of the contribution D&T education makes to the "well-being of the nation" in 2013 (p.192). An awareness of

the impact of technology has featured constantly but in various forms:

> make critical appraisals of … the implications of artefacts and systems" (Department for Education and Science and the Welsh Office 1988, p.17. cf Layton (1991))

> reflect on and evaluate present and past design and technology, its uses and effects (Department for Education, and Employment 1999, p.15. cf 2007 and 2013 versions)

Enabling pupils to become effective users of technology was mentioned by the Parkes report (1988), becoming "discriminating and informed users" in 1999, but mentioned in the 2013 version but only mentioned obliquely as being "capable citizens" (p.192). Being able to create and recognise "good design" has been a common theme since Eggleston's Keele project. Creativity and problem-solving have been recurring skills and capabilities in D&T, HE, design, technology and education. More generic skills such as teamwork, and moral development have also been mentioned regularly in D&T's history as part of the contribution it makes to an individual's education. Craft has faded away over time and no longer features in the National Curriculum (see Department of Education 2013); this contradicts the ascendancy of craft (Sennett 2008) outside of formal education in alternative learning spaces such as makerspaces (Leonard, et al. 2023) which some suggest could be used within formal education (Walan and Gericke 2023).

Lessons for Future Curriculum Reviews

As a new curriculum review begins, several lessons from D&T's history could inform the approach:

- **Clarity of Purpose:** Throughout its history, D&T has grappled with defining its core purpose. Future curriculum development must clearly articulate D&T's unique contribution to students' education, balancing practical skills, technological literacy, and creative problem-solving.
- **Responsiveness to Societal Changes:** D&T has consistently evolved in response to technological advancements and economic needs. Future curricula must maintain this responsiveness while ensuring a foundation of enduring principles and skills.
- **Inclusivity:** The subject's history reflects a journey from gendered curricula to a more inclusive approach. Future developments must continue to ensure D&T is accessible and relevant to all students, regardless of gender, background, or career aspirations.
- **Balancing Tradition and Innovation:** While embracing new technologies and practices, curriculum reviews should not discard established skills and knowledge. The history of D&T shows the importance of evolution rather than revolution in curriculum development.
- **Stakeholder Engagement:** The most successful curriculum changes have involved input from a wide range of stakeholders, including teachers, industry professionals, and subject associations. Future reviews should continue this collaborative approach.
- **Status within the Curriculum:** D&T's position has fluctuated from core subject to 'entitlement'. Future reviews must make a strong case for D&T's value in a balanced curriculum, drawing on its unique ability to integrate knowledge from various disciplines.

In conclusion, the rich history of D&T education in England provides valuable insights for shaping its future. By learning from past successes and challenges, it is possible to ensure that D&T continues to evolve as a subject that equips students with the skills, knowledge, and mindset to thrive in an increasingly technological world. The next curriculum review presents an opportunity to reaffirm D&T's vital role in education, drawing on its unique capacity to blend creativity, practical skills, and technological understanding in preparing students for the challenges of the 21st century.

Timeline

Year	Policy/Event	Impact on D&T Education
1904	Education Act	Introduced 'drawing ... manual work, and for girls, housewifery'
1913	Acland Report	Advocated for 'handwork' as part of a liberal education
1944	Education Act	Established tripartite system, including technical schools
1962	Crowther Report	Introduced 'The Alternative Road', advocating practical education
1967	Schools Council Project in Technology	Aimed to integrate technology across the curriculum
1988	Education Reform Act	Led to creation of National Curriculum
1990	First National Curriculum	Established D&T as compulsory subject for ages 5-16
1995	Revised National Curriculum	Third version of D&T curriculum implemented
1999	Curriculum 2000	New Programmes of Study for D&T introduced
2004	New National Curriculum	D&T no longer compulsory for GCSE, became 'entitlement' subject
2007	New Secondary Curriculum	Revised D&T curriculum with reduced content
2011	National Curriculum Review	'Expert Panel' recommended D&T become non-statutory
2013	National Curriculum	Proposed changes to D&T, later revised after lobbying
2014	New National Curriculum	Current version of D&T curriculum implemented
2023	Curriculum review	

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