University Technical Colleges

English Technical and Vocational Education in Historical and Comparative Perspective

Considerations for University Technical Colleges

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A report for the Baker Dearing Educational Trust

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English Technical and Vocational Education in Historical and Comparative Perspective: Considerations for University Technical Colleges

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Contents

Summary

Scope and purpose of the report
The report reviews trends in technical and vocational education since the 1880s in the UK and in four other counties: Germany, the USA, Japan and Sweden.

From the evidence presented, comparisons are made as to the common and divergent elements of technical and vocational education at the school level in the respective countries. Seven specific conclusions are drawn, relevant to those pioneering University Technical Colleges in England.

School-based technical education, 1880s to 1918: UK, Germany, the USA, Japan and Sweden
At various dates from the 1820s to the 1870s, these countries introduced compulsory elementary education. The date of implementation varied depending on political configurations locally, rather than as a specific response to patterns of occupation change. The age range mandated to attend school typically embraced 6–13 year-olds. Only in Britain was it enforced on 5 year-olds.

In all but one of the countries there was significant promotion of school-level technical education in the 1880s and 1890s (Sweden followed in the next decade), as industrial production grew in scale and became centred on aspects of engineering, notably metal working and machine tools. At the same time, apprenticeship structures based on craft guild control over certification were protected in Germany but left unregulated elsewhere.

Technical education expanded mainly at the higher levels of education. However, publicly-funded specialist technical schools were initiated in all of these nations variously from the 1890s to the 1920s, either in secondary schools or as the upper-tier of elementary schools.

Patterns varied, influenced by the extent of apprenticeship regulation. In the USA the expansion of comprehensive secondary schooling carried all before it from the 1920s. Elsewhere, part-time 'continuation education' developed for school leavers in the 12–15 age range (and was compulsory in Sweden after 1921), while full-time specialist and general schools for the same age range sat alongside each other well into the mid-decades of the twentieth century.

Specialist technical education was pioneered at the school level in England, Wales and Northern from 1905 through junior technical schools (13–15/16). Alongside these schools there were, in England and Wales, central schools (11–16), some of which specialised in vocational curricula until the late 1920s. From the outset in England and Wales there was employer indifference to the content of this education. However, it did open up entry to some occupations and was popular with 'skilled worker' households in urban areas, despite the often rudimentary nature of school premises.

School-based technical education, 1918–1945
During the 1920s, patterns of employment and in-company training diversified, building on the distinctive arrangements introduced in the various countries during 1890–1914. This influenced school organisation in important ways into the early 1960s, and educational responses to economic fluctuations thereafter.

In the USA, expansion of full-time, comprehensive ('high') schools continued its important nation-building role, sitting beneath a largely unregulated labour market and achieving secondary school attendance among 14–17 year-olds far in excess of other countries – two thirds by 1940.

In Japan, large corporations with complex internal job markets dominated employment. This encouraged a fiercely meritocratic school system based on entry examinations and was able to accommodate, from 1947, comprehensive reorganisation (to the age of 15) imposed by the American occupying authorities, with the support of local teachers.

In Sweden, neutral in both wars but depressed in the 1920s, unbroken social democratic government after 1932 made possible an

industrial settlement disposed toward expansion of full-time schooling rather than apprenticeship training.

In Germany, systematic work was undertaken to standardise the skills profiles of apprenticeship trades within the regulated craft training framework enacted in 1897, a promise of high quality youth employment which offset social pressures that might otherwise have arisen from early differentiation of pupils (at the age of 9/10) to parallel schools, based on general ability.

In Scotland no specialist technical strand of schooling developed but in England, Wales and Northern Ireland the junior technical schools provided a means for a small cadre of pupils (4% in England and Wales in the 1930s) to continue full-time specialist education, while the large and powerful trades unions attempted to control work-based training.

Outside America, with its large growth in the population of full-time high school students, all of the other countries maintained into the early 1960s varying forms of parallel general and technical schooling after the age of 12.

School-based technical education in the UK, 1945 to the mid-1980s

After much debate during 1940–41, the age of transfer from primary to universal secondary education after the war in England and Wales was set at 11 (rather than 13).

Some selective secondary technical schools were established from 1945 but provision remained small and peaked in 1954 (at 4.9% of the cohort) as politicians, local authorities, employers and most parents failed to back the attempt to expand the old junior technical schools. Scotland had no strand of such specialist secondary schools but they prospered in Northern Ireland (at 'intermediate' level) in the 1950s and on a large scale – one in six of pupils over the age of 11 – before being absorbed into further education in the 1960s.

From later in that decade, as comprehensive schools became the norm, technical education sat uneasily between two traditions: 'academic' grammar school science and 'vocational' modern school technology and crafts. Strong technical qualifications failed to develop in the context of growing parental demand for school-leaving certificates.

As the economy and youth employment prospects deteriorated through the 1970s, the UK government intervened increasingly in the comprehensive school curriculum, culminating in the Technical and Vocational Education Initiative (TVEI), from 1983 (England, Wales and Scotland) and the National Curriculum, from 1989 (England, Wales and Northern Ireland). However, rather than heralding, as promised, the 'rebirth of technical education', some critics saw in TVEI a 'colonisation' of the comprehensive school curriculum in favour of progressive, active-learning methods. More widely, TVEI was seen as failing to secure the coherent, skills-related curriculum, 14–19, that had been intended.

School-based technical education beyond the UK, 1945 to the mid-1980s

As in Britain after 1945, other industrialised countries set about expanding small-scale provision of secondary education. Also as in Britain, in most places this entailed dismantling senior elementary education (roughly, a 10–15 phase) by setting a universal age of transfer to secondary schools and determining how technical education should be provided at secondary level. Significant in these countries – and highly varied among them – was the organisation of 'lower' and 'upper' secondary education beyond a broadly similar primary phase.

Exceptions to this pattern included Sweden where, from 1962, a wholesale commitment to the community comprehensive school led young people aged 7–16 to attend the same institution, eliminating the concept of transfer to secondary education. At upper-secondary level from the early 1970s, almost all Swedish students transferred to a different comprehensive school offering vocational options within what became, from the mid-1990s, a common three-year curriculum.

In the USA, what now amounted to near-universal participation in common schooling to the age of 17+ was differentiated for a small minority who accessed specialist upper-secondary technical schools at the age of 14+ or 15+.

In Japan, common elementary and middle schools attended between the ages of 6 and 15 (with transfer at 12+) were imposed in 1947 by the USA as occupying power. A specialist technical stream from 15+ expanded rapidly during the 1960s as part of a trend to cohort-wide transfer to upper-secondary provision.

In West Germany, by contrast, the expansion and reorganisation of secondary education from 1964

retained selection by ability at the age of 9/10, while introducing a tripartite hierarchy of lower-secondary institutions from which a majority of the age group entered a system of apprenticeship training at age 16, reformed and strengthened through legislation in 1969.

Comparative developments since the mid-1980s

As the long-post-war boom drew to a close, and the youth labour market experienced contractions, in each of these countries participation beyond the school leaving age (now typically 16, but later in the USA) grew rapidly from the 1980s, as did higher education provision.

The trend in Germany since 2002 has been toward a more common, subject-based curriculum in lower-secondary education (ages 10–16), with some increase in comprehensive organisation at this level. The German apprenticeship system from 16+ remains very large by international standards but is under significant strain as skill-intensive manufacturing is exposed to global labour costs.

Against the general pattern, both the USA and England (alone within the UK) have reintroduced elements of selection to specialist schools – at 14+ in the USA (from the 1960s, via 'magnet' schools) and at 11+ in England (from 1988, via City Technology Colleges).

Sweden and Japan have both experienced painful economic adjustments since 1990. The means of differentiating students within patterns of universal participation at the upper-secondary level (15/16 to 18/19) has been a major feature of developments in both countries.

Conclusions and implications for University Technical Colleges (UTCs)

UTCs are forging a new path on the international stage. Their success will depend ultimately on legitimacy secured within the English educational system – on the part of parents, especially, but also among politicians and sponsors from higher and further education, and in terms of respected qualifications attained by students.

Specialist upper-secondary technical schools exist outside the UK and, of those reviewed here, the 'career academy' magnet schools of the USA are most similar (in key respects) to UTCs and serve as an interesting comparative model.

This comparative and historical review offers seven specific conclusions relevant to UTCs.

Age range. The creation of specialised UTCs for the 14–19 age group is a bold and significant innovation in English – and UK – education. It recreates the starting age of specialisation on which junior technical schools were based in England and Wales from 1905 to 1944 and which technical education specialists argued, in 1940–41, should be the basis of post-war planning. It also avoids the major problem encountered by secondary technical schools from 1945, that of operating selection by technical ability/aptitude at the age of 10/11 when its rationale had been rejected by scientific opinion in the UK, Germany and Sweden at this time. 14–19 'career academy' magnet schools in the USA have won legitimacy when recruiting to specialist programmes at the age of 14, not least because, in numerous states, there has been a tradition of school transfer at 14+ for many decades.

Selection at 13/14. City Technology Colleges (from 1988), specialist schools (from 1998) and academies (from 2002) have reintroduced partial selection by aptitude at the age of 10/11 to English secondary school education. This is counter to broad trends in European school organisation since the 1980s, including in Germany where traditions of technical education are especially strong. UTCs are distinctive internationally in inviting self-selection based on motivation rather than by ability, as in leading 'career academy' magnet schools in the USA.

Curriculum coherence. UTCs mark a recommitment, through a specialist institution, to the applied and progression-based 14–19 curriculum which was a largely unrealised goal of the Technical and Vocational Education Initiative (TVEI) during 1983–1998. Such programmes were integral to the design of the TVEI (albeit within 11–16 and 11–18 schools) and much recent curriculum policy remains concerned with the coherence of the 14–19 phase as a distinct stage of education. To the extent that full-time and apprenticeship streams will run in parallel in UTCs, there are similarities with Swedish 16–19 common schools where some industry-regulated craft apprenticeships survive. The lycée professionel for 15–19 year-olds in France also has this feature.

The role of qualifications. Qualifications have exerted an ever-stronger influence over English secondary education since the 1920s (linked to the absence of an effective counterbalancing apprenticeship structure). Within this pattern, technical and vocational qualifications embracing elements of general education in the lower

secondary phase have struggled to attract enduring support or respect, individually and collectively, despite being a major initial objective of the TVEI. The fortunes of UTCs in their early years will be tied closely to the success of vocational programmes (currently Diplomas and Young Apprenticeships), especially at the 14–16 stage, as Britain continues its attempt to endow vocational qualifications with some of the institutional strengths of other nations' arrangements – for example the co-regulation of craft skills in Germany and the semi-formal employer-school contracts found in Japan.

The basis of specialisation. Staff development for those teaching in specialist technical schools in England was hampered in the past by low status and the lack of a convincing overall rationale for the work of their institutions. UTCs may find that momentum generated by TVEI in the 1980s, by the technology colleges movement in the 1990s and by Diploma development since 2008 have lessened such past difficulties (although UTCs can expect to receive continued opposition from parts of the teaching profession and elements of public and policy opinion, including in some local authorities). A strong focus on the 'technical' Diplomas should allow UTCs to develop particular expertise and patterns of attainment of a kind not found in those English secondary schools currently designated 'specialist' technology providers.

Appeal to parents and other supporters. The experience of CTCs, the secondary technical schools of the 1940s-1950s and, before them, the junior technical schools of the 1920s-1930s, suggests that UTCs will appeal strongly to certain students and their families in urban localities, notably 'skilled-worker' households. Meanwhile, it is unlikely that UTCs will suffer a key problem faced by secondary technical schools in the 1950s: the strong feeling in professional and high-aspirant households that they were second best to grammar schools. Few local authorities now operate selection by ability at 10/11 and, in any case, UTCs will recruit on motivation at 13/14. Employer support, another longstanding difficulty faced, successively, by the junior technical and secondary technical schools is also unlikely to be a problem today, although continued endorsement by employers (and others) of Diplomas and Young Apprenticeships will be important. Small numbers of pupil enrolments and poor facilities also served to dent the credibility of the secondary technical schools when, in the 1950s, they were supposed to stand as a major plank of national provision. However, as CTCs demonstrated later, if the role is different – that of a niche provider, offering attractive facilities and a challenge to the status quo – then absolute numbers are irrelevant.

The UTC school leaver and the role of higher education. The public link of UTCs to sponsors from higher (and further) education is especially important. Across Europe, all countries have expanded dramatically their higher education provision since the days of the secondary technical school in the 1950s. In this context, an applied technical curriculum phase, 14–19, leading to worthwhile further and higher education, is the realistic goal of UTC provision. Similarly, UTCs offer an environment in which highly motivated young apprentices (aged 14–16) can be expected to benefit from an ethos of hands-on learning, with clear opportunities for progression, either within a school already strongly attuned to their interests and capabilities, or in further education.

Chapter 1
Introduction

University Technology Colleges

In December 2008 it was announced that the University of Aston and Birmingham City Council had agreed the site for England's first University Technical College (UTC). By the end of 2009 other partners were planning to establish further colleges. The purpose of UTCs is:

to offer 14–19 year olds the opportunity to take a highly regarded, technically-oriented course of study at a specialist college, equipped to the highest standards, sponsored by a university or FE College, and offering clear progression routes into higher education or further learning in work. Their focus will be disciplines requiring specialised equipment, for example, engineering, manufacturing, product design, construction and the building trades, and land and environmental services, together with an associated emphasis on the development of business skills and the use of ICT.

UTCs will typically have between 500 and 800 students. They will be developed under the Academies programme. There will be two streams of entry, with scope to move between them: Diploma programmes, and apprenticeships, including Young Apprenticeships for 14–16 year olds. All students between 14 and 16 will study the core requirements of the National Curriculum – Maths, English, Science and IT, as well as Religious Education and Sport.

In November 2009 the Baker-Dearing Trust, the charity behind the creation of University Technical Colleges, commissioned the authors to undertake a contextual study designed to support and inform the development of these new schools. Specifically, the task given was that of 'exploring past experience of technical and vocational education initiatives in England, coupled with comparisons of current policy and practice in the four nations of the UK and internationally'.[1]

The specific structure of the report was left open but the following elements were envisaged:

- a review of technical and vocational education initiatives in England since 1945, outlining their main features, strengths and weaknesses;
- a comparison of current policy and practice as it relates to technical and vocational education for young people in compulsory secondary education (a) in the four nations of the United Kingdom and (b) internationally, including as a minimum examples drawn from northern Europe, Scandinavia and North America;
- comments on the challenges likely to UTCs, based on historical evidence, international comparisons and the current educational landscape in England.

In developing our report we have kept these purposes firmly in mind but, for reasons explained in the next chapter, have widened the brief to include developments prior to 1945 and pertinent aspects of post-compulsory education as these impinge upon and influence the compulsory phase.

Subject matter, method and acknowledgments

The specific focus of our report is the development of technical and vocational education at school level in the UK, Germany, the USA, Japan, and Sweden: how it developed over the course of the twentieth century, its relation to other aspects of education in each country and its current position. Our reason for tracing developments in technical education over this period is to provide an appreciation of why it is that national traditions have been so varied and enduring, and what this implies for those undertaking innovations in the present.

In doing so we have sought to incorporate narrative accounts of how those policies and practices most pertinent to UTCs have developed in varied national settings (including those within the UK). The purpose here is to remind the reader that the actions of individuals, institutions and wider movements are always in dynamic relation and that any foreshortening of the period over which such dynamics have played out is likely to distort how they are depicted. We could have picked up our national accounts in 1945 on the basis that this is the start of the modern era

1. Baker-Dearing Trust briefing document.

in the education policy of developed nations. However, an appreciation of technical and vocational education surely has to take account of patterns of industrialisation. When this is done it is striking, as we show, how varied this process was and how important a bearing it retains on present-day concerns.

At the same time, we have also thought it important to draw on a range of analytical perspectives and organising concepts when attempting to assess – separately and together – the significance for UTCs of these national narratives: their particular characteristics, the patterns they share and the space for manoeuvre in the present which they suggest. Thus, we have drawn attention to current thinking about the place of skill creation in nationhood, role of institutions in education and training and the structures of education provision that characterise the practice of technical and vocational education in the recent past and in the present.

In tracing these events and outlining these analytical themes – brought together in this report for the first time and, we hope, assessed in an original way – we have been reliant on and indebted to the wide range of scholars and commentators cited in our references.[2] We have also been fortunate in having at our disposal the expertise of two project consultants, both international authorities in their respective (and highly complementary) spheres: Professor Andy Green (Institute of Education, University of London) in the field of comparative education and training systems; and Professor David Finegold (Rutgers University, New Jersey) in the field of the comparative political economy of skills.

Structure of the report

Chapter 2 of the report provides an account of school-based technical and vocational education in the UK since *c*.1880. This is divided into two phases either side of 1945. In chapter 3 a similar approach is taken to parallel developments in four other countries: Germany, the USA, Japan and Sweden.

These national narratives can be read as separate, self-standing accounts, designed to record with some precision the main contours of trends and episodes. At the same time they can be treated as detailed 'background' before the reader moves to the comparative assessment in chapter 4 where aspects of the national narratives are brought together, conclusions are drawn and their implications for University Technical Colleges explored in a self-standing analysis.

2. It would be remiss not single out for mention in the British context the skill of two scholars whose extensive archival research is so insightful: Professor Michael Sanderson of the University of East Anglia and Professor Gary McCulloch of the University of London.

Chapter 2
Technical and vocational school-based education in the UK, *c.*1880 to 2010

In this opening section an account is given of developments in the organisation and operation of school-level technical and vocational education in the countries of the UK during the twentieth century.

Prologue: The Branksome Dene Hotel, Bournemouth: November 1940

In October 1940 officials of the Board of Education were evacuated from London to a large mid-nineteenth century cliff-top hotel in Bournemouth, the Branksome Dene. Within days of arriving, in early November, the permanent secretary (MG Holmes) had determined that the board needed to begin planning in earnest for **post-war educational reconstruction** in England and Wales. Although the progress of the war was uncertain and its end seemingly years away, Holmes was anxious that, already, 'other persons and bodies' were concerning themselves in a process which he considered 'the board should lead rather than follow'.[1] At its outset, the principal task before the board's Educational Reconstruction Committee was the planning of a reformed system of education, including resolution of two related questions: the ages at which pupils should move from one type of school to another and when they should be allowed to leave secondary education.[2]

The place of technical education was a central component of these discussions and here, as elsewhere in education, a set of tensions had built up during the inter-war years that now required attention. Moreover, with the sweep of the entire twentieth century in view, it can be said that the **questions of technical education** with which board officials wrestled in Bournemouth during 1940–1941 retain a sharp contemporary resonance. They included the following.

- At what age should technical and vocational education commence and, if provided for older groups in specialist schools, what should be the age of transfer to such schools?
- Is it possible to discern specific technical abilities and aptitudes among the pupil population?
- How apt are current conceptions of the link between technical education and job preparation?
- What strong tides of political, professional and public opinion are running in the direction of particular forms of technical education?
- What policy framework would best accommodate the likelihood of varied local initiatives in this area of work?

To a striking degree, each of these questions posed in 1940–41 remains a live consideration in English education today, suggesting that enduring answers have been hard to find. Inevitably, each had its origins in the pattern of technical education that had developed in England and Wales over the previous six decades and it is to this context that the analysis now turns.

Context to 1940

The organisation of schools, 1872–1904

Up to the 1860s, school organisation in nineteenth-century England had evolved through a mix of ancient charitable schools gradually brought under a measure of state regulation alongside, on the one hand, a plethora of small proprietary schools serving fee-paying pupils and, on the other, church schools providing a basic curriculum for a majority of the large population of rural and urban poor.

The main transformation in the reach of the state occurred with the establishment of local school boards from 1872. The boards had a duty to compel the attendance of children between the ages of 5 and 12 with the option of part-time attendance from 11, a measure which in most area was only fully implemented during the 1880s. This age range was catered for by **elementary schools** – the new board schools and a much greater and still expanding number of church schools[3] – which, in tandem, took their place alongside the existing **endowed schools** of ancient (often 16th century) foundation. Financed privately, these latter schools admitted children at the age of 5–6 upwards and retained them until the age of 14, 16 or 18/19.

1. Gosden, 1976: 238; Sanderson, 1994: 114.
2. Gosden, 1976: 240.
3. In 1902 there were approaching 6,000 elementary board schools but over 14,000 elementary church schools, although the total number of pupils in the two sectors was similar due to the larger size of most board schools: Rich, 1970: 109; Maclure, 1969: 7.

After 1872, many school boards also established **higher grade schools**, under elementary regulations for curricula and funding, to cope with expanding demand. In the larger towns in particular, the higher grade schools specialised in educating children who had passed more rapidly than their peers through the seven elementary grades and who wished to remain at school after the age of 12.[4] From the outset, higher grade schools and all but the most liberally endowed grammar schools were able to take advantage of aid offered them by the government to develop science courses[5] and both types of school extended this work from 1899, through legislation which allowed county and borough councils (created the previous year) to supply and aid technical education.[6] Meanwhile, throughout this period the larger and wealthier grammar and 'public' schools[7] largely remained aloof from education in science and technology.

At the creation of local authorities in 1902, higher grade schools were permitted to become 'secondary' establishments (when they were re-labelled 'county' or 'municipal' secondary schools) under county or borough control. This secondary designation resulted in increased income from the Board of Education and increased status, benefits which were extended in 1904 when they began to be funded to provide a four-year course for the 12/13 to 16/17 age group.[8] However, this was the extent of the board's willingness to expand the range of secondary schools at this time. Instead, local authorities were encouraged to establish **higher elementary schools**, designed to offer new places to 12–15 year olds but at reduced capitation since they fell under the elementary funding regulations. In the words of an official report of 1906, the aim of higher elementary schools should be to serve 'the lower ranks of commerce and industry', whilst secondary schools prepared young people for 'the higher ranks and for the liberal professions'.[9] However, higher elementary schools were perceived by most local authorities as expensive to maintain and as an unnecessary 'intermediate' tier.[10] By 1917 only 31 had been established in England and 14 in Wales.[11]

Curriculum, employers and specialist technical and vocational education, 1904–1939

In 1904, new regulations for the **curriculum of secondary schools** were instituted by the Board of Education in response to swingeing criticisms by the inspectorate of their teaching of literature.[12] Influential in this judgment was educational opinion that decried a drift in favour of science in secondary education. This, it was said, ran contrary to the labour market requirement for clerks and teachers, rather than artisans or technologists, and the immediate effect was to diminish the scientific and technical orientation of the higher grade schools, in favour of languages and mathematics – traditional priorities of the grammar schools.[13]

Compounding this, employers showed a broad indifference as to the content of education experienced by pupils in higher elementary schools bound for the 'lower ranks'.[14] A committee of the Board of Education reported in 1906 that employers sought mainly moral qualities from the products of higher elementary schools: they 'should possess habits of discipline, ready obedience, self-help, and pride in good work for its own sake'.[15] These were to become sentiments echoed in successive reviews of employer attitudes to elementary education undertaken by the local authorities and by the Board of Education before and after the Great War. At each point the employer stance was reported as, respectively: 'indifference' (1904), 'little confidence' (1906), 'quite indifferent' (1909), 'disquieting indifference' (1928).[16]

Nevertheless, there was a continued drive on the part of local authorities to meet a growing demand for extended education, including where this set out to accommodate an occupational bias.[17] Two new models of upper-elementary education were pioneered by such local authorities. First, from 1905, in London and later elsewhere, an alternative to secondary education was offered for those winning scholarships in elementary schools via transfer to a **central school**. These schools provided (under 'elementary' funding rules) for the age group 12–15/16.[18] London and Manchester led the way but other authorities also adopted this model, for example Rutland, Warwickshire and Gloucestershire, and central schools were formally encouraged by the Board of Education from 1912. In Manchester, economic considerations dominated: how to secure low cost expansion of school places (i.e. those outside the secondary regulations) at the age of 11+ for those securing a scholarship. London also adopted a selective mechanism but here the aim was to give pupils 'a definite bias towards some kind of industrial work while ensuring that their intelligence shall be fully developed'. By 1912, 312 such schools had been established in the capital containing 42 separate departments (19 commercial, 16 industrial and 7 dual)[19] and they were given a further boost when the 1918 Education Act extended the upper age limit of pupils in elementary schools to 16 (or later in special circumstances). This measure also

4. Sanderson, 1994: 18.
5. Banks, 1955: 14–15.
6. Banks, 1955: 31–32.
7. i.e. fee-paying but 'public' in that the school was accessible to pupils from across the country, rather than private in the sense either of being a proprietary institutions or providing tuition in the homes of the nobility.
8. Board of Education, 1938: 66.
9. Simon, 1965: 265–66.
10. Banks, 1955: 55–56, 60.
11. Banks, 1955: 55.
12. Banks, 1955: 36–37. The Board had been created in 1899 as the single government department for schools.
13. Banks, 1955: 37–50.
14. Simon 1965: 264.
15. Simon 1965: 265.
16. Sanderson, 1994: 74.
17. The churches, which controlled a majority of elementary schools in the inter-war period, were less interested in innovation, see Simon, 1974: 129.
18. These schools were formally encouraged by the Board of Education from 1912, Banks, 1955: 98.
19. Banks, 1955: 99, 98.
20. Simon, 1974: 22.
21. This figure is derived from Sanderson, 1994: 39 and Sanderson, 2007: 272.
22. Banks, 1955: 105, see also Simon, 1965: 192, n.2.
23. Sanderson, 1994: 4. In one study of 16 major industries, it was found that the starting age of apprenticeship had risen steadily during 1909–1925 to a point at which 74% of apprentices started at age 16 or older, *ibid*., 63.
24. Sanderson, 1994: 59–60, 39–50.
25. Sanderson, 1994: 24–25.
26. Sanderson: 1994: 21.
27. Sanderson, 1994: 38.
28. Sanderson, 1994: 39.
29. In Germany at this time the take-up of part-time places in vocational schools among the 14+ age group was 66%, Greinert, 1994: 59.
30. Sanderson, 1994: 67–71; King, 1990: 93.
31. In 1912 the President of the Board of Education confirmed that he wished to encourage a broadening of the curriculum of secondary schools 'to give them an increased bias of

had the effect of encouraging many other local authorities to establish, from the mid-1920s, non-selective, non-fee levying central schools for 11–16 year olds.[20] A decade later approximately 1.5% of pupils left elementary schools for selective central schools.[21]

Second, also from 1905, at first in the northern cities and with immediate finance provided by the Board of Education,[22] non-selective **junior technical schools** sprang up. These catered for the 13–15/16 age group, bridging the period between the end of elementary schooling and the provision of apprenticeship at 14 or 16.[23] Compared to other forms of elementary education, they were expensive to equip and difficult to staff but local authorities such as Leeds and Middlesex had a clear preference for such institutions compared to central schools.[24] Some were trade schools specialising in a particular occupation (such as dressmaking and millinery for girls and engineering and building for boys). Others, especially after revised policy guidance was issued in 1913, provided a more general or practical education for 'artisan or other industrial employment', so as to allay criticism that pupils were being encouraged to specialise at too early an age. However, external examinations were not permitted and the provision had to reflect the local structure of occupational opportunity.[25] Junior technical schools charged fees, usually £3 *per annum*, and were most often an adjunct of a technical college.[26] 37 such schools were recognised in England and Wales in 1913/14, rising to 248 in 1937/38 (of which 18 were in Wales).[27] In the mid-1920s, 0.3% of children aged 11–16 were thought to be in such schools and, throughout the 1930s, a steady 4% of elementary school leavers (2.6% of boys and 1.4% of girls) proceeded to them at the age of 13.[28] As the preceding figures demonstrate, central and junior technical schools were attended by a small minority of the relevant age group.[29] Nevertheless, they were able to wield influence as models of specialist upper-elementary schooling. Junior technical schools were popular with parents and both junior technical and central schools, with their avowedly practical orientation, appear to have opened up new routes to employment, for example among girls in London.[30]

Meanwhile, opportunities for the study of science and technology remained limited for those elementary school pupils winning scholarships either to the endowed grammar schools or, from 1904, to the new four-year course at country and municipal grammar schools. After 1907 there had been some reaction against the regulations which three years earlier had brought about a renewed emphasis on languages and mathematics.[31] Nevertheless, the broadening of the secondary school curriculum proceeded slowly. Public examinations were rationalised in 1917 to form the **School Certificate**, the First or General certificate being taken at about age 16, and the Higher certificate at about age 18. While more practical studies (for example in handicrafts and domestic subjects) were permitted and increasingly advocated after 1918, take-up was low compared with the 'school cert.' combination of English, foreign languages, science and maths on which employers bestowed vocational legitimacy. The number of candidates taking commercial subjects showed a decline through the 1930s, from 2.3% in 1932 to 1.9% in 1938.[32] At the same time, the Board of Education faced mounting pressure to reform what was widely seen to be an overly narrow and 'bookish' culture of state-maintained secondary schools.[33]

This reflected the indifference of employers after 1918 to the content of school education experienced by those destined for the 'upper' as well as the 'lower ranks'. The First World War had drawn attention to the effects of mechanisation on traditional modes of apprenticeship, but the overall lesson drawn by commentators after 1918 was that technical education had instilled in Germany and Prussia gross material efficiency and dependence on the state, and British employers did not wish to emulate this experience.[34] Instead, they increasingly relied on the School Certificate as the school leaver's passport to employment. By the late 1920s observers were forcibly struck that 'employers should treat a "pass" in the examination as a virtual failure and ask for precisely the same all-round level of attainment as is required for a University entrance examination'.[35]

Against this background, it is perhaps not surprising that, by the early 1930s, the selective central schools were entering three quarters of their pupils for the General School Certificate and thereby losing much of their distinctive character.[36] Similarly, while some employers were enthusiastic about junior technical schools, praising a local example or lobbying their local authority to establish one, wider and longstanding employer apathy for this type of education was summed up in evidence given to an official committee in 1928, that they were 'academic in the bad sense, that is to say, unpractical and abstract'.[37]

a commercial, industrial or agricultural tendency according to the needs of the various localities', Banks, 1955: 72. By 1913, 74 out of 898 secondary schools had a definite vocational bias and urban local authorities attempted active experimentation from this time, *ibid*., 72–77.

32. Banks, 1955: 86–93
33. Banks, 1955: 77, 152, 244.
34. Sanderson, 1994: 32. In July 1925 an HMI survey at the behest of the Board sought to establish which industries out of a group of 44 were most engaged with technical education. The top nine were (in order): shipbuilding; structural engineering; pharmaceuticals; cabinet making; vehicle building; and watches, clocks and jewels, *ibid*., 79.
35. Comment by the chairman of the Association of Assistant Masters, January 1927, Banks, 1955: 93–94.
36. And, perhaps, some of their popularity, Banks, 1955: 101, 103–04.
37. Sanderson, 1994: 75. In addition, junior technical schools were disadvantaged by the ability of central schools to recruit at 11 (as opposed to 13), without charging fees, while also offering pupils potential occupational advantages: by the mid-1920s, 10% of boys at central schools were entering engineering or skilled trades, while an increasing number of girls in the large system of central schools in London were attracted by the growing demand of employers for school leavers to enter clerical office work, Sanderson, 1994: 59–61; King, 1990: 85. This was the 'white blouse' revolution of these years, a term coined by Anderson, 1988, as a complement for the contemporary usage which referred to male clerks as members of the 'black-coated' professions.

From 1922, all pupils in England and Wales were required by law to remain in school at least to the age of 14. However, with the Board of Education intent throughout the inter-war period on limiting attendance at secondary schools, rates of participation remained low compared those of other countries with developed economies.[38] By 1937, a mere 14% of pupils proceeded to secondary schools at age 10/11 (26% in Wales) and, in 1938, secondary school pupils aged 13–14 comprised only 13% of the age group.

Interlude: The Branksome Dene Hotel, Bournemouth: March 1941

Low numbers of pupils in secondary education and the complex architecture of schooling for the age group 11–15 thus formed a backcloth for the work of the board's Educational Reconstruction Committee during the winter of 1940/41. However, the principal concern of the committee was to win back control over the future direction of education from local authorities which, the board believed, had not only wrested influence from Whitehall during the inter-war period but also generated uneven and inequitable provision.[39] To achieve this, a blue-print would be needed.

An initial principle was put forward for discussion by a leading committee member (RS Wood, one of the few officials still in London) that, without exception, children should remain at school until age 15 before embarking on day release until the age 18 and that, before this stage, all children should have a sequenced 'primary' and 'secondary' education replacing the complexities and anachronisms of the elementary and secondary School Codes of regulation. Wood put the point bluntly: surely it would be possible to 'get rid of all the snobbish troubles that arise from different titles – senior, central, junior technical, technical high school grammar school etc. – and call them all secondary schools'?[40] Mid-ranking officials in Bournemouth (removed both from ministers and currents of opinion in London) were initially cautious before mobilising behind this broad framework.

However, there was specific contention over the **age of transfer** from primary schools to specialist secondary education. Only in the technical branch was there experience of the recruitment of pupils to schools at the age of 13. This, the branch proposed, should continue on the main ground that if, as all in the committee assumed, children were to be admitted to specialist secondary schools on the basis of tests, their interests and aptitudes were only reasonably clear by this later age.[41] Support for selection at 13+ became the predominant view among board officials, but the secondary branch alone held out for selection at 11+, so as to keep intact what had become the standard five-year grammar school course for 11–16 year olds.[42] To settle the matter the permanent secretary made the determination in March 1941, against the technical advice of his 'Educational Theory Panel',[43] that selection should occur at 11+ with the safeguard of further transfer at 13+ for pupils wishing subsequently to change direction. In the event, this far-reaching decision was made on the basis that the implementation of transfer at 13+ would take many years to achieve, whereas transfer at 11+ could be secured within five, so retaining for the board the immediate political momentum of being seen as enablers of the New Jerusalem.[44]

Developments since 1941

Secondary technical schools: 1940s to 1960s

As a result of this and other decisions taken by the board in 1941,[45] legislation was passed three years later that allowed, but did not require, local authorities in England and Wales to establish **secondary technical schools**.[46] These were to sit alongside the existing grammar schools and both would be permitted to select pupils when aged 10/11 and prohibited from charging fees. The elementary School Code of regulations was abolished, as a result of which all pupils would transfer from 'primary' to 'secondary' schools, the majority entering non-selective modern schools. Some local authorities moved swiftly to re-designate existing schools as secondary technical[47] and the building of new schools in other localities started soon after.[48] However, by the mid-1950s it was clear that, as a group, these schools were not flourishing. Some visionary institutions had been created and sustained in industrial towns such as Doncaster, Wigan, Wolverhampton and Leicester.[49] But even here there were difficulties and, more widely, it was becoming evident that such momentum as had been built behind concept of technical education in specialist secondary schools was faltering.

In the first place, many **local authorities** were half-hearted or resistant to specialist technical institutions. These were not only rural counties. Increasingly, urban local authorities were influenced by Labour Party priorities that were shifting in favour of comprehensive secondary education, a trend set out prominently in plans published in 1944 for school reorganisation across London on multilateral lines.[50] Once it had been possible to review a majority of the plans for secondary school organisation submitted to the new Ministry of Education by local authorities,

38. Simon, 1965: 357; Simon, 1974: 366
39. Gosden, 1976: 240. This, it was considered, had been revealed starkly through the large-scale evacuation of children in the autumn of 1939, *ibid*.
40. Gosden, 1976: 241.
41. Gosden, 1976: 243–45. The assumption flowed from a similar one in a recent report of the Board's consultative committee that local authorities would continue to set tests in elementary schools for the selection of some pupils aged 10 for specialised secondary education, see Board of Education, 1938: xxxii-xxxiv.
42. Although at first the head of the secondary branch retained an open mind, noting that transfer occurred in independent schools at 13+ and awaiting technical evidence from the Board's panel of technical experts, Gosden, 1976: 242.
43. This was a group within the Board of senior inspectors which recommended breaks at 7+, 11+ and 13+, even while stating that this was not practicable, Gosden, 1976: 256–57
44. Gosden, 1976: 258.
45. Initially the President of the Board, RA Butler, and his Parliamentary secretary, Chuter Ede, did not favour separate technical schools, instead believing that there was merely 'a strong case for developing secondary schools with a technical bias', Sanderson, 1994: 116, 120–21, 126.
46. The responsibility of the authorities was provide for pupils 'such variety of instruction and training as may be desirable in view of their different ages, abilities, and aptitudes, and of the different periods for which they may be expected to remain at school, including practical instruction and training appropriate to their respective needs', 7&8 Geo. 6, Ch. 31 § 8(1). See also Sanderson, 1994: 129, for evidence that Butler was broadly in favour of the comprehensive school.
47. In 1946, 85% of the old junior technical schools were reported to be located as adjuncts to technical colleges, Sanderson, 1994: 130.
48. Six early purpose-built schools were constructed

in 1947–50, Edwards, 1960: 36. In all, 63 new secondary technical schools were built between 1945 and 1960 in 32 different local authorities, *ibid.*, 44–45.

49. For accounts of each, see McCulloch, 1989: 137–57.
50. Sanderson, 1994: 141; McCulloch, 1989: 61–62.
51. This figure was based on the plans of 111 authorities up to 1952, Sanderson, 1994: 132. See also McCulloch, 1989: 57–66 and Sanderson, 1994: 141–43.
52. McCulloch, 1989: 57, 62–63
53. McCulloch, 1989: 60–61.
54. Sanderson, 1994: 133–37.
55. Sanderson, 1994: 146–47; McCulloch, 1989: 85–93.
56. Edwards, 1960: 34, reported that his visits to over 200 secondary technical schools during 1958–59 revealed a general standard of buildings which could 'only be described as most unsatisfactory in the main and appalling in many instances… Annexes consisted of pre-fabricated huts, private houses, old vicarages, parochial halls and even dance halls'.
57. Sanderson, 1994: 143–44. McCulloch, 1989: 147–51, discusses this point in detail in respect of Wigan.
58. McCulloch, 1989: 63, 148–51.
59. Sanderson, 1994: 143.
60. McCulloch, 1989: 102–10, 59–60. Reece Edwards' study of 1960 is a detailed treatise on this theme.
61. McCulloch, 1989: 59–60, 62–63. Before the war, both junior technical schools and selective central schools had experienced similar difficulties in establishing a distinctive reputation, Sanderson, 1994: 77; King, 1990: 89–90.
62. Sanderson, 1944: 92–95. At this time industrial psychologists were more insistent than educational psychologists that 'mechanical aptitudes' were detectable among 13 year olds and advised in favour of admitting pupils to junior technical schools at this age and on this basis, *ibid*.
63. A notable dissenting voice – influential over the Norwood Committee in reaching its determination that there were, indeed, 'types of mind' detectable

it became clear that only 7.5% of school places had been earmarked for allocation to specialist technical schools.[51] Within this headline figure, local politics and professional opinion played out in widely varied ways. Thus, in Manchester 15% of places were set aside for secondary technical schools as against 13% for grammar schools, whereas in Middlesborough no such technical schools were planned and officers in Doncaster proposed to close its one establishment.[52] In Somerset six secondary technical schools were announced but in neighbouring Dorset the ministry criticised the county's plan for being studiously vague and uncommitted in any coherent direction.[53]

At the **national level**, Labour ministers of education during 1945–51 were largely indifferent toward the secondary technical schools but it was from 1955 that their political fate was sealed when the Conservative minister David Eccles accepted the case for modernising and broadening grammar school provision, while also accommodating lower-level technical work in modern schools in preference to expanding separate specialist technical institutions.[54] Equally damaging to the secondary technical cause, industrial leaders at the Federation of British Industries were indicating at this time a preference for attracting an increased number of grammar school leavers – more likely, in their view, to supply 'the right type of boy' – than helping to strengthen occupationally-related curricula in other schools.[55] Compounding this, specialist facilities in general remained very inadequate,[56] while in local areas with strong secondary technical schools, parental confidence beyond the core constituency of skilled-worker households was never forthcoming, even where the overt aim was, in the words of one school brochure, 'training the new middle class of technologists and industrial managers, and so drawing exceptionally able boys from their former close adherence to administrative and professional careers.[57] Instead, in the mid-1950s parents recognised that local authority tests resulted in the intake to secondary technical schools comprising a 'second creaming',[58] cementing the view that grammar schools were the passport to secure clerical and white collar occupations at a time when the insecurities of inter-war industrial employment were still casting a deep shadow.[59]

In the long run, two related factors appear to have been the most debilitating for secondary technical schools in England and Wales at this time. First, their **educational rationale** was never clear or convincing to those whose support they most needed, especially parents. This, in part, was caused by a parallel lack of clarity over the proposed character of modern schools to which most 11 year olds would go. Edward Semper, head of Doncaster Technical High School of Boys emerged during the 1950s as the most prominent champion of specialist technical schools but he and his colleagues in the Association of Heads of Secondary Technical Schools remained acutely conscious of a lack of public understanding of, and confidence in, the distinctive place and role of the schools they led.[60] It was a problem they had faced from the outset, leading local authorities such as Middlesex to conclude that concrete planning for secondary technical education was not possible, seeing as the contribution of such schools 'has not yet been established even in theory', while others such as Barrow and Newcastle-upon-Tyne remained uncertain about provision within such schools for the education of girls.[61]

Linked to this was perhaps the most intractable problem. Since the 1930s, when psychologists had first addressed the question of identifying those aptitudes marking out the technically-orientated child, they had reached a broad consensus that **specific technical abilities** were not detectable at the age of 10/11.[62] Before the war this had militated against lowering the age of entry to junior technical schools from 13 to 11 and this advice had subsequently complicated the post-war plans being thrashed out among Board of Education officials at Bournemouth during 1940–41.[63] With the age of entry to secondary technical schools set at 11+, the question became urgent once more after 1944 and further consultation among psychologists convinced many local authority leaders and ministry officials that there was no scientific basis for school selection based on tests claiming to identify special aptitudes at either the age of 11 or 13.[64] This review, at its most intense during 1947–1950, served to bolster those sections of professional and public opinion which, from the early 1950s, were sympathetic to the complete abolition of selection by ability to secondary education. As such, once the political climate was transformed in 1965 in favour of a general move to all-ability schools, most of the 172 surviving secondary technical schools were earmarked by local authorities for early absorption into their planned systems of comprehensive secondary education.[65] Moreover, this logic was reinforced by recent innovation in policy toward apprenticeship. Through legislation passed in 1964, new funding and incentives were put in place to stimulate

at 11 or younger, including the 'mechanical' – was that of WP Alexander, Director of Education for Sheffield, Sanderson, 1994: 122.

64. Sanderson, 1994: 145–46; McCulloch, 1989: 64. Under the heading 'The classification of pupils', the question was discussed at length by Edwards (1960: 48–70), including the advice of various psychologists to local authorities who concluded that the weight of evidence was in favour of testing for suitability for grammar or technical schools but not for distinguishing between them.
65. DES, 1966: 26.
66. Richardson, 2007: 403.
67. Gertrude Williams estimated a 79% drop-out rate among candidates for the CGLI Intermediate award in the mid-1950s, Richardson, 2007: 393.
68. Anderson, 1999: 220–22.
69. McPherson and Raab, 1988: 73–74. As in England and Wales, the age of compulsory schooling in Scotland was raised to 15 in 1947.
70. Anderson, 1999: 222; McPherson and Raab, 1988: 250, 353–55.
71. NIA, 2001: para. 1.1.
72. Hyland, 1992: 54–55; Durcan, 1972: 175–77.
73. NIA, 2001: paras. 1.3–1.6; Gallagher and Smith, 2000: para. 1.1.1.
74. Gallagher and Smith, 2000: para. 1.1.2, n.6.
75. NIA: 2001, paras. 1.7–1.10; Gallagher and Smith, 2000: para. 1.1.2.
76. NIA: 2001: paras. 1.10–1.11; Gallagher and Smith, 2000: para. 1.1.2.
77. GNI, 1964: 29–30.
78. GNI, 1964: 30.
79. Sutherland, 1973: 22. In 1949/50, c.19% of secondary pupils were in technical schools, a figure that had fallen to less than 1% by 1969/70, Gallagher and Smith, 2000: para. 1.1.2, n.6.

firm-based training and this served to reinforce an English preference for primarily work-based rather than school-based technical education beyond the age of compulsory schooling. Thus, during 1964–1969 the volume of day release training of young workers in technical colleges rose by nearly 30%, building on long-established work-based qualifications well recognised by employers – the Ordinary National Certificate (ONC) and the Intermediate award of the City and Guilds of London Institute (CGLI) – to the point where British apprenticeship numbers peaked in 1968 at 236,000 (25% of young workers in: 40% of all boys and 10% of all girls).[66] However, the proportion of the age group participating was low compared to that in other industrialised counties, the extent to which apprentices had access to quality training was very varied and empirical studies had already established that the more rigorous courses, especially the CGLI Intermediate, had a very high drop-out rate.[67] The overall effect was to compound the already weak tradition of technical education in England, a country which, by comparative standards, had tolerated since the early nineteenth century a uniquely deep gulf between general education and 'training'.

Technical education, recession and comprehensive secondary education across the UK: 1960s to 1980s

By the end of the 1970s, technical education as a distinctive and separate tradition in secondary education in the UK had lost almost completely such momentum as it had built in the ten years from 1945.

In **Scotland** no secondary technical stream had been introduced after the war. Here, attendance at elementary school to the age of 14 had been enforced since 1901, at which time a general curriculum, including woodwork for boys and cookery and 'domestic economy' for girls, held sway. From 1903 strict separation of elementary and secondary education (the latter for a gifted minority) was observed but, as in England and Wales, local authorities attempted to blur the distinction in the inter-war period – through 'omnibus' schools in the small towns which took all older children and, elsewhere, through central schools which took pupils at the age of 12 (the 'clean cut').[68] However, there were no equivalents to the junior technical school south of the border, so when, in 1939, the Scottish Education Department formalised a universal transfer from primary to secondary schools at 12+, via competitive examination, there was no dedicated technical stream upon which to build after the war.[69] As in England and Wales, comprehensive re-organisation was introduced in 1965 in Scotland where it achieved widespread acceptance, in no small measure due to the breaking down of traditional heavy industry and its associated social structures that was occurring at this time.[70]

In **Northern Ireland** the authorities of the new jurisdiction created in 1921 inherited elementary education forged in Irish national schools where local attendance was patchy.[71] Compulsory enrolment between the ages of 4 and 14 was enacted in 1923 and the curriculum re-organised so as to further encourage practical subjects.[72] At the same time regional education committees were established alongside separate urban technical education authorities and these became active in establishing two-year 'intermediate' (i.e. senior elementary) technical schools. By 1944, at a time when rural elementaries remained one- or two-teacher establishments with small enrolments and when a small number of pupils attended fee-paying secondary schools, there were over 60 two-year technical schools in towns throughout the Province, most with affiliated out-centres.[73] These schools became the basis of a technical stream which initially enrolled one sixth of all pupils when an English-style tripartite pattern of secondary education was enacted in 1947.[74] The 'technical intermediate' schools (commonly called junior technical schools) now recruited to the two-year course a year earlier, at age 13+, and received in the main pupils transferring from the majority stream, the non-selective ('secondary intermediate') 11–15 schools.[75] In turn, the 11–18 'grammar' schools continued to charge fees (with poorer entrants having these paid by the state) while the great majority of teenagers left school at 15 with few or any qualifications but able, during the boom years from the early 1950s at least, to enter apprenticeship.[76] It was ministry policy that the technical intermediates would recruit boys only, to a curriculum specialising in mathematics and science 'with attention also to Woodwork and Metalwork' and have no staff or premises of their own: these were provided by the technical colleges to which they were attached.[77] Increasingly, however, the technical schools recruited at 11+ (so as both to extend their course and limit the disruption to pupils of a double transfer at 11 and 13), through candidates who had sat the general examination controlling entry to the grammars.[78] At the same time, overall numbers declined to such an extent that, during the 1960s, almost all courses were fully absorbed into the colleges of further education.[79] When comprehensive re-organisation was being

introduced in the rest of Britain, the devolved government in Northern Ireland resisted, on grounds of cost, school size and parental choice, coupled with concerns about erosion of academic standards and potential for the emergence of a private schools sector.[80] Thereafter, the onset of 'The Troubles' served to reinforce division within the community along sectarian lines and ossify a school structure in which control by the churches was to remain prominent.

In part, the rise and fall of specialist technical education in Northern Ireland mirrored that in **England and Wales**. In the larger two countries an older tradition of technical specialisation, dating from 1905, had also expanded significantly, but on a smaller scale and later, before enrolments melted away in the 1960s into non-selective secondary schools recruiting at 11+. The junior technical schools of England and Wales of the 1930s (recruiting at 13+) had enrolled 4% of children in school over the age of 11, compared to one in six in Northern Ireland in the late 1940s. Then, just as numbers were declining in the Province, secondary technical schools in England and Wales reached their peak in 1954, enrolling 4.9% of state-maintained secondary school pupils (at age 11+). However, by 1980 82% of such pupils were attending comprehensive schools,[81] the introduction of which had been adopted everywhere in Wales but only in a majority of local authorities in England, where the policy had proved highly contentious and divisive. Moreover, in neither country had the introduction of comprehensive schools been able to disrupt a longstanding pattern of early entry to the labour market by young people. A consequence of this in England and Wales, in contrast to the other countries in this study, was the continuance and broadening of the sector of technical colleges which served the 15–17/18 age group. In both 1918 and 1944 legislation to make part-time attendance at college compulsory upon leaving school had been enacted but not implemented. Instead, voluntary attendance at over 750 colleges was in operation by the mid-1950s, with institutions organised in a four-level hierarchy during the period 1956–69 when approximately 20% of the age group had contact with them.[82]

Meanwhile, throughout the UK by the late-1960s **technical education** at the secondary school stage faced the challenge of finding its way between two cultures: the rock of 'academic' grammar school science and the hard place of 'vocational' modern school technology and crafts. In Wales, Scotland, most of England and a few places in Northern Ireland, this accommodation would have to take place in comprehensive secondary schools, while in parts of England and most of Northern Ireland it was likely to become the focus in, respectively, the modern and general secondary schools which sat alongside grammars (with professional staff in Northern Ireland having resources sufficient only to allow them to adapt ideas generated on the British mainland).

An initial problem was that the divisions implicit in these new structures of schooling were likely to reassert in the popular imagination the idea that practical and applied study was of an 'elementary' kind or, in the new parlance of official reports, was suitable merely for the motivation of the 'average or less than average' child.[83] Already in 1963, members of the Association of Heads of Secondary Technical Schools in England and Wales were resigned to the fact that the terms technical and vocational were 'debased', but Edward Semper's suggestion that 'what is wanted is an adjective conveying "purposeful", "inventive" and "imaginative"' failed to generate an acceptable alternative. Moreover, although the Labour government did not move to initiate the re-organisation of secondary education on comprehensive lines until 1965, Semper foresaw the impending change and urged his association to redirect its energies to ensuring that the new comprehensives were 'permeated with the technical ethos'.[84]

In addition to such permeation and the curriculum development that it implied, to be influential at the school level technical education would also need more systematic assessment, leading to plausible **qualifications**. As early as the late 1920s, champions of technical education, in accord with other professional opinion, had been dismayed by the unexpected grip already exerted over the secondary school curriculum in England and Wales by the School Certificate examination introduced in 1917.[85] By the late-1950s, the post-war ideal of the secondary technical and secondary modern school free from external examinations, strongly supported by the ministry in England and Wales but viewed as wishful thinking within the technical schools, had been swept away in the face of parental pressure that their pupils should have access to the General Certificate of Education (GCE, introduced in 1951) or a parallel national award.[86] Similar pressures were building in Scotland[87] and, as the occupational structure of industrial Britain began to be transformed from the mid-1970s, it was inevitable that popular pressure for even wider certification would increase.

80. NIA, 2001: para. 1.12.
81. Simon, 1991: 583; Sanderson, 1994: 148.
82. Richardson, 2007: 386–90. Within this hierarchy and the broad 'technical' label applied to colleges, there were free-standing specialist institutions for art and design, commerce, nursery training, farming, adult residential centres and factory works schools, *ibid*., 389. The college tradition in Scotland developed later and remained smaller than in the south but, by the 1960s, had come to resemble that in England and Wales, see: Johnston, 1999: 571; McPherson and Raab, 1988: 361; Burness, 1989: 91–93.
83. Maclure, 1969: 278.
84. McCulloch *et al.*, 1985; McCulloch, 1989: 110. In 1964 the Association of Heads of Secondary Technical Schools became the Association for Technical Education in Schools, *ibid*.
85. Banks, 1955: 93–94. For similar dynamics in Scotland, see McPherson and Raab, 1988: 360.
86. Edwards, 1960: 149; MoE, 1960: 15–16.
87. Anderson, 1999: 222.

Dual pressures facing British education in the 1960s and 1970s stirred the ministries in Edinburgh and London into action. These pressures were, on the one hand, cohort-wide curriculum reform within increasingly comprehensive institutions coupled with the inexorable expansion of formal qualifications. On the other hand, there was a need to motivate the new cohort of students required to remain in school for an extra year until the age of 16 (from 1973/74 in both countries). In Edinburgh, proposals of a government report of 1963 to inject the Scottish secondary school with a 'vocational impulse' were rejected, only coming to the fore once more when an official curriculum paper on technical education was issued in 1973, and it was not until 1979 that pupils could sit a public examination in the subject.[88] In contrast south of the border, governments of both political parties presiding over education in England and Wales, aided by a leading educational foundation, enlarged the tentative steps taken since 1962 to exert more **central influence over the curriculum.** This involved a delicate balance of conserving the prestige accorded to a minority of pupils whose achievement was recognisably within the grammar school tradition, while tackling the lack of achievement of the majority, a sizable proportion of whom (up to 40% of the cohort into the 1980s) left school at the earliest opportunity with nothing formally to show for 11 years of full-time study.[89]

The former group was targeted through successive science projects developed by the Nuffield Foundation and, initially, through Schools Council projects in technology. However, from the mid-1970s, the work of the Schools Council in this sphere concentrated increasingly on education with a more vocational emphasis, aimed at the lower-attaining pupil.[90] Thus, in the 1960s, as previously, among the state schools it was the scientific education of the grammar school boy (leading to the supply of graduate engineers) that concerned the Federation of British Industries, as well as the scientific and engineering professional bodies. As an alternative, Semper established a curriculum project in 1962 in applied science and technology intended, like general science, to make 'progressively exacting intellectual demands' on pupils.[91] Over the subsequent decade, the Nuffield Science Teaching Project had significant influence, not least because its work was directly tied to the design of public examinations at GCE Ordinary ('O') level. Meanwhile, projects in technology were significantly weakened by factionlism. Initially discord centred on whether or not the well-spring should be 'pure' science or should accommodate the expertise of the craft departments. Later the Royal Society, in particular, became antagonistic to the very association of science with technology and all parties were careful to ensure that neither science nor technology become tainted with associations to vocational training.[92]

Such infighting not only dissipated the energy of all but the most resilient enthusiast for technical education but was also out of step with more pressing concerns. In the decade from 1976, as economic conditions deteriorated, both political parties expressed growing unease at the apparent **unresponsiveness of comprehensive education** to rapid change in the skills base of the adult labour market. Moreover, external critics within the OECD exposed starkly fundamental anachronisms within the ministry itself which, in part, accounted for its lessening grip over rates of participation in further education and work-based training, at a time when systematic comparisons were beginning to reveal that these were extremely low by international standards.[93] When related to technical education, it was not evident that the main avenues being pursued – infusing the traditional science curriculum for the able child with 'technology' or, in the words of the Newsom report of 1963, presenting education for the average and below-average child in terms 'more acceptable to the pupils and parents … especially by taking a proper account of vocational interests' – were achieving enough. Indeed, as one commentator observed a decade later, the 'outstanding feature' of science teaching other than that leading to GCE 'O' level awards was 'that we know next to nothing about it'.[94]

The urgency of the problem was heightened for the UK government in the early 1980s by the collapse of the youth labour market, at which point far-reaching interventions in the governance of secondary education began to occur. While the education minister, Keith Joseph, was bemoaning the failure of comprehensives to develop a 'technical stream' of pupils[95] his ministerial colleagues found a means (through a central agency, the Manpower Services Commission (MSC)) to target spending in schools across Britain on specific measures in technical and vocational education. Furthermore, the MSC had no such duty of system-wide oversight for England and Wales as rested at this time on the Department of Education and Science and asserted also its ability (confirmed by legal advice) to establish new schools if need be.[96] The inception of 'TVEI' – the **Technical and Vocational Education Initiative** – was an undoubted shock

88. McPherson and Raab, 1988: 359–61; Bain, 1999: 562. For later developments in the Scottish technology curriculum, see Dakers, 2006 and Doherty and Canavan, 2006.
89. McCulloch, 1987: 25. In Northern Ireland, too, 85% of leavers from non-selective secondary schools (containing c.64% of all secondary pupils) had less than the equivalent of one GCE O level by 1970/71, Gallagher and Smith, 2000: para. 1.1.2, nn. 5 and 7.
90. The first Nuffield Foundation project – in physics – was approved by its trustees in 1962; the Schools Council began work in 1964, McCulloch *et al.,* 1985: 74, 131.
91. McCulloch *et al.,* 1985: 134, 56, 191.
92. McCulloch *et al.,* 1985: 159, 183, 192.
93. OECD, 1975.
94. McCulloch, 1987: 19–20; McCulloch *et al.,* 1985: 192.
95. McCulloch, 1987: 25.
96. Finegold, 1993: 58.
97. McCulloch, 1987: 25–26; Finegold, 1993; 61.
98. Finegold, 1993; 61. After some initial resistance in Scotland, all concerned eventually 'found that they had a technological or vocational perspective and joined the initiative', Bain, 1999: 564.
99. Finegold, 1993: 60.
100. Howieson, 1989: 85; Saunders, 1990: 180, 182, 194; Howieson, 1989: 81–84. The TVEI co-ordinator in Bradford told the press in 1985 that he didn't want to see 'a repetition of the secondary technical schools' experience, having attended one myself. We aim to broaden people's options, not funnel them towards technology'. The general secretary of the Trades Union Congress had expressed similar reservations three years earlier, McCulloch, 1987: 28, 30.
101. McCulloch, 1987: 13.

to local authorities and those committed to curriculum change sanctioned only through 'local democratic control'. For others, who recalled wistfully the aims secondary technical schools, this was, after two barren decades, a welcome refocusing of government attention.[97]

In the event, almost all local authorities in England and Wales found the money irresistible at a time of relatively tight budgets, as did their peers in Scotland when the initiative began there 12 months later.[98] The local authorities also took some comfort from the fact that the MSC soon concluded that running TVEI through local authorities, rather than setting up rival schools, was cheaper, quicker and more likely to produce replicable change.[99] However, evaluators on both sides of the border were soon observing the 'colonisation' and 'domestication' of the Initiative in the mid-1980s by progressive educators who succeeded in imposing as their main objective methods of active learning and pupils' personal development[100] rather than securing the 'rebirth of technical education', as promised at the outset by the minister concerned, Norman Tebbit.[101] Not only this, TVEI was the most costly (£1.1bn) and most evaluated curriculum project in British history,[102] yet researchers could not demonstrate that it had led to improvements in individual attainment or preparation for work,[103] while its initial goal of establishing its own recognisable qualification (a decisive element in the success of 'Nuffield science') had foundered.[104] Similarly, commentators noted that TVEI had failed to remedy the low status accorded to vocational education and that its attempt to establish a coherent '14–19' phase of secondary education, in which a school-leaving examination at 16+ would have decreasing relevance and attraction, had also been unrealised.[105] Some bitterness followed. The director of the initiative in its politically embattled latter stages maintained that only TVEI was holding together the government's new national curriculum (announced in 1987) without which it was 'nothing more than a 1957 grammar school curriculum'. Meanwhile, Tebbit remained rueful that his vision of 'a few entirely new schools in inner cities funded through the MSC was eroded until the TVEI became simply part of the curriculum in some comprehensive schools'.[106]

Technical and vocational education at the turn of a new century

The fault lines that TVEI had helped to uncover came into stark relief in 1986–87 when the Conservative government brought forward major reform plans designed to bring about both new urban technical schools and a national subject-based curriculum. Continental influences had been important as successive education ministers sought to reconcile gloom at home over widely debated causes of relative economic decline, with aspects of European schooling that might suggest long-term recovery.

Research from the National Institute for Economic and Social Research on comparative standards in mathematics in England and West Germany, along with the report of a schools inspectorate visit to Germany, exerted direct influence over the rationale for a national curriculum for England and Wales which, when unveiled, included mandatory design and technology.[107] Meanwhile, the earlier plan for a cadre of new technology schools in England was revived, marking the point at which English policy began to diverge sharply from that in Wales.[108] Plans for these new schools were announced in 1986 and the first **city technology college** (CTC) was opened in 1988, to be followed by 14 more over the next four years. With one exception, they were 11–18 schools, the first mainstream state schools to be founded since the late 1950s with a specialist orientation, permitted to select entrants and receiving their funding outside the local authority system.[109]

A main cause of the controversy that CTCs occasioned was that they served directly to challenge the comprehensive ideal. As such their political significance was much greater than their number suggests.[110] Nevertheless, much effort on the part of individual colleges had to go into following the framework for **pupil selection** in the funding agreements drawn up by the ministry. CTCs would have a defined catchment, and would be required to admit pupils 'spanning the full range of ability' found in that catchment, while being 'representative of the community' in terms of social and ethnic composition. Beyond this, CTCs could select entrants based on 'general aptitude' and 'readiness to take advantage' of the distinctive secondary education they provided.[111] Colleges worked hard to follow this framework, later criticised by ministry advisers as 'collectively unworkable', and their task was made more onerous by the high level of demand for places.[112] Even so, a major study published in 1993 concluded that some CTCs had gone 'well beyond meeting the formal requirements' laid down in order to secure a 'comprehensive intake' from within the defined catchment.[113] In practice, and given their urban locations, CTCs reported that this resulted in the 'vast majority' of the intake being 'working class or lower middle class' and a detailed study of admission to the first CTC

102. Finegold, 1993: 62, 67; Helsby and Saunders, 1993: 46.
103. Finegold, 1993: 63–64.
104. There had been more success on this front in the FE colleges where, in the late 1970s, a new award available to full-time students – the BTEC – supplemented that old CGLI/ONC/OND structure and quickly established itself: Richardson, 1997: 403.
105. Gleeson and Smith, 1987: 177–92.
106. Finegold, 1993: 71, 67.
107. Callaghan, 2006; 81–82. Northern Ireland followed suit in 1989 but there is no statutory school curriculum in Scotland.
108. Callaghan, 2006: 78–79. None of the innovations of secondary school type discussed in the following paragraphs have been introduced in Wales where a new distinctiveness in education was realised through constitutional devolution in 1999, see NAW, 2001.
109. CTCs were established as independent schools, Walford, 2000: 147.
110. Notwithstanding that commentators pointed out that the planned number of industrial sponsors had failed to materialise, Walford, 2000: 149, 156. In the original timetable 20 'pilot' colleges were due to be in place by 1990, Walford and Miller, 1991: 14.
111. Whitty *et al*., 1993: 65–66.
112. Whitty *et al*., 1993: 69 , 71. By 1991/92 the ration of applications to places at different CTCs ranged from 1.8 to 4.4, *ibid*., 73.
113. Whitty *et al*., 1993: 76; Walford and Miller, 1991: 111.

bore this out.[114] In interviews held at two of the first colleges to open, a mixed range of reasons was given by parents and students for their attraction to a CTC: the emphasis on technology, the general sense that a 'better education' was on offer, the new facilities provided (including computing technology), the close links of the schools to business and industry, a sense that the CTC provided an education no longer available elsewhere, the distinctive ethos and, finally, a sense that state schools, and comprehensive schools in particular, were less attractive and should not have replaced grammar schools.[115]

If CTCs had provoked contention on account of an ability to select pupils, their specialised status also suggested a new point of departure in **the classroom**. In the event, although designated 'technology' colleges, CTCs did not necessarily specialise in technical or vocational education. Indeed, the only 14–19 CTC specialises in the arts. Rather, 'CTC' indicated an urban school environment boasting the latest facilities and equipment (including ICT), where staff taught the National Curriculum in a conventional way but instilled a strong ethos of aspiration to high attainment. Thus, a detailed study of the first CTC commented that 'one of the most noticeable aspects of the curriculum as embodied in the timetable is how *little* time is given to science and technology rather than how much', before going on to explain that the approach taken was to infuse not just the curriculum but the total school environment with new technologies.[116] In addition, business and economic awareness was introduced in the first year and, as in many other successful schools, there was a wide range of cultural and physical pursuits available beyond the formal timetable.[117] More generally, CTCs in operation by 1991 were found to practice quite conventional teaching methods, accompanied by a staff culture, not unlike aspects of TVEI orthodoxy, committed to the facilitation of learning rather than a didactic style of teaching.[118]

In these two central respects – governance (including selection by aptitude and direct funding from the ministry) and specialist designation – the CTCs symbolised an alternative to the 'bog-standard' comprehensive school that the Labour government elected in 1997 found irresistible.[119] It inherited a **specialist schools programme**, launched in 1993, through which state-maintained schools in England could apply for additional resources to develop a curriculum specialism, so long as they could raise a parallel fund from local sponsors. The programme began with 45 'technology' schools; at the change of government, this number had grown to 73, including specialisms in languages, sport and the arts. By 2002 there were 310 specialist schools and in that year the Labour government created the academies programme (under which University Technology Colleges will operate). These were to be termed 'independent state schools', established with a sponsoring partner and, like CTCs, funded outside the local authority system and permitted to select by aptitude. By 2009 there were 203 academies, with 100 more due to open the following year. Meanwhile, the number of specialist schools had mushroomed so that, by early 2010, there were 3,068 specialist secondary schools out of a total of 4,403 maintained by the state in England.[120] Among the 3,068 specialist schools, 58 are currently designated Engineering, 256 Business & Enterprise and 534 Technology.

To what extent are these schools the heirs of the secondary technical schools of the 1950s or the CTCs of the 1980s, and how does their work sit alongside the continued expansion of vocational and technical education in further education colleges for the 16–19 age group? Unlike secondary technical schools, present-day specialist schools are obliged to follow the curriculum of all other state-maintained secondary schools. In this respect their work bears comparison with the relatively conventional approach to the curriculum observed in the early CTCs.[121] Much of the research attention paid to them has related to whether examinations across all subjects are improved, with the results seeming to show a small enhancement after specialist designation.[122] However, what is not evidenced is that specialist schools, either before or after designation, are especially expert in the curriculum area of their designation.[123] This may improve as a result of the additional resources procured, but the main emphasis of these schools is on building capacity across the subject areas of the school.[124] In the words of one study, the programme has evolved from a stance, under the Conservatives, of 'providing a range of different specialisms within a locality to enable parents to choose between different "types"' to the position, under Labour, where it is 'a mechanism for school improvement across the whole curriculum', an aim and a process not dissimilar that of the TVEI.[125]

A second report on the specialist schools programme considered that for the schools concerned to become 'truly' specialist they would need to select pupils by ability at age 10/11.[126] Instead, specialist schools and academies are

114. Whitty *et al*., 1993: 79, 90–94; Walford and Miller, 1991: 103–16.
115. Whitty *et al*., 1993: 82–90.
116. Walford and Miller, 1991: 73. The first inspection report on this school referred to the 'poor deployment' of science resources, while the 'craft and design aspects of technology' were 'less than satisfactory', Whitty *et al.*, 1993: 111–12.
117. Walford and Miller, 1991: 76–77.
118. Whitty *et al.,* 1993: 110–14, 117–19,
119. 'The day of the bog-standard comprehensive school is over': Alistair Campbell, 10 Downing Street Director of Communications, February 2001.
120. DCSF, 2009: table 2.
121. The Education and Skills select committee of the House of Commons described the specialist schools programme in 2003 as emphasising 'curricula differences, while delivering schools that are largely identical in curriculum terms, but different in their funding and resources, HoC, 2003: 13.
122. Taylor, 2007; Noden and Schagen, 2006.
123. Rudd *et.al*., 2002; Sinkinson, 2006a; Smithers and Robinson, 2009: 60. Smithers and Robinson (*ibid*., iii) see the role of the programme as 'freshening up a tired comprehensive system', but found that science schools 'are not distinctively scientific', not least because a common reason for seeking involvement was pre-existing 'weakness in the subject'.
124. Warwick, 2004. Sinkinson, 2006b: 95, reports the same 'enclave effect' (some subject teachers benefit while others feel excluded) as was reported by Saunders (1990) in respect of TVEI.
125. Sinkinson, 2006a: 35.
126. Smithers and Robinson, 2009: iii, 60.

permitted to select up to 10% of entrants on aptitude if, in turn, their specialism is itself deemed an 'aptitude'.[127] Few take up this option as its remains highly emotive in most state secondary schools and, as in the 1940s, the psychology community is not agreed that the difference between aptitude and ability is clear-cut.[128] For this and other reasons the policy permitting such selection was dismissed as fundamentally flawed by a House Commons select committee in 2003.[129]

When it comes to the place of specialist technology schools alongside colleges of further education (FE) in England, the picture is distinctive in international terms. In contrast to the other countries in this study, the college sector (both state-maintained and private) is very diverse in its functions and is set in direct competition with schools for the 16–19 year old student while, in recent years, there has also been a blurring of the school-college boundary in some programmes of study followed by those aged 14–15.[130] In 1992/93, for the first time, there were more students in their first post-compulsory year in England studying full-time in colleges than in schools and by 2006 publicly-funded colleges of FE accounted for 55% of all 16–19 year olds studying full-time and 62% of all 16–19 year olds participating in education and training. Moreover, since 2002 colleges have been receiving from schools for a part of each week around 40,000 of their most challenging 14–16 year olds, a group supplemented since 2008 by those enrolled in schools but studying on college premises for one of up to 14 new Diplomas.[131] The college sector also hosts the governmental apprenticeship programmes which have emerged since the collapse of firm-based industrial training[132] in the 1970s and 1980s: National Traineeships (1997–2000); Foundation Modern Apprenticeships/ Apprenticeships (16+ age group: 2000 onwards) and Young Apprenticeships (14–16 age group: 2004 onwards).[133]

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Before the implications of these UK developments for the establishment of University Technology Colleges are discussed (in chapter 4), the report turns next to a survey of technical and vocational education at the secondary school level in four other countries: Germany, the USA, Japan and Sweden.

127. Such designations also deemed an 'aptitude' are: physical education/ sport; the performing arts; the visual arts; modern foreign languages; design and technology; and information technology.
128. Although there are proprietary tests on the market, such as the Sherwood Technology Aptitude Test.
129. HoC, 2003: 36–38. West and Ingram (2001: 7) comment that 'it does not appear feasible to differentiate between "ability" and "aptitude"', before going on to review how the difference has been interpreted in non-statutory guidance to the schools adjudicator.
130. In addition to the 'general' and agricultural further education colleges of the 1960s, variants began to be introduced: sixth form colleges (from 1964) and tertiary colleges (from 1970). By 1999 there were 435 publicly funded colleges of FE in England, categorized under six types: 217 general; 107 sixth-form; 63 tertiary; 28 agriculture and horticulture; 13 designated (i.e., voluntary-sector institutions eligible to receive public funding); and 7 art, design and specialist performing arts, Richardson, 2007: 389–90, 392.
131. Richardson, 2007: 405
132. 1967 saw the post-war peak in the proportion of manufacturing employees apprenticed and, overall, apprenticeship numbers reached their height in 1968 at 236,000, Richardson, 2007: 405.
133. Richardson, 2007: 404.

Chapter 3
Technical and vocational school-based education in contrasting nations, *c.*1880–2010

Outline

The main contours

In this chapter, an account is given of the development from the late nineteenth century of technical and vocational education at the school level in four nations: Germany, the USA, Japan and Sweden. In each case a similar framework is deployed to that of the previous chapter covering the United Kingdom but, necessarily, the treatment is more condensed. Together, the accounts of each country lead to conclusions in the final part of the report as to the forces at play and their implications for those supporting University Technical Colleges in England.

In this comparative section it is shown, first, how dominant types of schools were developed prior to 1900 against the overall background of **demographic and occupational change** in each country. In all cases (as in Britain) this entailed major decisions about whether, when and how to enforce elementary education among all young children in the population, broadly between the ages of 6 and 13.[1] At the same time, pre-existing schools for older children (not yet labelled 'secondary') evolved and were replicated more widely as demand grew. These schools were specialised in the sense that they offered contrasting curricula and served differing clientele.

From the 1880s (but delayed in Sweden until the 1900s), **technical and vocational education** became more prominent in each country and was encouraged by governments as well as by philanthropists and private organisations. This emphasis was to be found especially in higher-level education but was also widely developed in senior schools for the age group 13–16 (often in upper-tiers added to elementary schools), in specialist senior schools, in post-elementary trade schools and through part-time continuation schools for those entering work.

After 1918, as all countries began to extend the age of compulsory schooling upwards, there were appraisals of the extent to which technical and occupationally-orientated education should develop in **specialist** institutions alongside schools providing general courses, or be **integrated** within them. This led to divergent paths being followed in different countries which are still being worked out today. These parallel trajectories have, in turn, been shaped by **wider processes** shared in common by these nations: universal suffrage; the depression of the 1930s; the effects of war; rising birth rates and material living standards after 1950; long-term shifts from agriculture and manufacturing toward service occupations; periodic recessions from the mid-1970s; and the impact of electronic technologies. While these trends have configured to change society in the industrialised nations, three **constants** have shaped the educational response – the enduring presence of schools as institutions, the steadily increasing aspiration and expectations of almost all who have come into contact with them, and argument over specific aims and forms of organisation.

The view from Britain

The narratives which follow indicate, at various points, how education practices in neighbouring countries, or further afield, have influenced decisions and outlooks of different nations when developing capacity in technical and vocational education at the school level.

The same has been true in Britain. Indeed, the Board of Education's Office of Special Enquiries and Reports, under the direction of Sir Michael Sadler during 1895–1903, espoused a method that was later credited as the foundation, internationally, of comparative education method during the twentieth century. This was to study overseas models accurately, while taking account of 'national character', in order not to emulate other arrangements but to become 'better fitted to understand our own'.[2] It so happened that Sadler was especially interested in technical and vocational education, and in Prussian education in the context of the growing power of the unified German empire (an interest shared at the time in many countries, including the USA and Japan).[3]

Since 1903, the government in London has, periodically, carried forward the work that Sadler began. In its major report on *The Education of the Adolescent* (1926) the Board of Education's

1. The laws of 1872 (Scotland) and 1880 (England and Wales) enforcing attendance from the age of five, set the lowest age of entry among these countries.
2. Phillips, 2006: 46, 51
3. Higginson, 1992: 97–100. In addition, Sadler was an admirer of French culture, *ibid*., 98, 100–02.

Consultative Committee included a lengthy appendix devoted to post-primary education in countries of the empire and in Europe (including Prussia and Sweden).[4] After the war, in the context of the Marshall Plan, apprenticeship training in the USA was studied in detail (where it could be found) by a British delegation of the Anglo-American Council on Productivity and, in the late-1950s, in the context of the creation of the European Economic Community, the ministry's Central Advisory Council informed its investigation of education *15 to 18* by sending delegations to France, Holland and Germany.[5] When British membership of the EEC finally beckoned in 1972, Christopher Hayes led a delegation of training experts to France, West Germany, Italy, Holland and Belgium and it was to Hayes that the government turned in more straightened times to investigate a renewed sense that Britain's system of vocational education and training was seriously deficient in relation to key competitor nations: Germany, the USA and Japan. The resulting report, *Competence and Competition* (1984), set the tone for the next fifteen years in which these countries (along with France, Sweden and some other 'Asian tigers') formed the core arenas for a wave of reports produced by the national inspectorates for schools and further education in England and Wales.[6] Germany remained a compelling destination for these study visits and received more attention than the other countries, but more recently this allure, along with curiosity about Japan, has waned as both countries no longer epitomise recession-proof economic vitality.

It is in this context that our report now surveys technical and vocational education in four overseas counties. For reasons explained at the beginning of chapter 4, where we return to thematic and comparative assessments that include the UK, a longish view is taken in each case (from *c*.1880), with particular attention paid to two periods – 1890 to 1930 and 1980 to the present. The case studies which follow begin with Germany, the country displaying the strongest continuities from the European pattern of technical education generally prevailing in the nineteenth century. The USA comprises a narrative of New World aspiration and organisation on a grand scale. Japan represents an example of educational organisation framed by systematic meritocracy. Finally, Sweden is a nation that has sought to sustain a programme of extended egalitarian education in a conscious departure from nineteenth-century European tradition.

Germany

Context to 1945

When German unification was achieved in 1871, the states of the new federation not only recognised the King of Prussia as emperor but formalised politically the economic liberalism that had characterised the German confederation since the 1830s. With this had come industrialisation – steel, coal and manufactures – now set alongside the traditional craft guilds to be found scattered throughout the small and conservative German states and kingdoms. In turn, this liberalising economy sat in the shadow of a Prussian intellectual and political tradition that, among other things, had adopted a systematic approach to the provision of publicly-funded education.

Designed to instil loyalty and support pietistic spirituality, **attendance at school** by children aged 5–12 was declared compulsory in Prussia 1763. However, it was between 1810 and 1840 that the Prussian state created an integrated public school system – decades before any other nation. From 1826 universal elementary education was made available and compulsory between the ages of 7 and 14 in *Volksschulen* provided in each parish. All teachers were required to undertake prescribed training and a small elite of pupils proceeded to secondary schools, the *Gymnasien*, which, from 1812, operated under regulations comprising a nine-year course, culminating in the award of the *Abitur*, the certificate which controlled entry to higher education. Elementary schools were public institutions financed largely through taxation and, by 1861, they outnumbered private schools by 34 to 1.[7]

At this early stage of industrialisation handicrafts remained important – toys, clocks, wrought iron, embroidery – but with the arrival of the railways in the 1840s, engineering, metallurgy and foundries generated new occupations, and thus the need for new skills and new forms of training, as the population expanded dramatically and became increasingly urban.[8] The response to this need was met, on the one hand, by the 26 constituent states (S*taaten*) within the empire, each of which possessed local jurisdiction over education and training and, on the other, through imperial jurisdiction which extended to business and trade, including **apprenticeship**. Thus, while Prussian models were influential in education, they were not binding and a range of school patterns flourished, for example in respect of regulations for *Volksshulen* and the provision, from the 1820s, of specific types of vocational continuation school. At the same time, the

4. Board of Education, 1926: 288–313.
5. Richardson, 2007: 401.
6. Richardson, 2007: 407.
7. Green, 1990: 119, 3–4.
8. Sanderson, 1994: 14; Hahn, 1998: 30. Between 1875 and 1915 the population of Germany rose from 42.5m to 68.0m, while that in France rose from 36.2m. to 39.2m., *ibid.*

imperial impulse toward free trade left in place inter-state legislation from 1869 (modelled on a French law of 1851[9]) which loosened control of the guilds over juvenile training.[10]

On the education side the result was that, by 1900, most *Staaten* had evolved variations on a generic model of schooling: universal attendance at *Volksschule* accompanied by a network of post-elementary trade schools and by very small cadre of pupils (*c*.2.4% by 1870s[11]) attending secondary education, either at a *Gymnasium,* leading to higher education and elite occupations, or at a *Realschule, Oberrealschule* or *Technische Hochscule*, where more immediate and broader employment opportunities were the goal.[12] Following the creation of the Weimar republic in 1919, the constitution allowed, for the first time, the prospect of binding reform of schooling across Germany. In the event, certain minimum rights and duties were enshrined, notably compulsory attendance during the first four years of elementary school and free access to a further four, with two further years for vocational training. In a subsequent statute of 1920, separate preparatory schools with links to *Gymnasien* were abolished in favour of comprehensive primary education, but no further reform was politically possible. The result was that the dual structure of secondary education was retained, while differentiated entry based on potential occupation and ability was enshrined in the Weimar constitution.[13]

So far as **vocational training** was concerned, there was political agitation from the 1880s to restore some element of guild control over juvenile apprenticeship, culminating in a statute of 1897, the Act to Protect the Crafts, which established the right of craft chambers and local guilds to organise training and to hold examinations for journeymen and masters. In turn, this stimulated the work of the part-time vocational schools, which operated under a wide variety of local regulations among the states, and the efforts of industrial employers' organisations after 1918 to establish systematic occupational profiles, linked to trade syllabuses, which began to be examined from the mid-1920s through chambers of industry and commerce (a right hitherto reserved to the craft chambers).[14] While this was occurring, the institutional and didactic principles of the continuation schools were the subject of influential critique in Munich by Georg Kerschensteiner (1854–1932), with the result that the very wide diversity of practices and occupational specialisms that they offered (to women as well as to men[15]) were increasingly harmonised through the common principle of according value to the learning undertaken, both in the workplace and in the continuation school, while emphasising, overall, *Menschenbildung* (the education of the individual).[16] Renamed *Berufsschulen* after 1920, the take up of part-time vocational school education among the 14+ age group was 66% in 1937 at a time when the Nazi government began to institute systematic syllabus development for each trade, encompassing on- and off-the-job elements.[17] A year later, the National Socialist government made attendance at part-time vocational school compulsory for 14–17 year-olds not in secondary school, so enshrining the legal right of apprentices to trade training under the regulation of the local states.[18]

Developments since 1945

The education system established after the war in the German Federal Republic (West Germany) was administered regionally through 11 *Länder* (successors to the *Staaten* of the empire). Although there was some discussion of more radical change to the structure of secondary schooling, the biggest concern among the Western allies was to decentralise power and see through a programme of de-nazification of the teaching force, before authority for education was restored to the *Länder* in January 1947.[19] For their part, the *Länder* displayed no appetite for reform of secondary education. In the first decade after the war around 11% of the age group appears to have entered *Gymnasien* at a time when there was high youth unemployment, exacerbated by the effects of National Socialist policies in the 1930s to increase the birth rate.[20]

However, within a dozen years the position had been transformed. Industrial production rose by 50% in 1948 and a further 25% in 1949. In 1953, average living standards passed those of 1938, even though acute shortages of jobs and training opportunities remained, and the position held by Britain in 1950 as leading exporter in western Europe was overtaken by West Germany in 1958, by which time full employment had been secured.[21] All this had been achieved though a concentration on the production of goods for export which required a minimum of raw materials but considerable knowledge and skill in their manufacture, notably machine tools, precision mechanical, optical and electronic equipment, and chemicals.[22] This orientation was now being reflected in apprenticeship numbers. In 1960, over half of all 16–19 year-olds were in apprenticeships, of whom 35% were in craft

9. Taylor, 1981: 15.
10. Hahn, 1998: 32; Deissinger, 1996: 318–19. With the exception of most of the period of National Socialism (1934–45), this broad division of national and local responsibility for German education and training has remained in place to the present.
11. Green, 1990: 125.
12. The *Realschule* had its origins in Prussia where, from 1832, it was formally recognised by the state and concentrated on a broad, non-classical curriculum. In the 1860s, the Prussian authorities required Latin to be taught in the *Realschulen* and this led to the emergence of the *Oberschulen* and *Technische Hochschulen* which developed a capacity for engineering and technical education, Hahn, 1998: 36, Döbert, 2007: 299.
13. Articles 145 and 146. Döbert, 2007: 300; Hahn, 1998: 55–56.
14. Deissinger, 1996, 319–20; Taylor, 1981: 22; Greinert, 1994: 45–47, 56. 100 trades had had skills profiles determined by 1937, Deissinger 1996: 319.
15. Feller, (n.d.): *passim*.
16. Deissinger, 1996: 319–20; Hahn, 1998: 32–34; Taylor, 1981: 17–19.
17. Greinert, 1994: 59.
18. Deissinger, 1996: 320. Compulsory day-continuation attendance had been in force in at least seven states during the nineteenth century, starting in Bavaria (from 1864), DCL, 1905: 41.
19. Phillips, 1992: 116–18
20. Hahn, 1998: 115; Taylor, 1981: 126–27. Of the 11% in the *Gymnasien*, 2% of these were from working class backgrounds.
21. Taylor, 1981; 121, 154, 151.
22. Taylor, 1981: 123.

trades but easily the largest group (58%) were in industry and commerce.[23]

With the economy stable and prosperity advancing[24] attention turned once more the **structure of schooling** and the case for refinement of the vocational training system. Across all of the *Länder* a common stage of primary education to the age of 10 was in place, after which pupils began to be differentiated. A minority transferred to other institutions: either at 10+ to the *Gymnasium*, preparing students for university entry at age 19, or to the *Realschule*/*Mittelschule* at 10+ or 12+, preparing students for employment at the age of 16. However, a majority of the cohort remained in primary education (at V*olksschulen*) before proceeding to apprenticeship at the age of 14 or 15.[25] Reform plans of 1959, implemented from 1964, instigated a process through which a more common and universal stage of lower secondary education was created for the 10–16 age group. By the early-1980s the result was arrangements through which, in most *Länder*, primary schools (G*rundschulen*) recommended pupils at the age of 9/10 to one of three types (and tiers) of lower secondary school, each of which provided a two-year 'orientation stage' for pupils aged 10–11: *Gymnasium* (academic orientation: 15% of entrants in 1963/18% in 1979), *Realschule* (technical/intermediate: 12%/24%) and *Hauptschule* (vocational: 69%/49%).[26] During a similar period (1969–82), 78 comprehensive schools (*Gesamtschulen*) were introduced across most of the *Länder* but these had experimental status in law and were allowed to exist only alongside the main school types.[27]

Meanwhile, the **apprenticeship system** with its associated vocational training schools was also under review. In 1953 a federal law updated and expanded regulations for craft apprenticeship training, in the process creating a list of 111 trades defined as craft occupations.[28] Reform hearings in 1967 debated whether the vocational schools should be brought under federal control but this was dismissed as politically impossible. Instead, the 1969 Vocational Training Act (the basis of the present-day apprenticeship system in Germany) expanded the occupations subject to federal law to all those outside the public service, so constituting the widest such framework in Europe.[29] The effect was consolidation and by 1990, 74.8% of 16–19 year olds were in apprenticeship.[30]

Given the dominance of the 'dual system' of training (a term adopted in 1964 to denote the off- and on-the-job components of apprenticeship)[31] and the rigidity, by European standards, of the selection arrangements experienced by 9/10 year-old pupils upon which it relies, it was inevitable that the system would have its persistent detractors. Having remained roughly constant in terms of overall participants during 1960–76, the number of apprenticeship places was expanded by 40% through to the peak year of 1985. Even so, this undershot demand by 5%, a figure which occasioned much criticism (indicating how central a place apprenticeship has in German society), underscored by widespread complaints that many entrants were not securing their preferred occupational choice and that regional and gender disparities were unacceptably high and in contravention of German Basic Law.[32] Then, just as numbers fell back, mirroring demographics in the West German teenage population, the system came under renewed pressure due to the combined effects of the cost of German reunification (in June 1991), the resulting imbalance in the supply and demand for skilled labour within the expanded country, the threat that globalisation posed to the highly specialist and essentially conservative model of apprenticeship (in 2007 there remained 340 trade-based occupations in the 'dual system', down from 606 in 1970 and 901 in 1950)[33] and an increasing preference among large multinational firms for graduates rather than apprentices.

Linked to reunification, and telling in relation to German sensibilities, each of the five *Länder* of the former German Democratic Republic decided to renounce their Soviet-imposed systems of comprehensive secondary education, in favour of **differentiated secondary school structures** operating in various regions of West Germany.[34] Within a decade, the entire German school system had experienced the severe jolt to perceptions of results from the first PISA (Programme for International Student Assessment) study of pupil performance at the age of 15 across 32 countries in mathematics, science and reading literacy. This, the most comprehensive study of its kind to date, placed the performance of German 15-year-olds in 2000 in each curriculum area well below the average of the 28 OECD countries in the study, while also suggesting that the performance of German students was tied more closely than in all other countries to social background and type of lower-secondary school attended.[35] This finding has prompted significant efforts subsequently to increase the academic component of the curriculum in both the *Realschule* and

23. Shackleton *et al*., 1995: 123.
24. By 1968 West Germany was second only to the USA in the value of her export goods and in 1979 she overtook the USA to become the world's leading exporter, Taylor, 1981: 121.
25. Warren, 1967: 28–32.
26. Hearnden, 1976: 60–67; Naylor, 1985: 25 and 72 n.8.
27. Mitter, 1991: 157–58.
28. Deissinger, 1996: 319.
29. OECD, 1994: 13–14.
30. Shackleton *et al*., 1995: 122. Of these, 59% came from *Hauptschulen*, 57% from *Realschulen* (up from 47% in 1970) and 15% from *Gymnasien* (up from 4% in 1970): Deissinger, 1996: 321.
31. OECD, 1994: 14.
32. OECD, 1994: 22.
33. Trades unions and employer associations agreed to raise East German wages to the levels of the western *Länder* within five years, Wagner, 1999: 39–40, 53–55; EC, 2006/07: 107; Wagner, 1999: 50.
34. A vivid account of this process is Phillips, 1992: 111–27 and it is notable that a majority of the new *Länder* decided against creating *Hauptschulen*.
35. MPI, 2002: 7, 13.

Hauptschule, while in Hamburg and Berlin there are current (2010) attempts to abolish these two school-types in favour of the *Gesamtschulen* ('comprehensive') schools that achieved formal recognition in 1982 in a majority of the 16 *Länder* and which are located most frequently in the north of the country.[36]

In 2005 only 21% of lower secondary school pupils in Germany were in *Hauptschulen*, increasingly seen as problematic 'leftover' schools (akin to the image of some English secondary moderns of the 1960s).[37] A gainer in prestige and 'share' had been the *Realschulen* (up from 24% in 1979 to 28% in 2005) but, perhaps most notably, it was the *Gymnasien* that had increased their proportion more (up from 18% in 1979 to 34% in 2005), as 9/10 year-olds and their families 'traded up' following the onset of sharp recession in 1991 and the schools themselves shed some of their old 'elite' character and, increasingly, embraced specialisms such as modern languages, mathematics and sciences, music, and business & economics.[38] Undoubtedly, there has been an important **redistribution of enrolment** among the types of lower-secondary secondary school in Germany in recent years and this has prompted much discussion of the extent to which the wider education system is under fundamental strain. One effect of retaining *Gymansien* has been to perpetuate a higher education sector that is small by OECD standards,[39] with 'upward' pressure from teenagers channelled, instead, into the expansion of a variety of full-time, post-secondary vocational schools including those specialising in technology, social sciences, and business, economics & administration.[40]

Thus, the secondary school structure is now held in balance between the extended remit of both the *Realschulen* and the *Gymnasien*, alongside the counterweight of an apprenticeship route that has also broadened and modernised in the years since 1969, to keep pace with a manufacturing sector that remains very large by OECD standards.[41] Nevertheless, German manufacturing suffered contraction in the 1970s and again in the 1990s, creating one of the **pressures facing apprenticeship** 'dual system' training today.[42] Others are a lack of jobs in the growing services sector as attractive as those lost in manufacturing, the ways in which 'flexible working' has hollowed out the traditional employment relationships that gave stability to the model of apprenticeship and its underpinning specialist discipline (*Berufspädagogik*: the teaching of a *Beruf* [occupational calling/vocation]), and the drive of the European Commission to introduce instead its polar opposite – a common framework for training via occupational competencies. These derive from models developed in Britain in the mid-1980s and serve to emphasise the role of transferable skills in support of deregulated labour markets.[43] To these educational considerations may be added the continuing cost pressures facing German manufacturing, the accompanying movement of many productive jobs to eastern Europe and other low-cost locations, a resulting drive to increase automation and production re-organisation, and the way that this exposes rigidities in rationale of an apprenticeship system customarily focussed on individual skill acquisition within traditional occupational categories.[44] Nevertheless, in 2006, almost 60% of school leavers aged 16, equating to approximately 50% of the age cohort, entered apprenticeships, supplemented by a sizeable group of *Abitur*-holders taking up apprenticeship at age 18. Industry and crafts comprised 86% of all places and, of newly awarded contracts, one quarter went to those with the *Hauptschule* leaving certificate, one third with the *Realschule* certificate and 16% with qualifications at age 18+ allowing admittance to higher education.[45]

The USA

Context to 1945

In the United Stated of America, the English-language '**common school**', organised by local districts across the separate states, was the mainstay of education from the 1830s, designed to induct large waves of immigrants into a shared national culture and stimulate equality of economic opportunity.[46] The local publicly-funded school of mid- to late-nineteenth century America was the all-age elementary school and, in rural areas up to the 1940s, children often attended throughout in a 'one-room schoolhouse'.

Strongly protestant in impulse, the organisation of public elementary education in the north was consolidated through the middle of the century at the level of the state (despite fierce local resistance) and served eventually to establish the national model for the administration of schools. By 1850 attendance was near-universal in the rural north but in the large cities, where vast influxes of skilled as well as impoverished European immigrants were received, industrialisation and the pressures of rapid urban expansion created different social hierarchies to challenge the prevailing organisation of schooling.[47] Here, class boundaries may have been more fluid than in Europe but they were, nevertheless, clearly delineated in ways less

36. Mitter, 1991; 157–58.
37. *c.*12%-14% of pupils leave *Hauptschule* without any kind of leaving certificate (Döbert, 2007; 316), but other estimates put the number failing to complete *Hauptschule* at nearer to 40%, Mechan-Schimdt, 2010: 36.
38. Döbert, 2007: 316–17; Wagner, 1999: 38.
39. OECD, 2007. However, the European Union's 'Bologna Process' may lead to increased access to higher education, not least by making completion times appear less daunting.
40. Feller, n.d.: 1. By the mid-2000s thee were up to 15 different types of vocational schools in operation for the post-16 age group, Döbert, 2007: 313, 318. See also EC, 2006/07: 82–83.
41. EC, 2009: 2009: 301.
42. Wagner, 1999: 59–60.
43. *Via* the 'Copenhagen Process', Greinert, 2007: 56–58. For broader discussions of the dual system under strain, see Wagner, 1999: 37–76 and Thelen, 2004; 259–77.
44. Thelen, 2004: 269–70.
45. EC, 2007/08a: 135, 96.
46. Spring, 1990: 111.
47. Green, 1990: 187–88, 202; Thelen, 2004: 180. Between 1845 and 1855, 300,000 immigrants arrived annually.

evident on the frontier to the west, where homesteading was mainly a movement of independent farmers, and in the south where economic interests, including slavery, centred on commodity crops (especially cotton) and were reliant on states in the north for finance and manufactured goods.[48]

Except in the south, where there was opposition to the education of slaves, the process of nation-building within a culture of freedom and opportunity, accompanied by the wealth-creating potential of the country's vast physical and natural resources, ensured broad support for mass education.[49] The question in the cities was how education should develop, so as both to preserve the egalitarian values of the common school and satisfy the skills requirements of industrialisation.[50] Initially, the focus was at college level and on engineering, manufacturing and agricultural science, fed by the privately-governed academies and public high schools that were starting meet the aspirations of those seeking professional occupations.[51] However, at high school level there was pressure to provide not merely for college preparation but also for entry to employment and, while most states displayed a strong commitment to a comprehensive model of organisation, pressure to include **vocational education** led to experimentation.

For example, during the 1880s, some universities such as MIT and Washington created adjunct schools of manual training and investigated overseas models such as Prussian and French industrial schools. These were generally rejected on the ground that, in Europe, they reinforced the existing social structure whereas, in America, the organisation of schooling should be shaped to reflect the ideal that 'every boy is a natural candidate for the office of president'.[52] In the same decade, privately-sponsored, fee-paying trade schools also started to spring up, recruiting in specific occupations to a four-year course at age 14 or 16 (although enrolment often declined rapidly after the first year).[53] The first opened in 1881, in New York City, offered only short courses and its founder was clear that his school was a better alternative to apprenticeship. Neither boys nor masters, he asserted, any longer had the patience to accommodate time-served training and, in any case, labour unions, increasingly under the control of 'foreigners', were limiting quotas, so that boys were in danger of being shut out of the trades.[54]

In the following decade publicly-funded **specialist high schools** also emerged as a small sector in states such as Massachusetts, Philadelphia, New York and California.[55] In part, such specialist public schools for 14–17 year olds were stimulated by arguments similar to those which brought about junior technical schools in England – scarcity of skilled workmen, the decay of apprenticeship and the emergence of industrial competition from Germany.[56] Educational ideas were also to the fore, a Californian advocate of specialist occupational schools arguing in 1915 that they helped local school districts adapt to the 'needs of each type of child' in the community, 'the "finger minded" as well as those "who can work with ideas"'.[57] However, there was persistent opposition to such a view, on several grounds: that all children should receive both cultural and vocational training;[58] that separate industrial schools exacerbated unnecessarily existing social class divisions; and that, while it might be seen as appropriate in European counties such as Germany, where boys customarily followed the father's occupation, vocational specialisation cut across the American ideal which, in the words of proponent in 1910, was 'to give every child the opportunity, at as many points as possible in his educational career, to himself determine his own future'.[59] It was this view that triumphed in most states by the 1930s when vocational instruction became very largely absorbed into the general high school and most of the remaining specialist and technical high schools broadened their curricula to include a wider range of studies.[60]

Within the **general high schools** vocational preparation had, in any case, gained ground from the turn of the century in fields such as commerce, drawing and domestic science.[61] For example, where junior high schools were initiated, such as in New York during 1900–1910, a differentiated curriculum, followed by different children within the same institution, was often established and accompanied, as in other schools, by interviews and mental testing to distinguish the 'abstract-minded' from 'concrete or hand-minded' child.[62] Such overt 'tracking' was controversial at the time, especially where such allocations of pupils was seen to exacerbate divisions of class and race while, elsewhere, less overt streaming led to the mushrooming of course options and the need for commissions of enquiry to restore order to the curriculum.[63] Clear above all was that, compared to developments in Europe, the reach of the comprehensive public high school was expanding rapidly. By 1920, one quarter of all 14–17 year olds in the USA were in high schools, a figure which rose rapidly

48. Green, 1990: 196.
49. Green, 1990: 190.
50. Wirth, 1970: 313.
51. Wirth, 1970: 8–14.
52. Wirth, 1970: 21.
53. Kantor, 1988: 93. The first private trade school was founded in New York in 1881: Douglas, 1921: 187.
54. Wirth, 1970: 26.
55. Sanderson, 1994: 13; Kantor, 1988: 90–106.
56. Sanderson, 1994: 13. Although in the boom towns cheap, unskilled labour was in high demand, Wilms, 1998: 84.
57. Kantor, 1998: 100. In states such as California, it appears that all-day trade schools were more likely than general high schools to serve the children of recent immigrants: *ibid*. 99.
58. The philosopher Dewey advocated a version of the German ideal of *beruf* which he termed 'vocation', in contrast to the ideas of those championing technical instruction who stressed its efficiency, Wirth, 1970, *passim*.
59. Kantor, 1988: 101. Influential in such thinking were the writings of John Dewey.
60. Kantor, 1988: 102–03. See also Kantor, 1982: 36, 43.
61. Wirth, 1970: 24.
62. Spring, 1990: 211–20.
63. Green, 1990: 201; Lewis, 2007: 82; Wirth, 1970: 24–25.

to one half by 1930 and two thirds by 1940, the latter proportion having been achieved at a time when the equivalent figure in England and Wales for 13–14 year olds in state-maintained secondary schools (all of which were selective and most of which charged fees) was 13%.[64] By the mid-twentieth century, the age of transfer from elementary to high school in most states was set at 11+, followed either by a single- or two-stage ('junior' and 'senior') high school phase, the latter requiring an additional transfer at 14+.[65]

Developments since 1945

The decline of the trade schools from the 1920s reinforced the ascendancy of the comprehensive American high school, albeit that the country as a whole exhibited a huge variety of local organisation. In 1960 there were over 40,000 local school districts able, though local property taxes, to raise the majority of the school budget and wide variation was the inevitable result in terms of resources, teacher salaries and facilities.[66] As supervisors of the districts, the individual states operated what were, in effect, 50 separate education and training systems, with the duration of compulsory attendance varying, in the 1960s and today, from age 6, 7 or 8 until age 16, 17 or 18.[67]

Federal funding for vocational education had first been enacted in 1917 and this gave the proponents of the specialist technical school and those who sought to maintain a vocational stream within bilateral schools some small financial leverage against the comprehensive tide that washed over high school organisation from the 1920s.[68] However, the approach of such advocates was to exhort social and economic benefits rather than establish them systematically. As such, the field was notable for the vigilance of the vocational lobby in protecting federal funding and for an absence of evidence about its effects until well into the 1960s.[69] Critics were not disarmed but external pressures bearing on the nation as a whole ensured steady federal interest and support.

After the war, a first phase of renewed federal impetus was occasioned by the 'Sputnik shock' of 1957 which served to stimulate both the development of science education and, in the last two years of upper secondary schooling, a wave of federally-funded vocational provision, instituted in 1963 and broader in kind than that initiated in 1917. This stimulated a significant expansion of vocational programmes in high schools, peaking in scale around 1982 when, of all courses taken by students, one quarter were vocational,[70] and at a time when the rate of high school graduation at 17+ also reached its zenith (77% of students).[71] Taken together, these trends boosted significantly the progress of students to a rapidly developing two-year community college system at 17+ or 18+ – an arena championed by some for its open access and chided by others for its tendency to limit student aspiration.[72] Meanwhile, alongside the comprehensive high school, a small number of urban specialist schools had survived from early in the century, often devoted to technology and the sciences, recruiting via selective entry at 12+ (grade 7), 14+ or 15+ and enjoyed continuing high prestige.[73]

A second phase of federal concern about high school standards and their relation to labour market change dates from the 1983 report *A Nation at Risk,* and a range of similar reports which soon followed, occasioned by declining competitiveness in industries such as steel and electronics,.[74] However, this time around, the effect on vocational education was mixed. On the one hand, as schools were exhorted to focus on academic subjects, and critics renewed their assault on the 'tracking' effects and instrumental aim of such courses, leaders of vocational programmes in high schools came under pressure to justify their provision and found their enrolments falling.[75] On the other hand, the political stimulus served to breathe new life into justifications for 'VocEd' in high schools, as proponents strove to make such courses more educative and to catch the momentum the wider 'school reform' movement that *A Nation at Risk* had created.[76] In America's massive and locally-administered system of schooling these events created new configurations of technical and vocational education at the secondary school level, serving to reintroduce some of the variety of school type seen at the start of the twentieth century.

In the first place there were the surviving specialist high schools of longstanding and high repute.[77] These were supplemented, from the 1960s, by a parallel specialist, or '**magnet**' **school** movement, in part stimulated by a drive to desegregate school attendance voluntarily rather than through enforced 'bussing'.[78] In their turn, proponents of magnet schools were given a boost in the 1980s as school reform and 'school choice' policies gained ground. This provided encouragement to state legislatures (most notably Minnesota), school districts and activist groups that were already experimenting with specialist programmes within common schools, so as to stimulate non-catchment attendance in urban areas and thus

64. Spring, 1990: 197–98; Simon, 1965: 22, 366.
65. Warren, 1967: 56–57.
66. Cantor, 1989: 69–70. By the early 1980s the number of school districts had reduced to 15,750 and, by 2000/01, to 14,850, *ibid*. and Bailey and Berg, 2010: 272.
67. Warren, 1967: 56–57. In some states the age of transfer in the 1960s was 13+, followed by a four year high school, *ibid*. For the more recent position, see Valverde, 1994: 1034–35
68. Millsap and Muraskin, 1994: 6531.
69. Wilms, 1988: 87; Lewis, 2007: 81–82.
70. Millsap and Muraskin, 1994: 6534–35.
71. Valverde, 1994: 1035. A later study of those graduating in 1992 found that 7% had not achieved high school graduation level eight years later, Bailey and Berg, 2010: 275.
72. Ratcliffe, 1994: 12–13; Levinson, 2005: 28–30. Access proponents noted, also, the role of colleges in motivating students subsequently to enrol in higher education.
73. For example Boston Technical High School (founded 1893) and Brooklyn Technical High School (founded 1922).
74. Lewis, 2007: 82–83.
75. Lewis, 2007: 82, 87; Bailey and Berg, 2010: 274.
76. Lewis, 2007: 83–84.
77. See n. 190, above, and comprising, perhaps a core of 15–20 institutions in the large cities.
78. Spring, 1990: 368–69; Henig, 1994: 106–14.
79. Cantor, 1989: 73–74.
80. For example, there are currently over 100 members of the National Consortium for Specialized Secondary Schools of Mathematics, Science and Technology.
81. Bishop and Mane, 2004: 382.
82. Confusingly, there are also several thousand 'career academies' that are not magnet schools at all but the names for vocational programmes within high schools, many serving poor neighbourhoods, the first having been established in Philadelphia in 1969: Orr *et al*., 2004; Burnett, 1992.
83. Formally, the Monmouth and Bergen career

diminish segregation. Some of these programmes took the form of **new vocational high schools** established in school districts on a relatively small scale (400–500 students) and enrolling a minority of adults.

By the mid-1980s there were 225 such schools recognised nationally[79] and although this number has grown since,[80] vocational and technical education is a relatively small-scale aspect of the broader magnet school phenomenon, now accounting for 4%-5% of all United States high schools.[81] As with other aspects of school diversity in the USA, labels and terms imply only a loose uniformity. In the case of magnets, for example, the label indicates merely the enrolment of students beyond local catchments. Thus, magnet schools at secondary level can be highly selective or non-selective, the latter admitting by lottery or by a mix of methods. In one local example, in Monmouth and Bergen counties, New Jersey, such schools comprise clusters of, respectively, nine and four upper secondary schools (age group 14–18). These were founded between 1981 and 2005 and serve as the selective-entry technical / vocational 'magnets' or 'career academies' for each county,[82] securing strong involvement of leading local employers in sectors such as biotechnology, engineering and design technology, along with very high levels of student attainment leading to places at leading universities.[83]

More broadly, federally-funded programmes continue to address technical and vocational priorities in the comprehensive high school across a secondary education system which, nationally, registered a performance ranking, in terms of raw scores, at the mid-point of OECD countries in the 2000 PISA study of tasks in reading, mathematics and science taken by 15 year-old students. When it came to the strength of correlation between raw scores and the socioeconomic status of those sitting the tests the performance was poorer – in the bottom quartile of nations.[84]

Japan

Context to 1945

Japan's path to industrial urbanisation was something of a dash after the coming to power of the Meiji Restoration in 1868. At that time export trade was dominated by raw silk and tea[85] while the remainder of the economy was organised on feudal lines, with the great majority of the labour force employed on the land, in artisan crafts and the state bureaucracy. Thus, it was only in the 1870s that economic and educational development for the majority was embarked upon in earnest, in a drive that consciously adopted European models in an effort to stave off the threat of colonial subjugation.[86] Thereafter, the metalworking and engineering sectors expanded rapidly, initially under state supervision but during the 1880s through privatisation. The result was not only rapid industrial development and the creation of huge enterprises, but also enhanced military ambition.[87]

In education, **universal elementary schooling** was the initial goal, but from the outset – marked by a wide-ranging decree of 1872 – the aim was an integrated national system, based on the model of France, incorporating a cadre of universities to which the most able from among what was (and remains) a homogeneous society would proceed, via 'middle' (i.e. secondary) schools.[88] Initially, strong central planning and control imposed not only a uniform type of education (copied from European and north American models and dislocated from the village experience of most attendees) but also mandatory fees,[89] ensuring that attendance in elementary schools, although formally compulsory from 1872, was patchy, especially for girls.[90] Fees were abolished in 1900 and seven years later the period of compulsory attendance – for the great majority in small rural schools – was extended by two years to the age of 12 (commencing, as before, at age 6). As in England and Wales at this time, it was possible at the end of elementary school to transfer to the equivalent of a junior technical school (labelled in Japan the apprenticeship school) or to 'continuation' schools if the elementary school leaver was already in work.[91]

Expansion of **secondary education** was tackled in the 1890s, building on the highly literate temple schools and fief schools of the pre-industrial period. Initial growth was concentrated in the urban centres of Tokyo and Osaka. By 1903, 340 general secondary ('middle') schools had been established, alongside 200 technical schools (28 engineering, 52 commercial, 113 agricultural and fishery and 7 mercantile marine). These latter were designed, when attached to factories, to train both supervisors and skilled workers overseen, in the early years, by German advisors.[92] On this foundation 12% of the age group was entering secondary education at the transfer age of 12 in 1910 (compared to 4% in England and Wales in the same year).[93] Educational planning and control remained strongly directed by the central government bureaucracy, in co-operation with industrial interests which centred on very severe shortages of workers with the skills necessary to operate

academies are part of a state-wide system of VOTEC schools found in each county of New Jersey, many of which are more traditional vocational schools.

84. MPI, 2002: 7, 11.
85. Satō, 1987a: 30.
86. Dore, 1976: 38. The intense period of emulation of the west was over by 1880 as traditional (*kokugaku*) and Confucian themes in education were revitalised and promulgated, Kobayashi, 1976: 29.
87. Thelen, 2004: 152–53. By 1905, more than two thirds of those in engineering works were state employees and Japan was either at war or preparing for war throughout the period 1894 to 1912, *ibid*. nn. 2–3 and 5.
88. Dore, 1976: 38–39; Benjamin, 1991: 512. In the late 1990s only 2% of the population could be described as belonging to minority groups – ethnic Koreans or descendents from an outcast group known as *burakumin*.
89. Kobayashi, 1976: 26–27; Satō, 1987b: 49–51; Thelen, 2004: 154.
90. Satō, 1987b: 49–50.
91. Dore, 1976: 40–41; Satō, 1987b: 63; Sanderson, 1994; 12; ILO, 1933: 335. From 1872 the official period of compulsory attendance at elementary school was eight years from the age of 6, before being reduced to four years from the age of 6 in 1886, Satō, 1987b: 49–50, 63.
92. Kobayashi, 1976: 31
93. Dore, 1976: 40. However, it should be noted that, alongside the middle schools which led to university entry, the 'continuation' and 'vocational' schools had their designation changed from elementary to secondary from the mid-1900s, after which time, unlike in England, they were included in the secondary figures (Toyoda, 1987: 237). In the early 1930s, 8% of students completing elementary school were passing the examination for entry to the fee-paying middle schools, ILO, 1933: 335.

and maintain the technologies which had been imported.[94] The secondary education of boys and girls was kept separate[95] and higher education expanded rapidly, leading to an intense hierarchy of secondary schools and universities, with admission controlled by mass entry tests. These tests were in full swing by the 1890s with the result that the 'examination hell' (*shiken jigoku*) of modern-day infamy was already being endured by Japanese school pupils, and named as such to an English-language readership in the early 1930s.[96]

While the general secondary school led to the prestigious universities, a comprehensive range of technical and vocational schools was in place during the three decades from 1895, reflecting the rapid diversification from an agricultural economy into one, after the Sino-Japanese war of 1894–95, increasingly based on factory goods (notably mechanised textiles) and heavy industry (machine tools, electrical goods and military machinery).[97] From 1897, in addition to the recently-established technical schools, apprentice schools attended by elementary school leavers from the age of 10 were encouraged to adapt to the new industries and, from around 1907, many were upgraded to technical schools (organised at county – prefectural – rather than town or village level[98]), placing their sole emphasis on the training of foremen.[99] Thus, from a peak of 136 apprentice schools in 1918, there was established from 1921 a new cadre of **secondary technical schools** for the 12–17 age group whose curricula over the following two decades specialised in engineering, chemistry, mining and metallurgy.[100] Those destined to become unskilled workers supervised by foreman in traditional crafts were, from 1894, able to attend part-time vocational continuation schools after elementary school. From the outset, these schools were more agriculturally-biased than the government had intended (the model had been imported from Germany but in Japan there was none of the close affinity existing in Germany between the continuation schools (*Fortbildungsschule*) and guilds). The result was that, despite the establishment of 10,700 vocational continuation schools by 1917, severe labour shortages continued to accompany the rapid industrialisation of these years.[101] As a consequence of all of these developments, pre-war Japan retained a variety of schooling options for those beyond the age of 12: general secondary ('middle') schools for boys (from which one fifth proceeded to university), with specialist technical schools running alongside; separate high schools for girls; two-year upper elementary schools; and, for those leaving school at 12, part-time vocational continuation.[102]

Accompanying this rapid expansion of post-elementary school education in the inter-war years were industrial trends in the 1920s. These consolidated the already enormous corporations with huge internal labour markets, a dynamic was to become important in the post-war world. More immediately, however, the political climate began to shape developments in schooling that had disastrous short-term consequences.[103] Although the part-time continuation schools were voluntary, from 1915, and especially after 1926, they assumed a role in 'character-building' including military training from the age of 16. This tendency was underscored by nationalistic alterations to the secondary school curriculum in 1932, reinforced, from 1939, by the compulsory enrolment of non-secondary school males aged 16–20 in militaristic 'youth schools' attached to the vocational continuation schools.[104] Japan entered the Second World War in 1942 and by early 1945 the mainland was under constant air attack. Normal teaching rhythms became almost impossible and, in March, most school education was suspended and the citizenry prepared for what was expected to be a final, tumultuous battle on home soil.[105]

Developments since 1945

The period of Allied occupation in Japan from 1945 to 1952 resulted in a United States administration imposing, from 1947, with the support of the Japanese teaching profession, the largely **comprehensive, co-educational school system** that survives today. Universal elementary and lower secondary schools to 15+ were established, beneath an upper secondary stage (instituted in 1948), with administrative responsibility devolved for the first time to locally-elected school boards (46 prefectures and five urban authorities).[106]

In 1941 33% of those staying in full-time education after elementary school other than special schools were attending boys' or girls' technical secondary schools.[107] In the immediate post-war period, technical upper-secondary education declined as priority was given to general programmes as the means to establish democratic principles, amid very difficult physical conditions: 13% of school buildings had been destroyed and there were constant shortages of teachers.[108] However, from 1951 there was a renewed policy emphasis on technical provision, in response to industrial and student demand, resulting in a sharp increase in the number of **specialist schools** and courses at the upper

94. Tobayashi, 1987: 32–33; Thelen, 2004: 153.
95. Rohlen, 1983: 59.
96. Dore, 1976: 45–46; ILO, 1933: 335.
97. In 1902, 84% of enterprises nationally had been founded in the previous seven years, Satō, 1987b: 54.
98. Satō, 1987b: 52.
99. Satō, 1987b: 54; Satō, 1987a: 44–45.
100. Satō, 1987a: 42.
101. Satō, 1987b: 46–64. By 1934 there were 15,306 vocational continuation schools of which 81% were agricultural, *ibid*., 66.
102. Rohlen, 1983: 58–59.
103. Thelen, 2004; 153, n.5 and 166–67; Mitani, 1999: 311.
104. Satō, 1987b: 63–68; Kobayashi, 1976: 38–40.
105. Kobayashi, 1976: 40. The Japanese surrender was signed on 2 September.
106. Kobayashi, 1976: 44.
107. MoE, 1980: 458–59.
108. Kobayashi, 1976: 43; Okano and Tsuchiya, 1999: 33.
109. MoE, 1980: 248–49.
110. MoE, 1980: 276.
111. Kobayashi, 1976: 97.
112. Okano and Tsuchiya, 1999: 40. There were 62 such colleges by the early 1980s, attracting one third of those enrolling for specialist technical education at age 15, Lynn, 1988: 42.
113. Kobayashi, 1976: 88; Thelen, 1994: 153, n. 5.
114. Thelen, 1994: 171–72; Mitani, 1999: 311.
115. Kobayashi, 1976: 93, 95, 101–02.
116. Taira and Levine, 1992: 312.
117. Cantor, 1989: 7; Benjamin, 1991: 519–20. Compulsory attendance on Saturdays was abolished in stages during 1992–2002 but many schools continue to offer six days of classes and there were moves in 2007 to reintroduce Saturday attendance more formally, *Japan Times*, 2007.
118. See Benjamin, 1991: 520, for a vivid description of what is entailed.
119. At the end of which, in the leading high schools, there is a further 'gruelling effort' to secure a prestigious place within higher education, Benjamin, 1991; 522.

secondary level.[109] This formed part of a surge in participation which, between 1950 and 1970, saw the proportion of the age group staying in full-time state school after the age of 15 increase from 43% to 82%.[110] By 1960, 156 technical subjects within 17 broad courses were listed in official ministry publications,[111] alongside both a significant increase in specialised private schooling and, from 1961, a new group of public technical colleges established to train mid-level technicians by combining high-school and two-year tertiary-level studies.[112]

Such changes mirrored massive industrial growth. Immediate post-war output was one tenth of the levels of 1935–37, yet by 1959 the annual rate of economic growth reached 18.3% and remained above 10% throughout the 1960s. In 1958 Japan was ranked ninth for gross national product. By 1962 it had surpassed India, Canada and China, by 1964 France, by 1965 the UK and by 1968 Germany, to become the third largest economy after those of the USA and the USSR. All this had been driven by manufacturing in large corporations – steel, motor vehicles, electronic goods, chemicals and cement – modelled in general terms on the huge state enterprises of the early industrial period, some of which were their direct antecedents.[113] Among the results was a drive to sustain large-scale training within the firm which had evolved during the war, but there was no revival of apprenticeship.[114] Instead, industrial concerns were encouraged to become involved in high schools and, from 1966, the Ministry of Education's promotion of 'diversification' of secondary education, based on ability, aptitude, future career and local conditions, stimulated further the growth of technical high school education.[115] The effect on upper (post-15) secondary education of these developments – and of the peaking of economic growth (during 1973–75) and college/high school enrolment (at 39% in 1976 and 94% in 1981, respectively[116]) – was to inaugurate many of the key features of the present-day scene.

At the lower secondary stage the curriculum is centrally prescribed by the ministry, has traditionally been highly intensive (six days per week for 40 weeks of the year) and is dominated by preparation for the post-compulsory, fee-charging institutions which almost all will attend.[117] The student's mother plays a large role in the 'intense effort' to maximise grades and potential success in the high school entrance examinations that most will sit.[118] Since the early 1980s, the resulting pattern of post-compulsory destinations of young people aged 15 has settled at around three quarters sitting entry tests for admittance to a clear-cut hierarchy of three-year general high schools,[119] a small group (*c*.6% in the mid-1980s, falling to 1.4% by 1997[120]) entering work and around one quarter proceeding to technical or commercial high schools (also for three years, enrolment having declined from a peak of 40% during 1955–75 as the government increased the proportion of general education content).[121]

Within the quarter opting for **technical/commercial high school** (*jitsugyōkōkō/shogyōkōkō*) – a group below the most able and comprising a high school stream of secondary status – there is a clear gender separation. Males tend toward technical and trade courses and females to programmes in commerce, home economy and nurse training. This bifurcation reflects the wider filtering that now commences, by which men typically enter the major corporations that demand long working hours and women who, having determined their likely marriage prospects in part by the kind of post-compulsory course they choose at age 15, later prepare their own children for the next generation of school tests.[122] The picture is even starker in the 62 **colleges of technology**, the five-year, 15+ institutions created from 1961 which specialise in the education of supervisory staff for industry in the new technologies. Here, over 9,500 boys enrol each year alongside 350 girls.[123] In the three-year technical/commercial high schools about 55% of the curriculum comprises general subjects (compared to the technical colleges where over 80% of the first year curriculum is based on general subjects[124]) and the most popular vocational streams are: business-related (38% of students in the mid-1990s), industry-related (34%), agriculture-related (11%) and home economics (8%).[125]

Overall, the fortunes of these schools appear to be in continuing decline. The high enrolments of the 1950s and 1960s were accounted for by a formerly large group attending agricultural high schools replaced increasingly, through the 1960s, by students specialising in production and commerce, and benefiting from labour shortages in the rapidly expanding industries and services.[126] By the early 1980s the picture was less rosy. First, there was regional variation: the wealthiest prefectures had the largest private high school sector and the lowest number of vocational places.[127] Second, while observers commonly pointed to very high completion rates, depictions of individual technical and commercial schools varied from an anatomy of social malaise and low

120. Lynn,1988: 41; Mitani, 1999: 307.
121. For various estimates of these tends, see: Lynn, 1988: 412; Okano and Tsuchiya, 1999: 65–66, 72–74; Cantor, 1989: 9–10; Dore and Sako, 1998: 42–43; Mitani, 1999: 307.
122. Mitani, 1999: 307; Benjamin, 1991; 522; Cantor, 1899: 6, 11; Dore and Sako, 1998: 58. The most desirable large firms employed *c*.15% of the workforce in the mid-1980s, Benjamin, 1991: 516.
123. Cantor, 1989: 16–17; Dore and Sako, 1998: 56–57. After a problematic start for these colleges due to employer uncertainty about them, the pattern of graduate destinations had settled, by the mid-1990s, into three-quarters entering the labour market at the end of the five-year course and a further 20% transferring to two-year degree programmes in universities offering engineering, Dore and Sako, 1998: 57–58.
124. Dore and Sako, 1998: 57.
125. Dore and Sako, 1998: 57, 42.
126. Dore and Sako, 1998: 44. Until the late 1950s it was assumed that all eldest sons would stay on the farm, *ibid*. From 1951 the ministry set detailed standards for each course, *ibid.*, 52.
127. Benjamin, 1991: 523. The proportion of vocational places could vary from 45% to a little as 20%, *ibid*.
128. Rohlen, 1983: 37–43; Cantor, 1989: 15. Cantor's example was in the Tokyo area. Nationally, job offers *per* leaver fell from a peak of 3.3 in 1992 to 1.8 in 1997: Mitani, 1999: 306.
129. Dore and Sako, 1998: 43, 54–57.
130. Mitani, 1999: 305–07, 319.
131. Cantor, 1989: 11; Mitani, 1999: 307. Dore and Sako (1998: 58) comment that the junior colleges 'suffer a good deal from the girls' finishing school image'. One third of students take vocational courses 'used to enhance marriage chances (and to become "good education-crazy-mums" [*kyoiku-mama*])', *ibid*.
132. Mitani, 1999: 308; Benjamin, 1991: 517; Rohlen, 1983: 58.

motivation, to the relatively upbeat where there were four job offers for every leaving student and 80% of graduates found suitable jobs.[128]

By the mid-1990s, however, as the country moved into a decade of recession, the Japanese vocational high school was being described as, increasingly, 'the last resort of the children who cannot get a full-time place in a public high school in areas where they are scarce, and who cannot afford to go to a private spill-over school, nor, often, manage to get a full-time job either' – and all this despite significant effort on the part of the government at this time to improve their status.[129] During the 'lost decade' from 1991, the youth labour market deteriorated sharply and in a country where job transfer is difficult, the effect on Japanese high school graduates entering work was to trade down to a less attractive job with poorer training opportunities.

Whereas in 1991 (a boom year), 36% of new high school leavers entering the labour market joined large firms (1,000 employees or more, a yardstick for the better jobs), the figure had fallen to 23% by 1996.[130] Among the majority leaving high school and not seeking employment (70%+), approximately one third entered universities or junior colleges (the latter almost all females where primary school teacher training dominates) and a further 20% enrolled at a separate full-time vocational training institution catering for the 18+ age group.[131] Whether or not students sought to secure a job at the end of high school, or after tertiary education, the trajectory of their school or college career remained crucial in a country where employers prefer to recruit from the same schools year after year via semi-formal or implicit contracts known as *jisseki-kankei* (apprenticeships are almost non-existent) and where there is no national qualifications system because performance in entrance examinations (at age 14+ and 17+) to a rigorously-scrutinised hierarchy of schools and colleges is more prized by employers than performance on courses once enrolled.[132] Meanwhile, company-based training in large firms has remained a constant, serving to underscore its central role in the initial training of the workforce and counter-balancing – in good economic times, at least – the relative paucity of high quality, school-based technical education.

Across secondary schools as a whole, Japanese 15 year-olds testing for the 2000 PISA study scored highest for mathematics, second for science and eighth for reading literacy out of the 32 participating countries, a result which maintains Japan's top scores for mathematics and science established in pioneering international studies of this kind during the 1960s. Due to Japan's intense meritocracy, it also scored highest in PISA 2000 for the evenness of achievement spread across participating students from varied socio-economic backgrounds.[133]

Sweden

Context to 1945

Other than the United States, Sweden is comparable in land mass to the other countries under review but has always had by far the smallest population. Along with Japan, it relied throughout most of the nineteenth century on a largely rural economy. As a consequence, agrarian politics was influential here in determining the early expansion of mass education, independent farmers (well over two thirds of the population) comprising the fourth estate of the realm in parliament.[134] **Universal elementary education,** through *folkskolan,* was enacted in 1842 in response to the pressures of rural poverty aggravated by enclosure laws, widespread hunger among a rapidly increasing population of landless peasants and crofters, and stimulated by pietism in the church and the personal interest of Crown Prince Oscar.[135] These schools were to be financed by each the 2,300 parishes (to the dismay of the independent farmers) and governed by boards run by the clergy.[136] Notionally, almost all 7–13 year olds were enrolled, although actual attendance varied widely into the 1880s,[137] by which time c.85% of the school-age population was included.[138]

During this period, rural industries, notably timber and iron ore for export developed alongside improved agricultural methods and, after 1880, there was substantial state and private investment in electric power, railways, road and harbours. However, poverty was acute and more than one million of the rural poor emigrated to the USA in the five decades from 1850.[139] In the meantime, **secondary education,** accessible in the main only to the small minority of urban dwellers,[140] had been re-organised in successive waves from 1849. The curriculum of the grammar schools (modelled on the Prussian *Gymnasien*) began to be reformed: following three years of common study undertaken by all pupils from the age of 10, a six-year modern 'side' was now provided for students as an alternative to study comprising solely classical subjects in the later teenage years. This placed such institutions in direct competition with town schools run by burghers[141] while both existed alongside two other types of secondary-level institution. First, specialist high schools, including technical schools, lead either directly

133. MPI, 2002: 7; Rohlen, 1983: 4–5.
134. Beneath nobles, clergy and burghers, Paulston, 1968: 5; Wiborg, 2009: 58–59. Between 1720 and 1845, the proportion of land in Sweden owned by the peasantry rise from 30% to 59%, *ibid*., 58.
135. Paulston, 1968: 19–20, 15, 22.
136. Boucher, 1982: 9; Paulston, 1968: 15, 22–23.
137. One third of children continued to be schooled at home through ambulatory schools where the teacher and pupils met in different homes by rotation, Paulston, 1968: 23.
138. Wiborg, 2009: 39.
139. Paulston, 1968: 24; Magnusson, 2000: 106–42.
140. Less than one tenth of the population in 1840, Paulston, 1968: 14.
141. Boucher 1982: 10; Paulston, 1968: 15; Alexsson, 1989: 40. The control of cathedral chapters over the curriculum of grammar schools, established in 1649, was to last until 1904, Boucher, 1968: 5; Alexsson, 1989: 42. For the Burgher class in Sweden and its economic elites (merchants, shippers and manufacturers), see Magnusson, 81–105.

to employment or to higher technical institutions which had been established through individual sponsorship; and, second, from the mid-century, private girls schools were augmented by the six- or eight-year girls secondary schools to be found in most towns with a population of more than 3,000 by the 1880s.[142] Meanwhile, although the craft guilds and their associated apprenticeship structure had been abolished in 1846, there were, by 1850, only eight vocational schools at the lower secondary level in the country and such efforts as there were subsequently to expand vocational education were modelled on Prussian continuation schools. From 1872 the state gave increasing support to the sixteen Sunday and evening schools then in existence which catered for young workers.[143]

Occupational patterns started to change significantly from the 1890s accompanied by some urbanisation,[144] a bi-product of which, in 1905, was parliamentary agreement to a longstanding burgher aspiration: a state-funded, Latin-free, lower secondary school, the *realskola*, with its own leaving examination or progression to the upper secondary *gymnasium*.[145] Seen at the time by radicals as both a specific concession and a measure to subordinate the urban *folkskolan*,[146] the *realskolan* failed to establish the principle of selective secondary education aligned to the burghers' desire for a curriculum of overt utilitarian value for commerce or industry.[147] Instead, from 1909, four-year lower municipal secondary schools were introduced as the progression route for the urban child leaving the *folkskola* at the age of 13.[148]

Thus, by 1914 there was a somewhat elaborate dual system of schooling in place in urban areas, just as Swedish industry was poised to profit from national neutrality in the Great War and the opportunity this provided to meet increased overseas demand for manufactured goods (engineering-based products such as telephones, ball-bearings and drilling equipment) and the bulk export of raw materials (wood-pulp, paper pulp, iron and steel).[149] Yet despite massive growth in industrial production since the mid-1890s, accompanied by a shortage of foremen in industry and a dependence of foreign skilled labour, there was, as yet, no cadre of specifically vocational schools. This problem, coupled with calls for a more egalitarian structure overall, set the scene for major, and often bitter, political discussion of education during 1918–27.[150]

Immediately, the coalition government (which, from 1917, included Social Democrats for the first time) was able to receive recommendations on **technical and vocational education** from commissions which had sat almost continuously since 1907. These bodies had considered the merits of three kinds of innovation: compulsory four-year apprentice training schools alongside the municipal secondary schools for those leaving the *folkskola* at the age of 13 to enter craft or industrial employment; adult vocational schools which would sit end-on to both types of 14–18 school; and, in parallel, two-year upper-secondary continuation schools recruiting those leaving the technical high schools. The result was the establishment of practical trade schools (*praktiska ungdomsskolor*), where part-time attendance was compulsory (from 1921) for at least two post-school years and the aim was to prepare teenagers, including girls, better for the labour market including 'a love for … agricultural employment' while restoring the moral and social training once supplied by apprenticeships.[151] Much more contentious was the question of a general overhaul of compulsory-age schooling. The settlement eventually arrived at here – the 'compromise' of 1927 – retained the duality of state elementary schools (in which no foreign language would be taught) alongside private preparatory schools, the two strands being followed by a structure of parallel, separately-paced (lower secondary) *realskolan*, all of which could now be co-educational, and (upper-secondary) *gymnasien*.[152]

In the heat of the debate, during the five years from 1922, public and party political opinion had been behind the need for much closer articulation of the two systems of schooling but there was no consensus on the means for its realisation, while professional opinion, among teachers, local school boards, municipal and county councils, the church, and branches within the Board of Education, divided along existing lines, between those favouring either extended elementary education or early transfer to secondary schools.[153] Politically, the Liberals held the balance of power while the Social Democrats were less ardent for comprehensive reforms than otherwise they would have been, had not the Swedish economy nose-dived following the re-liberalisation of international trade after 1918,[154] and had it not been for severe problems of professional unemployment which persuaded them that selective secondary education should be retained.[155] Moreover, such was the intensity of the argument over school structures that other pressing questions – curriculum reform and the lack of access of the great majority of rural children to non-elementary education[156] –

142. Boucher, 1982: 10.
143. Alexsson, 1989: 40.
144. Craig and Fisher, 1997: 55. The population dependent on agriculture fell from c.80% in 1850 to a little over half in 1900.
145. Wiborg, 2009: 112–13; Paulston, 1968: 32; Boucher, 1982: 11.
146. The mass of the population still lived in rural areas 'where even to get to school was a major achievement', Boucher, 1982; 12.
147. Magnusson, 2000: 122–29.
148. Wiborg, 2009: 113. 40 such schools were in operation by 1918, Boucher, 1982: 13.
149. Magnusson, 2000: 164–64. As the war progressed, exports to Britain were instead directed to Germany, *ibid*., 162.
150. Alexsson, 1989: 41. The *riksdag* (parliament) had averted revolution in November 1918 by granting universal suffrage and this facilitated the reform discussions, Paulston, 1968: 38–39.
151. Alexsson, 1989: 41; Paulston, 1968: 39–41. If students failed to reach the prescribed level they could be compelled to continue in attendance until they were aged 18, *ibid*., 40, n. 13.
152. Boucher, 1982: 14–15; Paulston, 1968: 41–56.
153. Paulston, 1968: 44, 49, 46–47. 'Popular sentiment ran high, but many saw only narrow professional interests at work in a battle between the university-trained teachers against the normal-school trained *folkskola* teachers', *ibid.,* 52.
154. Magnusson, 2000: 164–65. During the depression of 1921–22, one third of the trades union membership was out of work, Paulston, 1968: 48.
155. While the unions focussed their attention on securing better vocational training and unionization of youth as a means to end exploitation, Paulston, 1968: 62, 63, n. 16.
156. In 1923, 70% of children lived in rural localities but only 19.5% attended secondary school. Of these, half boarded and half commuted, Paulston, 1968: 56.

failed to be addressed before all parties retired, exhausted, from the fray.[157]

With the onset of further economic depression in the early 1930s, hitting especially hard the small towns dependent on one or two major employers, the Social Democrats came to power and embarked from 1932 on major investment in social welfare.[158] This included a commitment, in 1936, to raise the age of compulsory schooling to 14 within ten years, so as to give greater equality between urban and rural areas, the latter of which saw an increase in secondary education via correspondence courses at this time.[159]

Developments since 1945

With Sweden once more a neutral country during the conflict of 1939–1945, a further period of school policy review was initiated. A national **School Committee** appointed in 1940 and which reported its findings in ten volumes during 1943–47 was confronted with an increasingly diverse range of post-elementary schools to which more and more pupils were transferring. Local industrial training schools had developed since the early 1920s to alleviate youth unemployment, alongside private vocational schools, while, in 1937, experimental variants of the lower secondary school that offered a practical curriculum were made permanent.[160] In the 1930s about 10% of the age group entered secondary schools, a figure that had risen sharply to 25% by 1944 and 30% by 1948, although in towns the rate of transfer was twice that of the countryside.[161]

In 1944 the committee proposed that after four years in a common school (ages 7 to 10), all pupils should transfer to four years of differentiated education, be this theoretical, technical or practical.[162] This suggestion was made at a time when the party political scene was marked by increasing consensus concerning the need for change, an impulse shared by trades unions, employer associations, the co-operative movement and others, and as migration to the towns continued unabated and a steep increase in the birth rate was occurring.[163] In response, a **parliamentary commission** was established which, in 1948, brought forward sweeping recommendations, the most important of which were passed into law in 1950. Subject to a phase of experimentation and 'within a period to be determined later', a nine-year unity school, divided into three stages, would replace all existing schools teaching pupils to the age of 16.[164]

Both the controversy and the operational challenge lay in **how pupils were to be differentiated** within the new common schools, the commissioners having been clear that while their key aim should be 'to educate democratic pupils', its realisation would entail the 'free development of children' rather than uniformity. It was expected that most pupils would leave school for employment at 16 and that there should be a common curriculum to the age of 15, followed by a final, differentiated year offering alternatives among three streams: 'g' (*gymnasium* / academic), 'a' (*allmänn* / general) and y (*yrkes* / vocational), the latter being taken up by about 60% of the cohort. The main purpose of the new final year was to prepare adequately those remaining in academic study.[165]

Influential on the decision of the commission to reject the recommendation of the earlier committee that differentiation should commence at 11 was its judgment concerning the evidence provided by psychologists. This amounted to a consensus that assessment of scholastic aptitude was possible at the age of 11 but that practical aptitude could not be determined prior to adolescence (approximately age 14 for boys and 13 for girls). On the basis of this evidence a minority on the school committee had argued in 1944 that a 'creaming off' at age 11 of students with high general intelligence would be greatly disadvantageous to vocational schools 'which would then be deprived of their most able pupils', include a likely majority of those with outstanding theoretical *and* practical abilities who would play safe by opting for an academic route.[166] Following this line of critique, the parliamentary commissioners concluded in 1948 that early allocation to tracks within the proposed common schools would deprive the practical vocations, and the forms of education that supported them, of the elite high in both theoretical and practical ability. This, it was argued, would increase social class disunity and, thus, 'bring democracy into danger'.[167]

By 1957, nine years into the period of experimentation, the influence of German psychologists in the early 1940s had been joined by that of their counterparts in Britain whose recent and intensive studies of the matter had been conducted in order to provide guidance to local authorities in England and Wales establishing selective secondary technical schools.[168] Moreover, in Sweden, as elsewhere, it had become clear that scientific consensus about basic questions of cognition, such as 'how the structure of abilities develops', was still far

157. Paulston, 1968: 55–56. Secondary school numbers remained small overall.
158. At a time when 23% of trades union members were, once more, out of work: Boucher, 1982: 15; Paulston, 1968: 60.
159. Boucher, 1982: 16, 19. The economy picked up again markedly from 1935, Paulston, 1968: 59 (see also, Magnusson, 2000: 168–70). Nevertheless, in 1936 the parliament was told that only 16% of rural children completed the full six years of elementary schooling to age 13 (compared to 72% in the towns), a problem of isolation that increased as, during the 1930s, large-scale migration to urban areas began to occur, Paulston, 1968: 64, 71.
160. Alexsson, 1989: 43–44.
161. Boucher, 1982: 23.
162. Boucher, 1982: 23–24. The proposals were similar to those of the Spens committee which reported in England and Wales in 1938, but whereas the Swedish committee left open the question of whether the differentiated education was to be conducted in separate or common schools, Spens and his colleagues recommend the differentiation of pupils between three separate school types, Maclure, 1969: 193–99.
163. Boucher, 1982: 23.
164. Boucher, 1982: 24–28; Wiborg, 2009: 195. However, as the result of a parliamentary compromise, high schools for girls and the new practical lower secondary schools (*praktiska realskolor*) were safeguarded during the period of experimentation, Alexsson, 1989: 47.
165. Boucher, 1982: 25, 27; Alexsson, 1989: 47. Government advice to local authorities in England Wales at this time was that selective grammar and technical schools should comprise 20%-25% of the cohort from the age of 11, McCulloch, 1989: 57.
166. Husén, 1962: 10–13.
167. Husén, 1962: 21–22.
168. See above, p. 9.

off. However, there was some evidence about how organisational differentiation in education, based on pupils' demonstrable achievements, served to disadvantage certain individuals over the longer run. In this context, British sociological studies showing how class groups exploited this problem were of influence in Sweden. The main practical problem with which Swedish educators were left to grapple was that of sustaining mixed ability classes as late as the age of 15 and the best compromise seemed to be to establish ability clusters within the school that would avoid 'a homogenous grouping of the class differentiation type'.[169]

In the event, it was not research findings but political decisions which prevailed[170] and, in 1956, the Social Democrat government announced its intention to adopt the **universal, nine-year common school** (*grundskolan*) and to do so by following the recommendations of a further commission charged with providing detailed implementation plans.[171] The new schools were passed into law in 1962 and the final two local authorities re-organised their schools from 1969.[172] As had been anticipated, the undifferentiated 13–15 stage proved the biggest challenge but neither did the final differentiated year (grade 9 for 15–16 year olds) run smoothly. Practical courses were unpopular and many more pupils than expected chose theoretical courses (75%-80% of the cohort),[173] not least because many more young people than had been envisaged were choosing to remain in education post-16. From 1969, separate streams in the final year were abolished and pupils were permitted, within a mixed ability setting, to continue the type of option subjects with which they had become familiar during their preceding two years. [174]

Naturally, these trends led to considerations of the differentiation present at the **upper secondary stage**. Reviews in the 1950s of existing specialist vocational and commercial schools operating as senior elementary institutions, coupled with an overhaul of the *gymnasium* curriculum and the introduction of a new part-time vocational school at 16+ were formally recognised from 1966 as comprising a new upper secondary sector of schools. However, in 1963 parliament had already resolved that these, too, would be merged into comprehensive schools (*gymnasieskolan*), the first of which became operational in 1971. As with the *grundskolan*, a long period of physical integration of existing and new buildings was required before the ideal of a nine-year comprehensive school, on a single site wherever possible, followed by a further three years of comprehensive, upper secondary schooling was in place.[175]

Perhaps the point of maximum momentum for this entire post-war plan was achieved *c*.1975 when 80% of young people stayed at school until the age of 18 and 80% of the adult population had left school at 15. In that year also the Social Democrats celebrated their forty-third successive year as the governing party. In the new urbanised services-based economy,[176] where housing was unusually integrated and slums virtually unknown, affluence was at its height[177] and seemed to be the dividend of sustained peace at home (since 1815) and traditional homogeneity among the people (the main minorities remained Lapps in Norrland and Finns in the far northeast, accounting for the 6% of Swedish pupils speaking a native language other than Swedish).[178] However, immigration now began to grow steadily (reaching a high point in 2008 at which 14% of the population was non native-born).[179] In the late 1970s recession was experienced for the first time since the war and was accompanied by steadily rising youth unemployment, followed by public sector cuts in 1980.[180]

Since the creation of the upper-secondary *gymnasieskolan* there has been more or less **continuous review of the curriculum**. Initially, there were 23 'lines' within the upper school in three broad fields of study – Arts & Social Studies, Economics, and Science & Technology – derived from the separate institutions of the pre-1971 system and of varying lengths (2, 3 and 4 years). Regardless of their origins all were now given a more or less vocational label.[181] As elsewhere in Europe, high-attaining middle class boys were much more likely to 'stay-on' than low-attaining working class girls; the former *gymnasium* lines were taken overwhelmingly by pupils from professional and managerial homes with those deriving from the vocational schools being taken overwhelmingly by pupils from unskilled homes. In addition, traditional gender difference in subject choices remained largely undisturbed.[182]

In the first decade or so, about 23% of accepted applicants did not secure their first choice of 'line', large urban centres being much more likely to accommodate students' initial preferences[183] and the extent to which the *gymnasieskola* was 'integrated' remained limited, in terms both of student and staff interaction.[184] However, before long and more than anywhere else in Europe, the Swedish upper secondary school came increasingly to resemble the 'common school' culture of the senior high school years

169. Husén, 1962: 60–62.
170. By 1960 only 14% of local authorities had been involved in the experiments and only 1% of pupils had experienced the entire nine-year common school, Boucher, 1982: 29.
171. Boucher, 1982: 29–30; Wiborg, 2009: 196–97.
172. As a result of this, the high schools for girls and the practical lower-secondary schools had their exemptions removed, Alexsson, 1989: 48.
173. Wiborg, 2009: 197.
174. Wiborg, 2009: 197; Boucher, 1982: 31; Alexsson, 1989: 50–51.
175. Boucher, 1982: 34; Stenholm, 1984: 60.
176. *Per capita* GNP was the highest of all the major industrial countries in the later 1970s: Turner and Rawlings, 1982: 3–4; Boucher, 1982: 36. By 1980 only 5.7% of the population was employed in agriculture and 54.6% was in white collar jobs, *ibid*., 40.
177. Boucher, 1982: 2.
178. Paulston, 1968: 5, n.5; Werler and Claesson, 2007: 749.
179. Sharma, 2010: 34.
180. Turner and Rawlings, 1982: 5; Boucher, 1982: 119, 39.
181. For example, the lines under the Arts heading were labelled consumer goods, nursing, music, special, liberal arts and social science, Boucher, 1982: 112. All lines were expected to combine theoretical and practical elements but the extent to which the latter permeated the former in *gymnasium*-derived three- and four-year courses was highly varied, Turner and Rawlings, 1982: 32.
182. Boucher, 1982: 103–10.
183. School size in the 1970s ranged from 300 to 2,500 and not all *gymnasieskolan*, especially in rural areas, were expected to offer all of the lines, Turner and Rawlings, 1982: 17.
184. In this and other respects the *gymnasieskola* of the 1980s was rather like a large tertiary college in England, Turner and Rawlings, 1982: 13; Boucher, 1982: 114–15.

of the USA. In what has been characterised as the 'trickle up' effect of successive Swedish reforms,[185] many fewer students than expected (*c*.30% rather than *c*.50% by 1980) elected for the most overtly practical courses and many more specialist, short-courses than originally envisaged became available (*c*.450 by 1979), lasting from as little as seven weeks to over one year.[186] The 23 lines were subjected to review from 1976 and reduced in number to 16 from 1994 (17 from 2000 13 of which are vocational), each of three years' duration and with an increase in common elements.[187] During this period also, the ideal of comprehensive upper school education intensified – from a situation in the decade from 1971 where the main aim of the Board of Education was to educate the 16–19 age group 'under one roof',[188] albeit with largely separate theoretical and practical subcultures based on students' prior attainment,[189] to a point where local school boards encouraged schools to abandon ability groupings in line with the formal injunctions of the curriculum to develop 'the pupils' sense of togetherness' and 'solidarity' and promote 'democratic working structures' within *gymnasieskola*.[190] Despite this, national policies have brought about increased competition between schools over the last 15 years and research findings are consistent over three decades that pupils' choice of programme at upper secondary school remains highly stratified, with social background a strong predictor of the standing of upper secondary school attended and programme chosen within that school.[191]

Within the current curriculum framework offering choice among 17 national programmes, students study a common core of eight subjects (30% of their whole programme) and choose a set of additional general or vocational courses. In 2006/07, this resulted in uptake across all national programmes of 53% general studies and 47% vocational studies (the latter requiring a minimum of 15% of time in the workplace). In 2008 a reform commission responded to criticism that upper secondary education had become too uniform by recommending replacing the 17 national programmes at upper secondary level with a set of 19, 16 of which would be vocational, to be taken either in school or through an apprenticeship, leading to a common qualification. These proposals remain at a pilot stage of development and are controversial in that they propose to reintroduce 1970s- and 1980s-style differentiation in the *gymnasieskola* between programmes preparing pupils for further study and for employment.[192]

The context in which these most recent curricular changes have been recommended and implemented is that of the aftermath of a major recession in Sweden, brought about by a banking crisis in the early 1990s. Unemployment rose to its highest rate since the great depression of the 1930s, the Social Democrats lost power and major school reforms were introduced (during 1990–92: decentralisation, school choice, 'goal steering' of school performance and expansion of the private sector).[193] The climate was one of increasing unease over the continuing ability of schools to help sustain Sweden's strong economy and record of social equity, [194] at a time when the immigrant population was rising steeply, income disparity was growing and urban housing began to become much more segregated along social class lines.[195] The existing school system secured for Sweden performance among 15 year-olds well above the average in PISA 2000. However, when it came to measures for the least difference in performance among students based on their socio-economic background, Iceland and Finland (traditional comparator countries) were placed third and fourth, while Sweden found itself adrift in twelfth place.[196]

185. Marklund, 1988: 181.
186. Boucher, 1982; 108; NSBE 1979: 1; Turner and Rawlings, 1982: 13–15. This number of courses was many fewer than the more than 800 that had existed before the imposition of the *gymnasieskolan* and was a reduction in scale similar to that seen in the number of separate, trade-based apprenticeships occurring in Germany over the same period: Marklund, 1988: 181; Wagner, 1999: 50.
187. These reforms were opposed by the Conservative and Liberal parties: Lundahl *et al*., 2010: 50.
188. By 'putting all study routes under one roof' it was hoped that students would not be 'swayed by outmoded ideas of class and status', NSBE, 1979: 5. See also, Marklund, 1987: 205 and Opper, 1989: 140.
189. Marklund, 1978: 199, 204–05; Opper, 1989: 148–49; Lundahl, *et al*., 2010: 48.
190. Opper, 1989: 148; SNAE, 2006: 14.
191. Lund, 2008: 641–43. Within the official curriculum the principals of *gymnasieskolan* are required to draw up a local 'work plan', taking account of 'the varying needs and circumstances of pupils', SNAE, 2006: 18.
192. EC, 2007/08b: 70, 78–80; Lundahl, 2010: 50–57. Since 2006 there has been a centre-right government, the Social Democrats having suffered that year their worst electoral performance since the introduction of universal suffrage.
193. Björklund *et al*., 2005: 2, 5, 7.
194. By 1995 Sweden's GDP *per capita* had fallen from a peak of 3rd-4th in the early 1970s to 15th-18th in 1995, Björklund *et al*., 2005: 8–9.
195. Werler and Claesson, 2007: 745, 754; Sharma, 2010: 32.
196. MPI, 2002: 7, 11. However, Sweden, Finland and Iceland had the least difference among all OECD countries in terms of variation between schools in PISA 2000, Ekholm and Wester, 2001: 5.

Chapter 4
Conclusions and implications for University Technical Colleges

1. For example, Dore (2000) and Hall and Soskice (2001).
2. Thelen, 2004: xi, 4.

Dynamics of change in the UK, Germany, the USA, Japan and Sweden

In drawing conclusions, the focus of the report now moves to creating a framework for analysis that can bring some coherence to the welter of trends, episodes and happenstance that the preceding narratives have thrown up. In doing so, we will draw on two particular ways of understanding the most important dynamics to have influenced the development of school-based technical and vocational education in the UK, Germany, the USA, Japan and Sweden.

At the beginning of chapter 3 the contrasting cultures of technical and vocational education in our case study countries were described as follows.

- *Germany*: a country displaying important continuities deriving from the European pattern generally prevailing in the late-nineteenth century
- *the USA*: a narrative of New World aspiration and provision on a grand scale;
- *Japan*: an example of educational organisation framed by intense meritocracy; and
- *Sweden*: a nation seeking to sustain a programme of universal, egalitarian education in a conscious departure from the nineteenth-century European tradition.

Drawing on the analysis in chapter 2, we might also add:

- *England*: a country exhibiting, within a broadly meritocratic impulse, clear residues of nineteenth century organisation and assumptions;
- *Wales and Scotland:* devolved nations within a shared UK economy, in which aspects of the governance of schools are influenced by egalitarianism and in pointed contrast to that in England; and
- *Northern Ireland :* a jurisdiction in which educational change has been overshadowed and impeded by cultural division within the community

This typology is useful as a starting point but is extremely general. On the other hand, it is no more useful merely to list, side-by-side, each of the salient characteristics of technical and vocational education in the various countries at different times. Rather, to fulfil Sir Michael Sadler's injunction to use comparative method so as better to understand our own situation and its possibilities, other analytical tools are required. Already, historical narrative has been one of these, aimed at creating ordered accounts of complex parallel trajectories. However, the aim of this report is to support those seeking to create a new institution, the University Technical College, and so institutional analysis also needs to be a central tool, alongside others – social, political and economic – especially pertinent to the study of schools in modern democracies.

This is a very large canvas and so, in the concise assessment that follows, we have selected two further means by which to illuminate the evolution of technical and vocational education in our various countries: political economy and historical sociology. Both have much to say about aspects of education and training and this report is the first to draw on these dual perspectives in respect of school-based technical and vocational education over the period.

Political economy. Within the comparative literature on technical and vocational education, there is an important strand which views it as a part of the institutional structure deployed by nations to foster skills creation, in order both to accommodate and promote occupational change driven by the broader economy. In our report the evolution of these institutional structures has been traced over a lengthy period in countries which did not embrace state socialism early in the twentieth century. The resulting patterns of skills creation, their dynamics and associated institutions, and how these played out can be linked to a broader assessment of 'varieties of capitalism'.[1] In viewing the twentieth century as a whole (and much of the nineteenth, in some cases), analysts have thus contrasted 'co-ordinated' market economies (such as Germany and Japan) and 'liberal' market economies (such as the USA and the UK).[2] The salience of this for our study is that it is

the continuity in institutional structures for national skills creation which are of particular interest, including how settlements arrived at many decades ago can continue to influence present-day provision of education and future planning.

Historical sociology. This, the other main strand informing our assessment, uses as its method a combination of historical and sociological analysis to illuminate change in education.[3] A particular area of interest is the creation by countries of systems of education as part of the process of nation-building: how this occurs, when it occurs and why the process varies, in particular among countries which appear to share common cultural inheritances or to be experiencing common transformations such as industrialisation.[4] Whilst interesting in itself, this type of analysis is also important for the light it sheds on the evolution of those aspects of education not under the direct influence of the labour market, including the broad organisation of schooling and its curricula. Here, too, it is the continuities as much as the points of departure that are important in the context of the present report, influencing in the English context the canvas upon which University Technical Schools may be able to work.

Implicit in our description of these perspectives is the enduring importance of the nation state,[5] notwithstanding evidence of convergence in some aspects of the education across the countries surveyed in this report.[6]

Education and skills creation, 1890s–1920s

With the exception of Sweden where it come a decade later, across the countries reviewed there was a **surge in the promotion of technical education at the higher school level in the 1880s and 1890s**. A part of this process was driven by educators and policy specialists whose travels to other countries in this period were often stimulated by awareness of developments in technical education which seemed significant in relation to economic competitiveness and military capability. At this time, each of the nations under scrutiny had broadly liberal political and economic regimes (very recently in the case of Japan) but it was not the case that patterns of school organisation were closely aligned as a result. Of these five, the last to impose compulsory elementary education were Japan and Scotland (in 1872) and England and Wales (in 1880).[7] Japan had been released only four years before from the feudal yoke and now set about rapidly importing European models of state-sponsored schooling. Britain, meanwhile, had been set on a path of concerted industrialisation for over a century and was easily the most urban country on earth throughout the nineteenth century, yet it was the last to leave the provision of schools to voluntary organisations. In Prussia, a largely agrarian economy in the early nineteenth century, an integrated system of state-funded schools was brought into widespread operation before 1850 and in sparsely populated Sweden, where there was much extreme poverty, local communities had been required to organise universal schooling since the 1840s.[8] In the case of the USA, a vast and rural economy (despite mass immigration to American cities, Germany was 125% more urbanised than the USA in 1880, the UK 240% more so), nation-building was the key impetus in establishing the common school, as it was also in Japan where the threat of colonisation was the impetus for industrialisation and its accompanying technical education.[9]

All this indicates that the creation of school systems in different countries was influenced strongly by the way in which, in each national context, political, economic and military concerns aligned to initiate state-imposed action in varied ways.[10] Yet the impetus for technical education in the 1880s and 1890s, with its characteristic concentration at the higher level on engineering, suggests that convergences were occurring. Most particularly, these appear to have been driven by common patterns of industrial change. First, the scale of production was accelerating across the other nations as they caught up with Britain's lead and in all cases production was becoming more technically complex (so advantaging the 'pursuing nations' who did not have the re-investment hurdles present in Britain). Wealth creation through textiles was giving way to fast-growing industries such as steel, chemicals and electric power generation and a crucial element in this development was a much expanded machine tools sector.[11]

This led swiftly to development of technical education at the higher level, suggesting that not only was industrial development itself becoming more international but so too was the educational response. Study visits aided the circulation of ideas and methods for technical education across borders while, at home, there was consensus in each country (underscored by activists in related professional associations) that industrial innovation needed next to be imparted at the upper-school level so as to enhance capacity and reduce reliance on imported expertise. In some countries, notably Japan, there was also

3. See McCulloch and Richardson, 2000: 52–68 for how this has been applied to the study of education.
4. Green, 1990.
5. Green, 1997: 4. The European Commission does not claim 'competence' (i.e. the exertion of active influence) over the school systems of member states but does so in respect of vocational education and training. However, Greiner comments that all of the European Commission's 'attempts since the 1960s to harmonize VET across the member states have ended in dismal failure', Greinert, 2007: 58.
6. For Europe, see Green *et al.*, 1999.
7. Satō, 1987a: 49–50; Anderson, 1999: 216; Simon, 1965: 112.
8. Craig and Fisher, 1997: 53, 55.
9. Craig and Fisher, 1997: 53.
10. Green, 1990: 308–13. The mix was civil and military in Britain, Japan and Germany, civil in the USA and, in Sweden, where reforms to technical education began to be considered in 1907, seemingly a case of what Green (1990: 310) calls 'escape from relative economic underdevelopment'.
11. Craig and Fisher, 1997: 565–61.

the specific intention that technical education should ensure the supply of both supervisory-level and semi-skilled labour for the new large-scale enterprises being created.

Particularly far reaching in its consequences for technical education in the twentieth century was the dynamic between employers and unions in skill-intensive industries – especially machine and metal working – in countries which had developed large-scale manufacturing by the period 1890–1910 (including all of those in this study).[12] At issue here were battles for **control over skill certification** played out with respect to apprenticeship in the craft trades. This had long-term consequences for not only the organisation of skill creation within the firms, but also the future strength of apprenticeship regulation outside each firm and, by extension, for the wider organisation of publicly-funded vocational education and training in the upper-elementary and vocational continuation schools. And, at root, these processes were influenced by the extent to which national governments were prepared to protect the industrial craft guilds' monopoly over skills certification.

In short, in Britain and the USA where economic liberalism had been the nineteenth-century imperative, there were no guilds to regulate the artisan trades. In this environment craft recognition became a battleground between employers (reliant on scarce skills) and unions (intent on shop floor control), played out across class/income lines. Inherently unstable, this accommodation was repeatedly upset in Britain during the twentieth century by developments in the macro-economic cycle and in politics, while, in the USA, employers sought to break the unions by subcontracting the training of skilled workers to independent craftsmen.[13] In Japan deregulation of artisanal associations prevailed only from the late nineteenth century but, as in the USA, subcontracting of skills training soon became a major means of supplying scarce skills within the labour market supplemented, from the 1920s, by links to schools, including technical high schools, through which larger enterprises secured those employees who would go on to become skilled workers and supervisors.[14] In Sweden and Germany employers were no less interested in managerial control but the specific conditions in each country led to patterns of central regulation of quite different kinds. By the 1900s employers in Sweden's burgeoning industries felt pressed increasingly to stem emigration while also holding down labour costs in order to price traded goods competitively. This led to draconian measures, notably a succession of sector-wide employer lockouts from 1905 which had the effect of centralising employer-union negotiations over wages and the management of firms' internal labour markets, including skills development.[15] By this means, a cross-class/income alliance in industrial relations was forged well before the Social Democrats came to power in the 1930s.[16] A cross-class/income alliance was also achieved in Germany but here, in contrast, the government worked with the guilds from the late 1890s to organise skills supply, granting them monopoly rights of certification. In this context employers sought to gain the right also to certify and during the 1920s co-managing skills became the joint aim of employers and unions, accompanied by the beginnings of systematic skills profiling and standardisation, led by key trade associations.[17]

These various means by which national skills supply was secured and regulated had an important impact on the availability and attractiveness of apprenticeship to school leavers in different countries. In turn, this exerted some influence over school organisation, for example the formal purposes and functions of upper-elementary and vocational continuation schools, as well as over educational thinking and politics.

As we saw in chapter 3, **apprenticeship** had never become firmly established in the USA where high labour mobility and a ready supply of immigrant labour dictated much of landscape of late-nineteenth century urban America. Instead, the expansion of the high school both mirrored aspiration and became the nexus of a debate about the merits of specialist or comprehensive institutions settled, in the 1920s, in favour of the latter. In Japan, apprenticeship was broken at the onset of industrialisation in the 1870s and 1880s, and the consolidation of large state enterprises into private corporations with massive internal labour markets, job security and advancement had the effect of intensifying pressure on young people to work hard at school and seek entry to high schools – general or specialist – that had strong links to the best firms. A similar institutional structure evolved in Sweden where guild regulation of apprenticeship was dismantled in the 1840s and where, in the 1900s, employers in leading industries moved to regulate skills training in cooperation with trades unions underpinned, from 1921, by compulsory attendance of young school leavers at continuation school. In Britain, apprenticeships survived in attenuated form within the firm and were of mixed attractiveness to young people (lengthy and uncertain training, low wages and

12. The pioneering study is Thelen, 2004.
13. Thelen, 2004: 279–82.
14. Thelen, 2004: 280, 282, 154; Ryan, 1999: 443.
15. Swenson, 2002: 72–98. The process began in the engineering industry and later spread to textiles, sawmills and steel.
16. By this means employers achieved a suppression of wages in each firm and in firms across a sector, while the unions secured industry-wide collective bargaining undisturbed by militancy in high-skill pockets, Swenson, 2002: 77–78.
17. Thelen, 2004: 279, 281.

lack of certification in the worst cases; high potential to be poached, on favourable terms, for those trained well in the best firms). From the 1900s this situation expressed itself in persistent employer indifference to the content of elementary and upper-elementary education, including junior technical schools, with many firms seeking to insure their investment in training by concentrating effort on entrants from grammar schools holding the School Certificate. In contrast, by the 1920s in Germany the tradition of handicraft regulation, coupled with clear certification and increased standardisation across industries rendered apprenticeship attractive to many young people and enhanced the reputation of the continuation schools which were joint inheritors, with the grammar schools, of the Prussian ideals of *Bildung* (personal/moral/spiritual formation through education) and *Beruf* (occupational calling/vocation).

Depression, war and recovery: the place of technical education in mass secondary education, 1930s–1970s

The large, skill-intensive industries and their associated industrial relations were clearly important in determining key structures in the overall provision of technical and vocational education. But so, too, was the role of government in setting priorities for education, the place of local authorities and the education professions in providing it (and arguing over it), and the effect of public opinion on what was being offered. In all of the countries in this study, there was pressure by the 1930s to **expand the reach of school-based education** and, with the exception of the USA which had resolved the matter in the 1920s in favour of comprehensive secondary education, to continue to refine the place of specialist technical and vocational education in the school structure.

The comprehensive general high school (whether organised in one single or two consecutive stages) carried all before it the USA, building on the ideal of the common school tradition established from the 1830s. Although, in reality, high schools were very uneven in terms of access, resources and cultural capital, the rates of participation achieved across the nation – 47% of 14–17 year-olds by 1930[18] – were three times or more that of the other the countries in this study. In these nations, European traditions (imported, in the case of Japan) had seen the creation by the respective governments of parallel systems of publicly-funded schools. On the one hand, the grammar school admitted selectively a minority of 10 or 11 year-olds from either private preparatory or elementary schools, to a five- to nine-year course leading to university or to employment.[19] On the other hand, elementary schools were managing increased aspiration by adding senior or upper tiers to their provision through to the age of 14 or 15, after which employment could be supplemented by education though a vocational continuation school. In three of the countries there was also a small intermediary track: the technical high school (*jitsugyōkōkō*) in Japan and the middle-ground *Realschule/realskola* in Germany and Sweden which featured a modern version of the subject-based *Gymnasium* curriculum.[20]

Expansion in all countries was hampered by the world-wide depression of the 1930s and, in Japan, Germany and Britain, retarded further by the dislocation and material damage of war. Thus, the distinctive path followed by Sweden was exceptional as well as hard-won. Between 1905 and 1923 it had, like Germany, developed strong employer/union co-operation over workplace regulation but this was accompanied by a divergent politics of secondary schooling. In Germany a popular conservatism in politics ensured selection of pupils to a hierarchy of schools from the age of 10, whereas the accession to power of the Social Democrats in Sweden (from 1932) saw the introduction and, in subsequent decades, consolidation of 'welfare' politics, including a broadly consensual commitment to expanded school-based education on comprehensive lines.[21] However, the Social Democrats' school reform plans were significantly delayed by the need to tackle chronic unemployment,[22] with the result that it was in Japan that comprehensive education for 6 to 15 year-olds was imposed first, by the occupying USA authorities in 1947. Single sex secondary schools were merged and specialist technical schools were now to recruit at 15+ (rather than at 12+), as alternatives to general upper secondary school and as an adjunct to a school system in which rationalised structures encouraged an even purer pursuit of competitive meritocracy than previously. In neutral Sweden, it was possible to return to the question of school reform in 1940 but it took ten years of policy discussion, a further six of experimentation on the ground and a final six years of administrative preparation before universal comprehensive education for the age group 7 to 16 was passed into law, so effecting a clean and largely consensual break from the Prussian tradition.

During this protracted process, a central question to emerge in Sweden concerned the point at which **differentiation of pupils** within the

18. Spring, 1990: 197.
19. Private preparatory schools were abolished in Germany in 1920.
20. The broad equivalent in England and Wales, the central schools, were managed and financed as elementaries.
21. Swenson, 2002: 71–90; Thelen, 2004; 286–87, 290.
22. Paulston, 1968: 59–75.

common school should be countenanced and expert psychological opinion from both Germany and Britain had influence over these debates. The question had already arisen in these countries in the context of plans to expand secondary education from the age of 10 (Germany), 11 (England, Wales and Northern Ireland) and 12 (Scotland), via differentiated institutions. Almost all scientific opinion concurred that high general educability was measurable at a range of ages but that any differentiation between theoretical and practical aptitude was unsafe, certainly before the age of 13 or 14. In pre-war Germany under a popular, centre-right government (the CDU), this was sufficient to justify a small grammar school stream, but it remained an unresolved and debilitating problem for technical education in England and Wales into the 1960s, entry to secondary technical school having been set in the 1940s at 11+, via competitive examination.

However, by the 1960s adherence in West Germany to differentiated lower secondary schools (ages 10–16) was, itself, becoming exceptional among the major economies. Moreover, in contrast to the other countries in this study, an unusual political configuration served to sustain apprenticeship on a large scale and with renewed statutory authority from 1969 and this, in turn, reduced 'upward' pressure on the grammar schools and universities to broaden their diet. Critical in this was the support of social democratic unions in the co-determination, with employers, of workplace skills within a publicly regulated framework of recognised trades. Thus, the successors to groupings instinctively opposed to the crucial legislation of 1897 that had confirmed the right of craft guilds to certificate skills, now sustained this regulatory framework for different reasons – employers on account of the need to rehabilitate their tarnished reputation after the record of the 1930s, and union members due to the individual benefits they had accrued from credentials received under the existing system.[23] The settlement within the major firms – bolstered by Germany's spectacular economic achievements from the mid-1950s – created a climate in which the reorganisation of lower-secondary schools along comprehensive lines in West Germany was a political non-starter.[24]

By the mid-1970s, two decades of **sustained public investment** and rapidly rising standards of living in all of the countries under review had transformed the pre-war landscape of technical education at the secondary school stage. Mass participation in high schools to the age of 17 and 18 was a fact in the USA (where specialist technical schools were very rare) and in Japan (where 40% of the age group transferred to lower-status technical upper-secondary schools at 15+). In Germany, the all-through elementary school had given way, in most *Länder*, to a lower-secondary structure of 'tri-partite' schools to which pupils were allocated, mainly on the recommendation of their primary school teachers. The grammar school stream remained small (18% in 1979), while around half of all 16–19 year olds secured apprenticeships (53% in 1979).[25] In Wales and Scotland, all state secondary schools were comprehensive, or about to become so, by this time, as were most in England. Technical secondary schools had withered away and a majority of students in Britain left school at the earliest opportunity (from 1972/73, at age 16) and looked for work, with or without training opportunities.[26] By contrast, in Sweden vocational and commercial schools enrolling at 16+ (full-time and part-time) were now being phased out in favour of comprehensive upper secondary schools and in these fledgling institutions the main operational consideration was an update of the question from the 1950s, now applied to the 16–19 age range studying full-time at school: at what stage, and how, should such students be differentiated?

Structures under revision, 1980–2010

The curriculum questions confronting Swedish planners of comprehensive **upper secondary schools** from the early 1970s included the extent and volume of technical and vocational education appropriate to the age group when in common schools (along with the difficulty of providing the full curriculum outside the cities and larger towns). The USA already had 90%+ levels of participation to 18+ and here attention was directed to the extent of parental and political satisfaction with the very concept of the 14–18 neighbourhood school. One result was for 'magnet' schools to become a vehicle for states to experiment with 'school choice' policies, opening the way for a revival of the specialist high school movement of 1890–1920, including very high performing 14–18 career academies, successors to the turn of the century technical high school. This partial breaking up of the secondary-level common school moved the USA closer to the situation in Japan, where participation rates to 18+ were also already at the 90%+ level and specialist schools (public and private) had been maintained at the upper-secondary (15–18) stage. Here, however, the technical high schools were losing ground rapidly as the labour shortages of the 1960s eased. The

23. Thelen, 2004: 245, 290.
24. Wiborg, 2009: 229.
25. Shackleton *et al*., 1995: 123.
26. The number of young people in apprenticeship peaked in 1968 and began to fall dramatically in 1971/72, Richardson, 2007: 403–04.

system whereby companies link to schools on a semi-contractual basis to offer leavers a job (*jisseki-kankei*), came under strain but survived the long 1990s recession.[27] Nevertheless, it appears that the malaise of the Japanese technical high school is less a question of its secure place in the school structure (enrolment is steady at about one quarter of the 15+ cohort) and related more to the rigidity of highly gendered links to employment and further education at a time when the Japanese labour market, itself rigid by overseas standards, is now much less buoyant than during the long post-war boom.

Germany, Britain and Sweden have each experienced recession-induced **contractions of the youth labour market** on a periodic basis since the early 1970s and the way that these have played out points to the very different nature of the education and training system operating in each county. In Germany the grammar schools (*Gymnasien*) have experienced by far the largest proportional growth in enrolment among the three types of secondary school[28] but the higher education sector remains small. Apprenticeship and full-time vocational colleges have broadened their intakes so as to accommodate increased demand, at a time when there is significant uncertainty as to how well the 'dual system' can survive the global pressures under which German manufacturing finds itself.[29] In Britain, participation in full time education to the age of 18 accelerated rapidly in the decade from the mid-1980s but here higher education was also allowed to expand subsequently, to accommodate the upward pressure brought about by increased awareness of the rates of return in deferred wages enjoyed by those delaying entry to employment in order to secure higher levels of general skill.[30] Compared to the Swedes, who had been wrestling since the early 1970s with accommodating technical and vocational education in a common-school 16–19 curriculum, the £1.1bn TVEI in Britain had proved unable, by the early 1990s, to secure its initial goal of permanent enhancement of technical and vocational education. In response, and influenced by school choice programmes in the USA, successive Conservative and Labour polices in England (but not Scotland, Wales or Northern Ireland) have re-introduced partial selection by aptitude at the age of 10/11 via City Technology Colleges (from 1988), specialist schools (from 1998) and academies (from 2002). The CTCs were the first mainstream state schools with a specialist orientation to have been founded since the 1950s, although their 'technical' designation pointed more to the infusion of technologies (especially ICT) within the facilities of the school, than it did to specific teacher expertise in technical or vocational education. The same was true for the 530+ technology specialist schools that were in existence by 2010 under the academies programme.

Britain was distinctive in two furthers way among the countries under review. First, it continued to maintain the deepest gulf between general education and 'training', construing vocational learning in terms narrower than elsewhere and separating it more completely from general education.[31] A result was that, from the mid-1980s, much of the increased demand for full-time education among 16 and 17 year-olds in Britain was absorbed in a large and diverse sector of **colleges of further education**, permitted to enrol this age group in direct competition with 11–18 schools – and, indeed, from 2002, to teach 14–16 year-olds enrolled in schools.[32] Where local authorities (a small minority) had reorganised their secondary schools so that none offered 16–18 education but, instead, transferred students to the local 'tertiary' college, those institutions resembled the upper-secondary schools of Sweden, insofar as 16–19 education was concerned. In both, a clear segmentation developed among students following general and occupationally-orientated programmes along socio-economic and gendered lines and in neither institution type was there much mixing of students on different 'tracks'.[33] What distinguished the working of the *gymnasieskolan* from the tertiary colleges was the multiplicity of separate qualifications awarded in the English setting, whereas, in Sweden since 1971, there have been several revisions to a curriculum framework which embraces all of the 'lines' of study taken by the age group (23 during 1971–94, 16 during 1994–2000 and 17 since then) leading to development of a 'common-school' culture and the award to students of a cohort-wide school-leaving certificate.[34] In 2004 an official committee of enquiry in England recommended a single, Swedish-style curriculum framework for all 14–19 year-olds but this was rejected by the government in favour of the existing multiplicity of single-subject awards, set by external examining bodies, and the introduction of Diplomas in occupationally-orientated areas (14 'lines') which would have to compete with existing, well-established awards aimed at similar student groups such as the BTEC National Diploma.

UTCs: the comparative view

What can the promoters of University Technical Colleges (UTCs) learn from examples of technical

27. Ryan, 1999: 443–4, 448–50.
28. The *Hauptshulen* lost out and are, in 2010, wrestling with problems of low motivation, high drop-out rates and a disproportionate number of children from families recently arrived in the country.
29. Crouch *et al.* 1999: 139–63; Thelen, 2004: 269–77.
30. OECD, 2007: 54.
31. Traditions in work-based learning compounded this. Until the 1960s most British apprentices did not receive any general education and even after day-release became more prevalent in that decade such provision often remained scanty. In contrast, German apprenticeship has maintained the connection between occupational training and general education, apprentices still being required to continue with studies in the *Berufschulen* in maths, German, a foreign language (in many cases) and civics-type subjects.
32. From this time the state-sponsorship of new competency-based vocational qualifications (NVQs) exacerbated the traditional gulf between general education and 'training'.
33. Boucher, 1982: 115
34. The *slutbetyg från gymnasieslkolan*, Werler and Claesson, 2007: 749.

and vocational education at the secondary school stage in the USA, Germany, Japan and Sweden? Before answering this question directly, the first task is to recall the principles underpinning this kind of comparative study:

- national systems of education developed in broadly similar economies exhibit some common elements, but the many variations in institutional patterns and organisation are a clear indication that they also reflect the cultural expression of separate nations;
- particular aspects of overseas education provision may suggest potential solutions to concerns at home, but these have evolved in their national settings and may not travel well;
- comparative study is especially helpful in understanding more clearly domestic concerns and priorities for change but, in the last resort, such change has to be forged in the domestic context.[35]

With these principles in mind we review first salient aspects of provision in the four overseas countries, before relating these to the UK situation.

Closest overseas model to the UTC. Of the forms of school-level technical education we have reviewed overseas, the closest in spirit and organisational context to the UTC in England is the **USA 'career academy' magnet school**.[36] The particular circumstances that make this a clear match are:

- in both the USA and England, traditions of localism are longstanding and, more recently, both countries have moved in the direction of policies to create increased parental choice and exemplar schools run by enterprising heads and governors;
- in the USA career academies have re-established an earlier tradition of separate technical institutions at the secondary school level;
- the career academies are 14–18 schools to which students transfer from neighbouring junior high schools in order to pursue a broadly-based, four-year programme centred on a specialist orientation;
- students and their parents make the choice to attend the academy;
- they are a small, niche sector rather than a model for wide emulation;
- there is local variation in aspects of organisation and practice – for example in specific admissions policies and in 'target' groups of students (ranging from those in deprived neighbourhoods to the children of ambitious professionals);
- there is close involvement with industry where the career academy has chosen a technical orientation.

The career academy schools organised at county level across the state of New Jersey are a good example of the genre. The main respects in which the UTCs differ from the career academies are in their provision of an apprenticeship stream alongside full-time education at the upper (post-16) stage and their more modest aims within the general subject curriculum (compared to the use of the International Baccalaureate in the New Jersey schools).

Aspects of overseas models that perform some of the tasks envisaged for UTCs. Elsewhere in our survey, there are forms of school-based technical and vocational education which are a clear echo of the remit of UTCs but set in different organisational contexts.

- In ***Japan,*** almost all students transfer between schools at 15+ in what, since the late nineteenth century, has been a school system based on highly competitive entry examinations to a clear hierarchy of institutions. **Technical/commercial high schools** (*jitsugyōkōkō/shogyōkōkō*: age group 15–18; all fee-paying; publicly or privately managed) recruit one quarter of the age group and have low status in relation to the dominance of general schools (which are, in turn, subject to competitive ranking). As a result of this context, equivalence in the role of these schools to that of UTCs alongside other English secondary schools is weak, although the curriculum structure of the Japanese technical high school is of interest. It comprises *c.*55% general subjects within various vocational streams, among which three-quarters of students engage in business and industry-related studies, along clearly gendered lines (technical studies for boys; commercial studies for girls). The vast majority of those leaving these schools enter employment directly.
- In ***Germany***, the age of transfer for non-grammar school (*Gymnasium*) students is 16. Prior to this age, a general curriculum is offered in the **separate types of school** students attend (mainly *Realschulen* and *Hauptshulen*), based on ranking by ability at age 9/10. At 16+, *c.*49% of school leavers secure an apprenticeship,[37] and their continuing education occurs up to two days per week in a **part-time vocational school** (*Berufschule*); other school leavers aged 16 enrol in **full-time vocational schools**

35. These principles were eloquently discussed by Sir Michael Sadler in 1900, see Phillips, 2006: 45–46.
36. See n. 217, above, for the important point that what is not being discussed here are the 'career academies' within large general high schools – a label given to the vocational curriculum ('VocEd') within such schools, rather than to separate institutions.
37. CEDEFOP, 2009: 29

(*Berufsfachschule* or, at a level leading to higher education, *Fachoberschule*).[38] Meanwhile, an increasing number of those leaving grammar school (*Gymnasium*) at age 18/19 then transfer to an apprenticeship (where they take 15%+ of new apprentice contracts each year). Compared to the structure of UTCs in England, non-university technical and vocational study in Germany commences at 16, after transfer from school, and is dominated by publicly regulated, high-status apprenticeships in which firms supply the costs of training.

- In ***Sweden***, almost all students transfer between schools at 16+ and enter **comprehensive upper secondary schools** (*gymnasieskola*: age group 16–19; most are publicly managed, non-fee paying).[39] All students have followed a common curriculum to this point and it is at 16+ that programme 'lines' offer choice. In that respect, the comparison to UTC students studying for Diplomas, post-16, lies in the efficacy of Sweden's 16+ curriculum. The 13 vocational 'lines' in Sweden are three-year courses where 70% of the programme is a common core of eight subjects and a further 15% of curriculum time is spent in the workplace. The *gymnasieskola* also houses apprentices in the small number of trades where certification is publicly regulated.[40] One quarter of *gymnasieskola*: students proceed to higher education.[41]

In all of the countries surveyed here, as in the UK, programmes of **work experience and work-related learning** have become an increasingly familiar part of the curriculum followed by students after the age of 14. These may be regarded as now comprising part of the breadth and balance offered in all general curricula at the secondary stage.[42] However, when it comes to the institutional structures that support specialist programmes of learning in technical and vocational education for the 14–19 age group, there is wide variation. Notable also, is that in all four countries qualifications take the form of a broad school-leaving certificate, whereas in England those leaving UTCs will have an array of single subject awards.

In international terms, UTCs are upper-secondary schools where the age of entry is at the lower end of the spectrum – at age 14, as in parts of the USA, rather than 15, as in Japan (and France) or 16, as in Sweden and Germany.

UTCs: the domestic legacy

If this is the international context in which UTCs are being created, it is at home in England that they will have to establish their credentials and secure legitimacy. In doing so they will need both to grapple with the legacy of past experience related to their specific aims, while also securing assent within the broader contemporary education landscape. Inevitably, the two tasks are interconnected.

In terms of specific legacy, UTCs are the direct heirs of the pre-war junior technical schools and the post-war secondary technical schools, a tradition established on a small scale in the 1900s and expanded to 4%–5% of the relevant age group during the 1930s to the 1950s, before fizzling out in the following decade. Historically-speaking, their enrolment age of 14 is especially significant. Their other key characteristic, that of a 'choice' school aiming to establish a new type of institution, makes them the more recent heirs of the 15 City Technology Colleges established after 1988.

The legacy of the junior technical schools and secondary technical schools. Local authorities were the key to the kinds of specialist technical schools that existed in England and Wales between 1905 and 1960. Urban authorities were always most likely to be interested and, up to 1944, such schools were formally 'elementary' (thus, compared to secondaries, more instrumental in approach and less well funded). One innovation (from 1905) was the selective 'central school' recruiting at 11+ and in London, a stronghold, the orientation among more than 300 such schools was toward industry and commerce. Other urban authorities (also from 1905) established junior technical schools which levied fees (their equipment made them more expensive to run), where the aim of the two- or three-year course, recruiting at 13+, was either preparation for specific trades or a more general education for would-be 'artisans'. Nevertheless, there was employer indifference toward them – work habits were prized by companies above 'abstract' knowledge – and overall numbers remained small (*c*.4% of all elementary school leavers during the 1930s).

After 1944, the junior technical schools were the immediate foundation upon which secondary technical schools were based, before completely new institutions started to come on-stream from 1947. However, there were problems from the outset, including widely inadequate premises, lack of support from local authorities (not least London

38. See EC, 2006/07: 82–83.
39. 20% of *gymnasieskola* enrolment is to private schools, Sharma, 2010: 34.
40. Boucher, 1982: 124. In this latter respect, the Swedish *gymnasieskola* shares some of the characteristics of the French *lycées professionel*s (age group 15–19), one of the two types of lycée to which almost all French students transfer at 15+ and in which full-time and apprenticeship streams run in parallel.
41. Werler and Claesson, 2007: 753.
42. Although such provision remains weak or non-existent in the USA for the average high school student not specialising in vocational education.

which opted, instead, for multilateral schools), equivocal support from successive government ministers at Westminster and, crucially, continued employer indifference alongside limited parental interest, both groups lending greater support to grammar schools. These specific weaknesses were problem enough, but they were linked to two overarching difficulties that proved the most problematic: the schools failed to convey a convincing educational rationale, while selection by ability/special aptitude was never convincing and was unsupported by scientific opinion. Both of these flaws were evident early – by the late 1940s – and both contributed in the longer run (at home and in Sweden) to support for the comprehensive re-organisation of the late 1960s which swept these schools aside. As with their pre-war antecedents, numbers remained small, with enrolments to secondary technical schools peaking in 1954 at 4.9% of all state-maintained secondary pupils.

The legacy of the TVEI and of City Technology Colleges. By the early 1960s, the champions of secondary technical schools could see the writing on the wall and began to throw what weight they had behind a broader conception of technical education in the coming comprehensives. Notwithstanding a major Schools Council project, two lean decades ensued as battles were fought over the boundaries of grammar school science, technology and the crafts departments in modern schools. As a result, vocational education came to be identified as, fundamentally, something for the under-motivated 'ordinary child' who, typically, would seek to leave school at the earliest opportunity to take his or her chance in a youth labour market which, by international standards, offered little in the way of high quality technical education and training. Tackling this latter problem became a priority of growing urgency for the government as the youth labour market contracted rapidly from the early 1970s so that, in stages from the early 1980s, the recourse was to greater intervention in education from Whitehall.

The Technical and Vocational Education Initiative (TVEI: 1983–98) found the local authorities, this time around, as beggars rather than choosers. However, the complex professional networks that emerged across England, Wales and Scotland as the £1.1bn curriculum development programme evolved, were seen by some (including its evaluators and minsters who had initially toyed with using the money to create new technical schools) as imbuing TVEI with a 'progressive', student-centred focus. This, it was argued, would do little to revive the British economy at a time when comparative research was starting to demonstrate that Britain was deficient when it came to 'intermediate' (technician/ supervisor) level skills in industrial employment, exacerbating internationally low levels of participation in education and training, post-16.[43]

At the mid-point of the TVEI, the Conservative government introduced a national curriculum (including design & technology) in England, Wales and Northern Ireland – a major departure from the voluntary tradition of the earlier twentieth century – while also creating 15 City Technology Colleges (CTCs). With one exception these enrolled 11–18 year-olds, in a sought-for renewal of the specialist secondary education available in earlier decades. Moreover, they were permitted to select entrants and receive their funding outside the local authority system. As such, they were a direct challenge to the comprehensive ideal. Yet despite their designation as 'technology' colleges, this did not necessarily mean they displayed specific curricular expertise in technical or vocational education (indeed, one 14–19 CTC specialises in the arts). Rather, it indicated an urban school environment boasting the latest facilities and equipment (including ICT), where staff taught the National Curriculum in a conventional way but instilled a strong ethos of aspiration to high attainment among students travelling to school across conventional geographic catchments. In this respect, CTCs are the direct antecedents of two important innovations in the management of English secondary schools which followed: academies (in terms of their governance) and specialist schools (in terms of enhanced resources, as opposed to specific curricular expertise). In 2010 there were 3,068 specialist schools (out of a total of 4,400 state-maintained secondary schools). 256 of these had the designation Business and Enterprise, 58 Engineering and 534 Technology. As the numbers imply and as the modest additional resource enjoyed by these schools attest, they have only a very general orientation toward the specialism concerned compared, for example, to the purpose-built secondary technical schools of the 1950s.

Implications for UTCs

From the comparative review at the start of this section **we commend to UTC pioneers** the model of the **magnet career academies of the USA** for 14–18 year-olds, such as those in New Jersey. The overall context from which they have sprung, and the specific role they seek to fulfil, is

43. Prais and Wagner, 1985; Finegold and Soskice, 1988; Ryan, 1991.

the closest match to UTCs found among the four comparator nations in this study.

Beyond this we suggest, also, that aspects of the work of other schools which we have reviewed will have interesting and useful models of practice and organisation for UTC organisers to consider, although here we would emphasise that would-be visitors should note carefully the contextual accounts of the work of these schools that we have provided in chapter 3:

- the age 10–16 intermediate schools in Germany (***Realschulen***) and the part- and full-time vocational schools to which many *Realschulen* students transfer at 16 for two- or three-year programmes of study (***Berufschule***, ***Berufsfachschule*** and ***Fachoberschule***);
- the age 16–19 comprehensive upper secondary schools in Sweden (***gymnasieskola***), with their vocational 'lines' and apprenticeship arrangements; and
- the age 15–18 technical high schools in Japan (*jitsugyōkōkō*).

From overseas models we turn, finally, the UK context. What are the lessons here for those now establishing UTCs?

An initial, rather obvious, point is that contrasting education traditions within the UK suggest strongly that UTCs would not be welcomed in Wales or Scotland, where education policies since comprehensive re-organisation in the 1960s, reinforced since devolution in 1999, indicate a strong commitment to non-specialist secondary education. Meanwhile, education in Northern Ireland is otherwise distracted by major controversies over plans to dismantle selection at 11+.

Closer to home, how daunting should UTC protagonists find the junior technical school / secondary technical school record of 1905–65 and what is the significance of the TVEI and CTC era since 1983? Undoubtedly, there are important continuities to be noted and, while some remain relevant, none appear to pose insurmountable obstacles. **First there is the local/urban tradition.** The urban bias among local authorities founding technically-orientated central and junior technical schools gave way, after the war, to a more mixed politics in which Labour-controlled localities were more inclined to support non-specialist, non-selective secondary education. However, the picture today is more variegated. Local partners will be crucial in the development of all UTCs but the climate at present is more one of 'ways and means' than ideological road-blocks (although, for many, UTCs will be anathema).

Second, there is the record of employer indifference toward specialist technical education. This has deep roots and derives, ultimately, from the tenacity of eighteenth-century arguments for free markets and a liberal political economy, consolidated in new ways during the nineteenth-century.[44] The craft guilds withered earlier in Britain than elsewhere and, ever since, most employers have sought to keep education and training costs to a minimum. When confronted in the mid-1980s with the alternative of supporting City Technology Colleges (CTCs) or TVEI, it was instructive that entrepreneurs came forward to back the former while the large firms, with sizable corporate 'education relations' budgets, sought the anonymity of spreading resources more widely across the secondary curriculum, via the latter.[45] This would matter if UTCs were dependent upon employers for specific forms of support, as were secondary technical schools when it came to demonstrating strong links to youth employment and CTCs where sponsorship was a necessity. Neither applies to UTCs.

Third, the public link of UTCs to sponsors from higher (and further) education is important. Since the days of the secondary technical school in the 1950s, England has joined other European countries in expanding dramatically her higher and further education provision. In this new context, UTCs have the potential to draw strength from close ties to higher and further education, building on not only the pressure placed on contemporary vice-chancellors to be seen to be supporting secondary school reform (a lead taken in the UTC context by Aston University) but also the model of joint provision between schools and FE colleges now in place to offer the full Diploma curriculum (the platform being built upon in support of a planned UTC by Walsall College and the University of Wolverhampton). As such, an applied technical curriculum phase, 14–19, leading to worthwhile further and higher education, is the realistic goal of UTC provision, especially if reinforced by innovations in course design and validation procedures. Similarly, UTCs ought to be able to offer an environment in which highly motivated young apprentices (aged 14–16) can be expected to benefit from an ethos of hands-on learning, with clear opportunities for progression, either within a school already strongly attuned to their interests and capabilities, or in further education.

44. Wiborg, 2009: 222.
45. Walford and Miller, 1991: 141–42; Walford, 2000: 147.

Fourth, the number of pupils passing through previous specialist secondary schools in England has been small. This mattered for secondary technical schools as they were supposed to stand as a major plank of national provision. However, as CTCs demonstrated, if the role is different – that of niche provider and a challenge to the *status quo* – numbers matter not at all. However, this report has shown that for the learning in UTCs to be distinctive from CTCs and specialist technology schools, dedicated high quality teacher expertise will be essential if the 'bar' for excellence in school-based technical education in England is to be raised. Ideally, this expertise will be closely informed by practitioners in both industry and higher education, as occurs in the 'career academy' magnet schools in New Jersey.

Fifth, there is the role of qualifications in supporting innovation in technical education. Here the TVEI was a notable failure in relation to one of its initial purposes: no enduring qualification resulted, the initiative being bent subsequently toward other ends. However, as we have seen, this is an important point in a country (similar to Japan) where qualifications – first the school certificate, then GCE 'O' and 'A' level awards – have exerted huge, unplanned and often unwelcomed influence over the perceptions of English schools by all of the key groups involved since the 1920s. In such an environment, those participating in qualifications (candidates, schools, regulators) become actors in an institution similar in strength and influence, for example, to the institution of German apprenticeship, but less able to enhance work-related learning and skills development.[46] UTCs will need strong qualifications to support them, something not available to secondary technical schools when those schools were struggling to establish their identity.[47] In the immediate future, Diplomas and Young Apprenticeships will have an important role to play and will need to maintain strong employer involvement. In local UTC areas, a mix of these qualifications alongside those well established in FE colleges, such as the BTEC National Diploma, need to receive the sustained support of higher education admissions tutors in leading universities. This will be more likely if UTC students demonstrate high attainment, at the 14–16 as well as later, as Britain continues its attempt to endow qualifications beyond those in traditional school subjects with some of the institutional strengths of other nations' arrangements – for example the co-regulation of craft skills in Germany and the semi-formal employer-school contracts found in Japan.

Sixth, the support of parents and young people choosing UTCs will also be important. Both junior technical schools and occupationally-orientated central schools were popular before the war,[48] with their clear links to employment, the opportunity they presented to enhance an elementary education and, for some, to bridge the gap from leaving school (at 13) to securing an apprenticeship (at 14 or, more usually, 16). Significantly, their specific appeal to 'skilled worker' households was subsequently transferred to secondary technical schools and later, to City Technology Colleges. The narrowness of this constituency seriously debilitated the secondary technical schools as they needed show they could compete head-on with grammar schools rather than, as became the case, have their selection procedure characterised pejoratively as a 'second creaming'.[49] In contrast, the CTCs have operated (as will UTCs) on a smaller canvas and the attraction of niche groups of parents has not been seen as a significant weakness. Similarly, the often dire premises with which some secondary technical schools were associated was never replicated by CTCs where part of the attraction (prospectively for UTCs, also) lay in their start-of the art facilities.[50]

Finally, and perhaps most significant in the long run, **entrants to UTCs will be young people aged 14.** By this means they recreate the starting age of specialisation on which junior technical schools were based and which, technical education specialists argued in 1940–41, should have been the basis of post-war planning. This aligns with the results of extensive investigations made into the measurement of general and practical aptitudes among young people in Britain, Germany and Sweden between the 1930s and 1950s, and avoids the major problem encountered by secondary technical schools from 1945 in justifying, on scientific grounds, selection on the basis of practical aptitude at the age of 10/11. Education programmes commencing at 14 were integral to the design of the TVEI (albeit within 11–16 and 11–18 schools) and much recent curriculum policy remains concerned with the coherence of the 14–19 phase as a distinct stage of education. Elsewhere, 14–19 career academies in North America have won legitimacy when recruiting to specialist programmes, helped by the fact that all students choosing a new school at 14+ has been the norm for many decades.

In these ways University Technical Colleges are forging a new path on the international stage. The example of the USA is pertinent but the success

46. Ryan, 1999: 443–44, 448–50 discusses the importance of building new institutions, understood in this sense, to ease difficulties in the school-to-work transition. He cites the semi-formal contracts that employers make with high schools in Japan (*jisseki-kasnkei*) as a good example. In such an instance, the institution derives its key strength from the authenticity of the employer commitment, as is the case also in German apprenticeship where employers' costs are substantial and borne voluntarily. Ryan argues that achieving such institutional attributes should be the aim of government youth employment programmes and questions whether this is possible in the political economies of the USA and USA where policies are short-term and widespread employer commitment is absent, *ibid*., 449–50. The repeated description in recent years by UK civil servants of the government's programme of apprenticeships as a 'brand' is telling in this context.
47. Politically and bureaucratically the role of secondary technical schools was clear at a general level – as schools to serve a 'type' of child (Board of Education, 1943: 4), of value to employers and building on an urban tradition of technical education. However, for reasons discussed, this was never made convincing in operation on a wide scale.
48. Sanderson, 1994: 67; King, 1990: 86.
49. McCulloch, 1989: 63, 148–51. A similar effect had been noted in the early 1920s concerning the position of central schools *vis à vis* secondary schools, King, 1990: 79.
50. Although in at least one case (Thomas Linacre School, Wigan) the modern architecture of a new-build secondary technical school was said to have alienated the local community, McCulloch, 1989: 147.

of UTCs will depend ultimately on legitimacy secured within the English educational system – by parents, especially, but also by politicians and sponsors from higher and further education – in the context of the bridgehead from universal comprehensive organisation to specialism and autonomy opened up by CTCs during the 1990s. Beyond this, within an English tradition of secondary education dominated increasingly since the 1920s by examinations, the fortunes of UTCs will also be tied closely, in the early years, to the success of the diplomas set to exert strong influence over their curriculum. Paradoxically for schools with a strong vocational orientation, the direct support of employers is likely to matter less (beyond their endorsement of Diplomas and Young Apprenticeships). For, across Europe and the wider OECD membership of countries since the 1980s, extended schooling, expanded higher education and intensified certification have been, and appear set to remain, the main engines driving educational change.[51]

51. Green et al., 1999; OECD, 2007.

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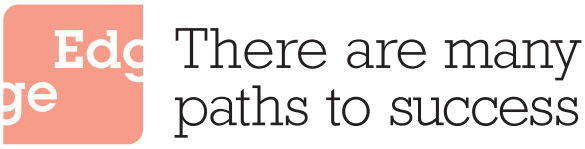

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