Technologies Curriculum Background and Evidence Paper

May 2026

Executive summary

Overview

Working Together to Make Change Happen (Education Scotland, 2025) states that a key outcome of the analysing stage of the Curriculum Improvement Cycle (CIC) is the development of an evidence paper for each curricular area, or context for learning, to be published on the CIC website.

This paper contextualises the 3-18 Technologies curriculum within the wider landscape of Scottish education. It aims to highlight the contribution made by Technologies to the achievement of learners in the Broad General Education and by Business, Computing and Craft, Design, Engineering and Graphics (CDEG) in the Senior Phase.

This paper draws on a range of local, national and international evidence, underpinned by academic research and the perspectives of stakeholders including young people and subject associations. It highlights key strengths and issues, and explores international alternatives and emerging trends. The insights drawn from this paper will help shape the next phase of the Technologies CIC ensuring a modern, inclusive, research-informed and future-orientated curriculum for all learners.

Key messages

- Whilst Technologies spans Business Education, Computing Science, and CDEG, each with distinct traditions and evidence bases, Technologies is frequently conflated with digital skills, particularly within ELC and Primary settings.

- The cross-cutting relationships between Business, Computing Science and Craft, Design, Engineering and Graphics creates an opportunity to view the Technologies curriculum not as a collection of separate subjects, but as a connected learning landscape where each area contributes to a broader technological culture. This integrated perspective positions Technologies as a dynamic, future-oriented curricular area, one that is responsive to Scotland's aspirations for economic innovation, digital transformation, and sustainable development.

- Technologies is positioned as central to economic growth, sustainability, innovation, and entrepreneurship. Technologies is a core component of Scotland's curriculum, underpinning economic prosperity, innovation, sustainability, and wellbeing, and is therefore a key focus for the Curriculum Improvement Cycle (CIC).

- Variability in teacher confidence results in inconsistent and partial provision, particularly in early learning and primary settings where Technologies is often reduced to digital skills with vital components of Computing and CDEG being omitted completely. Evidence shows that early gender stereotyping affects later engagement in STEM and Technologies.

- At the Secondary level, persistent gender imbalance in uptake, geographical variation and differences in resourcing and staffing issues affect access and participation, particularly in the senior phase, limiting learners' curricular entitlement. Government aims to reduce gender gaps in entrepreneurship and technology participation, and the increasing cross-disciplinary pressures in the secondary sector, underline the importance of sustained professional learning, networks, and clear curricular guidance.

- International evidence highlights the growing importance of data literacy, critical digital understanding, creativity, sustainability, and interdisciplinary problem-solving, areas where learner experiences in Scotland can currently be fragmented. Employers also prioritise problem-solving, creativity, communication, and collaboration. There is high demand for software, data, AI, and cybersecurity skills. Skills gaps are evident across multiple sectors (business services, IT, manufacturing, retail).

- Global reports highlight the need for digital competence, creativity, and entrepreneurship within curricula and there are calls for curriculum updates that embed AI, sustainability, and clearer digital literacy progression.

- UK and Scottish government aim to ensure the home nations are digitally resilient and are investing in cyber security programmes that can be embedded within the curriculum to build a cyber aware workforce.

Next Steps

This paper sets out the need for a refreshed and evolved national technical framework for Technologies that supports and exemplifies progression at all levels across the subject disciplines of Business, Computing and CDEG. The CIC provides an opportunity to explore these considerations in greater depth and to support the development of coherent and inclusive approaches that reflect local contexts and emerging priorities, supporting improved outcomes for children and young people. The evidence suggests that more consistency in delivery across local authorities, would ensure learners are receiving their entitlement to a full Technologies education allowing them to access, and experience success, the broad range of qualifications and awards available to them.

The CIC provides a timely opportunity to co create a future orientated Technologies framework that builds on the strengths of CfE. Drawing on international evidence, Scotland can address disparities in provision and align more explicitly with global trends. A refreshed framework should ensure shared clarity, provide progression and depth and promote consistency of provision nationally. Building confidence of existing teachers will be central to addressing the barriers to participation highlighted in the paper. Through collaboration, targeted support and evidence informed decision making, the CIC can deliver a modern, inclusive and culturally responsive 3-18 Technologies curriculum which develops creativity, wellbeing, equity, excellence and future ready skills for all learners.

Contents

1 Introduction

1.1 Purpose

This paper offers a snapshot of the current educational landscape, drawing on a diverse range of research and evidence to illuminate prevailing trends, challenges, and successes across contexts. It serves as a foundation for ongoing curriculum development, offering insights into the policy environment, learner experience, and professional perspectives. By incorporating both qualitative and quantitative data, it creates space for reflection and informed discussion. Whilst not all available studies are included, those selected reflect the breadth of work currently shaping thinking in this area. The insights outlined here are intended to support Curriculum improvement Cycle (CIC) stakeholder groups as they consider key issues and navigate the next steps in the evolution of the curriculum.

1.2 Sources Of Evidence

A comprehensive body of research was reviewed through a collaborative effort involving representatives from Education Scotland's Curriculum, Learning, Teaching and Assessment (CLTA) team, the Data, Performance and Research (DPR) Team, Scottish Government Analytical Services, and the Scottish Government Library Support Service. This collaboration brought together a wide range of expertise to support the identification, evaluation, and organisation of relevant literature. The sources drawn upon include, but are not limited to, peer-reviewed academic papers, His Majesty's Inspectorate of Education publications (HMIE) and Scottish Qualifications Authority (SQA) data analysis, government data sets, research produced by national agencies, Scottish Government reports, and international publications from organisations such as the OECD and the United Nations. Additionally, the perspectives of children and young people are represented through the work of bodies such as the Scottish Youth Parliament and the Children and Young People's Commissioner Scotland.

1.3 Scope Of The Review

This paper examines the Technologies curriculum area across the full 3–18 learner journey, considering the breadth, depth, and coherence of provision from early level through to the Senior Phase. It explores progression pathways and learner experiences with particular attention to the development of technological and business knowledge, practical skills, digital literacy, and computational thinking. The paper identifies key policy drivers and educational practices that underpin high-quality learning and teaching in Technologies and its relevance to society, supporting learners to become creative, enterprising, and digitally competent participants in an increasingly technological world.

The paper reflects on national measures of attainment and participation in the Senior Phase, including National Qualifications (NQs), National Progression Awards (NPAs) as well as wider qualifications. By presenting an integrated analysis of current practice and emerging trends, this paper aims to contribute to a holistic understanding of the

Technologies curricular landscape and support informed discussion and decision-making within the CIC process.

1.4 Related National Policies

The policy landscape surrounding Technologies education in Scotland reflects the interconnected and rapidly evolving nature of technological, economic, and societal change. Whilst *Curriculum for Excellence* (CfE) distinguishes between areas such as *Business*, *Computing Science*, and *Craft, Design, Engineering, and Graphics* (CDEG), these divisions function primarily as curricular organisers within schools. Yet the themes that shape national policy rarely sit within discrete boundaries. Economic, industrial, digital, and sustainability strategies tend to emphasise themes such as creativity, problem-solving, innovation, and design thinking, flowing across and enrich all areas of Technologies education.

Recognising these cross-cutting relationships offers an opportunity to view the Technologies curriculum not as a set of isolated subjects, but as a connected learning landscape in which each area contributes to a wider technological culture. This integrated perspective positions Technologies as a dynamic and future-facing curricular area, responsive to Scotland's ambitions for economic innovation, digital transformation, and sustainable development. The following section outlines the key policy frameworks which influence this landscape, highlighting the shared themes that shape learners' experiences from early level through to the Senior Phase.

National Economic and Innovation Policy Drivers

The Scottish Government's overarching economic agenda, articulated in *Delivering Economic Prosperity* (Scottish Government, 2022a) seeks to establish Scotland as a nation that achieves economic growth alongside environmental sustainability, high quality of life, and equitable opportunities for all. This vision is supported by a suite of sector-specific strategies aimed at transforming areas with strong technological dimensions, including manufacturing (Scottish Government, 2025c) tourism, construction, food and drink and retail (Scottish Government, 2022b).

A persistent issue highlighted across these strategies is Scotland's comparatively low level of entrepreneurial activity relative to OECD benchmarks, including in comparison to other home nations with a total rate of early-stage Entrepreneurial Activity (TEA) of 7.3% in 2019, compared with 10.5% in England, and 12.4% in Ireland (Scottish Government, 2022a, p. 16). The national ambition is to position Scotland as an innovation-led, entrepreneurial economy capable of generating new industries and high-value employment. Key to achieving this ambition is the cultivation of entrepreneurial behaviours and competencies from an early age through high-quality learning experiences within the school curriculum. These policy objectives explicitly identify the role of the education system, particularly the Technologies curriculum, in developing a workforce equipped with creativity, digital competence, design capability and technical skills. The strategy also acknowledges gender disparities in entrepreneurship, signalling the need for educational approaches that address barriers to participation for girls and young women, discussed further in Section 5.4.3. The gender gap with regards to business start-up rates with the TEA for women, at 5.3%, consistently below that of men, which was 9.3% in 2020. The TEA for ethnic minorities, at 12.3%, is significantly higher than that of the general population, showing the value of diversity to the Scottish economy.

Entrepreneurship, Enterprise Education and Equity

The Scottish Government's commitment to broadening participation in entrepreneurship is reflected in its endorsement of *Pathways: A New Approach for Women in Entrepreneurship* (2023). The report outlines pervasive structural, social and economic barriers that contribute to the fact that only one in five Scottish businesses is led by a woman and that women-founded start-ups receive only 2% of investment capital. Among its findings is the identification of limited enterprise education in schools and the perception that entrepreneurship is not a realistic career aspiration for many young people, especially girls.

Social enterprise also features prominently in national economic and social development policy. The Scottish Government highlights social enterprise as critical to Scotland's common good, contributing approximately £1 billion to the economy, supporting rural development, including fragile communities, and promoting the Gaelic language. Significantly, 60% of social enterprises in Scotland are led by women (Scottish Government, 2016, p. 16). The Scottish Government's *Social Enterprise Strategy* (2016) aims to foster a culture of entrepreneurship and innovation for greater business competitiveness. By integrating values-based social enterprise learning into the education system, from pre-school through to further education, the government seeks to inspire young people and support them in establishing and growing their own enterprises.

Sustainability, Circular Economy and Future Workforce Development

The *Circular Economy* route-*map* (Scottish Government, 2024) emphasises the role of education in raising awareness of the circular economy and the importance of preparing the future workforce for working in the circular economy stating that "… we must ensure knowledge building of circular economy is embedded across the whole education and skills landscape." (Scottish Government, 2024, p. 76). To strengthen support, The Circular Economy (Scotland) Bill became an Act in 2024 and the Scottish Government has pledged to embed a fully circular economy approach by 2032.

As well as being an important contributor to tackling the climate emergency and improving our environment, a circular approach can help grow the economy, by opening up new market opportunities. According to the Zero Waste Scotland's *State of the Circular Economy* report (2025), circular economy sectors in Scotland contributed £7.11 billion to the national economy in 2021, accounting for approximately 81,447 jobs. The circular economy in Scotland is a growing field with substantial economic contributions and job opportunities.

Digital and Technological Ecosystems: Computing Science, Manufacturing and STEM Policy

In 2020, Mark Logan was commissioned by the Scottish Government to carry out a review of how the technology sector in Scotland can contribute to the post-Covid economic recovery. The *Scottish Technology Ecosystem Review* (2020) made recommendations on stimulating Scotland's Technology Ecosystem and increase the creating rate of viable and profitable tech businesses in Scotland. The review defines the tech ecosystem as one which comprises of tech businesses, which is a business that develops a product or service with a high degree of software engineering required to develop it and aspires to operate according to Internet Economy methodologies which is characterised by the speed of iteration. Encouraging technology start-ups and nurturing them through to maturity is central to growth in this sector and that greater inward investment will come when there are credible start-ups in which to invest.

The report argues that the more young people with programming and related skills the more tech start-ups Scotland will have in the future, and that Computing Science education is key to attaining this goal. The report makes reference to a number of widely acknowledged concerns around the teaching of Computing Science in schools, and makes several recommendations including:

- Greater emphasis should be given on the teaching of Computing Science from S1
- The curriculum should be revised to include more programming and project work.
- Work should be carried out by schools to educate parents and carers on what Computing Science is and the potential pathways for children who follow this path.
- Extra-curricular programming clubs should be strategically supported with particular emphasis on supporting demographics that under participate in Computing Science.
- Addressing the gender role stereotyping in early years that contributes to the lower uptake of Computing Science amongst girls.

The report also emphasises the importance of fostering an entrepreneurial mindset among students. Computing Science learners should be developing technical proficiency alongside learning business and leadership skills and be provided with opportunities for start-up experiences. Logan argues that students from Business and Computing Science disciplines should collaborate more frequently, combining their expertise to build the diverse skillset required for successful tech start-ups that would allow students to learn the process of taking a technical product to market.

In 2022 The Scottish government pledged £1.3million to support schools in enhancing Computing Science provision (Scottish Government, 2022).

The Strategic Framework for a Cyber Resilient Scotland (Scottish Government, 2025) outlines Scotland's approach to becoming a digitally secure and resilient nation. Ensuring strong digital safety and security is essential for sustained economic growth, and taking a proactive stance will enable Scotland to innovate and thrive. Although the Scottish Government provides national leadership for implementing the Framework, delivery is a shared effort involving public services, industry, education and academia, law enforcement, and government at local, national, and UK levels.

A core principle of the Framework is the development of a thriving cyber security sector, supported by a strong research community and a skilled professional workforce. It also emphasises the importance of raising public awareness of cyber risks and ensuring people are equipped to manage these risks through education and lifelong learning.

Scotland's cyber security industry continues to expand, and its academic institutions are producing new cyber-related products and systems. The Scottish Government remains committed to embedding cyber resilience throughout learning. It supports initiatives that introduce cyber security concepts from the early years and promote integrated cyber resilience learning across the 3 - 18 curriculum.

Few national policies explicitly address Craft, Design, Engineering, and Graphics (CDEG). Instead, policy frameworks that employ the Science, Technology, Engineering, and Mathematics (STEM) label typically state, or imply, that CDEG is subsumed within the Technology and Engineering components. For example, the Science, Technology, Engineering and Mathematics: Education and Training Strategy for Scotland (Scottish Government, 2017) uses the definition that:

"Engineering is the method of applying scientific and mathematical knowledge to human activity and Technology is what is produced through the application of scientific knowledge to human activity. Together these cover a wide range of fields including business, computing science, chemicals, food, textiles, craft, design, engineering, graphics and applied technologies including those relating to construction, transport, the built environment, biomedical, microbiological and food technology."
(p. 50)

Despite focussed attention on STEM strategies, the Technologies curriculum area subjects, such as CDEG, continue to be afforded less emphasis than their scientific counterparts. In practice, the STEM label is frequently applied in ways that minimise, or even omit, Technology and Engineering altogether (see, for example, Section 5.3.1 or University of Aberdeen (2025). This pattern is further illustrated in the STEM Education and Training Strategy: Refresh (Scottish Government, 2022, p. 9), which notably excludes Technological Education from its graphical representation of teaching workforce data.

The *STEM Education and Training Strategy* (Scottish Government, 2017) sought to enhance STEM literacy and promote "inclusive, economic growth" (p. 9) by strengthening the capacity of the education system, reducing equity gaps in participation and attainment, fostering learner engagement and progression in STEM pathways, and aligning educational provision with labour-market needs. The strategy anticipated that, by 2022, there would be measurable increases in participation in STEM-related study and training across all sectors, from schools to apprenticeships, alongside improvements in practitioner confidence in STEM within early years and primary education. It further aimed for expanded opportunities for STEM-focused professional learning, substantial reductions in equity gaps across demographic groups (including gender, socioeconomic status, rurality, race, disability, and care experience), and growth in employment within STEM-related occupations, accompanied by higher employer satisfaction with the STEM skills of school, college, university and apprenticeship graduates.

In 2021, Scottish Ministers and COSLA (Scottish Government, 2025b) endorsed a policy that eliminated the charges schools occasionally imposed on pupils in public schools for participation in core curriculum subjects including Technologies and specifically CDEG. The accompanying Scottish Government guidance makes clear that all materials required for CDEG within both the Broad General Education and the Senior Phase must be provided at no cost to learners. This policy aims to remove financial barriers that may restrict students' engagement in practical subjects and associated qualifications, particularly for those from socioeconomically disadvantaged backgrounds. In doing so, it seeks to promote wider participation in technology-related disciplines and to enhance equity in educational opportunities.

Early Learning and Childcare (ELC)

Realising the Ambition: Being Me is Scotland's national practice guidance for ELC, building on Pre-Birth to Three and Building the Ambition. It outlines the developmental needs of children from birth to Primary 1 (Education Scotland focus is from age 3 onwards) and emphasises the importance of nurturing relationships, play-based learning, and responsive pedagogy. The guidance supports continuity across transitions and highlights the foundational role of early learning in shaping lifelong wellbeing and educational outcomes. *Realising the Ambition: Being Me* supports nurseries and other ELC settings by providing a clear, research-informed framework for delivering the Early Level curriculum in a way that is developmentally appropriate, child-centred, and responsive to individual needs.

Realising the Ambition: Being Me highlights concerns that by the time children enter ELC settings they may already be developing gender-based expectations of behaviours, academic preferences and perceived abilities. These stereotypical views can shape their attitudes to relationships in play, participation in the world of work and affect their wellbeing. A narrowing of experiences at this stage too often evolves into a narrowing of opportunities later in life. For example, girls are still under-represented in physics, technology and engineering, as evidenced in the SQA presentation data in Section 2.1 and discussed further in Section 5.4.3.

Collectively, these policy frameworks reflect Scotland's commitment to embedding Technologies as a central component of Curriculum for Excellence. From Early Level through to the Senior Phase, national guidance promotes innovative, equitable, and future-focused learning environments that recognise the vital role of digital competence, creativity, and technological understanding in shaping learners' opportunities and outcomes. The coherence between curricular expectations, skills for learning, life and work, and cross-sector collaboration underlines the strategic intent of Technologies within CfE, positioning it not as a discrete curriculum area, but as an essential and evolving strand that equips learners to engage confidently with an increasingly digital and interconnected world.

2 National Data Sets

2.1 SQA Attainment And Presentation Data

This section summarises Scottish Qualifications Authority (SQA) data on Craft, Design, Engineering and Graphics (CDEG); Computing Science; and Business qualifications. The data presented in this evidence paper is drawn from the pre-appeal Scottish Qualifications Authority (SQA) results for the 2024/25 academic session. Given that the research process commenced in August 2025, the 2024/25 (pre-appeal) results were the most current and complete dataset available at the time of analysis and therefore were used to inform the findings of this paper.

The Technologies area encompasses almost 100 different qualifications across multiple levels and awarding bodies. Given the time constraints and scope of this review, it is therefore not feasible to undertake a 'deep dive' into all available qualifications. To maximise impact, this in-depth section of the review focuses exclusively on National Qualifications offered by the SQA as 95% of Local Authority schools offer at least one Technologies National Qualification, as illustrated in Figure 1 (p.9).

2.1.1 National Qualifications

This section presents an analysis of trends in presenting centres, candidate entries, gender balance and attainment for selected National Qualifications National 5, Higher and Advanced Higher in discrete subjects within the Technologies area 2019 to 2025. The period includes the disruption caused by COVID-19, when the 2020 and 2021 examinations were cancelled and replaced by teacher judgement. During these years, attainment patterns were markedly different from examination years, with a higher proportion of A and B grades and fewer no award entries. The data relating to gender distribution comes from the publicly available attainment data by gender from the SQA website where the data is rounded to the nearest five. Therefore, the numbers are not exact but is strong enough to identify patterns and distribution.

National Picture

Across the period 2019–2025, several broad patterns emerge that reflect both the structural features of Technologies education in Scotland and the wider sociocultural and economic forces influencing subject uptake and attainment. First, the stability, or, in some cases, contraction, of presenting centres in certain Technologies subjects suggests persistent variation in local capacity, staffing, and resource availability. These patterns are particularly evident in specialist areas such as Computing Science and some CDEG subjects, where fluctuations in teacher supply continue to shape the opportunities available to learners.

Second, Figure 1, (p.9, below) illustrates that over 95% of Local Authority schools present at least one Technologies National Qualification. Figure 1, (p.9, below) also shows a marked increase in the number of National Progression Awards, particularly at SCQF Levels 5 and 6, and is discussed in more detail in Section 2.1.2.

Whilst some subjects have seen modest growth, the overall picture suggests that the Technologies suite has not yet experienced the expansion anticipated within national STEM, digital and economic strategies. The data also reinforce a consistent gendered pattern in participation, with girls remaining significantly underrepresented in Computing Science and boys comprising the majority in CDEG subjects. These gender disparities appear deeply entrenched and resistant to short-term policy interventions, underscoring the need for sustained, systemwide action beginning in the earlier stages of schooling.

Attainment patterns across the qualification levels broadly mirror national trends. The COVID-19 disruption produced atypically high pass rates in 2020 and 2021, reflecting the shift to teacher professional judgement. Subsequent examination years show a return towards pre-pandemic attainment distributions, though in some subjects the rebalancing appears gradual rather than immediate. Such patterns may indicate ongoing legacy effects from the pandemic.
Whilst many learners continue to attain well, participation patterns highlight persistent gendered pathways, subject-level fragility in staffing and provision, and an ongoing misalignment between national policy ambitions and learner uptake. These national-level observations offer an important backdrop for interpreting the subject-by-subject and level-by-level data that follow.

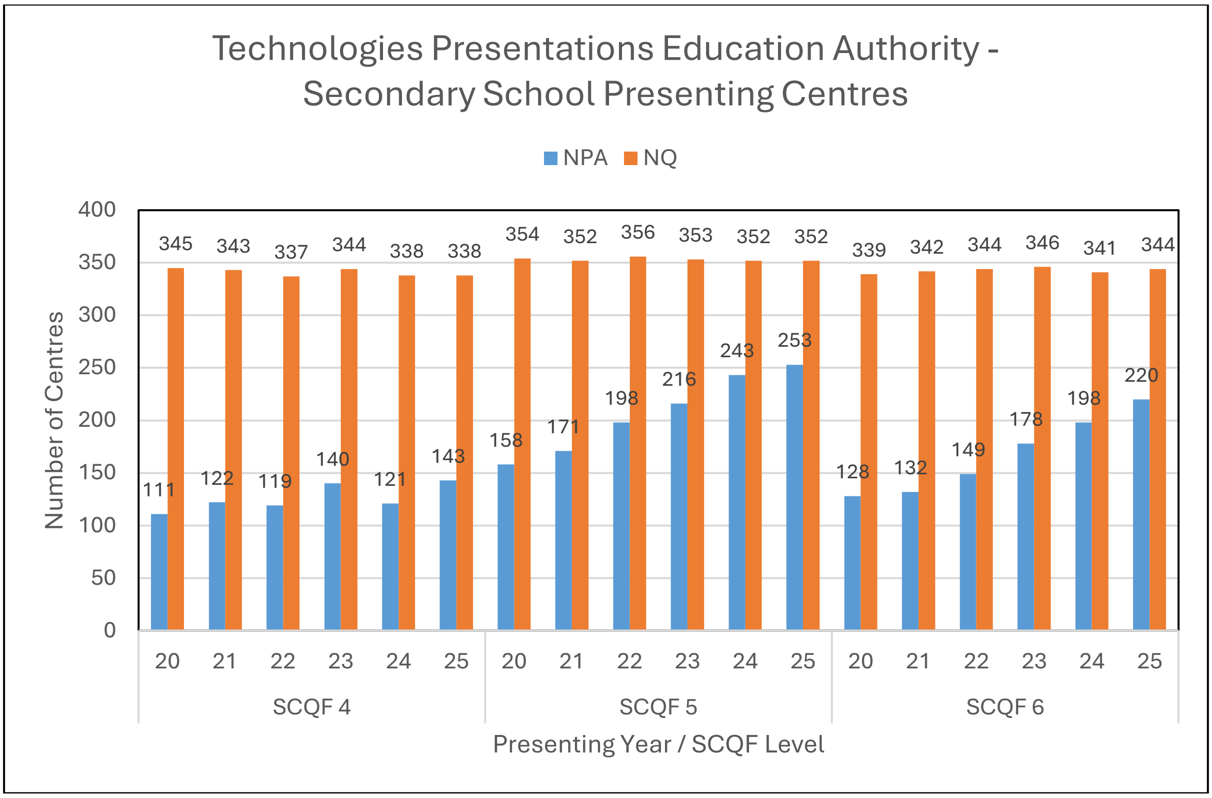


Figure 1 Number of Local Authority Schools presenting at least one Technologies Qualification (n=357)

Accounting

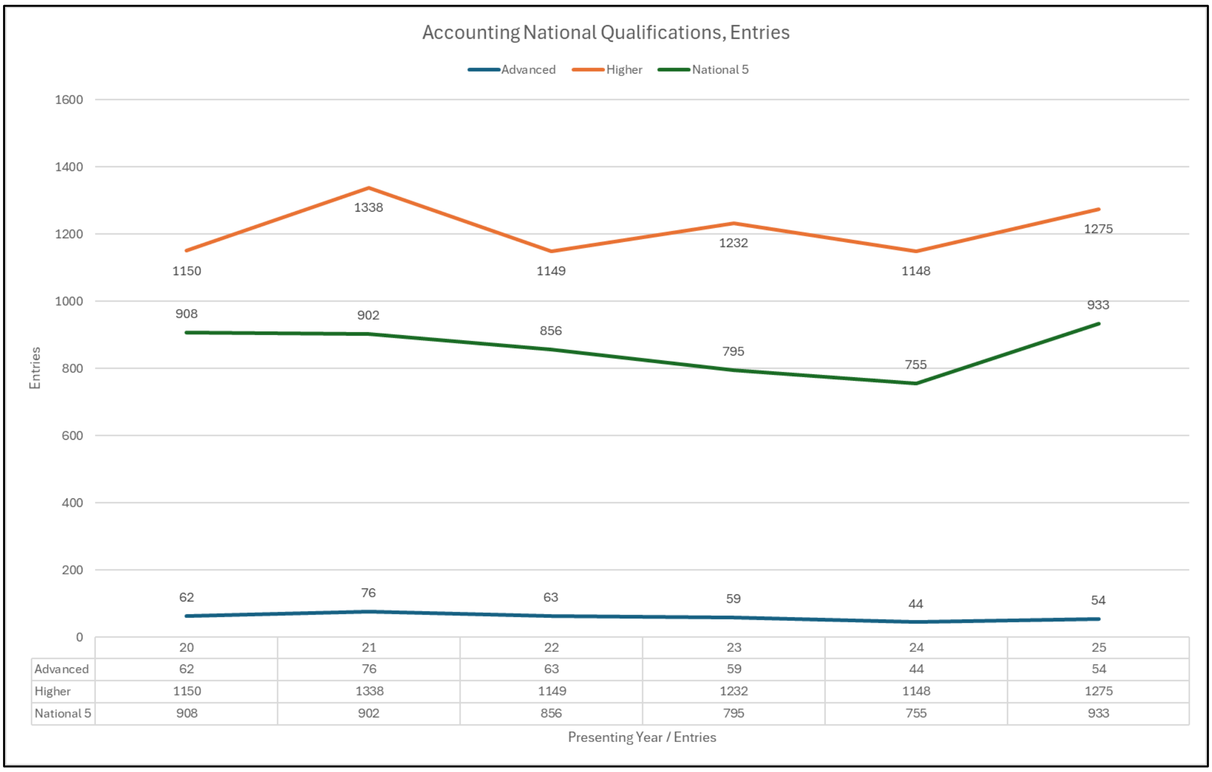


Figure 2 Accounting Presentations at SCQF Levels 5-7 from 2020-2025

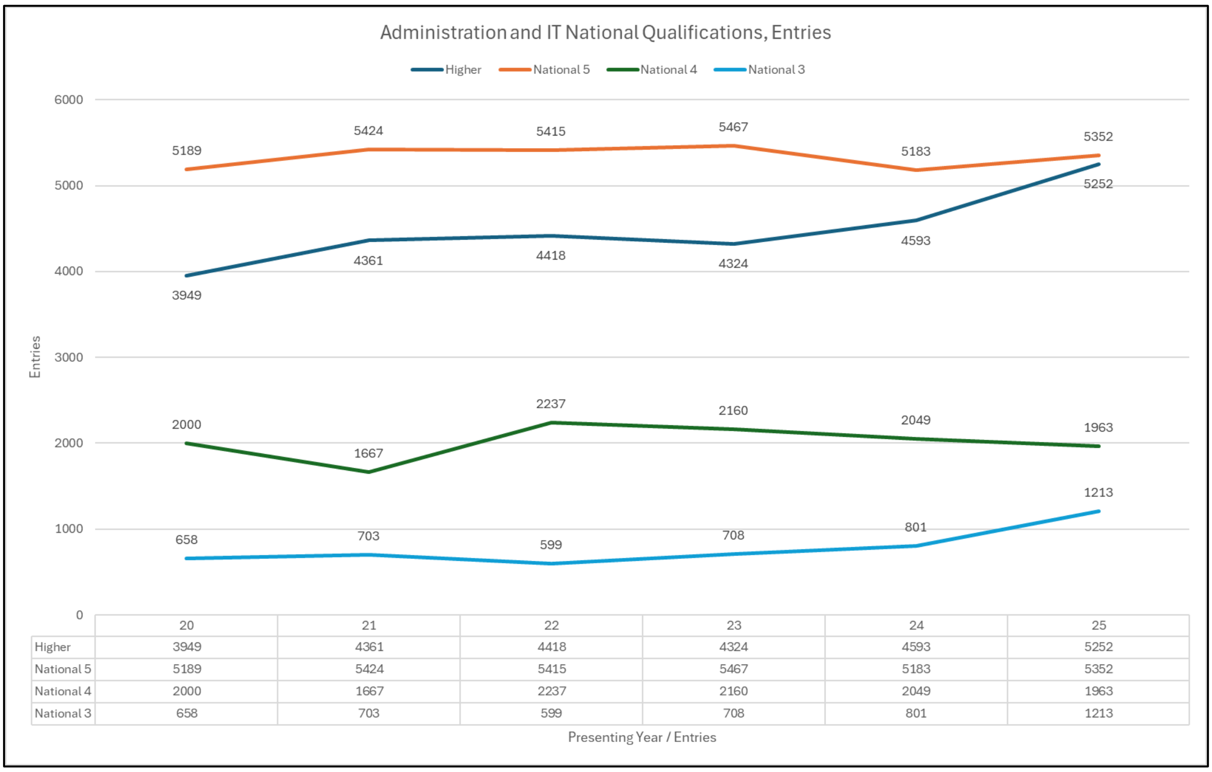
At Advanced Higher, Accounting experienced a substantial decline in centre provision, falling from 22 centres in 2019 to 13 in 2025, a decrease of 41%. Entries followed a similar pattern, decreasing from 64 candidates in 2019 to 54 in 2025, representing a 16% reduction. After the return to external examinations in 2022, both entries and attainment stabilised at lower levels, reflecting the smaller number of centres offering the course. Female entries fell from 25 to 20 (-20%), male entries stayed at 35 (0%), giving a 2025 gender balance of 36% female / 64% male.

At Higher level, Accounting centres declined modestly from 112 in 2019 to 97 in 2025, while entries remained relatively stable, rising slightly from 1,222 to 1,275 candidates (+ 4%). Female entries fell from 535 to 505 (-6%), males rose from 685 to 770 (+12%), resulting in 40% female / 60% male in 2025.

At National 5, centre provision fell from 71 to 63 between 2019 and 2025, while entries increased slightly from 898 to 933 (+4%). Female entries fell from 440 to 390 (-11%), males rose from 460 to 545 (+18%), producing a 2025 balance of 42% female / 58% male.

Attainment at National 5 and Higher mirrored national patterns during COVID, with a temporary elevation of top grades in 2020 and 2021 followed by a return to typical distributions in subsequent years.

Administration & IT



	20	21	22	23	24	25
Higher	3949	4361	4418	4324	4593	5252
National 5	5189	5424	5415	5467	5183	5352
National 4	2000	1667	2237	2160	2049	1963
National 3	658	703	599	708	801	1213

Figure 3 Administration & IT Presentations at SCQF Levels 3-6 from 2020-2025

Higher Administration and IT maintained broadly stable centre coverage, ranging from 251 in 2019 to 257 in 2025 (+2%). Candidate entries grew substantially over the period, rising from 3,770 in 2019 to 5,252 in 2025, an increase of 39%. After the return to external exams, post 2022 results remained strong, indicating sustained learner achievement in this subject area. Female entries rose from 2470 to 3090 (+25%), males from 1,300 to 2,160 (+66%), giving a 2025 balance of 59% female / 41% male.

At National 5, the number of centres declined slightly from 284 to 269 (-5%), while entries increased modestly from 4,885 to 5,352 (+10%). Female entries rose slightly from 3200 to 3230 (+1%), males from 1,685 to 2,120 (+26%), giving a 2025 balance of 60% female / 40% male.

Attainment patterns followed the national COVID trend with a temporary uplift in top grades, and stable achievement was maintained after exams were reinstated.

Business Management

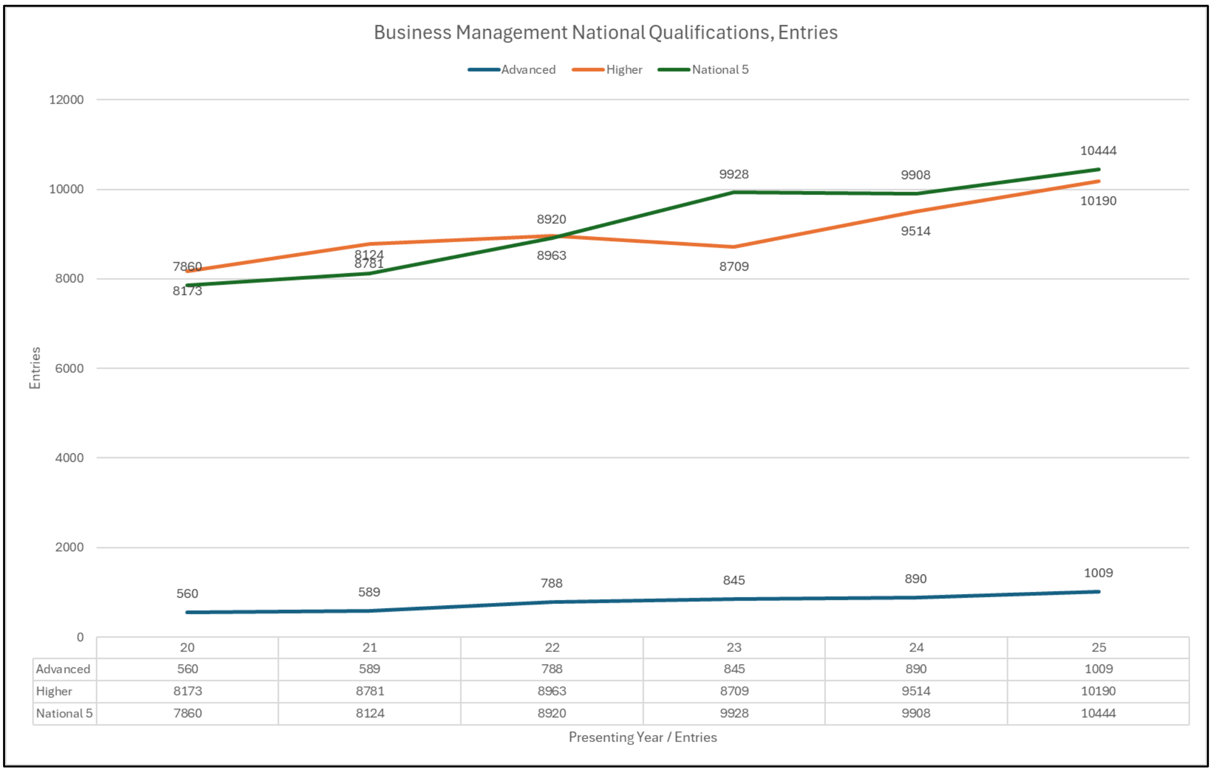


Figure 4 Business Management Presentations at SCQF Levels 5-7 from 2020-2025

At Advanced Higher, Business Management experienced strong growth, with centres increasing from 76 in 2019 to 105 in 2025, a 38%. Candidate entries more than doubled, rising from 453 to 1,009 (+123%). Post 2022 performance remained consistently high. Female entries rose from 260 to 595 (+129%) and male entries from 195 to 415 (+113%), resulting in 59% female / 41% male in 2025.

At Higher level, the number of centres remained stable, ranging between 335 and 342, while entries increased from 8,322 in 2019 to 10,190 in 2025 (+22%). Female entries increased from 4,525 to 5,350 (+18%), males from 3,795 to 4,840 (+28%), resulting in 53% female / 47% male.

At National 5, centres were stable at approximately 327 - 333, while entries rose from 7,576 to 10,444 (+38%). Female entries increased from 3,865 to 4,920 (+27%), males from 3715 to 5,525 (+49%), resulting in 47% female / 53% male.

Attainment at Higher and National 5 peaked during the COVID years and returned to typical distributions afterwards.

Economics

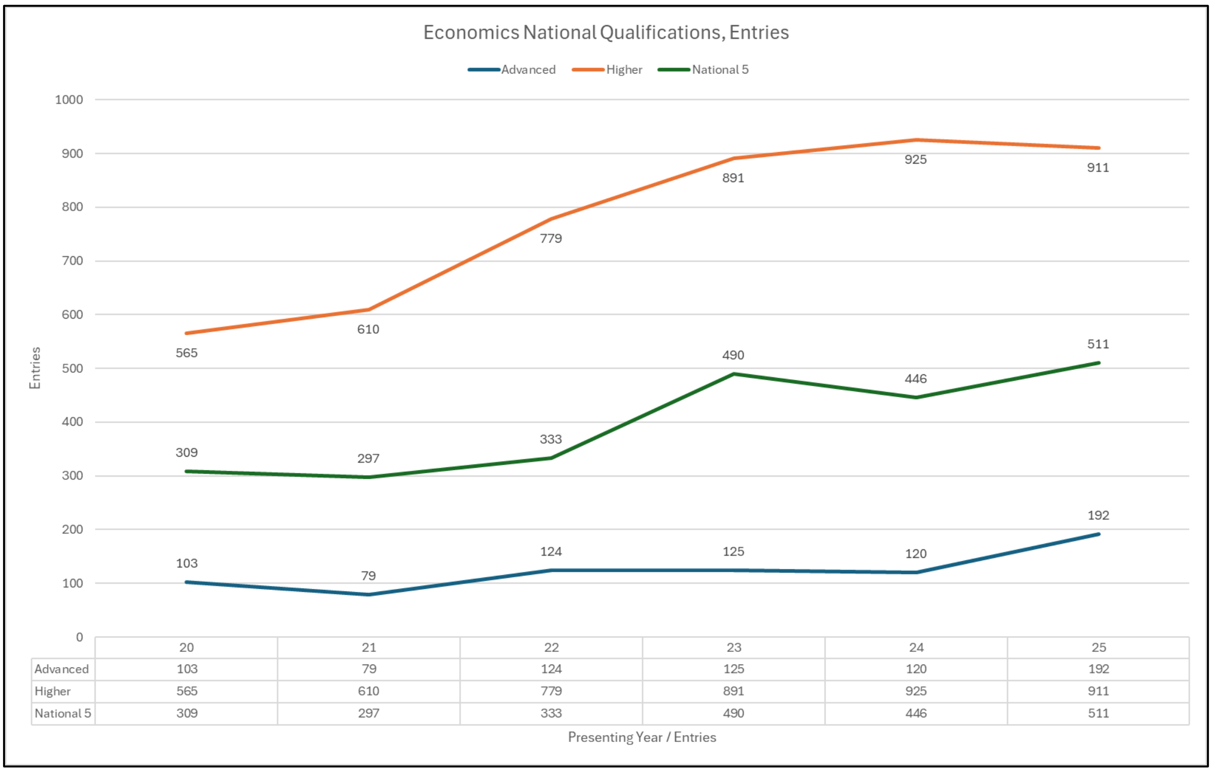


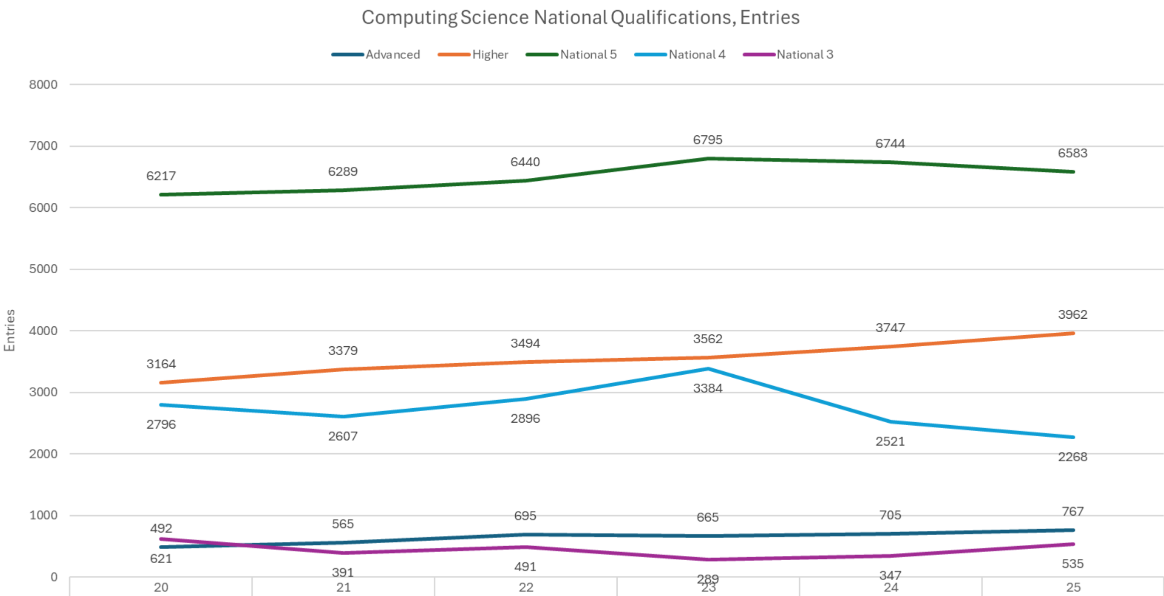
Figure 5 Economics Presentations at SCQF Levels 5-7 from 2020-2025

At Advanced Higher, the number of centres grew from 14 in 2019 to 18 in 2025 (+29%), with entries rising sharply from 107 to 192 (+79%). Attainment remained strong, with high proportions of A and B grades. Female entries increased from 30 to 60 (+100%), while male entries rose from 80 to 130 (+63%), giving a 2025 gender balance of 32% female / 68% male.

At Higher, centres increased from 45 to 50 (+11%), and entries rose from 583 to 911 (+56%). Female entries grew from 210 to 345 (+64%), and male entries increased from 370 to 565 (+53%), resulting in a 2025 balance of 38% female / 62% male.

At National 5, the subject saw the most significant proportional growth, with centres increasing from 13 to 19 (+46%) and entries almost doubling from 268 to 511 (+91%). Attainment remained strong, with a consistently high proportion of passes. Female entries rose from 70 to 165 (+136%), while male entries increased from 195 to 345 (+77%), producing a 2025 gender balance of 32% female / 68% male.

Computing Science



	20	21	22	23	24	25
Advanced	492	565	695	665	705	767
Higher	3164	3379	3494	3562	3747	3962
National 5	6217	6289	6440	6795	6744	6583
National 4	2796	2607	2896	3384	2521	2268
National 3	621	391	491	289	347	535

Figure 6 Computing Science Presentations at SCQF Levels 3-7 from 2020-2025

At Advanced Higher, Computing Science saw a modest decline in centres, from 134 in 2019 to 126 in 2025 (–6%), while entries increased from 614 to 767 (+25%). Female entries increased from 90 to 155 (+72%), males from 525 to 610 (+16%), giving a 2025 balance of 20% female / 80% male. This may reflect a shift by local authorities towards centralised hubs or consortium-based delivery of Advanced Higher, increasing its accessibility to learners.

At Higher, centres remained stable between 284 and 297, while entries rose from 3,228 in 2019 to 3,962 in 2025 (+23%). Female entries rose from 535 to 820 (+53%), males from 2,690 to 3,140 (+17%), giving a 2025 balance of 21% female / 79% male.

At National 5, centres were consistently stable at around 315 - 308, with entries increasing slightly from 6,344 to 6,583 (+4%). Female entries rose from 1,280 to 1,445 (+13%), males from 5060 to 5140 (+2%), giving a 2025 balance of 22% female / 78% male.

Attainment at all levels followed the national trend, peaking in the COVID years before normalising post-2022. In recent years, attainment has improved, particularly at National 5 and Higher. This improvement may be linked to the COVID-era modifications, such as the Web or Database option, being retained. Higher attainment levels are likely to have contributed to increased entries at Higher and Advanced Higher.

Design & Manufacture

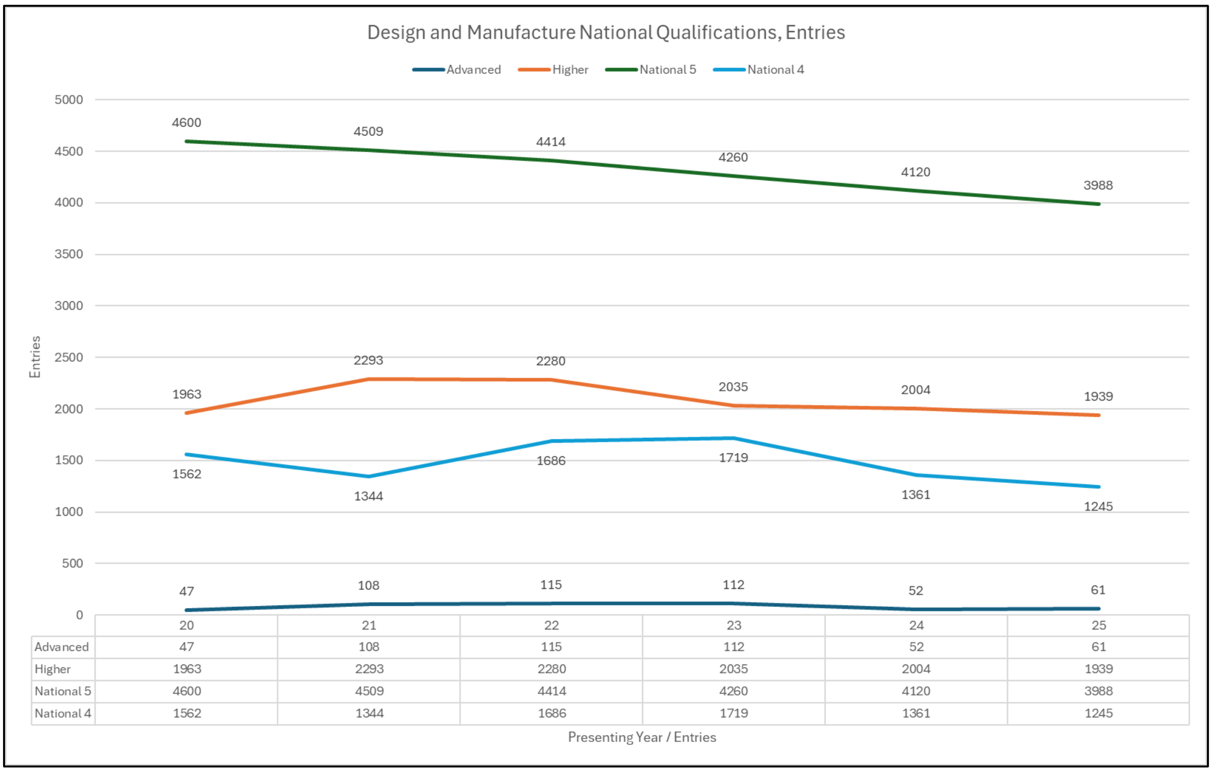


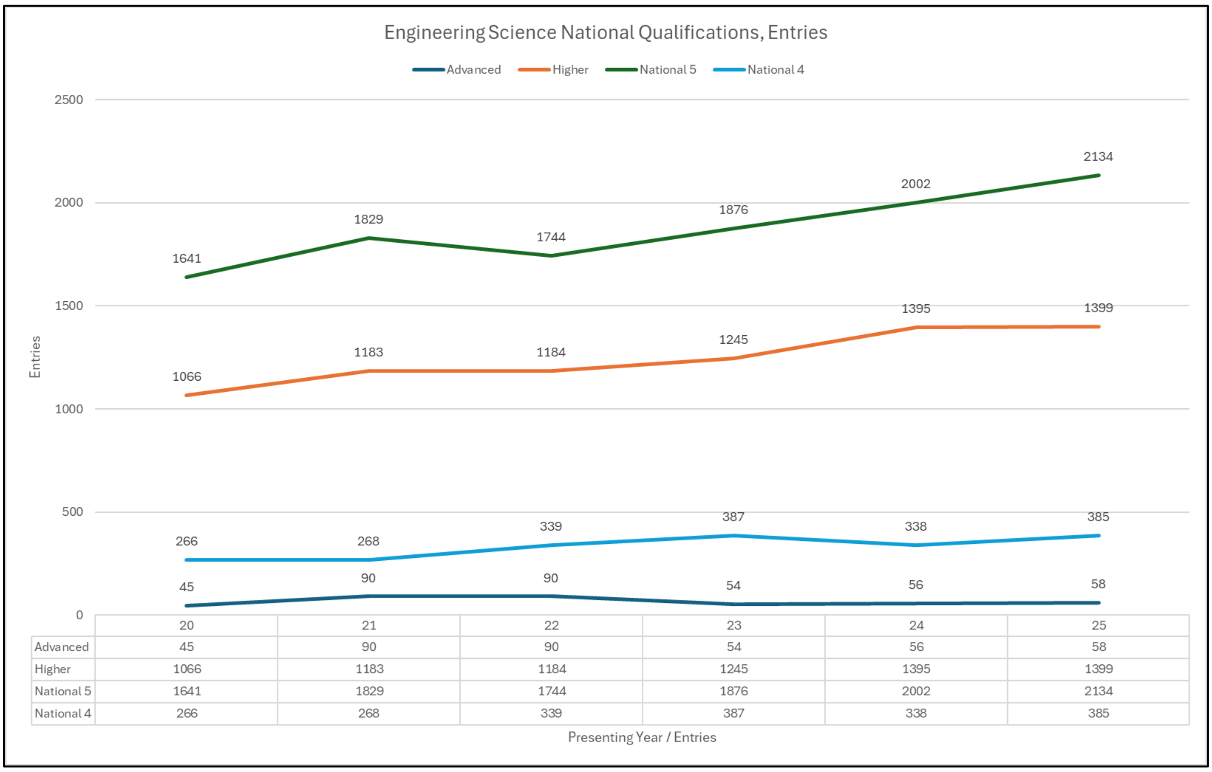
Figure 7 Design and Manufacture Presentations SCQF Levels 4-7 from 2020-2025

At Advanced Higher, centres fluctuated significantly, from 34 in 2019 to 25 in 2025 (-26%), with entries declining from 79 to 61 (-23%). Female entries stayed at 30 (0%), males fell from 45 to 30 (-33%), creating a 50% female / 50% male balance in 2025.

At Higher, centres decreased from 232 to 175 (-25%), with entries declining from 2,248 to 1,939 (-14%). Attainment remained broadly stable within cohorts, though total passes fell with smaller cohort sizes. Female entries fell from 710 to 635 (-11%), males from 1535 to 1305 (-15%), creating a 2025 balance of 33% female / 67% male.

At National 5, centres fell from 265 to 208 (-22%), with entries decreasing from 4,482 to 3,988 (-11%). Female entries remained stable from 1,165 to 1,145 (-2%), males dropped from 3,315 to 2,845 (-14%), creating a 2025 balance of 29% female / 71% male.

Engineering Science



	20	21	22	23	24	25
Advanced	45	90	90	54	56	58
Higher	1066	1183	1184	1245	1395	1399
National 5	1641	1829	1744	1876	2002	2134
National 4	266	268	339	387	338	385

Figure 8 Engineering Science Presentations at SCQF Levels 4-7 from 2020-2025

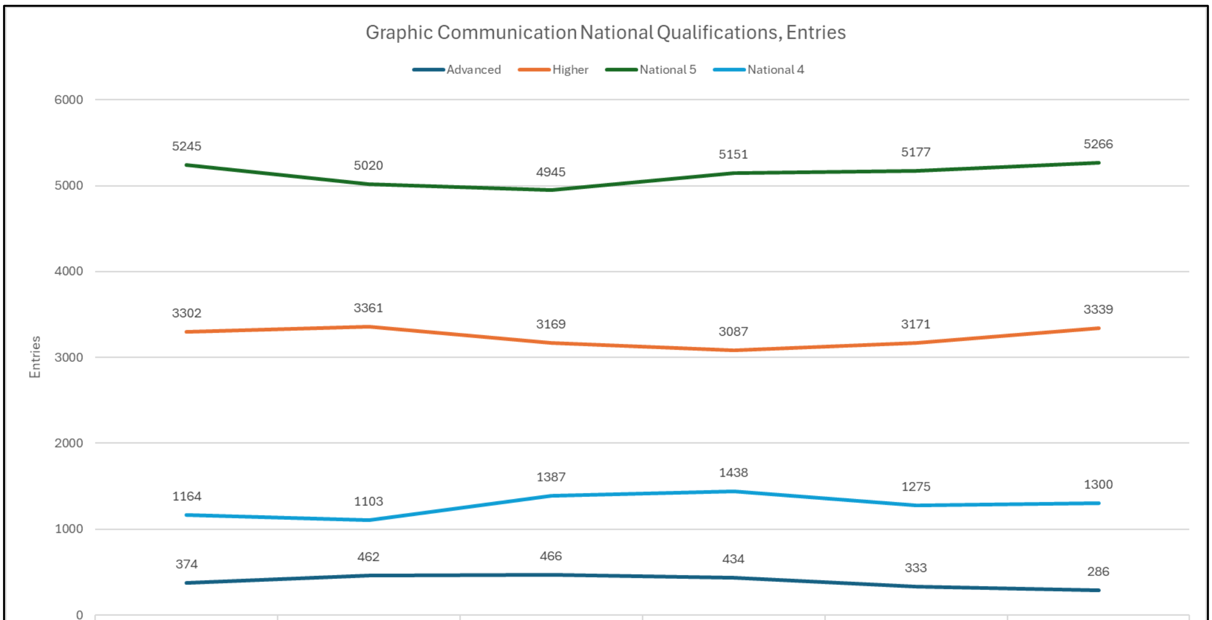
At Advanced Higher, the subject has small and fluctuating centre numbers, decreasing slightly from 16 in 2019 to 14 in 2025 (-12%), while entries increased from 36 to 58 (+61%). Female entries rose from 0 to 10, males from 30 to 50 (+67%), giving a 2025 balance of 17% female / 83% male.

At Higher, centres grew moderately from 93 to 101 (+9%), and entries increased from 1,110 to 1,399 (+26%). Attainment remained strong and stable across all years. Female entries increased from 115 to 165 (+43%), males from 995 to 1,235 (+24%), resulting in 12% female / 88% male in 2025.

At National 5, centres were very consistent at around 105/106, while entries rose from 1,646 to 2,134 (+30%). Female entries grew from 160 to 285 (+78%), males from 1,485 to 1,850 (+25%), leading to a 2025 balance of 13% female / 87% male.

Like other subjects, COVID affected years showed temporary attainment increases, with standard distributions resuming afterwards.

Graphic Communication



	20	21	22	23	24	25
Advanced	374	462	466	434	333	286
Higher	3302	3361	3169	3087	3171	3339
National 5	5245	5020	4945	5151	5177	5266
National 4	1164	1103	1387	1438	1275	1300

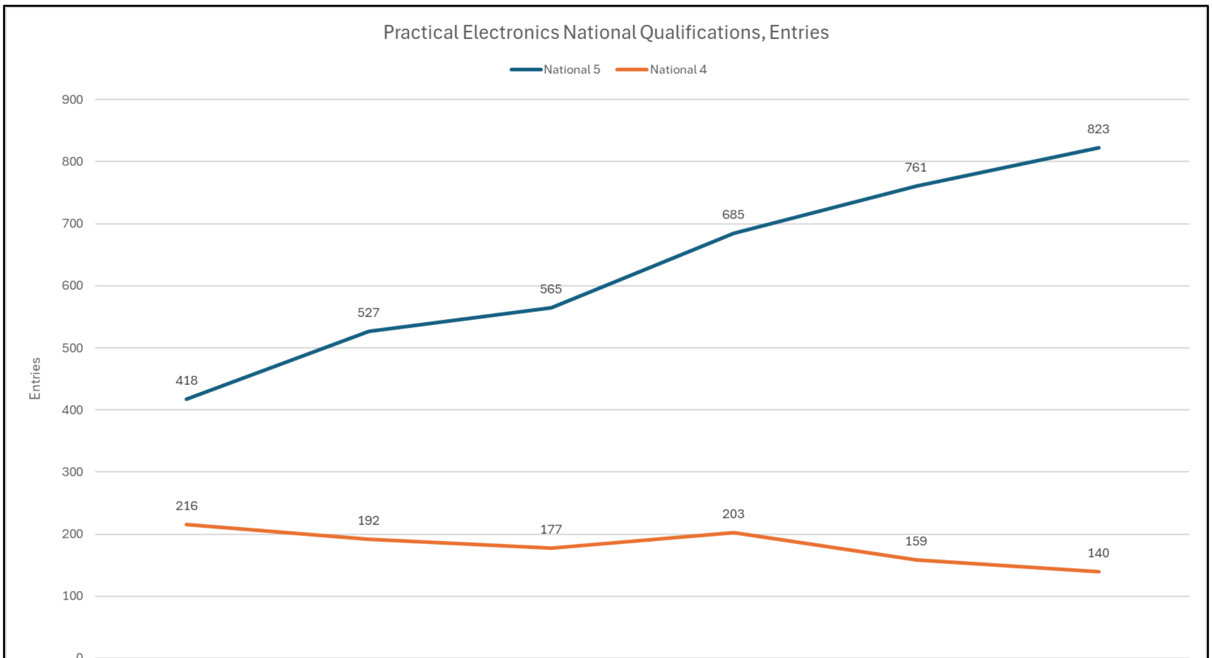
Figure 9 Graphic Communication Presentations at SCQF Levels 5-7 from 2020-2025

At Advanced Higher, centres declined sharply from 133 in 2019 to 88 in 2025 (-34%), while entries fell from 507 to 286 (-44%). Attainment in smaller cohorts remains high proportionally. Female entries dropped from 190 to 115 (-39%), males from 315 to 170 (-46%), leading to a 2025 balance of 40% female / 60% male.

At Higher, presenting centres have decreased gradually from 310 to 291 (-6%), with entries declining slightly from 3,497 to 3,339 (-4%). Attainment remains consistent. Female entries increased from 1100 to 1165 (+6%), males fell from 2,400 to 2,175 (-9%), giving a 2025 balance of 35% female / 65% male.

At National 5, centres reduced slightly from 327 to 313 (-4%), while entries decreased from 5,406 to 5,177 (-4%). Female entries rose from 1,530 to 1,785 (+17%), males dropped from 3,875 to 3,480 (-10%), giving a 2025 balance of 34% female / 66% male.

Practical Electronics



	20	21	22	23	24	25
National 5	418	527	565	685	761	823
National 4	216	192	177	203	159	140

Figure 10 Practical Electronics Presentations at SCQF Levels 4 & 5 from 2020-2025

Practical Electronics showed growth in centre provision, increasing to 54 in 2023 and remaining at that level in the subsequent years (+42%), with entries rising from 418 to 823 (+98%).

At National 4 level, both presenting centres and entries reduced.

Practical Metalworking

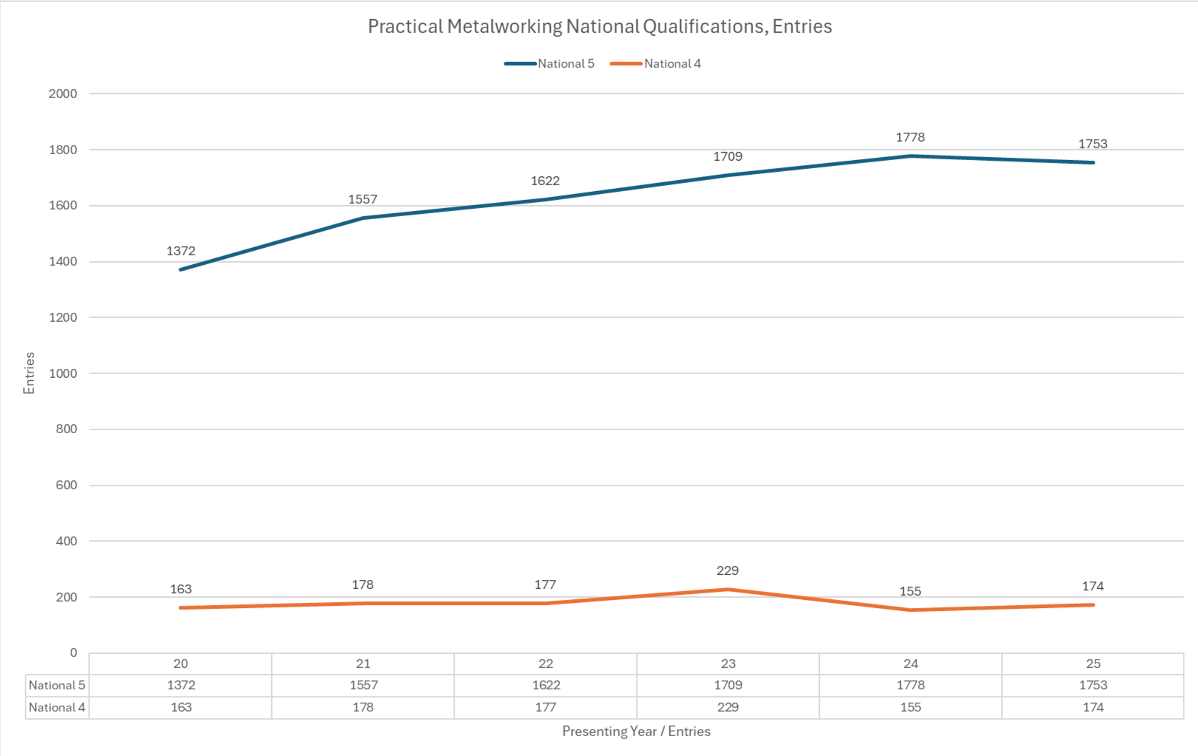


Figure 11 Practical Metalworking Presentations at SCQF Levels 4 & 5 from 2020-2025

Practical Metalworking showed growth in centre provision, increasing from 115 in 2019 to 126 in 2025 (+10%), with entries rising from 1,267 to 1,753 (+38%). Attainment remained consistently strong. Female entries rose from 80 to 140 (+75%), males from 1,190 to 1,615 (+36%), resulting in a 2025 balance of 8% female / 92% male.

Practical Woodworking

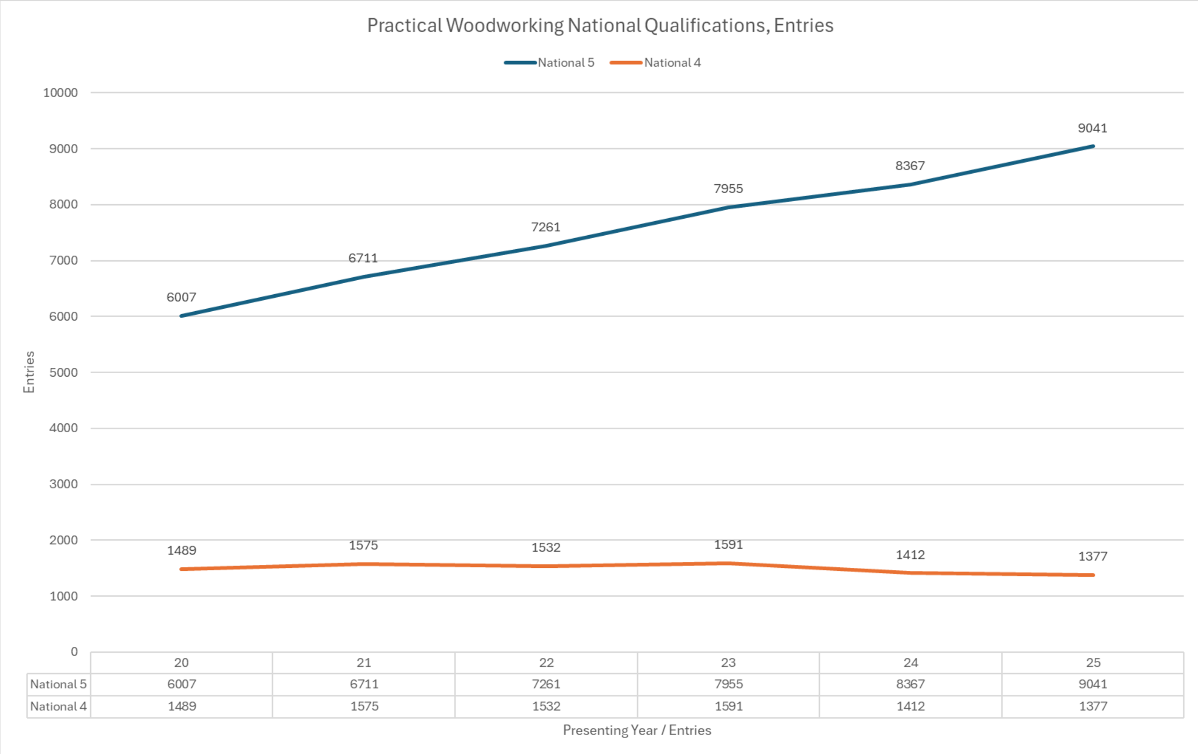


Figure 12 Practical Woodworking Presentations at SCQF Levels 4 & 5 from 2020-2025

Practical Woodworking experienced similar expansion, with centres rising from 315 to 344 (+9%) and entries increasing markedly from 5,300 to 9,041 (+71%). Attainment is high, particularly for A-C grades. Female entries increased from 690 to 1,395 (+102%), males from 4,610 to 7,645 (+66%), producing a 2025 balance of 15% female / 85% male.

2.1.2 National Progression Awards (NPAs) in Technologies

There are a large number of NPAs associated with the Technologies. This section provides a snapshot of NPA trends from a school perspective and is a not comprehensive representation of all available courses.

National Picture

The data indicates that secondary schools are the primary drivers of NPA delivery, with strong uptake in digital and business related NPAs. The most common NPAs delivered consistently across levels are Computer Games Development, Business with IT, Customer Service, and PC Passport. Newer NPAs, such as Esports and Enterprise & Employability, are growing whilst more specialist qualifications show smaller, but targeted, delivery. Over time, both the number of presenting centres and total entries have increased substantially, particularly for popular NPAs at Levels 5 and 6.

The data shows that Local Authority secondary schools are the primary providers of NPAs across Levels 4, 5, and 6, with other provider types (special schools, FE colleges, independent schools, private/public sector, and voluntary organisations) contributing much smaller numbers of entries.

High demand NPAs consistently delivered across multiple years include:

- Computer Games Development (Levels 4, 5 and 6)
- Business with IT (Levels 5 and 6)
- PC Passport (Levels 4 and 6)
- Customer Service (Levels 5 and 6)

These NPAs also show the largest number of centres delivering them.

The NPA in Furniture Making has seen rapidly increasing popularity, rising from 50 presented candidates in 2021, to 555 in 2025. Most of the presenting centres were secondary schools.

Compared with schools, the FE offer is much wider and has higher numbers, with strong growth in specialist trades like Carpentry and Joinery and steady delivery in Bricklaying, Painting and Decorating and other construction NPAs. Schools, by contrast, tend to offer fewer construction awards with smaller entry numbers, while FE colleges provide a much broader range of pathways.

Level 4 NPAs

- Business and Marketing had 4 centres in 2020 (54 entries) and 5-7 centres in subsequent years, with entries fluctuating between 59 and 129.
- Computer Games Development was the most widely delivered NPA at this level, with 68 centres in 2020 (501 entries), briefly declining to 58 centres in 2021 (572 entries) and increasing to 71 centres in 2025 (587 entries), remaining consistently the highest uptake Level 4 NPA.

- Construction Craft and Technician grew from 3 centres (38 entries) in 2021 to 7 centres (89 entries) by 2025.
- Customer Service grew steadily from 2 centres in 2020 (12 entries) to 17 centres in 2025 (221 entries).
- Cyber Security fluctuated, peaking at 30 centres in 2021 (126 entries) but declining to 17 centres in 2025 (77 entries).
- Other NPAs such as Data Science, Digital Media, Digital Passport, Enterprise and Employability, Esports, Events, Mobile Technology, and PC Passport showed variable adoption, with PC Passport particularly prominent, delivered by 27-37 secondary schools over 2020-2025 with entries rising from 250 in 2020 to 473 in 2025.

Level 5 NPAs

- Administration: IT/Audio and Office Skills had low but consistent delivery, ranging from 1-7 centres over the years, with entries varying from 6 to 96.
- Business and Marketing expanded substantially, with 6 centres in 2020 (59 entries) rising to 36 centres in 2025 (724 entries), indicating growing popularity.
- Business with Information Technology increased from 43 centres in 2020 (432 entries) to 105 centres in 2025 (1,405 entries), reflecting a strong growth trend in digital skills.
- Computer Games Development remained the most widely delivered NPA at Level 5, with centres rising from 91 in 2020 (1,036 entries) to 134 in 2025 (1,560 entries).
- Construction Skills showed growth, rising from 6 centres (68 entries) in 2021 to 22 centres (339 entries) in 2024, before a slight decline in 2025.
- Customer Service also increased rapidly, from 2 centres (30 entries) in 2020 to 33 centres (630 entries) in 2025.
- Cyber Security saw entries peak in 2021–2023 before declining slightly in 2025.
- Carpentry and Joinery, Painting and Decorating, and Bricklaying remained small-scale

NPAs such as Digital Media, Digital Media Animation/Editing, Digital Passport, Enterprise and Employability, Esports, Jewellery, PC Passport, and Web Design demonstrated moderate growth, with some fluctuations, particularly for niche skills like Jewellery which increased to 197 entries by 2025.

Level 6 NPAs

- Accountancy had low uptake, delivered by 2 centres in 2020 (14 entries) and increasing to 11 centres in 2023 (87 entries), with some fluctuation afterward.
- Business Skills shows growth at Level 6 in secondary schools, from 9 centres (77 entries) in 2020 to 25 centres (318 entries) in 2025.
- Business with Information Technology increased from 49 centres (472 entries) in 2020 to 107 centres (1,388 entries) in 2025, highlighting growing demand for higher-level digital skills.
- Computer Games Development rose from 61 centres (415 entries) in 2020 to 92 centres (839 entries) in 2025, maintaining high participation.

- Customer Service grew from 2 centres (115 entries) in 2020 to 19 centres (637 entries) in 2025.
- Cyber Security fluctuated, peaking at 49 centres (436 entries) in 2022 and declining slightly to 38 centres (402 entries) in 2025.

Other Level 6 NPAs, including Data Science, Digital Media, Digital Media Production, Digital Passport, Enterprise and Business/Employability, Esports, Events, Financial Services, Jewellery Advanced Techniques, PC Passport, and Software Development, showed smaller but increasing entries and variable numbers of delivering centres over time. For example, Software Development increased from 8 centres (33 entries) in 2020 to 14 centres (102 entries) in 2025.

2.2 SQA Course Reports

SQA Course Reports, publicly available for exam diets 2022-2025, give an overview of candidate performance in the respective components of NQs. The course reports give insight to how candidates perform in each qualification, showing both areas of strength and areas of challenge. A summary of key themes for each subject and level, extracted from the SQA Course Reports is outlined below.

2.2.1 Accounting, Administration & IT, Business and Economics

Across the Business subject group, a recurring pattern emerges: candidates generally demonstrate strong practical, procedural, and numerical skills, while written explanation, depth of theory, and evaluative commentary present more consistent challenges. This tension between operational competence and extended-response performance mirrors trends seen across the Technologies as a whole.

In Accounting, candidates perform well in structured, technical tasks such as preparing accounts, completing cash budgets, or constructing financial statements. However, across all levels, theory questions remain a key area of weakness, with responses often lacking detail or, in some cases, omitted entirely. Issues such as working backwards at National 5 and adding values to calculations at Higher highlight gaps not in procedural knowledge but in applying underpinning principles. Spreadsheet-based work is a further area where practical ability is evident, yet marks are frequently lost due to a lack of cell referencing or missing formulae, highlighting a disconnect between digital competence and assessment expectations.

Within Administration and IT, the practical IT tasks continue to be a strength, particularly in word-processing, presentations, spreadsheets, and charting. Yet candidates often underperform in tasks requiring precision, such as correct keyboarding, database functions, or producing complete sets of documentation. Theory is attempted more confidently at National 5 and Higher, but extended answers requiring comparison, explanation, or depth remain challenging. Tasks that mirror workplace communication, such as emails, letters, and meeting documentation, are particularly problematic, suggesting a need for more explicit teaching around professional conventions and digital literacy.

For Business Management, the reports identify a clear divide between understanding broad concepts and providing detailed, justified responses. The command word "Explain" is consistently difficult, with many candidates offering descriptive rather than explanatory answers. Higher-order skills, justification, discussion of costs and benefits, and drawing evaluative conclusions, remain challenging across levels. While candidates gather information effectively for assignments, forming overall judgements or recommendations from evidence is less secure, indicating underdeveloped analytical reasoning.

In Economics, performance in key topic areas is strong, with many candidates demonstrating secure knowledge of current economic issues and applying diagrams effectively, especially at Advanced Higher. However, as in other subjects, analysis, evaluation, and conclusion-writing are recurring areas of weakness. Accurate diagram construction and up-to-date terminology remain essential skills that some candidates struggle to apply consistently. Success improves notably for those who engage with real-world economic events, underscoring the importance of contextual understanding.

Taken together, the Business and Administration qualifications highlight strong operational capability, producing accounts, using IT tools, gathering data, but less consistent performance in theoretical explanation, evaluative writing, and applying concepts to unfamiliar contexts. Strengthening assessment literacy, especially around command words, depth of response, and structured evaluation, would enable candidates to fully demonstrate their knowledge and improve alignment between practical skill and written assessment performance.

2.2.2 Computing Science

Across all levels of Computing Science, a clear pattern emerges: learners demonstrate strong practical programming skills but struggle with the analytical and written elements of the assessments. Coding and implementation are consistently areas of strength, indicating solid conceptual understanding and procedural competence. However, this is not translating into the extended written responses required in the question papers or evaluation sections of assignments.

Difficulties with describe, explain, and evaluate questions recur at National 5, Higher, and Advanced Higher. Candidates often fail to use appropriate technical terminology, may provide generic answers that do not relate to the question or provide the depth required for higher-tariff marks. This suggests that candidates find the application of computing knowledge a challenge.

There are improvements seen year-on-year in design and algorithm questions in the exam paper, and more candidates are attempting these questions. More candidates are demonstrating the ability to adapt standard algorithms to the given problem. Evaluation can be a weakness with some candidates as it is a higher-order skill and often accessible to A grade candidates. Many learners do not refer to their own code when evaluating solutions, limiting their ability to comment meaningfully on efficiency, accuracy, or suitability.

While implementation is strong, testing and verification receive significantly less attention, especially at Higher. This indicates a tendency to focus on producing working code rather than demonstrating a full development cycle, mirroring wider patterns across the Technologies.

At Advanced Higher, candidates show variability in their readiness for the increased complexity of algorithms and independent project work. Weaknesses in fundamental algorithms and difficulties in selecting relevant evidence suggest that organisational and evaluative skills become even more critical at this level.

Overall, Computing candidates show capability and confidence in practical tasks, but their performance is limited by challenges in written communication, evaluation, and application of technical language. Strengthening these areas would help ensure that learners’ strong practical understanding is fully reflected in formal assessment contexts.

2.2.3 Craft, Design, Engineering and Graphics

The breadth of qualifications offered in the CDEG subject area of the Technologies illustrates the diversity of skills and knowledge encompassed within this curricular domain. Yet, despite their differing emphases, the course reports reveal clear areas of cross-cutting knowledge and shared challenges.

Themes such as adherence to British Standards, graphical conventions, and accuracy in representation emerge consistently across qualifications and levels. Ironically, these very foundations of technical communication core to all of the CDEG subjects, are also among the most frequently cited areas of underperformance. This suggests an ongoing issue not of content omission, but of transfer: students appear to learn graphical and representational conventions in isolated contexts without consistently applying them under assessment conditions.

A recurring message in the reports concerns exam technique rather than conceptual weakness. Candidates' tendency to provide insufficiently detailed answers, or to disregard the specific command words of a question ("describe", "explain", "justify"), indicates that performance is often constrained by literacy and question interpretation skills, rather than by a lack of subject knowledge. In response to feedback from teachers and lecturers gathered through research conducted in 2024, SQA removed the question paper element from the Practical Woodworking and Practical Metalworking qualifications can therefore be seen as a recognition that traditional high-stakes written examinations were not authentic measures of learning in these practically focused domains. Knowledge in these qualifications is assessed instead through a log-book and newly introduced case study which have been designed to allow candidates to showcase their understanding through more contextual settings.

In subjects retaining written components, similar issues persist in quantitative tasks. For example, in Engineering Science, candidates frequently lose marks for rounding intermediate values, an error of process rather than understanding. This pattern reflects assessment pressures where procedural fluency is tested under time constraint, and suggests a need to integrate assessment literacy, explicit teaching of how to approach technical questions, into classroom practice.

The breadth of content and knowledge required even within a single qualification is a continuation of what the OECD (2021b) identified in S1-S3 as a "mile-wide, inch-deep" (p. 56) curriculum. Advanced Higher Graphic Communication for instance covers multiple and diverse graphical disciplines including CAD modelling, 3D rendering, graphical standards, illustration and presentation techniques, and print and digital media, all within a single course structure. This broad range may limit student's opportunity for mastery or depth in any one aspect.

These reports reinforce that while the Technologies qualifications cultivate high levels of engagement and practical skill, there remains a need for deeper integration between technical knowledge, design thinking, and assessment literacy and provide considerations

2.3 Wider Qualifications

2.3.1 Creative Thinking

Daydream Believers is a not-for-profit educational organisation whose work focuses on developing creativity, critical thinking and problem-solving within curricular and interdisciplinary learning contexts. Daydream Believers offers the Creative Thinking qualification at SCQF Levels 5 and 6, carrying 24 SCQF credit points, with the Level 6 award also attracting 36 UCAS tariff points. They offer regular professional learning for teachers including a 30-hour professional learning course in collaboration with the Glasgow School of Art.

Reported outcomes (Daydream Believers, 2025) include increased learner engagement and wellbeing. All projects have a future thinking, "fail and fix" approach which aims to support the development of learner resilience and transferrable skills relevant to contemporary and emerging contexts. Table 1 1 (p.27, below) illustrates the growth in presentation numbers, with Level 5 almost doubling in one year (91%).

Table 1 1 Level 5 and 6 Creative Thinking presentations from 2023

	2023 - 2024	2024 - 2025
Level 5	247	471
Level 6	277	346
Total	524	817

Daydream Believers in numbers:

- 95 schools
- 27 local authorities
- 200+ teachers (feedback from Teachers)
- 6000+ learners (3280+ aged 5-15 engaged in BGE resources)
- 96% of teachers report an increase in their engagement and
- enthusiasm for learning and teaching

In 2026 Daydream Believers plan to launch the *Creative Innovation* qualification which is designed to enhance creativity, problem-solving, and critical thinking skills through project-based learning in a business context and is available at SCQF Levels 5 and 6.

2.3.2 Enterprise Awards

Young Enterprise

Young Enterprise is a charity that helps young people build confidence, manage money, discover entrepreneurship and shape their own future. This organisation absorbed the work previously undertaken by Young Enterprise Scotland. S5 & S6 students in Scotland can experience setting up an enterprise and can work towards a qualification at SCQF Level 6, up to 30 credit points. Young Enterprise also runs a *Circular Economy* challenge for young people who are tasked with creating a circular product or service and pitching it to a judging panel.

START for schools

The *START* programme run by the High School of Glasgow and is designed for S6 pupils across Scotland. It is an interdisciplinary programme where young people experience participating in a startup incubator. Young people are taught about the principles of design thinking and entrepreneurship and put them into practice as they develop and then pitch their enterprise ideas. Successful participants will achieve an award at SCQF Level 6 through the City of Glasgow College.

Social Enterprise Academy

Social Enterprise Academy runs a programme in Scotland (and internationally) to support young people in setting up social enterprises within their schools and develop business plans to help pitch for funding. The Social Enterprise Schools programme offers learners workshops and a digital learning platform for resources with teachers offered CPD and one-to-one support from a mentor.

2.3.3 Design, Engineering, Construct (DEC)

The DEC Learning Programme focuses on sustainable building design in a digital context. DEC comprises three levels, each with recognised qualifications – Foundation Level 1 (SCQF Level 5), Intermediate Level 2 (SCQF Level 6) and Advanced Level 3 (SCQF Level 7). The projects focus on the built environment, sustainability and digital skills where learners respond to real-world design briefs, develop practical, technical and creative skills used in architecture, engineering and construction careers.

Assessment is mainly through coursework portfolios, supported by examinations at higher stages, ensuring learners demonstrate both applied knowledge and practical competence.

Table 2 2 DEC Level 1 and 2 presentations in Scotland

Academic Year	Level 1	Level 2
20-21	155	22
21-22	45	11
22-23	90	38
23-24	86	38
24-25	144	53
	520	162

2.3.4 CyberFirst

A key ambition of the Scottish Government in the Strategy for a Cyber Resilient Scotland is to increase the number of CyberFirst Schools in Scotland. CyberFirst is a UK Government backed programme and works with the National Cyber Security Centre (NCSC) which is part of General Communications Headquarters (GCHQ). The programme creates opportunities for young people to learn about cyber security and cyber resilience. CyberFirst will become TechFirst in 2026 which will reflect advances in AI and better prepare young people for working in the tech ecosystem.

Schools that are registered as CyberFirst schools have free access to a range of resources. CyberFirst currently operates in more than half of local authorities in Scotland and has 10 associate teachers who support CyberFirst schools and deliver professional learning. North Ayrshire employs a full time Community Learning and Development (CLD) officer who works with hard-to-reach young people and supports them onto the Access Granted cyber pathway. West College Scotland offer a cyber pathway for young people in the senior phase of school that allows them to move on to the HNC Cyber Security at college.

CyberFirst offers a range of qualifications for young people including the Cyber Defenders and Advanced that carry SCQF points at level 4 and level 6 respectively. This work supports the learning in the NPA in Cyber Security which is offered at L4 –

6. Learners can also access the Cyber Explorers platform where they can get SCQF points at Level 4 or 5 for completing the Cyber Squad or Cyber Champions certificates.

In 2025 65 schools in Scotland registered for the CyberFirst Girls Competition. This competition aims to inspire girls interested in technology to pursue a career in cyber security.

2.4 Labour Market Information

Skills Development Scotland (SDS) provide labour market information in partnership with other stakeholders, and using key evidence, they prepare forecasts about future labour market patterns and future demand for skills from employers.

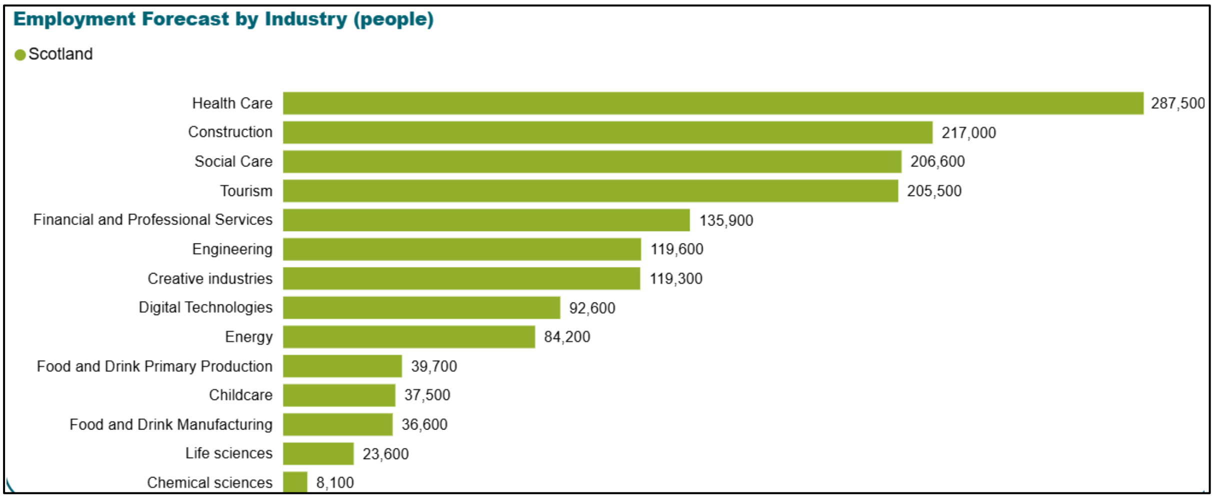


Figure 13 13 2034 Scotland Employment Forecast by Industry (Skills Development Scotland, 2025)

Figure 13 (p.31, above) illustrates the projected demand for jobs in Scotland in 2034. All of these industries will require employees to have some level of knowledge and proficiency with technologies. Several of these industries will require a high level of knowledge and proficiency in technologies, notably Construction and Engineering (craft, design and engineering skills), Digital Technologies (computing science skills) and Finance and Professional Services (business, admin and accounting skills).

Each year, SDS carry out Sectoral Skills Assessments (SSAs) that looks at the current and future skills demands in key sectors. They have a strong evidence base and are used to inform future investment.

The Digital Technologies (Skills Development Assessment, 2024a) sector comprises tech startups, financial technology (fintech), manufacturing of digital components, computer games publishing, telecommunications, computer programming, data processing, and web services. In 2023 Scotland produced more than 1,500 tech startups and the Scottish tech sector is predicted to grow rapidly in the next 5 years. In 2024, Gross Value Added (GVA) in the Digital Technologies sector was estimated to be £6,867m, contributing 4.7% of Scotland's total economic output, forecasting to grow on average 2.6% each year between 2024 and 2034, which is above Scotland's average. In 2034, the Digital Technologies sector is forecast to account for 5.3% of Scotland's total economic output. Within the Digital Technologies sector, fintech is ranked as the strongest Scottish tech sub-sector. There are large financial institutions in Scotland who recognise Scotland's strengths and availability of digital skills. SDS cite JP MorganChase's new Global Technology Centre in Glasgow as an example of the investment being made in Scotland's future. This inward investment from Digital Technologies businesses into Scotland will lead to a projected growth in the workforce to 91,000 by 2027 and 92,600 by 2034, representing future job opportunities for young people in Scotland with strong digital and computing skills.

The Financial and Professional Services sector includes banking, insurance, asset management, accountancy, management consultancy and legal services (Skills Development Scotland, 2024b). In 2024, GVA in the Financial and Professional Services sector was estimated to be £13,464m, generating 9.2% of Scotland's total economic output. GVA in the Financial and Professional Services sector is forecast to grow on average 1.3% each year between 2024 and 2034. In 2024 the workforce size was 128,800 and is predicted to grow to 132,200 by 2027, and a further 2.7% growth to 135,900 by 2034. Within the finance sector, the investment sector in Scotland accounts for 12,200 jobs. This is a growing sector and is a significant contributor to Scotland's economic growth and represents future opportunity for young people with accounting, finance and business skills.

The vision of *Making Scotland's Future* (Scottish Government, 2025c) is to support Scottish manufacturing companies harness the power of technology and innovation to drive growth. Manufacturing is a vital part of Scotland's economy and accounts for over half of Scotland's international exports. Manufacturing contributed £18.1 billion in GVA to Scotland's economy in 2023 and employs 178,000 people. The Scottish Government has invested considerably to support Scottish manufacturers in becoming innovative and technically advanced. Increasing the competitiveness of manufacturing businesses in Scotland creates employment opportunities across the country for people with creativity, innovation and technical skills. As part of the recovery action Scottish Government will support manufacturers in recruiting and retaining apprentices to ensure a future skills pipeline.

2.4.1 Changing demand for skills

The SDS places a great deal of emphasis on skills (Skills Development Scotland, 2018), as the labour market changes, the types of skills people need will also likely change. There is a growing focus on 'meta-skills', i.e. skills that create adaptive learners and thinkers such as communication, collaboration, creativity and critical thinking.

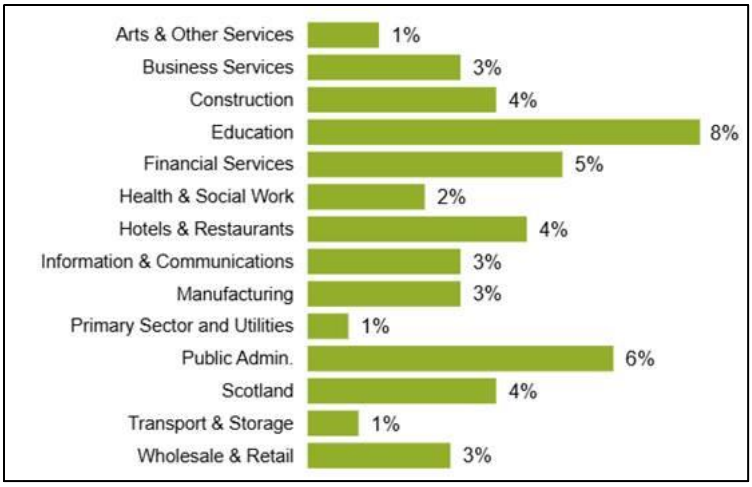


Figure 14 Skills gap across Scotland by sector (Skills Development Scotland, 2025)

Skills mismatches occur when there is gap between demand and supply of skills within the labour market (Skills Development Scotland, 2025). Skills gaps are when employees do not have the skills to do the job and skills shortages are when employers struggle to find employees with the right skills. Figure 14 (p.32, above) shows the skills gaps reported by businesses (as at October 2025). There are skills gaps in a number of technology areas including business and financial services, information & communications, public administration, manufacturing, and wholesale & retail.

ScotlandIS represents Scotland's Digital Technologies industries. According to the *Scottish Technology Industry Survey* (ScotlandIS, 2024) there is a critical shortage of people with software and IT skills in Scotland. Artificial Intelligence/machine learning, data analytics, and cybersecurity are the top three areas for new opportunities for sales growth and employers will be seeking skills in these areas. The most in demand skillset is sales and marketing, with 80% of businesses seeking these skills to help them grow. While software and web development skills remain crucial. ScotlandIS is working with partners to support uptake of Computing Science and technologies in schools.

In some STEM sectors, developments can move so fast that spending any time out of the workforce can mean that skills and knowledge quickly become outdated and so the employee loses their 'currency'. Time out of the labour market can be detrimental to the career progression of women, or others who have taken time out of the labour market for caring responsibilities. They can miss out on promotions, training and career development opportunities.

Cultural factors that relate to workplace attitudes within STEM also result in low levels of women in senior positions and, as found by a study Tapping All Our Talents (The Royal Society of Edinburgh, 2012). Though there is limited data evidence on the scale of women dropping out from STEM education and careers, the report demonstrated that 73% of women graduates are lost from STEM industry, compared with 48% male graduates. Additionally, anecdotal evidence suggests that the drop-out rate for female students on MA frameworks is three times as high as for males (1 in 8 versus 1 in 25) (Ekosgen, 2017). Women either leave STEM sector early on in their careers or stay but are under-represented in top positions. Whilst some pursue STEM-related careers in other sectors, e.g. teaching or government, there is a loss of opportunity to individuals, economy and society. It is estimated that doubling women's high-level skill contribution to economy could be worth £170m per annum to Scotland's national income (The Royal Society of Edinburgh, 2012).

3 International Reports And Comparative Studies

3.1 International reports

International reports provide valuable insights into global trends shaping Technologies curricula, offering a broader context for Scotland's ongoing curriculum development. Comparative studies from organisations such as the OECD, UNESCO, and the European Commission highlight the increasing importance of integrating digital competence with practical, creative, and entrepreneurial skills. International evidence emphasises the need for learners to develop adaptability, problem-solving abilities, and creative thinking to thrive in future economies. These perspectives underline that a Technologies curriculum is not only about preparing young people for employment, but also about fostering innovation, design mastery, and the transferable skills required for lifelong learning and active citizenship in a rapidly evolving world. Whilst the majority of reports found reference "Technology" or "Technologies", they primarily focus on the instrumentation of delivery i.e. hardware and software, rather than a curricular area. The latter are presented here.

It is worth noting at this point, the collection of subjects in the Scottish Technologies curriculum area is unique, so international reports will not cover all disciplines or may include others, such as Food and Textiles.

3.1.1 England

The recently published review of the English Curriculum, *Curriculum and Assessment Review: Building a World-Class Curriculum for All* (Department for Education, 2025), seeks to raise ambition, coherence and inclusion across all stages of learning in England. Whilst *Curriculum for Excellence* operates under a different structure and governance, this report offers fresh perspectives on themes such as ensuring a broad and balanced curriculum for every learner, strengthening links between curriculum, assessment and teacher professional development, and embedding equity and progression as core design principles. Brief summaries of areas pertinent to the Technologies curriculum in England are collated below and offer insight into patterns in the individual subject areas that could also be reflected in the Scottish curriculum.

Computing

The review argues that Computing education is vital to preparing young people for a technology-driven world, yet their evidence shows a steady decline in teaching time and qualification uptake between 2011/12 and 2024/25. GCSE Computer Science entries have stagnated at around 12–13%, with particularly low participation among girls. Despite requirements for all students to study Computing to the end of Key Stage 4, provision remains inconsistent, often limited to those taking GCSE Computer Science. Stakeholders highlighted a lack of clarity in the curriculum, especially at Key Stage 4, and call for greater specificity, inclusion of artificial intelligence (AI), and integration of digital literacy across subjects. The Review recommends updating the Computing curriculum to provide clearer expectations, ensure coherence across key stages, and reflect emerging technologies. It further proposes replacing the current GCSE Computer Science with a broader GCSE in Computing that balances computer science with applied digital skills, encouraging wider engagement and addressing digital skills shortages. However, challenges such as limited teacher supply and uneven access to technology continue to constrain delivery, underscoring the need for sustained investment alongside curriculum reform.

Design and Technology

Evidence from the Review indicates that Design and Technology (D&T) in schools has been in long-term decline, with GCSE entries falling sharply since 2005 and over a third of state-funded mainstream schools having no entries in 2024/25. This lack of provision is particularly severe in schools with higher levels of disadvantage, where 60% offered no D&T GCSE. Factors contributing to this decline include the subject's removal from accountability measures, shortage of specialist teachers, high delivery costs, and inconsistent provision across school types. Despite these challenges, primary D&T is generally functioning well, though progression into Key Stage 3 remains weak. Stakeholders have called for an updated curriculum that better reflects modern design practice, embedding sustainability, social responsibility, and inclusive design, while strengthening students' understanding of materials, problem-solving, and iterative design. The Review recommends refreshing D&T's aims and content to make it more engaging, relevant, and aligned with pathways into creative, technical, and engineering careers.

Sustainability

Design and Technology currently lacks a clear focus on sustainability, despite its natural connection to material choice, resource efficiency, and renewable supply chains. Teachers report that limited emphasis on climate education within the national curriculum hinders the development of meaningful learning around sustainability. Yet, as green technologies expand and reshape the economy, equipping young people with the knowledge and skills to contribute to sustainable industries is increasingly vital. Students themselves have expressed a strong desire for more climate-related learning and opportunities to engage with real-world environmental challenges. The Review therefore recommends strengthening sustainability and climate education across subjects, particularly in Science, Geography, and D&T, by refreshing curriculum content and sequencing, and by supporting teachers to embed climate-conscious approaches through effective pedagogy.

Financial Education

Financial education is essential for preparing young people to manage money effectively and make informed financial decisions throughout life. It encompasses core concepts such as budgeting, debt, interest, and pensions, and helps students apply mathematical knowledge to real-world contexts. Despite its inclusion in the secondary Citizenship and Maths curricula since 2014, evidence shows that financial education is inconsistently delivered, with only a third of students recalling useful lessons about money. As financial habits form early and children increasingly engage in digital transactions, early and consistent financial education is critical. The Review recommends strengthening this provision by embedding financial education more fully within Citizenship, where practical money management can be taught, while ensuring coherent sequencing with Maths to introduce relevant concepts beforehand. It also calls for Citizenship, including financial education, to become part of the national curriculum from Key Stage 1, supported by high-quality teaching resources and stronger delivery at 16–19 through collaboration with employers and non-qualification activities.

Digital Literacy

Digital Literacy refers to the knowledge, skills, and confidence needed to use technology safely, creatively, and effectively, while understanding its risks, impacts, and ethical implications. It enables young people to thrive in a digital society and workplace, yet evidence suggests current provision is inconsistent and insufficient. Although Computing is the main vehicle for teaching digital literacy, its curriculum, particularly at Key Stage 4, lacks clarity and breadth, leading to uneven delivery. Stakeholders report that many students are leaving school without the digital competence needed for modern life or employment, contributing to national skills shortages. The Review recommends strengthening Computing as the foundation for digital literacy by providing clearer expectations at each key stage and broadening the GCSE to cover the full spectrum of computing knowledge, including artificial intelligence. Other subjects, such as Design and Technology, Geography, RSHE, and Citizenship, should reinforce these skills through practical applications, online safety, and critical evaluation of digital content.

3.1.2 Technologies and the UNCRC

Digital Technologies

EdTech is a growing market, and this growth is expected to accelerate as more students and teachers use GenAi as a part of learning. There is limited evidence on the impact of GenAI on learners especially within education settings (Atabey, Sylwander, & Livingstone, 2025).
Concerns have been raised regarding the risk to children's rights and wellbeing, particularly for vulnerable children. Some of the most popular AI applications that are marketed as educational tools are in danger of violating children's rights to information (Article 17), education (Articles 28, 29), health (Article 24), privacy (Article 16), and non-discrimination (Article 2). Concerns have been expressed surrounding safeguarding and the processing of children's data by teachers and school staff, as well as young people themselves. A 2024 survey by the Association of Directors of Education in Scotland (ADES) found the vast majority of young people and teachers believe AI has a place in the Scottish education system (Staff College, 2024). Students identified the potential of AI in learning for example through creating personalised learning experiences and supporting inclusion. Young people also expressed concerns surrounding data privacy, and possible accusations of academic misconduct.

GenAI risks deepening inequalities and exploiting children without appropriate safeguards in place including child rights and data protection risks and impact assessments. In 2021 the UN Committee on the Rights of the Child outlined the obligations and responsibilities of states for protecting children's rights in the digital environment. States should have an evidence-based approach to the regulation of EdTech and AI in education and standards for digital educational technologies should ensure technology is ethical and appropriate for education and does not expose children to content that would violate their right to be protected from violence, discrimination and exploitation.

Business

In 2013 the Committee on the Rights of the Child outlined the obligations regarding the impact of the business sector on children's rights as laid out in the UNCRC. States must protect children from any business activity that may impact on their rights; notably, non-discrimination (Article 2), all business-related laws and policies must be in the best interests of the child (Article 3) and business activities must not harm children's health or development (Article 6). States are obliged to create environments that promote children's rights through legislation, policy, and education.

4 Scotland's Evidence

4.1 HMIE Evidence And Reports

Primary school inspection reports show that references to the Technologies curriculum area are most commonly framed around the use of digital technology to support learning and teaching. Inspectors frequently highlight schools' effective use of devices, applications, online platforms and digital tools to enhance engagement and develop children's digital literacy. This suggests that in the primary context, inspection evidence tends to conflate Technologies with digital learning.

Primary reports also frequently contain broad references to STEM "…. a few children show a keen interest in technology and tools as they investigate their new STEM (science, technology, engineering, and maths) area" (HMIE Report, May 2023, p.9) and reports often highlight the engaging, interdisciplinary context the Technologies can provide with opportunities for external recognition such as the British Science Association's CREST Awards scheme and the Scottish Engineering Leaders Award (HMIE Report, March 2023).

In a minority of HMIE Secondary inspection reports, specific Technologies subjects are explicitly named. For example, in one school (HMIE Report, February 2023), Design and Manufacture was listed among curriculum offerings in addition to sciences and Music Technology. At another school, (HMIE Report, January 2019) inspectors commented that attainment was "significantly higher than the national figures" in Computing Science and Graphic Communication.

4.2 Care Inspectorate

Care Inspectorate reports have not been included at this stage due to the ongoing development of a new joint inspection programme. This plan introduces a refreshed approach to multi-agency scrutiny and improvement support, which is still in progress. Once the updated framework and findings are fully implemented and published, they will provide a more comprehensive basis for inclusion in future curriculum evidence papers.

4.3 Education Scotland Reports And Evidence

4.3.1 Building Society: young people's experiences and outcomes in the Technologies

Building Society examines how the Technologies curriculum areas supports learning and development for children and young people in Scotland. It outlines the scope of the Technologies area and considers strengths in learning across early learning and childcare, primary, special and secondary education, as well as within individual subject areas. The report also identifies areas where the practice does not realise the full potential of the Technologies.

The findings are based on a broad range of evidence, including exploratory visits to over 40 schools and early learning settings, Education Scotland fieldwork, research literature, international practice, and attainment data. The report highlighted that the technologies 'brand' is not always clear. Schools and early learning and childcare settings have access to extensive material resources for the technologies. Arguably, the report argues that issue facing practitioners is not a lack of high-quality resources, but the challenge of finding, and at times funding, the resource which best meets the needs of their young people. Another issue highlighted was the financial cost of some technologies learning materials, for example for software, craft or food technologies and contends that these costs must be justified in terms of the educational return on the investment they represent.

Early Learning and Childcare

Across the early learning and childcare (ELC) sector, all children benefit from experiences involving technologies. Children are given opportunities to explore structures and mechanisms, and to use computers in ways that support their developing literacy and numeracy. In some ELC settings, children experience high-quality technologies learning through play, such as investigating materials for engineering or construction, or engaging creatively with digital tools like cameras and microscopes.

Children demonstrate strong creative capabilities in technologies, using them to express ideas and solve problems, for example, deciding how many squares to programme a robotic vehicle to move forward, or choosing the right brick to form a corner in a playhouse. Creativity is a natural attribute in children from the earliest years, and emerges as a defining feature of learning in the technologies.

These experiences highlight the impact of responsive, creative programmes delivered by staff who have built confidence and expertise in the technologies. The report found that, across ELC settings, a range of factors influence practitioners' self-efficacy in providing high-quality technologies experiences.

Primary

The report states that all primary-aged children have some exposure to Technologies, particularly through developing digital skills such as researching, organising, processing, and presenting information. However, the breadth and depth of these experiences are often limited, and provision can be patchy when relying solely on interdisciplinary approaches. Schools that prioritise Technologies through purposeful leadership, self-evaluation, and staff engagement demonstrate higher-quality provision, fostering motivation, creativity, and broader outcomes such as numeracy and enterprise.

Concerningly, the report found that significant saps remain in specific areas, including Computing Science, Business Education and Engineering Science, often due to staffing constraints, lack of specialist expertise, or omissions in curriculum planning at school or departmental level.

Secondary

The report looked in depth at each of the subject areas at the secondary school level however broad findings for the sector highlighted that partnerships with colleges, local community providers, and other schools can help supplement technologies experiences, particularly in specialised areas. Again, access to high-quality learning remains dependent on staff expertise, resource availability, and deliberate curriculum planning. Where these elements are well managed, students can engage fully with both practical and digital technologies, developing the skills and understanding required to meet their full entitlement.

Business Education

Business Education programmes often intersect with ICT provision, particularly within rotational structures in the early secondary years (S1–S3). This integrated approach enables learners to understand how digital technologies underpin and drive modern business practices. As pupils progress through the broad general education and into the senior phase, they engage with increasingly complex concepts that link technological applications to real-world commercial contexts. Motivation and engagement are heightened when learning activities draw on authentic business examples and incorporate both individual and collaborative tasks, mirroring teamwork in professional environments. The digital dimension is central to this area of learning, not only as a source of information but as the primary medium through which contemporary businesses function. When high-quality digital learning is effectively embedded, it significantly enhances learners' appreciation of the relevance and dynamism of business education in a technology-driven economy.

Computing Science

In some secondary schools, Computing Science programmes are exemplary, strengthened by partnerships with local universities and businesses. These schools effectively distinguish between ICT, which permeates the wider curriculum, and Computing Science, which focuses on the technical and specialist aspects of computing, including information systems. However, such positive practice is not consistent across all schools. In many cases, Computing Science has declined in popularity, often perceived as a functional and uncreative subject, leading some schools to remove it from the curriculum entirely. This represents a significant loss, as computing science provides essential learning experiences that should be universally accessible.

Craft, Design, Engineering and Graphics

The report found that most young people experience a broad range of learning across Craft, Design, Engineering, and Graphics within the Broad General Education phase (S1–S3). Whilst engagement and motivation are generally high, there remains an imbalance, with many programmes placing greater emphasis on craft and graphics than on design and engineering. Learners thrive when they see the relevance of their work to real-world contexts, such as sustainable development, construction, or energy systems. The senior phase offers diverse pathways, including Skills for Work courses and qualifications up to Advanced Higher, which connect strongly with career aspirations. High-quality teaching, partnerships with industry and universities, and project-based learning, such as building computers or designing submersibles, enhance students' skills and enthusiasm. Nonetheless, challenges persist in encouraging greater participation in engineering, despite recent curriculum revisions designed to revitalise the subject.

4.3.2 Craft, Design, Engineering and Graphics in Local Authority Secondary Schools

Craft, Design, Engineering and Graphics in Local Authority Secondary Schools (Education Scotland, 2022) provides a detailed national analysis of the provision, participation, and attainment in craft, design, engineering and graphics (CDEG) subjects across Scottish secondary schools. Drawing on data from 254 of 356 schools, the study found that while all responding institutions employed specialist CDEG teachers, there was significant variation in the range and depth of curricular offerings. Within the Broad General Education phase (S1–S2), most schools provided courses in craft and design, and graphics, yet engineering remained comparatively underrepresented. In the senior phase, patterns of subject uptake revealed divergent trends: entries for Design and Manufacture and Graphic Communication declined between 2018 and 2022, whereas enrolments in Engineering Science and the practical craft subjects of metalworking and woodworking increased.

The analysis also identified persistent gender imbalances, with male students continuing to dominate participation in most CDEG disciplines and attainment outcomes revealing notable disparities between genders. Attainment overall showed modest improvement across several subjects, though Graphic Communication remained an area of concern due to stagnating performance. The report concludes by emphasising the need to enhance equity, strengthen progression pathways, and improve staffing and curriculum coherence in these subjects. It positions CDEG as a vital component of Scotland's technological and creative education landscape, while calling for sustained policy and pedagogical attention to ensure their continued relevance and accessibility within a modern curriculum.

4.3.3 Computing Science in Local Authority Secondary Schools

The report Computing Science in Local Authority Secondary Schools (Education Scotland, 2022) provides an overview of Computing Science delivery in Scottish local authority secondary schools, based on survey data, SQA statistics, and FOI teacher data. Drawing on data from 309 out of 356 local authority schools, the survey found that in 93 schools, Computing is a single person department or there is only 1 FTE Computing teacher. 48 schools have no Computing Science teacher at all, limiting the provision of a Computing Science curriculum to learners. 90% of schools offer Computing Science in S1/2, which is often integrated with a digital skills or business course. Within the senior phase, 82.7% of schools offer National 4 Computing Science, 85.7% National 5, 83.1% Higher and 38.3% Advanced Higher. Many schools offer Computing Science to learners through college partnership or local authority consortium arrangement.

There was a decline in total presentations of Computing Science between 2010 and 2022, mainly at SCQF Levels 3 & 4, although uptake of Computing based NPAs (Cyber Security, Game Design, Data Science) is growing. This trend could reflect the shift from application-based content, such as that in the now discontinued Information Systems course, to the coding and software development content of the National Qualification courses.

- The socio-economic gap in attainment persists and learners from more affluent backgrounds are more likely to study Computing Science. There is a significant attainment gap at Higher/AH.
- The report recommends that groups such as single person departments, newly qualified teachers and schools that are not delivering Computing Science in the BGE be identified and offered support. The report also recommends further research is carried out to investigate the causes of, and possible solutions to, the poverty-related attainment gap and gender gap in Computing Science.

4.4 Curriculum Improvement Cycle Pilot Reviews

As part of the pilot projects for the Curriculum Improvement Cycle, the pilot curriculum review for Computing Science took place in November 2024 and involved over 140 educators and stakeholders from industry, Higher and Further Education and Education Scotland.

The output from the day of provocations and discussions highlighted the need to enhance consistency and coherence across the Computing Science curriculum by streamlining the learner journey through creating a more defined and consistent connection between the Broad General Education and the Senior Phase. This alignment was seen as crucial to ensuring all pupils experienced a coherent and progressive learning pathway, unlocking high quality Computing Science education for every learner and moving beyond current variation in provision. The call to empower teachers by increasing teacher confidence and expertise through dedicated professional development and support, particularly at the primary level, was also recognised.

The pilot review examined the perception that current National Qualifications were too narrow and agreed that the CIC presents the opportunity to evolve the curriculum beyond its heavy focus on programming and fully embrace the breadth of modern computing, including fields like Artificial Intelligence and big data and a call to see more creativity, collaboration and real-world relevance in Computing Science education.

The current curriculum was acknowledged as being built on strong foundations and the commitment of passionate teachers with successes of creative, applied learning tools like micro:bits and Scratch in primary schools noted as demonstrating the subject’s potential to spark early and lasting interest in young people. Participants also felt that Computing Science could be seen as a natural fit for cross curricular integration, successfully fostering 21st century skills such as data literacy, logical thinking, and problem solving.

5 Section 5: Stakeholder reports and reviews

5.1 Key stakeholder reports

5.1.1 SSERC

SSERC is a local authority shared service which provides professional learning and advice for primary and secondary educators and technicians plus resources to support practical/experimental provision within the sciences curriculum. SSERC also manages the Young STEM Leader Programme and the STEM Ambassadors Programme.

SSERC provides professional learning for practitioners in subjects including Digital Skills and Computing Science, Physics, and Technology, catering to the needs of different education sectors. This includes newly qualified teachers, early-career teachers, mid and late career teachers, and those undertaking a STEM leadership role within their centre.

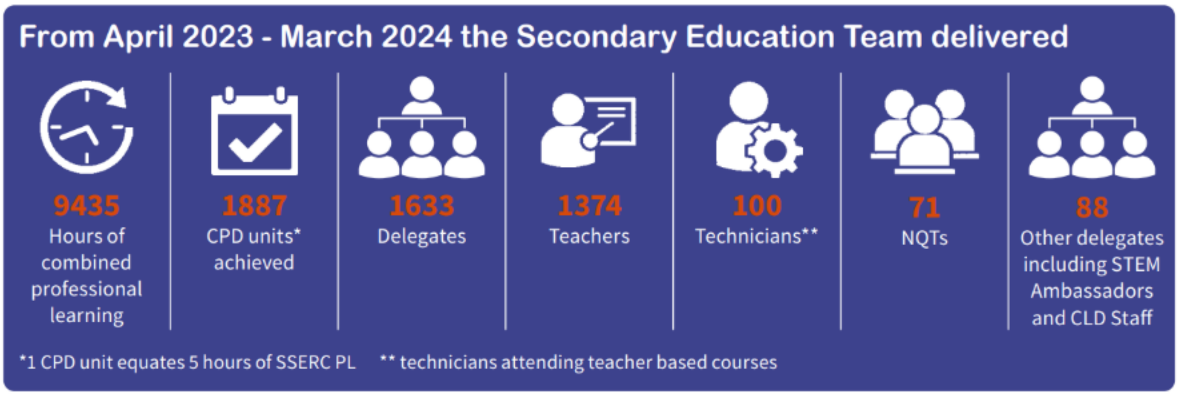


Figure 15 Professional learning delivered by the SSERC in 2023-24 (SSERC, 2024, p. 10)

SSERC also delivers GTCS accredited courses for STEM leadership, early years, primary and ASN skills which were rated highly for their impact and usefulness.

Technology

In 2023/2024, SSERC delivered a range of practical hand and machine skills-based courses to develop and enhance teacher and technician competence. The following range of 2-day
courses were delivered this session:

- Welding Skills
- Woodturning Skills
- Hot and Cold Metal Forming
- Centre Lathe Skills
- Technology Probationer Residential.
- Safe Use of Classroom Machinery

In addition to this the Technology team have also delivered a further 178 CPD units (945 hours) under the technician portfolio of professional learning. This was through the delivery of:

- Safe Use of Fixed Workshop Machinery
- Safe Use of Fixed Workshop Machinery Refresher

November 2023 saw the second Technology NQT residential being held at SSERC. This event was well attended with 18 delegates representing a wide spread of Local Authorities in Scotland. 5 practical workshop sessions were developed with fresh projects, ideas, and teaching strategies to support NQT's to deliver safe, high-quality hands-on practical STEM learning within the technology curriculum

Early Years and Primary

SSERC has developed a new 3-year programme*, Inspiring a Sustainable Approach to STEM*, promoting and supporting education in primary schools and the wider community. The programme aims to inspire and engage practitioners to equip their learners with
STEM-related knowledge and skills (including Digital Skills and Computing Science) required to succeed in the future workforce and encourage them to consider STEM-related careers.

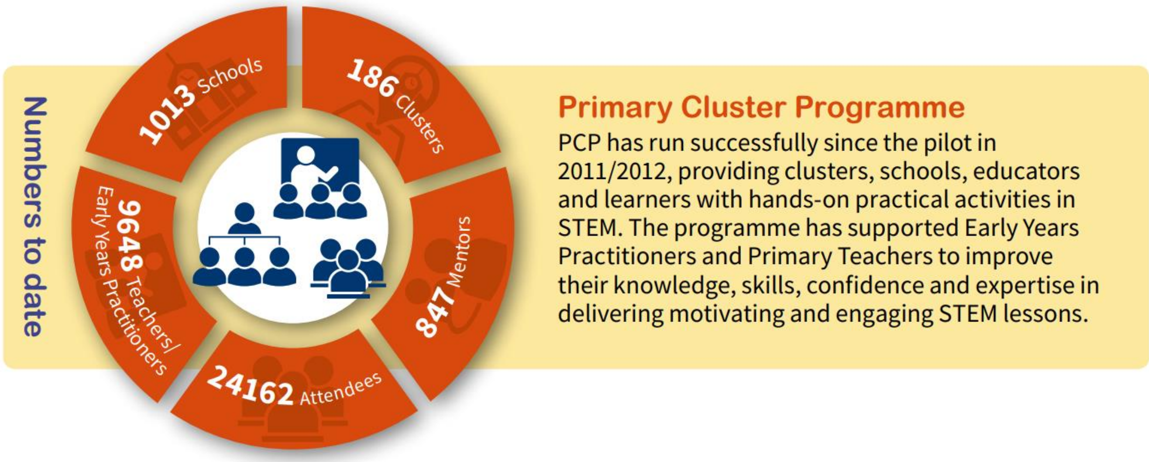


Figure 16 Early Years and Primary incorporating Digital Skills and Computing Science (SSERC, 2024, p. 23)

5.1.2 Stemovators

Formerly known as Young Engineers and Science Clubs Scotland (YESC), Stemovators now engages with entire classes, year groups, and whole schools in addition to their continued work with extra-curricular clubs. Stemovators aims to "…ignite curiosity and build skills in science, technology, engineering, and maths through exciting and engaging learning activities" (Stemovators, 2024, p. 1). Over the year 2023-24 Stemovators engaged with:

- 7,500 pupils and 200 teachers
- 10,000+ young people overall
- Schools from 29 local authorities.

They also distributed 254 kits to schools and hosted seven regional events, targeting rural and low SIMD settings of kit recipients and event attendees were in the top 25% of the Scottish Index of Multiple Deprivation (SIMD) or from areas graded 5-6 on the 6-fold Urban/Rural classification.

Projects included:

- Climate Smarter – pupils investigate how energy, building materials and water are produced, used, and how this is affecting the world around us
- Carbon capture and storage (CCS) – Using a CCS ‘in a box’ kit explored the properties of carbon dioxide (CO2) and the impact of excess CO2 on our atmosphere as well as the full process of capturing, transporting, before identifying suitable storage sites around the UK
- Power path – Pupils designed and built a marble run to simulate subsea cables transferring electricity from renewable sources
- Rampaging chariots - inspires pupils to think like engineers and encourages them to adopt an engineering mindset by designing and constructing a competitive sports robot
- Lighting up the Curriculum for Excellence – pupils get the chance to construct their own electronic device using circuit kits.

Teachers rated resources and professional learning highly and felt the projects linked well to careers and future skills whilst students said that they learned more about STEM pathways and that they enjoyed the activities.

5.2 Subject associations

5.2.1 Scottish Technology Teachers Association (TTA)

The Technology Teachers' Association was founded in 1955 to "…advance design, engineering and technology education in Scotland". Until 2016 it published an annual journal and has run conferences with half days of professional development workshops.

5.2.2 Design and Technology Association (DATA)

The Design and Technology Association works to enhance the teaching and learning of design and technology (D&T) across all educational stages in the UK, but England and Wales having greater representation. With a membership base of over 33,000, the association aims to ensure that D&T is a vital part of the curriculum, equipping students with essential skills and knowledge for the future. It supports Technology teachers through providing resources, access to training and publishes a journal on international research.

5.2.3 Scottish Business Education Association (SBEA)

The Scottish Business Education Association is a teacher-led organisation that brings together Business Education teachers as a community for sharing ideas, resources and comment.

5.2.4 Scottish Teachers Advancing Computing Science (STACS)

Scottish Teachers Advancing Computing Science is a teacher-led organisation and is funded by the Scottish Government. It is aimed at supporting and working with the Computing Science teacher community; helping advance Computing Science at school level and provide support to teachers.

5.2.5 British Computer Society (BCS)

The BCS Academy of Computing is network of teachers, scholars, researchers and practitioners that working together to advance computing education. The BCS provides resources and support to teachers including:

- Barefoot Computing which provides teaching resources for primary school pupils to help them understand the fundamentals of computing. Barefoot provide free workshops, helpful online guides and engaging lessons for early years and primary practitioners.
- Computing at School (CAS) is a network of computing teachers that share resources, connect, and discuss news and views on issues affecting computing education.

5.3 Professional Associations

5.3.1 The Learned Societies' Group on Scottish STEM Education

The Learned Societies' Group on Scottish STEM Education (LSG) identifies and promotes priorities for school STEM education in Scotland. This includes providing advice on school STEM education to decision-makers, including Ministers, MSPs, civil servants, and local authority representatives. Whilst its membership includes the Association for Science Education (ASE), British Computer Society (BCS), Edinburgh Mathematical Society (EMS), Institute of Physics (IOP), Institution of Engineering and Technology (IET), Royal Society of Biology (RSB), Royal Society of Chemistry (RSC), and Scottish Mathematical Council (SMC), the LSG does tend to focus more on the Sciences and Computing. Their response to the *STEM Education & Training Strategy* (discussed earlier in Section 0, p.5) was revealing in this regard in that 'science' was mentioned over 50 times (in addition to numerous explicit references to 'chemistry' and 'physics') whilst 'engineering' was only mentioned twice and there was no mention of any of the discrete CDEG subjects or Technological Education as a whole (Royal Society of Edinburgh, 2017).

One of the LSGs' main concerns is around a lack of specialist STEM teachers they believe results in the dropping of certain subjects from the curriculum in schools across Scotland (Royal Society of Edinburgh, 2024). Whilst they are not necessarily in favour of non-subject specialist teachers teaching subjects they do not have a degree in, or training for, the alternative of having the subject disappear entirely is of greater concern to them.

5.4 Children and Young People's Perspectives

Children have a right to an education and the right to have a say on matters that affect them. This section provides a snapshot of some of the views which young people have expressed in relation to their Technologies education.

5.4.1 Artificial Intelligence

There is a growing awareness among young people that education may not be adequately preparing them for the future, where technological skills, particularly in AI, are becoming increasingly vital. Young people would like to study examples of real-world issues to help them better prepare for the future (Staff College, 2024). The Scottish Children's Parliament (Children's Parliament, 2024) worked with the Scottish AI Alliance and The Alan Turing Institute to work with children and Members of the Children's Parliament to examine how they interact with AI, and what they think the possibilities and risks are for its use. Children and young people were involved in the development of learning resources for schools for learning about AI. Young people shared their ideas and concerns surrounding AI and recognised the impact it will have on their future lives. Young people mostly feel positive about the impact AI could have, they are interested in how AI systems and tools can be designed to include and support all young people and protect their rights. Young people did, however, show a preference for interacting with humans rather than AI systems because of the emotional intelligence shown by people. A group of young people participated in the Scottish AI Summit in March 2024 and made calls to action over issues of fairness and bias, safety and security, AI in education and learning about AI.

5.4.2 STEM and Language Choices in School Report

The *STEM and Language Choices in School* Report (Social Research, 2018) investigated patterns of uptake in STEM subjects across demographic groups, including gender, age, and SIMD profile, although the report does not clearly specify which subjects were categorised as STEM for the purposes of the analysis. When asked about their intention to study a STEM subject, approximately two-thirds (65%) of respondents indicated that they had chosen, or expected to choose, a STEM subject, while only 10% reported that they had not chosen, or did not anticipate choosing, a STEM subject. No substantive gender differences emerged in the proportion of young people who reported having chosen or intending to choose a STEM subject (67% of girls compared with 63% of boys). However, girls were more likely than boys (13% compared with 8%) to state that they had not chosen, or did not intend to choose, a STEM subject. Socioeconomic disparities were also evident. Young people from the most deprived areas (SIMD 1) were less likely than those from the least deprived areas (SIMD 5) to report that they had chosen, or intended to choose, a STEM subject (57% versus 71%).

As shown in Figure 17 (*p.50, below)* over half of the young people who chose to study a STEM subject reported doing so because they enjoyed the subject (56%), believed it was important for their future career or employment prospects (52%), or considered it essential for their intended future study pathway (51%). Boys were significantly more likely than girls to cite several key motivations for choosing or intending to choose a STEM subject, including personal enjoyment (61% vs. 52%), confidence in their ability ('I'm good at it': 45% vs. 33%), and perceived compatibility with their broader subject choices ('It fits well with other subjects I want to study': 41% vs. 34%).

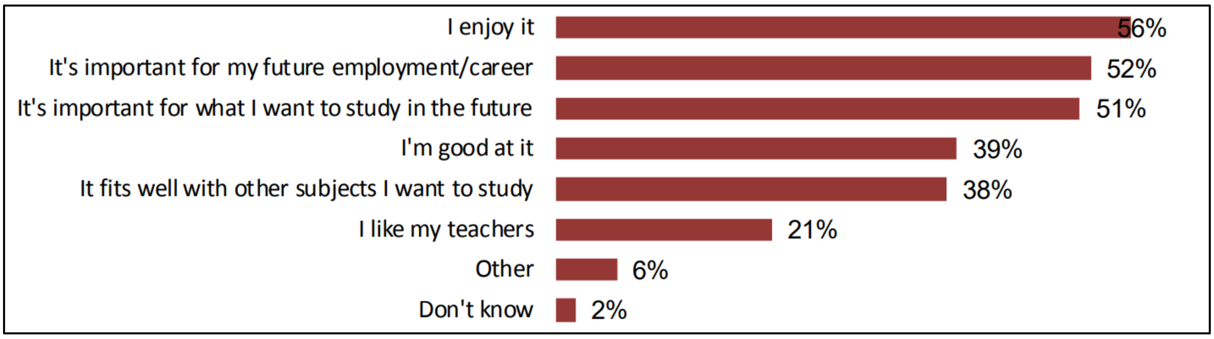


Figure 17 Reasons for choosing/intending to study STEM (Social Research, 2018, p. 4)

As showing in Figure 18 *(p.50, below)* the most frequently cited reasons for not choosing to study a STEM subject were a lack of enjoyment (36%), a perception of low ability in the subject (31%), a lack of interest in STEM (28%), and the belief that STEM was not relevant to their future educational aspirations (23%). Gender-based differences were evident in these responses. Most notably, girls were significantly more likely than boys to report that they did not believe they were competent in STEM subjects (40% compared with 17%). Although these differences did not reach statistical significance, a higher proportion of girls than boys also indicated that they did not enjoy STEM (40% compared with 32%) and that the subjects were not important for their intended future studies (26% compared with 17%).

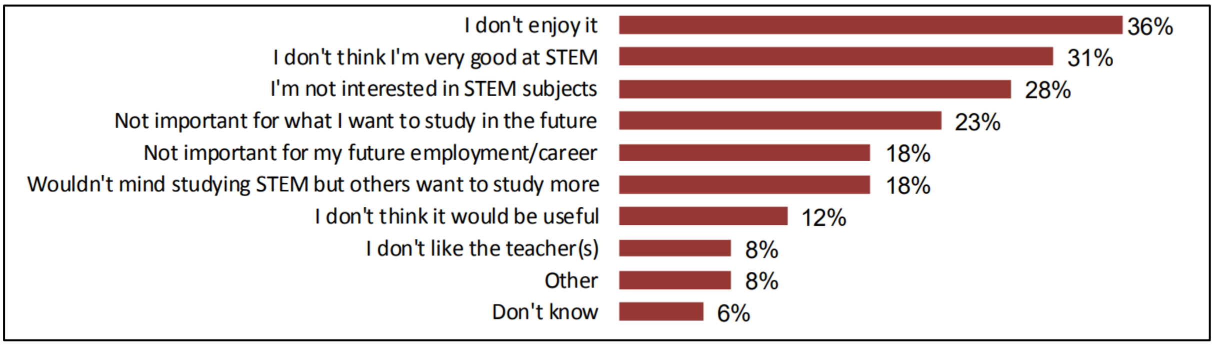


Figure 18 Reasons for not choosing/intending to study STEM (Social Research, 2018, p. 4)

Most young people (40%) reported uncertainty regarding whether they wished to pursue a career within the STEM sector. Boys were more likely than girls (34% compared with 24%) to indicate an interest in entering a STEM-related career. As shown in Figure 19 (p.51, below). Among those who did express such an aspiration, the most frequently cited motivations were anticipated enjoyment or interest in the field (64%) and perceived competence in STEM subjects (53%). Additionally, over one third of respondents stated that they had been encouraged to consider a STEM career due to the perceived abundance of job opportunities within STEM industries (39%), through their own independent research (32%), or as a result of influence from family members (34%) although this varied significantly given their SIMD background.

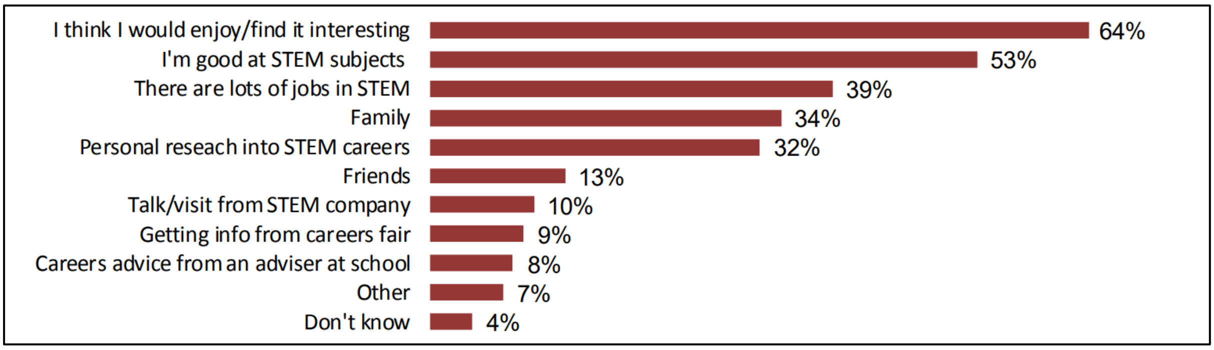


Figure 19 Reasons young people feel encouraged to pursue a STEM career (Social Research, 2018, p. 5)

5.4.3 The Gender Gap in Technologies

A recurring theme across all the Technologies curriculum area has been the under-representation of females (see sections, 2.1.1, 0, 6.2.5, & 6.3.1). Exposure in schools is vital and *Close the Gap* study (2015) found that young people said that early experiences affected the industry they were likely to enter and the subject choices they would make. The study, which focused on the manufacturing sector, found that whilst females are more likely to study biology and chemistry and males are more likely to study physics, overall, females are less likely to choose STEM-related subjects than their male counterparts and this can limit their options to enter certain roles and sectors.

Young people also cited teachers as influencers. Some had negative experiences with teachers, such as teachers suggesting that their chosen career was "not academically challenging" or simply did not allow them to take a particular subject as it was "for boys" (SDS Evaluation & Research Team, 2025, p. 11). The influence of parents and guardians was also highlighted as a strong influence

"When I was at school, I wasn't allowed to take Technical, which was really infuriating. ….so I was like, well, it's fine …. I will just be with my dad anyway…. so my dad was, like, my biggest inspiration for the [trade]."
Woman, Construction
(SDS Evaluation & Research Team, 2025, p. 10)

5.4.4 YouthSTEM2030

YouthSTEM2030 is a youth led organisation which aims to empower young people with the resources, skills and networks to enable them to develop and scale the impact of their STEM-based research, initiatives and solutions. By connecting with companies and institutions, YouthSTEM2030 enables young people to become active contributors in a more sustainable world.

YouthSTEM2030's *Changemakers: Entrepreneurs for Impact* is a 10-week programme open to 16–24-year-olds based anywhere in Scotland can apply to join the programme. The programme helps young people develop their own project which is a STEM-based entrepreneurial solution to a real-world problem. By the end of the

10 weeks, young people have some sort of prototype, working model, early sample or minimum viable product of their proposal.

6 Academic Research

As Technologies curricula have been present in some countries and some schools for a long time, it is surprising that there is still no consensus as to what a Technologies curriculum should be, how pupils learn when they study it, and what are effective teaching strategies. Although the school subjects of the Technologies curricular area are commonplace in global, statutory education there can be differences in understanding of the terminology, and combinations. This presents issues for researchers and teachers, especially where the recognised terms, and scope, may differ between primary/elementary and secondary/high school sectors.

A comprehensive and systematically curated list of research sources was developed through a collaborative effort between the Technologies Curriculum Team, the Data, Performance and Research (DPR) Team, and the Scottish Government Library Support Service. This collaboration ensured a comprehensive and detailed level of expertise in the identification, evaluation, and organisation of relevant literature. A dedicated research database has been established to house these sources, with each document catalogued alongside direct access links and annotated with its relevance to the Technologies curriculum. This structured approach facilitates ease of access and supports evidence-informed decision-making in curriculum development. Furthermore, as the research process progressed, emerging gaps within the original research parameters were also identified and systematically recorded in the same database. These documented gaps may inform future research priorities and provide direction if further inquiry is required to strengthen the evidence base underpinning the Technologies curriculum. This paper does not present an exhaustive review of all available literature in the field of Technologies; rather, it offers a curated selection of brief commentaries on key studies and reports that have been identified as particularly relevant to current curricular priorities and practice. The subject organisers for ‘Technologies’ is unique to Scotland so very little academic research focuses across the whole curriculum area so the research is presented in these groupings.

A Rapid Research Review has also been undertaken by the DPR team and will be published in parallel with this paper to complement its findings and evidence base.

6.1 Business Education (including Administration & IT, Accounting, Business Management and Economics)

The academic research about business education focuses on business in further or higher education. Within further and higher education business is a diverse area of study. Business courses are offered at all of Scotland's further education colleges and universities. There are a variety of different business courses with varying entry requirements offering a range of options for a variety of learners.

Internationally the picture varies in terms of content and mode of delivery and there has been very little academic research carried out that considers the question of what business education in schools is, how it should be taught and what should be covered. In some countries business education is a cross curricular, interdisciplinary or transverse competency. For example, in Finland, Entrepreneurship and ICT is integrated across the curriculum. In British Columbia some business education such as marketing and accounting sits in the Applied Design, Skills and Technologies or Enterprise curricular areas whereas administration and IT skills are within Business Computer Applications. The International Baccalaureate Diploma Programme offers an Individuals and Societies pathway that includes Business Management, Digital Society and Economics units.

In Scotland, the subjects that come under the business umbrella are Accounting, Administration & IT, Business Management and Economics. Although there are also a wide range of NPAs for learners such as retail and customer service that reflect the diversity of the business offer.

Accounting as a subject has a relatively low uptake when compared to Business Management and Administration & IT and may be offered as a third option within Business faculties (White, 2018). Due to a number of factors, including shortages in Business teachers, Accounting is not offered as widely in Scottish schools. Within the current experiences and outcomes, learners have limited experiences of the basics of accounting practice and principles in the BGE and this could also affect the demand for Accounting as they move through the school. Young people often express their desire to learn more about skills for life, especially regarding finance and taxes (Children & Young People's Commisioner Scotland, 2025). The accounting and finance courses offered at Scottish universities range from the Bachelor of Accountancy (BAcc) degree to the BA Finance, Investment and Risk and prepare learners to work within Scotland's growing finance sector.

Administration and IT grew out of secretarial studies which was previously offered in Scottish schools. Young people often choose Administration and IT as it equips them with the skills for work or further education (White, 2018). In the BGE the digital skills delivered to learners are often the ones that will lead to success in Administration & IT and are delivered within Business or Computing faculties.

Business Management is the most popular subject for learners in the Business family and is often chosen as a 'crash' Higher (White, 2018). Learners will study theoretical and practical aspects of business through looking at real-life business contexts.

6.1.1 Economics

There is a long history of the study of Economics in Scotland and is offered at several Scottish universities. It is also a foundational element in the business courses offered in colleges and universities. However, it's popularity in Scottish schools has waned, possibly as a result of the competition it faces from other social subjects (White, 2018). It is offered in less than half of the Scotland's local authorities and over 60% of candidates come from the independent sector. The SQA Business Management courses cover the impact of the economy and economic factors on the business environment, but it does not explore causes and the wider impact of economic phenomena.

Regenerative Economics

Reimagining Economics: Five Transformative Shifts for Secondary Schools (Brandsberg-Engelmann , 2025) argues that traditional economics curricula are too narrowly focused on neoclassical models, which prioritise markets, growth, and profit, yet sidelines equity, wellbeing, and sustainability. The report emphasises that economics education shapes young people's worldview, and current approaches fail to address 21st-century challenges such as climate breakdown, biodiversity loss, inequality, and democratic threats which are symptoms of systemic failure. Brandsberg-Engelmann makes key recommendations for rethinking the teaching of economics:

- Using experiential learning will engage students in collaborative, real-world initiatives to bridge theory and lived experience.
- Develop in leaners the understanding that the economy is part of a dynamic, interdependent system.
- Use regenerative principles that highlight the role of care, reciprocity, and collaboration as central to economic systems.
- Frame the economy as meeting human needs within planetary boundaries, not as a machine for profit and growth.

International bodies like the IMF and OECD recognise the need for this change and there is a growing school of thought that regenerative economics will help prepare learners for an uncertain future and the metacrises facing them (World Economic Forum, 2025).

6.1.2 Games Based Learning in Finance and Economics

Games both digital and paper based can have a positive impact in economics lessons; both in terms of developing a deeper understanding of economic concepts and increasing social interactions (Guest, 2015).

Effective economics education is essential for developing the analytical competencies required to interpret financial systems and make informed decisions. Innovative pedagogical strategies enhance conceptual understanding by enabling learners to apply theoretical principles in practice. Theoretical knowledge alone does not guarantee effective decision-making in real-world contexts. Experiential learning approaches, which engage students in activities simulating economic and financial challenges, have been shown to increase motivation and deepen comprehension of market dynamics. Gamification, implemented through interactive digital platforms or structured board games, can reinforce complex economic concepts and improve retention. Similarly, simulated trading environments provide opportunities for learners to practice investment strategies while accounting for external economic shocks. Economics education should prioritise financial literacy as a core outcome. Students must critically evaluate the broader implications of economic decisions, including ethical considerations and sustainability concerns, to prepare for responsible participation in global financial systems (Caruana, 2025).

6.2 Craft, Design, Engineering and Graphics (CDEG)

6.2.1 What is CDEG, why teach it and what are the issues?

Education Scotland's (2014) study into the Technologies curriculum determined that the technologies "brand" (p. 41) needed to be clearer. Indeed, the CDEG subject area itself has many iterations across the country and even within local authorities including, but not limited to: Design and Technology (D&T); Design, Engineering and Technology (DET); Craft, Design and Technology (CDT); Design, Manufacture and Graphics (DMG) to name but a few (Canavan & Doherty, 2003). *For clarity, the term CDEG is used throughout this paper, although other terms may appear in quotes.*

The Scottish Technologies curriculum area is unique in its combination of subject areas but is representative in that "…each country builds on its own history of technical education and develops an approach within its own context to suit the perceived needs of society and the individual" (Banks & Williams, 2013, p. 32). Whilst the earliest curricular incarnation of CDEG in Scotland appeared in the late 1800s in response to fast growing agricultural needs, CDEG has evolved into a more complex discipline and established itself as a valuable component of Scottish education. However, the complex nature of CDEG results in variations in how it is viewed and understood as a subject. Historical perceptions of techie simply being wood work, or the subject areas as a whole being perceived as a less academic pathway, appear to be lessening in Scotland (Morrison-Love, 2018) although still widely considered as vocational (McLaren & Murdoch, 1996). There appears to be a signifant split among staff as to role of CDEG departments; whether it be purely vocational, skills based or whether it should encompass the broader intellectual and philosophical learning (Canavan & Doherty, 2007).

A world-class performance in CDEG is essential to Scotland's future and the prosperity, health and wellbeing of its young people (Education Scotland, 2014). McCormick (1993) identified four key justifications for including CDEG in the curriculum:

- Personal development: Technology education fosters problem-solving, creativity, and critical thinking through engagement with real-world challenges.
- Cultural relevance: It prepares students to live responsibly and make informed decisions in an increasingly technological society.
- Vocational relevance: Technology offers pathways to employment and aligns education with evolving economic and industrial needs.
- Education for production: Once prominent in Marxist-influenced systems, this rationale emphasised productive capability and national development; though less common today.

Primary educators more frequently affiliated their understanding of technology education with the use of technology, though not individual disciplines within the CDEG curriculum area. Indeed, in a study by Anderson and Holme (2023), the main finding was that primary and secondary educators did not share a collective definition of technology education, highlighting that coherence of educational experience is an issue for young learners studying in Scotland. This chimes with studies elsewhere in the UK where Year 7 regression (Growney, 2013) has been recognised as a long standing problem, with student's learning in the primary school is not built upon when starting secondary and is compounded by the “carousel system” (Growney, 2013, p. 59) which involves the frequent rotation of pupils around different technologies subject areas and can result in difficulties tracking student progress.

6.2.2 Economic and Societal Importance of CDEG

On a curricular or sectoral level, technology plays a vital part in future economic, societal, and environmental successes (SEEAG, 2012; Parker et al., 2021; Scottish Government, 2021). The fast-changing pace of technology indicates that Scotland's young people must be prepared with knowledge and skills required for current and future challenges (Scottish Government, 2014) and so the subject area of CDEG is argued as essential for young people (Morrison-Love, 2018). There is some criticism of SQA qualifications from stakeholders, in that there is a perception, from strategic stakeholders and from industry, that they are not matching what industry needs (Ekosgen, 2017). There is some suggestion that the emphasis needs to be more on the skills that industry needs and is also responsive to industry changes.

6.2.3 Skills for the Future: Creativity, Problem-Solving and Sustainability

As creativity and innovation drive the growth of intellectual capital, developing these skills in the future workforce has become essential which, given its nature, CDEG is well suited to foster such skills within today's school curriculum (Atkinson, 2019).As creativity and innovation drive the growth of intellectual capital, developing these skills in the future workforce has become essential which, given its nature, CDEG is well suited to foster such skills within today's school curriculum (Atkinson, 2019).
CDEG uniquely integrates processes, concepts, knowledge, and skills, making it a distinctive part of the school curriculum (Atkinson, 2000). It fosters creative, critical, and analytical thinking, problem-solving, and practical technological skills while helping pupils adapt to continual technological change. Lewis (1999) emphasised the link between higher-order thinking, problem-solving, and technology education, arguing that it enables pupils to understand technology through creative technological activity. He viewed technology as a manifestation of human creativity, noting that troubleshooting, whilst valuable, does not equate to inventing.

Gowan et al. (1981) argued that declining creativity stemmed from an overemphasis on left-brain skills, reading, writing, and arithmetic, whilst neglecting right-brain activities like art and music. Guilford (1981) added that creativity often involves rebellion, which arises when schools fail to recognise or nurture it, leading to student frustration. Creativity, which encourages questioning and innovation, can challenge school order (Gardner, 1995 whilst teachers value creative thinking, they simultaneously enforce conformity, limiting its development in secondary education. In CDEG, the sub-activities of a simple linear design model were adopted as assessment units in the GCSE Design and Technology exam, limiting flexibility and stifling creativity (Atkinson, 2000). To secure high marks, teachers often required pupils to document every stage of the process, regardless of its relevance to effective design.

Whilst some are of the opinion that practical skills are "...filling a niche market for disaffected pupils" (Dakers, 2003, p. 24) there are arguments that part of the problem of the Technologies curriculum us intellectualisation of what was traditionally a craft based, production oriented subject has led to confusion among (Dakers, 2003). Whilst Daker maintains that this view is not "…confined to an isolated pocket of the technology education community" (2004, p. 2). Again, there is a lack of recent research regarding teacher attitudes towards the subject. Before *Curriculum for Excellence*, there were tensons regarding what should be taught (Canavan & Doherty, 2007), ranging from that there was too much practical to too much design, or that the subject was "too difficult" (p. 296) or should be "purely vocational" (p. 302). There has been little published research in this area since the introduction of CfE.

6.2.4 CDEG as pedagogy and teacher confidence

In their study of technology education in primary schools, Moreland, Jones and Northover (2001) concluded that a strong teacher knowledge base is critical in the realisation of proficient technology education where uncertainty leads to limited teaching methods. Alongside this strong knowledge, Growney (2013), Dakers & Dow (2009) assert the importance of confidence in delivery resulting in effective or restricted pedagogical and assessment approaches. Considering the multitude of strands that contribute towards effective D&T learning supports (Education Scotland's 2014) study into the aversion that some educators feel towards approaching the subject. For primary educators, this is amplified by an expectation to apply this in a broad range of curriculum areas.

"There is also the question of the role of performance in technological literacy. Should a technologically literate person be able to display some degree of practical competence? Can technological literacy be measured by paper and pencil examination only?" (Lewis, 1999, p. 44)

Although dated, McLaren (2013) found that the effect of low confidence and poor understanding can influence approaches to teaching. For example, strategies vary from:

- teaching as little of the subjects as one can get away with;
- stressing process aims rather than conceptual development;
- spending more time on construction work and less on design and more on social and less on other;
- placing heavy reliance on kits, prescriptive texts and pupil work cards where pupils have to follow clear instructions step-by-step;
- emphasising expository teaching and underplaying questioning and discussion.

Canavan and Doherty (2003) found that the levels of confidence and enjoyment in teaching the newly introduced design elements of the course had a direct correlation with the length of service of the teachers. However, this research is over 20 years old predates the introduction of Curriculum for Excellence so there is appetite for this research to be repeated to provide a more accurate, current national picture. Nevertheless, it is important to bear this in mind as we undergo the Curriculum Improvement Cycle and the levels of support and resourcing that will be required to ensure quality of provision and staff confidence.

A key recommendation from the Canavan and Doherty report was the advocation for "technology champions" (p. 273), officers in key policymaking and coordination positions who have a deep understanding and supportive disposition towards this curricular area and could see opportunities within the politics of curriculum development or where additional streams of financial support could be harnessed. They make the case that these officers should being subject specialists and not managers from unrelated backgrounds reliant on the quality of the advice they receive. CDEG teachers identify the evolving nature of technology and subject diversity as key aspects of teaching technical education, while consistently citing low subject esteem as the most unfavourable element (Canavan & Doherty, 2003).

6.2.5 Equity, Access and Social Mobility

Gender

Studies continually demonstrate that females are consistently significantly underrepresented in technological education, areas, and employment as evidence in Section 5.4.3. A notable exception, however, is teachers *of* Technological Education in Scotland, where females currently represent 38% of the workforce (Scottish Government, 2025a) in stark contrast to under 4% in 1996 (McLaren & Murdoch, 1996). Research consistently draw attention to perceptions of the subject area as a vocational subject, conceived very much as a masculine, working-class domain. Çağatay (2001) synthesises the underlying issues associated with low numbers of women working in the technologies and STEM and identified three key issues: societal influences and biases, school education and workplace systems. In 2002 Baroness Greenfield et al. (2002) in her Report on *Women in Science, Engineering and Technology* had indicated her concern:

"The under-representation of women in science, engineering and technology threatens, above all, our global competitiveness. It is an issue for society, for organisations, for employers and for the individual."

(Greenfield et al. 2002, p. 9)

This under-representation has been evident despite a plethora of initiatives such as the introduction of comprehensive education, equal opportunity legislation and many interventions specifically targeted at encouraging female participation in various aspects of STEM, for example TVEI, Technical and Vocational Education Initiative in 1982; WISE, Women into Science and Engineering in 1984; GIST, Girls into Science and Technology in 1985; and jumping to more recent times, Girls in Tech in 2007, Technovation in 2010, Little Miss Geek in 2012, Campaign for Science and Engineering in 2014 and 1000 Girls: 1000 Futures in 2015. Added to these been the compulsory participation of all pupils in Technologies subjects in primary and lower

secondary level since the introduction of the National Curriculum (DES 1990) and a willingness by many STEM teachers to tackle the gender imbalance. However, shortages witnessed in girls' take-up and their levels of success in STEM subjects during secondary education have continued to the present day.
Citing the Equal Opportunities Commission, Paechter (2007) argues that technology education leads ''young women overwhelmingly [to] opt for pathways that lead to poorly paid jobs with little possibility for advancement or the development of their skills, in contrast to young men, who tend to favour these courses leading to recognised trade qualifications with the potential for self employment and good rates of pay'' (p. 129). Murphy (2007) reports similar findings. She highlights the fact that pupil choice in the technology subjects follows gender stereotypes: a significant majority of boys elect to take the workshop-based or electronically-orientated subjects whereas a significant majority of girls elect to take food or textile-orientated subjects. Paradoxically, this is in direct contrast to the performance indicators in examination results where statistically, more girls achieve higher grades in virtually all technology subject domains. It is therefore clearly not a question of lack of ability on the part of girls.

Dakers, Dow and McNamee (2009) found that when technology education is framed around trade-based or traditionally masculine occupations, girls are significantly less likely to engage with the subject. Likewise, when teaching focuses narrowly on procedural and declarative knowledge, female participation declines. Their research indicates that interest among both girls and boys increases when technology is presented through inclusive pedagogies that integrate conceptual, socio-cultural, and critical perspectives. They argue that shifting from teacher-led, expert models to more collaborative and reflective approaches requires targeted policy support and investment in both pre-service and in-service teacher education.

Access

Students are likely to be most influenced in their option choice by their subject experiences in the lower school (McCarthy & Moss, 1990), and their perceived value to career choices.
Doolittle and Camp cited in Canavan & Doherty (2007) highlight the sociological complexities that link the curriculum and class structure. They also highlight the behaviourist underpinning of the traditional skills based CDEG subjects. The fact that departments now offer a rich, constructivist learning experience is one which is often lost within an environment of misrepresentation, inter-subject positioning, politicising and downright ignorance of Technical departments and the subjects taught within them.

6.2.6 Teacher Workforce, Recruitment and Retention Crisis

It is a turbulent time for CDEG within the secondary curriculum and an equally difficult time for universities recruiting secondary teachers of CDEG (Atkinson, Knox, & Hardy, 2011). An unique facet of the CDEG subject area is the potential to offer a significantly greater number of possible subjects than any other school department however resources and capacity will typically allow for between two and four subjects to be offered with a range of SCQF levels (Morrison-Love, 2018). However as expressed in Section 6.2.4 Canavan & Doherty (2003) found that teacher confidence can be a considerable influencing factor. this chimes with Morrison-Love's (2018) warning about the "protection of disciplinary expertise" (p. 419). Unlike most other subject areas, the Technical teacher is required to specialise in a number of certificated subjects. This has posed a longstanding challenge to initial teacher educational institutions that are required to develop competence over a diverse range of subject areas. (Canavan & Doherty, 2007). This may lead to a degree of subject 'cherry picking' along the lines of personal preference or practitioner confidence. The degree to which the pace of curricular change has been a de-motivating factor among senior staff, coupled with the need for, and in some instances, resistance to professional development was investigated through consideration of length in service in relation to a number of perception-based variables.

Education Scotland found that pupils in early years and primary school settings are not receiving their full entitlement to design and technology education (Education Scotland, 2014).

6.3 Computing Science

The terms "digital skills" and "ICT skills" are often used interchangeably, and some studies will also use the term digital technologies in its widest sense to include programming skills and computing science. For example, the SDS report on the digital technologies sectors refers to the demand for technology skills in industry. Some of those skills are digital i.e. the knowledge, skills, and confidence needed to use technology in life and in the workplace, and some are computing science skills which has a very specific body of knowledge and set of skills and would include areas such as software engineering, cyber security and data science.

Computing Science as a discipline is about developing an understanding of computational processes and thinking. Computing scientists are problem-solvers and designers, they apply skills and knowledge to analysis, design, implementation, testing and evaluation of digital solutions.

There is a limited amount of academic investigation into computing science as a discipline in schools, but it is a growing field of research. The rationale behind, and design of, a computing science curriculum depends on the personal philosophy of the curriculum designer and what their values, perspectives and goals are (Schulte, et al., 2024). The four theoretical traditions that underpin approaches to computing education are:

- The *algorithmic tradition* that focuses on algorithms and computational thinking. It will develop the ability of learners to think algorithmically, break down complex problems and develop solutions. Programming is fundamental in the algorithmic approach although there are unplugged approaches that develop algorithmic problem solving.
- The *science tradition* focuses on using computational techniques and modelling as a tool for inquiry. The aim is to understand and explore the world through computation.
- The *design and making tradition* cultivate creativity, collaboration skills and (real world) problem solving. Learners are designers and innovators and build meaningful projects.
- The *societal tradition* reflects on the how technologies contribute to the wellbeing of individuals. Learners understand that technology is not neutral and has an "impact on equity, justice and social good".

The content and aims of computing science can evolve and teachers may need to remain flexible and open to changing content. Teachers have different perspectives on what is important to teach and may have different beliefs over what is important and have varying approaches.

6.3.1 Uptake of Computing Science

SDS reports concern over the uptake of Computing Science at school and it remains an issue for employers who are concerned about the relatively low numbers of young people participating. Many organisations report they are looking for people with programming skills. They do note that there has been some progress with Higher

Computing Science entries up 5% in 2024 to 3,745, of which 785 were female, representing an increase of almost 15% on the previous year (Skills Development Scotland, 2024).

The *System Upgrade Required* report (The Royal Society, 2025) considered concerns from employers regarding the digital skills gap and worries that too few young people are gaining qualifications in computing subjects. The report looks at barriers that exist to participation in Computing Science for all young people, but also examined the barriers for underrepresented groups including girls and young people from areas of deprivation.
Figure 20 (p.63, below) illustrates that, across Europe, the UK has the lowest percentage of girls taking computing science subjects (Google, 2023). However Figure 21 (p64, below), reveals that this is not due to a lack of interest in pursuing the subject. This disconnect needs to be examined further as it is reducing the talent pool for industry and opportunities for the individual

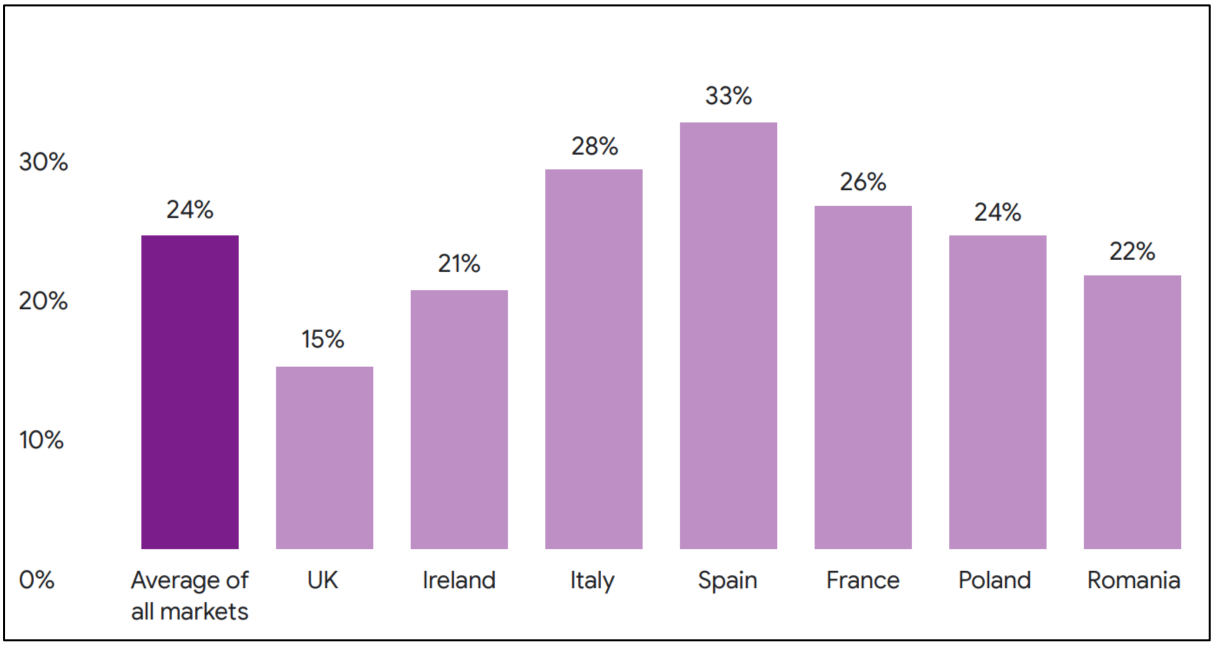


Figure 20 Percentage of girls who are interested in Computer Science subjects by market (Google, 2023, p. 7)

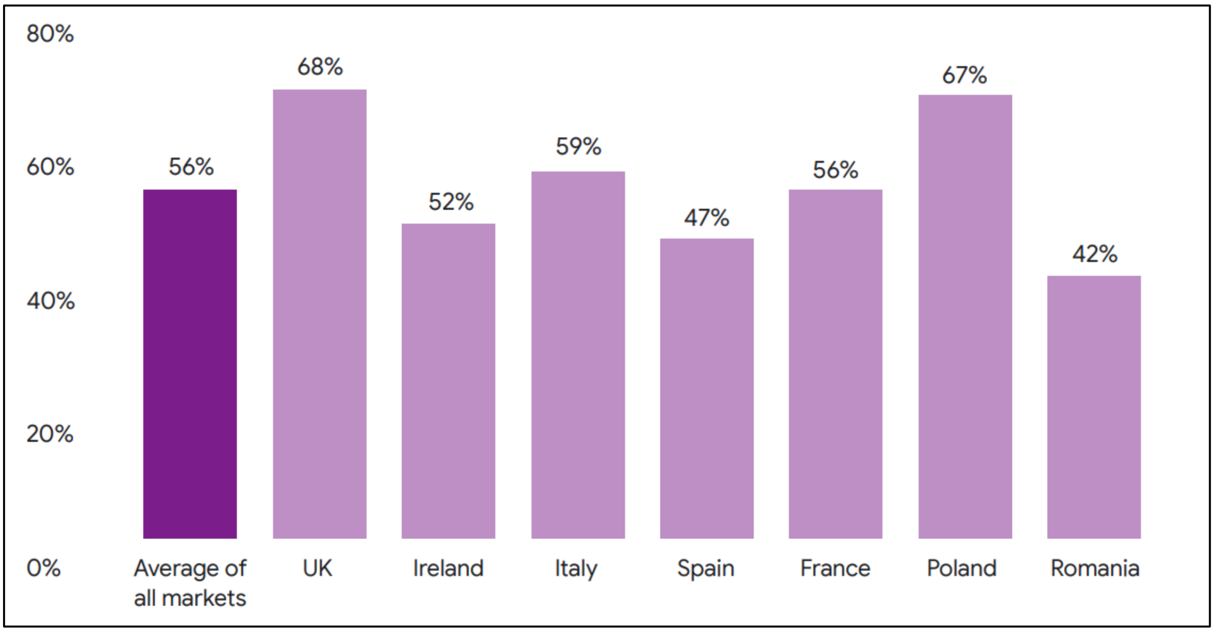


Figure 21 Percentage of girls who are interested but not currently studying CS subjects (Google, 2023, p. 7)

The *Subject Choice, Attainment and Representation in Computing* project was funded by the Nuffield Foundation and looked at how computing education has changed in England over the past 10 years. The Future of Computing Education; Considerations for Policy, Curriculum and Practice (Kemp, Wong, Hamer, & Copsey-Blake, 2024), made recommendations for the future of computing and outlined steps to support schools and families in recognising the importance of computing, which combined with the outcomes and recommendations from System Upgrade Required include:

- Reform the Computing Curriculum, broaden KS3 (S1 – S3) content to include digital literacy, project work, digital media, and data science. Multiple research studies have found that girls prefer the creative and people-focused elements of computing such as digital media, graphic design and animation. Changing the language around computing to emphasise the creative skills involved could increase appeal among students particularly among underrepresented groups. Links to other areas should be developed to increase awareness of the potential application of computing skills more broadly.
- Support inclusive computing education by creating inclusive computing classrooms that foster belonging. Supportive teaching and resources boost self-belief and subject uptake. Teachers play a pivotal role in the enjoyment of computer science. As the digital economy grows, access to quality computing teaching for all pupils is vital for the digital workforce of the UK. Positive teacher relationships encourage more girls to choose computing. Their research found that 46% of students in England say that teachers have an impact on their subject choice. They also found that neurodiverse and disabled students, although more likely to have self-directed computing hobbies outside of school, including playing video games with elements of coding, building web pages and designing games, they are less likely to choose Computing Science.
- Reframe the computing narrative schools should work on showcasing diverse role models and skills beyond stereotypes and address perceptions that

computing is only for the most able. The belief that persists with students, teachers and parents that only the cleverest students reduced the number of people pursuing it.

- Showcase diverse digital opportunities by improving career guidance to highlight computing's relevance across pathways. Young people should be made aware of how computing literacy could assist them in a range of careers and how computing can lead to a diverse range of roles.
- Ensure equitable access to devices, broadband and extracurricular activities. Having access to technology from a young age builds computing capital. Reduced access to technology inside and outside of school means students from areas of high deprivation have reduced access to careers in computing. Attendance at computing and coding clubs outside of school is lower than other activities such as music, dance or sports.

6.3.2 Computational Thinking in Early and Primary Education

Kallia and Cutts (2023) introduce a conceptual model for early computing education based on grounded cognition theories, which emphasise the role of sensorimotor activities and embodied experiences in learning. The paper describes how children's conceptual development in computing progresses from concrete actions on physical objects to abstract, formal representations (like programming) and proposes a framework to guide the design of learning trajectories for ages 4 to 8, ensuring progression from tangible experiences to abstract computational thinking.

- In the enacted phase learners explore and play through physical actions and unplugged activities (e.g., sorting cards, dance-based sequences).
- In the instrumented phase learners use symbolic actions using tools like Bee-Bot or ScratchJr to manipulate objects.
- In the formal phase formal coding activities (e.g., Scratch, Micro:Bit) are introduced, where actions are represented as programming constructs.

7 Future Events

This section aims to use evidence and predictions available to outline future global trends, relating these to the likely impact on Scotland and its education system. Given that one of the aims of the Curriculum Improvement Cycle is to co-create a future-oriented curriculum, the trends in this section, whilst not certain, offer some insights for consideration.

Some of the challenges facing the world, common to many future looking reports and analyses include:

- The *Future Trends for Scotland* (Scottish Government, 2025) report sets out 60 trends that are likely to be important to Scotland over the next 10 to 20 years. Changes in technology are a significant emerging trend, including growth in AI and emerging technologies, green technologies, global multinational tech companies, and data and society becoming increasingly digitised.
    - The use of AI technology is growing rapidly across many sectors and is likely to have an important role in education reforms with generative AI driving transformation over the coming years. The report highlights concerns about how to manage the potential harms of generative AI, identifying risks of malicious use, and systemic risks, such as labour market disruption, environmental risks and risks of deepening inequality.
    - Society continues to become increasingly digitalised with more services being provided online. Technological innovation is driving change in how people work. The digital revolution creates opportunities. However, digital exclusion remains a concern with around 15% of adults lacking basic digital skills. Older people, disabled people, people with low incomes and households in rural areas or areas of higher deprivation are more at risk of digital exclusion.
- Digital technologies provide opportunities to improve the lives and well-being of people and offer considerable benefit to those who know how to use them effectively. The ability to use the Internet effectively is key for equal opportunity and inclusion. Many services are offered online, and more people are using them, as a result the cost of providing in-person services increases, leaving the unconnected and those that lack the resources and skills to use online services with less choice and higher costs. While uptake of online services has increased rapidly, important gaps remain that are often linked to differences in education and skills. There is a statistically significant relationship between formal education and uptake of online education services. ICT skills tend to be highly correlated with activities that set up or involve monetary transactions such as Internet banking and online purchases. The digital divide will need to be tackled to ensure equitable access to digital technologies (OECD, 2024).
- The issue of information poverty is complex and the impact on children has not been extensively studied (Breslin Davda & Buchanan, 2024). Information poverty is recognised as having a negative impact upon the health and

wellbeing, and prosperity of individuals and communities. Some, but not all, of the barriers to information finding relate to access to, and the ability to use, the Internet successfully.

- Social media use is growing, including in the youngest age groups. More than nine in ten young people use social media, with the vast majority using social media every day. Social media use has been linked to poor mental health and wellbeing for young people, as well as to exposure to online harms, although some evidence suggests that social media can support wellbeing through connection.
- Digital addictions are on the rise globally (OECD, 2025a). Excessive and compulsive use of digital media can have a negative impact on the user's life, leading to mental health issues. Evidence suggests that negative behaviours in digital environments are on the rise and they disproportionally affect girls; there are increasing incidents of cyberbullying internationally and girls are more likely to experience higher rates of cyberbullying than boys. Teaching young people about bullying on social media is expressed as a Children's Rights issue (Children & Young People's Commisioner Scotland, 2025).
- Increases in digital regulation is likely to have on organisations that operate within the internet ecosystem. Although written for digital and technology companies many of the themes will impact how digital technology regulation affect everyone; these include online safety, regulation of AI, considerations surrounding misinformation and disinformation, and data access and storage.
- Robotics has a growing role in medicine, manufacturing, agriculture and many other sectors of the economy (OECD, 2021a). Advances in robotics requires progress in computer science, cognitive science, biology, engineering, and mathematics. Robotics engineering programmes could be embedded in high school curricula and some countries are already rapidly developing curricula relevant to robotics.
- The metacrises facing the world include climate breakdown, biodiversity, growing inequality and threats to democracy are symptomatic of system breakdown (World Economic Forum, 2025).

It is also important to note that trends identified are likely to affect children and young people differently, or disproportionately, compared with impacts for older generations. This is, in part, because children and young people must live with the outcomes of identified trends for longer, and the long-term future has particular importance for those who are youngest now (Scottish Government, 2025). They are increasingly exposed to conflict, displacement, environmental degradation, and unregulated commercial exploitation, especially in digital and food environments as well as being the first generation to grow up under the 'shadow of climate change' (Patton et al., 2016).

Young people may also experience societal transformations differently from older generations because they are often at the leading edge of change or technology adoption. The trends will also have differential impacts for different equalities groups. Intersecting inequalities and disadvantage may reduce resilience or the ability of both households and communities to adapt to future challenges, or to take advantage of future opportunities. In many cases the trends have the potential to drive and deepen inequalities still further (Scottish Government, 2025).

8 Points to Consider

The evidence reviewed throughout this paper confirms that Technologies is a vital component of Scotland's curriculum and wider society, supporting economic prosperity, innovation, sustainability, and individual and collective wellbeing. It also highlights a number of important issues for consideration through the Curriculum Improvement Cycle (CIC), particularly in relation to curriculum coherence, equity, progression, assessment, and future readiness.

Technologies within Curriculum for Excellence comprises three distinct but interconnected disciplinary groupings, Business Education, Computing Science, and Craft, Design, Engineering and Graphics (CDEG), each characterised by different traditions, bodies of knowledge, and pedagogical approaches. A key consideration arising from the evidence base is that the volume, nature, and currency of research relating to these individual subjects varies significantly. Computing Science, as a relatively recent and rapidly evolving school subject, is supported by a growing body of specific and contemporary evidence, often focused on digital skills, computational thinking, and workforce demand. In contrast, CDEG has seen limited recent academic research, with much of the available literature historical in nature or focused on particular aspects such as creativity, gender, or teacher confidence rather than the subject area as it currently exists. Evidence relating to Business Education is more substantial in post-school and labour market contexts, with comparatively less research examining its role and impact within compulsory schooling. This uneven evidence landscape presents challenges for curriculum design and underlines the importance of adopting unifying conceptual frameworks that can support coherence across subjects while remaining responsive to their distinct disciplinary identities.

Across early learning, primary, and secondary contexts, evidence highlights the importance of early and sustained engagement with creative, exploratory, and problem-finding approaches. Experiences that support learners to identify needs, explore possibilities, test ideas, and articulate solutions are associated with positive outcomes in confidence, creativity, and engagement. However, provision remains uneven, particularly in early years and primary settings, where Technologies is often narrowly interpreted as digital skills alone. This has implications for learners' opportunities to engage with design, making, enterprise, and innovation, and for their ability to build transferable approaches to problem-solving and creative thinking as they progress through the curriculum. Practitioner confidence and professional learning are critical enabling factors. Evidence points to variability in confidence across sectors, particularly in early learning and primary settings, and increasing pressure on secondary teachers teaching across multiple disciplines. Sustained professional learning, strong networks, and clear curricular guidance will be essential to support practitioners to engage confidently with curriculum change and to deliver coherent Technologies learning across the 3–18 continuum.

International evidence increasingly points to the value of technology education that develops learners' capacity to navigate and make sense of a data-rich world. OECD and UNESCO studies highlight the growing importance of data literacy, critical interrogation of information, and the ability to use and present data meaningfully across disciplines. While elements of this are present within Computing and Business

Education, evidence suggests that learners' experiences can be fragmented, with limited opportunity to develop coherent understanding of how data underpins decision-making, systems, and innovation across technological contexts. Internationally, there is a clear shift towards integrated, future-facing technology education, with increasing emphasis on creativity, sustainability, ethical use of technology, and interdisciplinary problem-solving. Comparative evidence from OECD countries indicates growing recognition that technology education is not solely about technical competence, but about developing technological agency, critical digital literacy, and innovation capability. Developments such as broader computing curricula, design thinking approaches, and sustainability-focused technology education illustrate how other systems are seeking to align curriculum, skills, and societal need. Scotland's distinctive Technologies curriculum offers opportunities to build on this global learning but also requires clarity of purpose and coherence to realise its potential.

A further recurring theme in both national and international evidence is the need for greater emphasis on the ethical, social, environmental, and economic dimensions of technological development. Technologies education is increasingly understood as a space where learners explore the impacts of technology on people, communities, and the planet. Issues such as sustainability, the circular economy, artificial intelligence, and digital rights require learners to engage critically with the consequences of technological choices, rather than focusing solely on technical capability. The evidence suggests that embedding these considerations meaningfully within curriculum design can enhance relevance, learner motivation, and alignment with wider societal priorities.

Rapid technological change, increasing digitalisation, environmental pressures, and economic uncertainty require a curriculum that supports adaptability, critical thinking, and responsible innovation. Technologies education is uniquely positioned to help learners understand not only how technologies work, but how they shape, and are shaped by, human choices, systems, and values.

Evidence from SQA course reports and inspection findings consistently highlights a distinction between learners' practical and technical capability and their ability to evaluate, explain, or justify technological decisions. Learners often demonstrate strong skills in making, coding, modelling, or constructing, but encounter difficulty articulating processes, managing risk, or reflecting on outcomes. This raises important considerations for curriculum design and assessment, particularly in relation to how practical competence, technical knowledge, and reflective understanding are developed and valued across the 3–18 learner journey.

Equity and inclusion emerge as persistent and significant considerations. Gender imbalance across Technologies subjects remains evident, alongside variation in access linked to geography, resourcing, and staffing. Evidence indicates that perceptions of Technologies as gendered or narrowly vocational continue to influence participation, despite strong attainment by underrepresented groups where access is secured. Curriculum design has a role in addressing these issues by offering inclusive contexts, diverse exemplification, and pathways that clearly connect technological learning to a wide range of future possibilities.

Equity of provision is also a significant concern. Access to the full range of Technologies subjects varies widely across schools and local authorities, particularly at senior phase. In some cases, learners' experiences are shaped more by staffing capacity and local infrastructure than by curricular entitlement. These inconsistencies risk limiting learners' opportunities to develop key technological knowledge and skills that are increasingly essential for citizenship, employability, and participation in a digital society. Ensuring more consistent access and entitlement will be a key consideration for the CIC. Practitioner confidence and professional learning are critical enabling factors. Evidence indicates variability in confidence across sectors, particularly in early years and primary settings, and increasing pressure on secondary teachers required to teach across multiple disciplines. Sustained, accessible professional learning, strong subject networks, and clear curricular guidance will be essential to support practitioners to deliver high-quality Technologies education and to engage confidently with curriculum change.

In responding to these considerations, there is an opportunity to articulate a clearer and more coherent vision for Technologies which supports learners to explore ideas, engage critically with information and data and understand the impact on the environment and wider society. Doing so would strengthen the contribution of Technologies to a curriculum that is inclusive, future-facing, and grounded in meaningful learning.

9 Declaration

The content of this document was written by the author, exercising full professional judgement. Education Scotland approved AI tools were used to support review, clarity, and quality assurance. Education Scotland staff retain full responsibility and have reviewed and approved all content.

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Annex A Abbreviation List

Acronym	Definition
ACEL	Achievement of Curriculum for Excellence Level
ASN	Additional Support Needs
BGE	Broad General Education
CDEG	Craft, Design, Engineering and Graphics (also, Design and Technology, D&T)
CfE	Curriculum for Excellence
CIC	Curriculum Improvement Cycle
CLD	Community Learning and Development
CLPL	Career-long Professional Learning
CLTA	Curriculum, Learning, Teaching and Assessment
DPR	Data, Performance and Research
DHT	Deputy Headteacher
DYW	Developing the Young Workforce
EDI	Equalities, Diversity and Inclusion
ELC	Early Learning and Childcare
Es and Os	Experiences and Outcomes
GIRFEC	Getting it Right for Every Child
GUS	Growing Up in Scotland
GTCS	General Teaching Council for Scotland
HGIOS	How Good is Our School
HMI	His Majesty's Inspectorate of Education
HT	Head Teacher
ITE	Initial Teacher Education
LA	Local Authority
LTS	Learning and Teaching Scotland
NASUWT	National Association of Schoolmasters and Union of Women Teachers
NC	National Certificate
NIF	National Improvement Framework
NPA	National Progression Award
NQT	Newly Qualified Teacher
OECD	The Organisation for Economic Co-operation and Development
PE	Physical Education
PG Cert	Post Graduate Certificate
PRD	Professional Review and Development
SCQF	Scottish Credit and Qualifications Framework
SDS	Skills Development Scotland
SHANARRI	Safe, Healthy, Achieving, Nurtured, Active, Respected, Responsible, Included
SP	Senior Phase
SQA/QS	Scottish Qualifications Authority (Qualifications Scotland from 1st December 2025)

STEM	Science, Technology, Engineering and Mathematics
TIS	Teacher Induction Scheme
UNESCO	United Nations Education, Scientific and Cultural Organisation
WHO	World Health Organisation

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