Scottish Computing Education Committee (SCEC)

Securing the Future of Our CS Learning Pathway for All

This position paper by BCS, the Chartered Institue for IT, (BCS) Scottish Computing Education Committee (SCEC) responds to the Curriculum for Excellence (CfE) review process in process as an outcome of the 2023 OECD report, with a particular focus on Computing Science (CS) and current thinking around the Technologies curriculum area in primary schools.

Summary

For the wellbeing of Scotland, the Scottish Government is committed to world-class CS education, both to fuel the tech sector and to develop 21st century intellectual skills across the population. Primary CS education is key to this and is already flourishing in some schools. Structural curriculum changes must: preserve disciplinary integrity, support progression, ensure disciplinary visibility, and respect teacher investment.

The Importance of Computing Science

The suggestion that AI renders coding obsolete misses the point: learning to program is one engaging vehicle for developing the cognitive capacity, known as Computational Thinking (CT), required to understand both AI and all future technologies. Just as we study English and Mathematics not for every pupil to produce Shakespearean prose or solve Fermat's Last Theorem, but for the intellectual development those subjects foster, Computing Science must be viewed as a core academic discipline rather than vocational preparation. The *content* is instrumental; the *cognitive growth* endures. In an era where technology pervades every aspect of life, our education system must shift its focus from transient tools to the enduring intellectual capacity of CT, prioritising cognitive development over the vehicle that delivers it.

Current Good Practice and Risks of Change

Observed Good Practice in Scottish Primary Computing Science

High quality CS teaching goes beyond 'using technology' to include problem decomposition, logical reasoning, algorithmic thinking, and structured problem-solving. CfE has always named CS a distinct discipline and the current CS Es & Os use a research-backed framework resistant to trends, with a clear developmental pathway from Early Years. While implementation remains a challenge for primary/EY, practitioners have progressed with little support; excellent practice now exists at teacher, school, and local authority levels. These examples present CS as a coherent discipline, providing age-appropriate introductions to CT and foundations for further study. Confident teachers successfully transfer this expertise to less well-prepared colleagues.

Advantage 1: Cross-Curricular Integration Without Loss of Discipline

Listening to successful practitioners, we find that effective teaching at primary level leads to meaningful integration across the curriculum, including mathematics and numeracy, enterprise and business contexts, and literacy, collaboration, and communication. Crucially, practitioners are firm that CS should retain its disciplinary identity, while highlighting how it strongly contributes concepts and methods to other subjects. Integration succeeds because CS is understood as a discipline in its own right.

Advantage 2: Strong Learner Identity and Progression to Secondary School

We understand that primary pupils are able to develop a clear understanding of what Computing Science is and how it differs from general digital skills. Where pupils are known to have developed

a good foundation in primary, they can accelerate fast in secondary; when all feeder primaries are developing strong skills, no "starting again" at S1 will be necessary and pupils can move swiftly from the concrete to more conceptual and theoretical computing content.

Primary Concern with Proposed Curriculum Coupling

The Technologies curriculum area in the CIC includes CS, Craft, Design, Engineering and Graphics and Business Education. The development process so far has emphasised Technologies, with Big Ideas at curriculum area rather than disciplinary level. Furthermore, decluttering is a key objective in the process. Discussion on these aspects can point to a potential loss of identity of CS within the BGE curriculum, particularly at primary level, with the following risks.

Risk 1: Losing momentum on developing strong CS foundations at primary

The 2017 CfE revision for CS asked much of primary practitioners. Initially at sea, many have been steadily developing successful materials and practice for CS resulting in the benefits outlined above. The CIC focus on Technologies over disciplines risks blurring this picture of strong and positive development, so valuable to young people.

Risk 2: Subsumption into a Technology Narrative

Adopting a common Technologies narrative risks blending CS outcomes with those of other subjects until they are indistinguishable. A key separation lies in solving problems versus having problems solved; the latter is uniquely computational and widely valuable. We risk forfeiting this capacity, along with abstraction and algorithmic reasoning – the very signature approaches to learning that establish CS as an academic discipline and the foundation for further study.

Opportunity

We recognise the importance of curriculum review, seeing it as an opportunity to scale existing good practice, strengthen developmental pathways and reinforce disciplinary clarity and contribution. Disciplines are problematic when they become closed silos; they are maximally valuable when their unique contribution to the wider educational landscape is clear. Drawing on this and on our current understanding of CS education practice in Scotland, we propose four *principles* for the development of CS through the CIC process:

1. **Disciplinary Integrity**. CS should remain conceptually distinct and recognisable across all stages of education.
2. **Coherent Progression across Stages**. Curriculum design should ensure continuity from primary to secondary education and from BGE to senior phase, and underpin cumulative conceptual development.
3. **Disciplinary Anchoring for Holistic Learning**: CS increasingly provides essential cognitive concepts and skills for subjects across the curriculum, beyond tool–using within Technologies. The contribution of subjects like CS within interdisciplinary learning is most impactful when the roots in domain expertise are deep, manifest, and affirmed.
4. **Respect for Existing Teacher Expertise**. Significant investment in developing high-quality practice should be retained, and shared wherever possible.