

Discussion paper: Digital literacy for all

1. Purpose

- 1.1. This discussion paper is part of a series produced by the BCS School Curriculum and Assessment Committee (SCAC) to stimulate debate about key issues in computing education. It stands back from the specifics of individual nation's curricula and draws on global perspectives, including those from academics, governments, and employers to provide a cross UK view on the essential knowledge, skills and attitudes that make up digital literacy. Its aim is to clarify terminology, make clear the fundamental role that the computing curriculum has in developing young people's digital literacy, and provide policy makers and curriculum developers with a high-level framework for reviewing their approaches to digital literacy education.

2. Background

- 2.1. 'Digital Literacy' is a priority for education across the world. It is a key component of the national curricula in all four UK nations, and frameworks and standards for digital literacy have been developed in a variety of national and international contexts.¹ The global pandemic and the move to online learning and working has raised the profile of digital skills globally.² However, there are differences in approach and a lack of alignment across nations and sectors. This is further complicated by the large number of organisations with a stake in the digital skills landscape.³
- 2.2. Evidence to the House of Lords Select Committee on Digital Skills from employers indicates that they are struggling to find these skills in their recruitment. At the same time around 11 million people in the UK lack the digital skills needed for everyday life, and 36% of the workforce lack Essential Digital Skills for Work. Moreover, only 74% of those who earn up to £13,500 per year have Essential Digital Skills for Life, compared to 95% of those who earn over £75,000.⁴
- 2.3. Priorities within digital literacy have changed over time. SCAC has carried out significant exploratory work reviewing frameworks for digital literacy and policy and research papers globally. An initial trawl of the available research identified 21 key sources from the past forty years. A key conclusion from reviewing these sources was the extent to which views on digital literacy have been shaped by the concerns of the time: employment in the 80s, citizenship in the 90s, safeguarding in the 2000s and social media disinformation more recently.⁵ The group's review of qualifications identified similar trends.

¹ Ferrari, A. and Punie, Y., 2013. DIGCOMP: A framework for developing and understanding digital competence in Europe.

² Ostapenko, I. and Sosniuk, O., 2021. USAGE OF DIGITAL TOOLS AND SOCIAL MEDIA FOR LEARNING: UKRAINIAN EXPERIENCE IN THE CONTEXT OF THE COVID-19 PANDEMIC.

³ <https://www.cbi.org.uk/media-centre/articles/cbi-launches-tech-guarantee/>

⁴ Lloyds Bank. (2021). Essential Digital Skills Report 2021: Third Edition—Benchmarking the Essential Digital Skills of the UK. https://www.lloydsbank.com/assets/media/pdfs/banking_with_us/whats-happening/210923-lb-essential-digital-skills-2021-report.pdf

⁵ Buckingham, D., 2006. Defining digital literacy—What do young people need to know about digital media?. *Nordic Journal of Digital Literacy*, 1(4), pp.263-277.

- 2.4. We have adopted a set of evidence-informed principles to address these challenges, drawing on the National Curriculum for Computing⁶ in England, and a thematic analysis of a range of existing frameworks for digital literacy including:
- the JISC digital literacy framework⁷
 - the European Union Digital Competence Framework for Citizens 2.0⁸
 - the UK Government Essential Digital Skills Framework⁹
 - UNESCO’s ICT Competence Framework for Teachers¹⁰, Education for a Connected World¹¹,
 - the SFIA framework¹²
 - less well-established frameworks such as Greenwich University’s critical digital literacy 5 resources model¹³.
- 2.5. These frameworks address digital literacy from a variety of different perspectives including schools, FE, HE, work-based learning, citizenship, and employment. They address the needs of a variety of **overlapping** groups, not all of which appear in every framework:
- **Workers** – involved in a wide range of roles and industries not limited to ‘technical occupations’ as all areas of employment will require core digital competencies.
 - **Learners** – who use a wide variety of digital tools to access and process information critically and use these tools to communicate their ideas in a variety of media.
 - **Leaders** - who make and implement decisions based on a critical understanding of what digital technology can do and what needs to be put in place to make that happen
 - **Citizens** – who are active and informed participants in social and political processes and are use digital tools to engage with others in a discursive democracy.
 - **Individuals** – who reflect on their own use of digital technologies and are capable of engaging safely and ethically in a range of digital environments
 - **Parents/carers** – who need to understand their role in helping young people develop as safe, secure and critical users of technology
 - **Consumers** – who need to make informed choices about digital products and services.
- 2.6. This taxonomy focuses on personas, and, while it helps identify how different groups may need to apply their digital literacy, it falls short of identifying the knowledge, skills and attitudes needed in each persona. It also overly segments the needs of individuals who will

⁶ <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study> explored more fully at <https://blog.teachcomputing.org/digital-literacy-within-the-computing-curriculum/>

⁷ <https://www.jisc.ac.uk/guides/developing-digital-literacies>

⁸ https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework-20_en

⁹ <https://www.gov.uk/government/publications/essential-digital-skills-framework>

¹⁰ <https://www.unesco.org/en/communication-information/digital-competencies-skills>

¹¹ https://www.google.com/url?q=https://www.gov.uk/government/publications/education-for-a-connected-world&sa=D&source=docs&ust=1657094568836331&usg=AOvVaw0_nMoz4jzJEpSatCCw4UP1

¹² <https://sfia-online.org/en>

¹³ <https://sites.google.com/site/dlframework/the5resourcesframework?overridemobile=true>

adapt different personas in different situations. For this reason, we have adopted a view of digital literacy that applies to all without adopting this taxonomy.

3. The principles underpinning our approach

- 3.1. While digital literacy draws on an underlying understanding of computer science, it draws on knowledge from elsewhere. To take an analogy with science, descriptions of 'scientific literacy' might build on an understanding of scientific knowledge and its methods, however, they also include the ability to think critically about the limits of science, which questions it can answer and which it cannot, and the complex relationship between scientific endeavour and how its direction and application is shaped by forces outside science.¹⁴ We propose a similarly 'holistic' view of digital literacy.
- 3.2. Our view of digital literacy includes the skills needed to get digital technology to do what you want it to do 'confidently and effectively'¹⁵, both as a 'creator' and a 'user' of digital tools and content. However, it goes significantly beyond this, and also includes:
 - the underpinning knowledge and understanding of the essentials of computer science and how digital technology works;
 - data, information and media literacy, and the impact of artificial intelligence on everyday life;
 - the critical thinking skills needed to analyse and evaluate one's own and other's uses of digital technology and their impact from a variety of perspectives;
 - the knowledge skills and understanding needed to work individually and collaboratively with digital technology; and
 - the ability to manage one's online life, relationships, identity, and reputation, and be respectful of others.

4. Our view of digital literacy

Defining 'digital literacy'

- 4.1. Based on the above analysis, we propose the following working 'definition' of digital literacy

Digital **literacy** encompasses the knowledge, skills and attitudes that underpin the ability to:

- make **confident**, creative, and **effective use** of technologies and systems, and
- make **well-informed critical judgements** about the implications and impact of how digital technology is used.

- 4.2. The focus of an education in digital literacy is on individuals as **users**, not as creators, of digital systems. Creating digital systems is important, but it's not the focus of what we mean by "literacy". A literate person can read a book, but we might not expect them to write one. We use the term "digital **literacy**" rather than "digital skills" to include

¹⁴Laugksch, R.C., 2000. Scientific literacy: A conceptual overview. *Science education*, 84(1), pp.71-94.

¹⁵ <https://royalsociety.org/topics-policy/projects/computing-in-schools/report/>

knowledge and attitudes as well as skills. Skills without underpinning knowledge are brittle. The following paragraphs ‘unpack’ our definition further.

The essential knowledge and skills

- 4.3. A digitally literate person has a “growth mindset”, and a sense of agency and control. This confidence is founded on knowledge and skills but may not be an immediate consequence of acquiring them. It enables them to be confident in both using digital technology and making well informed judgements including when/whether to use a system to achieve a given goal, what risks there might be, what level of trust to place in the system and its outputs, and the ethical and social implications of using the system. It also helps them respond to new technologies as they emerge.
- 4.4. Education in digital literacy should ensure that, all learners are taught the essential knowledge, skills and understanding needed as:
- Digital ‘**consumers**’ with the functional digital skills required to be empowered users of everyday systems and devices, to solve basic technical problems, and to support social and cultural participation.
 - Digital ‘**creators**’, able to use digital tools creatively to identify and solve problems to meet a specific purpose for specific audiences and produce digital artifacts for work, leisure and for learning.
 - Digital ‘**communicators**’, who communicate and collaborate through digital tools and on-line communities, considering the nature of media and its impact on the message, and how digital ‘sharing’ needs to be undertaken with thought and consideration of purpose and consequences.
 - Digital ‘**decision makers**’, who think critically about digital systems and data, including the provenance of information sources, the assumptions that underlie the design of digital artefacts and systems, the reliability and validity of data/information, and how that data it was produced.
 - Digital ‘**evaluators**’, who understand how institutions and social and societal relationships are being shaped by digital technology and the implications (both foreseen and unforeseen) for self and society, including safety, security and legal and ethical issues.

Recommendation 1: The essential knowledge, skills and attitudes needed to participate in each of these ways should be set out coherently as the basis for building a consensus on what digital literacy is, how it should be taught, and how it should be recognised through qualifications.

BCS SCAC will bring together key stakeholders, including educators, trainers, employers, citizens’ groups, awarding bodies and policy makers from across the four countries of the UK to build that consensus.

The ‘myth’ of the ‘digital native’

- 4.5. It is often assumed that because young people have grown up in the digital world they will automatically have developed digital literacy. This is not borne out in practice. Firstly, young people might be highly adept at aspects of using technology, but many young people's engagements with digital technologies are ‘often unspectacular – in stark contrast

to popular portrayals of the digital native'.¹⁶ Secondly, where young people may have developed a technical facility with digital products, they may lack the knowledge and critical understanding that underpins the effective, safe, and secure use of those products.¹⁷ All of which supports our belief that digital literacy should be actively taught as part of all young people's education, becoming more sophisticated as they progress through the key stages.

Recommendation 2: School leaders and governors should ensure that digital literacy is actively taught and nurtured as part of the school curriculum at all key stages.

The BCS SCAC will bring together school leaders and their representatives to identify the support they need to embed digital literacy teaching in the school curriculum.

- 4.6. Digital Literacy is a key component of the computing curriculum in England, however, the intentions within the National Curriculum do not necessarily follow through into teaching in schools. This is a result of the dense wording of those aspects of the programme of study addressing digital literacy and the increased focus on computer science as the 'new' and challenging part of the computing curriculum. This lack of clarity¹⁸ is compounded by a lack of a shared working understanding of respect to 'digital literacy'.¹⁹
- 4.7. The NCE has developed helpful content setting out teaching activities and resources that will help teachers come to terms with the Digital Literacy requirements within the National Curriculum's Programme of Study for Computing. It is important that this is maintained given the ever-changing digital landscape.
- 4.8. Teachers' ability to teach digital literacy will clearly influence the extent to which students experience a full digital literacy curriculum. However, evidence from what schools are currently offering at Key Stage 3 suggests that, in contrast with the computer science aspects of the key stage 3 computing curriculum where subject knowledge is a well-documented issue, there are teachers with the necessary knowledge of digital literacy. Suitably supported by high quality resources, these teachers would be able to teach digital literacy.

Recommendation 3: Alongside its work supporting teachers' subject and pedagogical knowledge of the computer science aspects of computing, the National Centre for Computing Education (NCE) should continue and grow its support for digital literacy within the computing curriculum at all key stages.

The BCS SCAC will continue to work with the NCE on its support for digital literacy.

¹⁶ Selwyn, N., 2009, July. The digital native—myth and reality. In Aslib proceedings. Emerald Group Publishing Limited.

¹⁷ <https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing>

¹⁸ In general, national curricula do not 'define' subjects. They list the benefits of studying them and the content that should be covered, but steer clear of the philosophical questions that come with 'definitions' such as 'what is art?' or 'is economics a science?' Where subjects are well established with a working understanding of the subject's architecture and boundaries this is not a problem.

¹⁹ Sefton-Green, J., Nixon, H. and Erstad, O., 2009. Reviewing approaches and perspectives on "digital literacy". *Pedagogies: An International Journal*, 4(2), pp.107-125.

Digital literacy within other subjects.

- 4.9. We endorse the NCCE's view that 'Although digital literacy is explicitly mentioned as part of the computing programme of study, its place shouldn't be limited to the subject of computing.'²⁰ Any sufficiently rich approach to digital literacy does not sit simply within the confines of a single subject computing curriculum. It draws on knowledge and skills from other curriculum areas and contributes to young people's development in those areas. For example, simply determining the provenance of an information resource on the internet requires some technical understanding of reading URLs and how search engines prioritise, alongside critical thinking skills and domain specific knowledge and understanding. Approaches to the curriculum that simply partition knowledge into discrete and completely distinct areas struggle with cross cutting competencies.
- 4.10. Where there is recognised custom and practice, links between subjects pass largely unnoticed. For example, the National Curriculum for England's programme of study for English requires students to be taught to 'read easily, fluently and with good understanding'. Most would accept that teaching other subjects draws on and further develops this skill. Digital Literacy lacks this history so decisions about where and how it is taught can severely restrict what is taught.²¹

Recommendation 4: Aspects of digital literacy sit within the computing curriculum, but digital literacy needs to be developed in a wide range of subject contexts in a coherent coordinated way.

BCS SCAC will work with subject associations on advice for schools on how to address this.

Digital literacy is one of several 'new literacies'

- 4.11. The demands of life, individual responsibility, and participation within an increasingly complex, globally connected, modern world of has led to the growth of several 'new literacies', such as media literacy, statistical literacy, and financial literacy. While the focus of this discussion paper is on digital literacy, it is important to note that, just as digital literacy draws on and supports knowledge and skills from other school subjects, it complements these other 'new literacies'. For example, given young people in particular carry out financial transactions through digital means and the risks associated with fraud, there is a clear synergy between developing digital and financial literacies.²²

Recommendation 5: The teaching of digital literacy should support the development of other important new literacies and life skills.

BCS SCAC will work with organisations that support these new literacies and life skills to help them ensure that digital literacy is embedded in their programmes and resources.

Digital literacy and lifelong learning

- 4.12. The world is not static. The relationship between learning, earning and participation change, and changes in digital technology are key enablers of those changes. Individuals' digital literacy should develop and mature throughout their lives. Critical reflection on their

²⁰ <https://blog.teachcomputing.org/digital-literacy-within-the-computing-curriculum/>

²¹ Polizzi, G., 2020. Digital literacy and the national curriculum for England: Learning from how the experts engage with and evaluate online content. *Computers & Education*, 152, p.103859.

²² Lusardi, A. and Mitchell, O.S., 2011. Financial literacy around the world: an overview. *Journal of pension economics & finance*, 10(4), pp.497-508.

experiences deepens their understanding of the underpinning knowledge and skills, broadens the range of context in which they can apply them, and increases their ability to adapt to technological change. At the same time, digital technology increasingly provides the access to learning opportunities.²³ As these learning opportunities become more sophisticated the demands the place on participants digital literacy will increase. Digital literacy is a key aspect of lifelong learning, both as a means of accessing education and training and as an outcome of that education and training.

Recommendation 6: Government should ensure as part of its digital strategy to support the Lifetime Skills Guarantee that measures are in place to develop participants' digital literacy so they can fully engaged with digital courses and resources.

BCS SCAC will convene a stakeholder meeting to identify how this can be achieved.

5. The importance of qualifications

- 5.1. Significant groups, such as the House of Lords Select Committee on Digital Skills see digital literacy as a core skill alongside literacy and numeracy,²⁴ Digital Literacy currently occupies an anomalous position in the school curriculum. Many students end their studies of important subjects such as history and geography at the age of 14. The national curriculum in those subjects provides a basic grounding, but, beyond that it is generally recognised that these subjects should be optional provided a proper curriculum balance is maintained.
- 5.2. In contrast, all students should leave school digitally literate, and able to demonstrate to others the knowledge and skills they have acquired. However, while literacy and numeracy are both embedded in qualifications that are taken by most young people, this is not the case for digital literacy. This has particular implications in the workplace if potential employees cannot demonstrate the generic digital literacy required in an increasingly diverse range of occupations.
- 5.3. This inevitably has practical and wider impacts. Firstly, qualifications benchmark expectations for students and schools, providing an invaluable shorthand for young people to be able to demonstrate to others such as employers their competence. Secondly, without the clear benchmark provided by qualifications schools may take a minimal approach to digital literacy, unaware of the true nature of young people's needs for the future.
- 5.4. This will only be addressed through schools adopting qualifications in digital literacy with the expectation that all young people leave school with their capability properly recognised. A flexible approach will be needed which allows students to take qualifications 'when ready' to minimise the impact on crowded timetables and recognise the different routes followed by young people.

Recommendation 7: Develop a specification for a digital-literacy qualifications that would meet the needs of students who elect not to focus on computing in KS4 and consider how to make such qualification(s) attractive to schools and pupils.

²³ <https://firstmonday.org/ojs/index.php/fm/article/view/5857>

²⁴ <https://publications.parliament.uk/pa/ld201415/ldselect/lddigital/111/111.pdf>

6. Next steps

6.1. The BCS SCAC will continue to develop its thinking on digital literacy, reviewing the progress made annually, and we would welcome input from those reading this discussion document on:

- **Does our view of digital literacy capture effectively the technical, creative and critical aspects?**
- **Given digital literacy draws on knowledge and skills from a number of disciplines, how might it be taught and integrated within the curriculum?**
- **What should be the essential features of a qualification in digital literacy and how should it be developed?**
- **Which organisations are best-placed to take forward these recommendations and how should they do it?**

7. About BCS, The Chartered Institute for IT

- 7.1. BCS is the UK's Chartered Institute for IT. The purpose of BCS as defined by its Royal Charter is to promote and advance the education and practice of computing for the benefit of the public. As the professional body for the industry with the ambition to 'make IT good for society' we bring together commercial organisations, academics, practitioners and government to share knowledge, inform the design of new curricula, shape public policy and inform the public.
- 7.2. The BCS School Curriculum and Assessment Committee (SCAC) is a permanent committee under the auspices of the BCS Academy of Computing. It was established in response to a major recommendation of the Royal Society's report 'After the Reboot'. It aims to offer thoughtful, well-evidenced scrutiny and review of the school curriculum in computing, how it is taught, and how it is assessed.

Bibliography

The following offer useful background reading.

Policy

The UK Government's views of the digital skills adults need to safely benefit from, participate in and contribute to the digital world are set out in the [essential digital skills framework](#). The National Curriculum for England in [Computing](#) includes the statutory requirements for maintained schools in England. These are explored more fully at the NCCE [Blog](#) which links to a substantial [report](#) produced by the Raspberry Pi Foundation.

The wider policy context in Scotland is set out in [A changing nation: how Scotland will thrive in a digital world](#). The [Welsh Digital Competency Framework](#) sets out the essential digital competencies that are mandatory within Curriculum for Wales.

An international perspective is provided by the [DIGCOMP](#) framework for developing and understanding digital competence in Europe and [UNESCO's](#) report on digital competencies.

Academic background

Publications by academics aiming to widen the debate beyond user skills to include wider critical thinking include:

Buckingham, D., 2006. Defining digital literacy—What do young people need to know about digital media?. *Nordic Journal of Digital Literacy*, 1(4), pp.263-277

Selwyn, N., 2009, July. The digital native—myth and reality. In *Aslib proceedings*. Emerald Group Publishing Limited

Sefton-Green, J., Nixon, H. and Erstad, O., 2009. Reviewing approaches and perspectives on “digital literacy”. *Pedagogies: An International Journal*, 4(2), pp.107-125.

Digital literacy in the population as a whole

[The Lloyds Bank. \(2021\). Essential Digital Skills Report 2021: Third Edition](#) surveys the general population's ability to carry out a number of basic digital tasks that are important in modern life.