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Becta leading
next generation
learning

Becta's contribution to the Rose Review



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Preparing for the future

01. We may confidently predict that the future will be characterised by continuing social and technological change. To prosper and succeed in this changing world will therefore require a lifetime of learning, for all of us. We cannot anticipate in detail the knowledge, skills and understanding that today's young learners will need throughout their adult lives. The education system which we design today must equip young learners with the flexibility, confidence and abilities that they will need to participate in this lifetime of learning.
02. The challenge is to equip all young people, of all backgrounds and capabilities, with the personal and cognitive resources to participate in learning throughout their lives. As well as benefiting individual learners, this will help to ensure the prosperity of this country in an era of increasing global economic competition.
03. Advances in technology will drive many of the changes we anticipate. Globalisation with its economic opportunities and challenges reflects the increased connectivity of the world economy. Environmental challenges such as climate change are affected by the expansion of technology. Successful employment and social participation will increasingly involve the use of new technologies.
04. Although we can't be certain about the ways in which technology will develop, some general trends can be predicted. It is probable that the relative costs of technology will decrease, making a wider range of devices and facilities accessible to more people throughout the world. At the same time, there will be access to a greater range of information, with opportunities to create new content. There could be an increase in invisible embedded technologies. Technology is likely to become even easier to use, and be more pervasive. We can also be certain that technology will continue to develop and change.



05. Technology also provides us with a resource we can harness in developing an agile education and skills system that prepares us for these challenges. Used correctly within the education system, technology can contribute to supporting each learner as they develop the thinking and learning skills they will need in the future. Learners will not only need to learn to use specific devices and applications, they will need to understand the fundamental concepts of safe and effective use, and to have opportunities to harness the potential of technology to enhance their thinking skills.
06. The formal education system of childhood should prepare young people for this lifetime learning journey, both technically and emotionally. The design of the primary curriculum is fundamental to this.

i Key point: By the end of Key Stage 2 learners should have sufficient knowledge, skills and understanding to allow them to be independent and confident users of technology for learning. This will enable them to enter secondary education with confidence, and enjoy learning throughout their lives.

07. Some primary school pupils have little access to technology outside the classroom. For these pupils in particular, it is important that school gives them an opportunity to develop a familiarity with technology, which they will need in later life. Education is a vital means to ensure these young learners do not lag behind in knowledge, skills and understanding. Becta is also implementing the universal Home Access programme on behalf of the DCSF to address this concern.
08. Young people – whether they are familiar with technology or not – also need appropriate support from education, to ensure they use it safely and constructively. Both the technology available in the classroom, and the learning opportunities provided, should be as sophisticated as resourcing allows, and not, as is often the case, inferior to those in pupils' homes.
09. However, an education based on merely equipping young people to use the particular technologies and services that are currently available will not be an adequate preparation for this changing and unpredictable future world.

¹ Some 92 per cent of parents of school-aged children reported in 2007 that they had computer and internet access at home (Peters *et al.*, 2007). This figure does, however, mask some differences between groups. Access to the internet at home is strongly related to social class. While 97 per cent of children from social class AB have internet access at home, for children from social class E the figure drops to 69 per cent. Other relatively disadvantaged groups include those whose main language is not English, 77 per cent of whom have access, and children in lone-parent households.

10. Currently only one in four primary schools* are taking full advantage of technology across the full range of the curriculum, in a way that directly impacts on quality and pupils' achievement. We now need a step change to ensure that all schools use and apply technology to maximum effect.
11. We need to raise expectations about the level of ICT knowledge, skills and understanding that will be taught and acquired by all pupils in the new curriculum arrangements.
12. This will be achieved by setting out clearly what pupils must be taught, covering the essential skills of finding and selecting, organising and processing, creating, reviewing and improving, collaborating and communicating. These 'essential skills' must be supported by knowledge and understanding, and integrated into the statutory programme of study in each of the six areas of learning. In addition, these essential skills, and the associated knowledge, must be systematically assessed so that schools can report to parents the level of ICT capability that their child has achieved.



Key point: The use of technology in schools is not optional. Technology forms a vital part of a fully rounded modern education.

13. This submission therefore includes recommendations on bringing about this step change:
 - The range of knowledge and skills that we expect a young learner to have developed by the end of Key Stage 2.
 - How technical knowledge, skills and understanding must be combined to give a full digital literacy that prepares the young learner for the next stage of education, and for a lifetime of using technology in a safe and appropriate way.
 - How assessment procedures will help to monitor and assure this progression.
 - How technology may be used by teaching professionals to support curriculum management and assessment as well as a more developed pedagogy.
 - The need for Continuing Professional Development of the teaching workforce, which will help to develop teacher confidence and versatility in the use of technology in the classroom.
 - How improved home access to technology, with resultant increases in parental engagement and involvement, will extend learning beyond the classroom, and give confidence that all pupils are developing the technical understanding that they are entitled to.

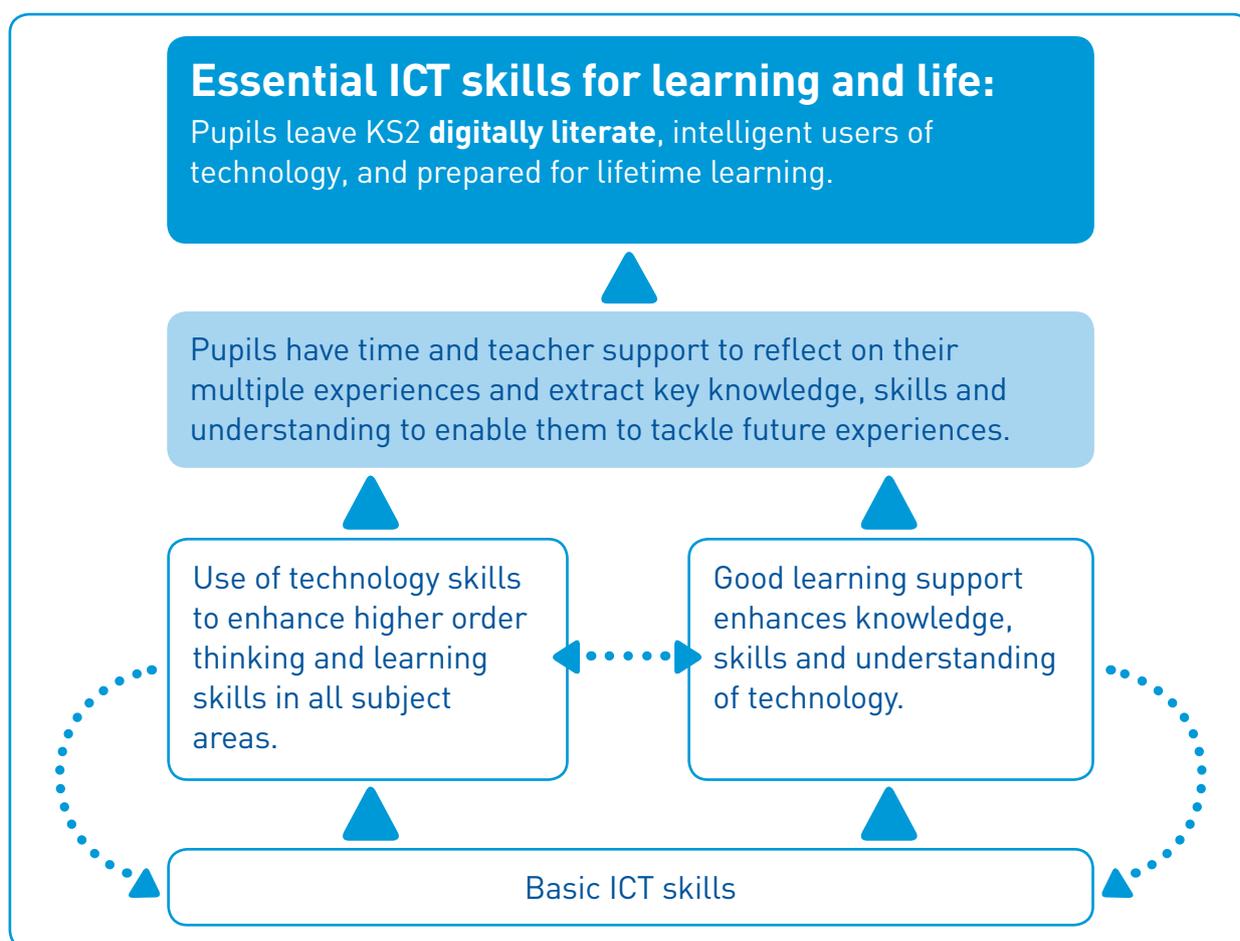
* 'Some 28 per cent of primary schools are categorised as e-enabled.' [p4] Becta (2008) *Harnessing Technology Review 2008: The role of technology and its impact on education* www.becta.org.uk/publications/htreview08

Technology in the curriculum

- 14 By 'technology in the curriculum' we mean the essential ICT skills for learning and life that all children will need to acquire by the end of Key Stage 2, as a result of their learning experiences across the curriculum. These 'essential ICT skills', systematically developed and progressively applied, throughout the primary years, will ensure pupils develop full digital literacy.

Our model

15. The diagram below summarises our model of how technology should be integrated into the primary curriculum. This model must apply to all young learners – no one must be left behind. 'ICT skills for learning and life' are not just about how technology is used. Learners must be both users and creators of information, using technology to develop knowledge, skills and understanding.
16. The benefits are potentially enormous, and while we do not minimise the scale of the task, we believe it is more than justified by the cost of failing to meet this challenge.



Our challenge

17. Although Becta has clear evidence that ICT is being exploited more frequently and skilfully in schools than ever before, this usage is not consistent or universal. The application and use of ICT is not sufficiently embedded in curriculum goals and design, or in example materials and activities. We challenge those developing the new primary curriculum to ensure that technology is fully embedded across all subjects and supports interdisciplinary understanding between them.
18. The increasing digitisation of information worldwide will demand digital literacy for all adults, to ensure full participation in society. Information required for leisure, work, finance, communication and citizenship will be mediated electronically. In all branches of knowledge, all professions and vocations, the correct use of new technologies will be 'mission critical'. This implies that the appropriate use and understanding of technology will need to be deeply and thoughtfully embedded in curriculum design and delivery.
19. Therefore, the successful integration of technology into the curriculum must have many dimensions: the use of technology to develop deeper cognitive skills, the education of young people so that all can use technology, with none excluded, and an informed understanding that ensures full 'digital literacy'.
20. Success in achieving this ambition will require the engagement of pupils, teachers and other stakeholders such as parents in a lifelong learning journey.
21. A key success indicator is that our new curriculum makes room for the new, the unexpected, and the creative. If the curriculum over-specifies and leaves no scope for young people to make new uses of technology, it will fail in its goal of providing a positive foundation for lifelong learning.

 **Key point: Becta recommends that those designing the revised primary curriculum embed the development of full digital literacy, while allowing the flexibility to respond to the challenges of the future.**

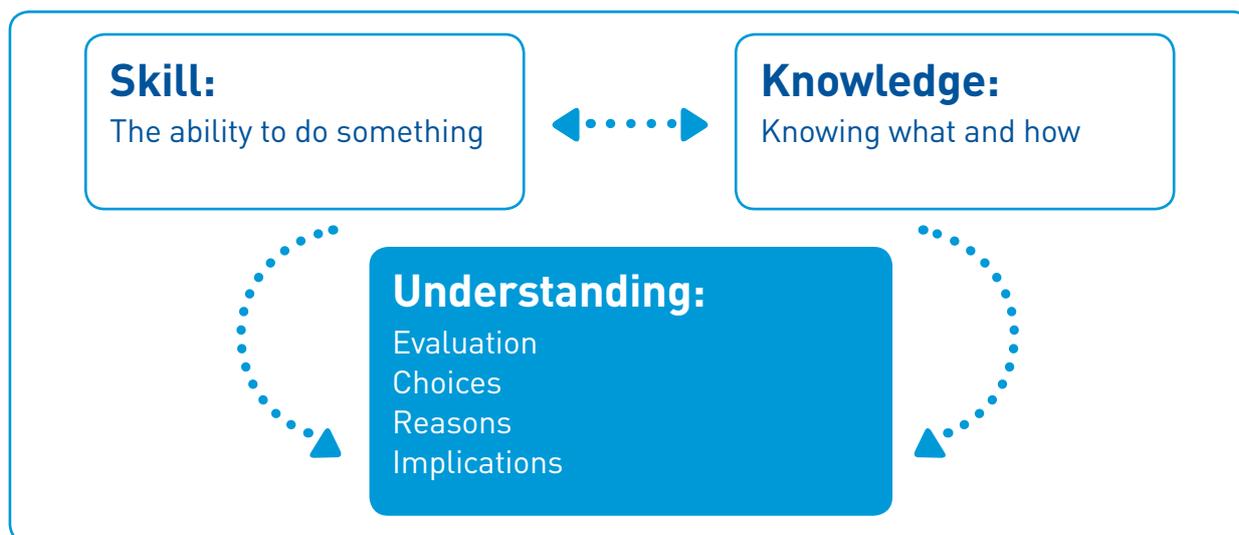
Integrating ICT into the curriculum

22. It has been proposed that in the new primary curriculum the use of technology should be treated as an 'essential skill for learning and life', comparable to literacy or numeracy. This means it will not be a separate area of learning. The 'essential skills' of ICT will be delivered by the teaching and learning of major ICT concepts, skills and processes, built into the six areas of learning. Like literacy and numeracy, technology will be utilised throughout all learning areas, to support subject learning.
23. In this proposal, the rounded development of technology as an essential skill will take place during lessons designed to deliver other curriculum subjects. This means that it is vital that technology is fully utilised and fully supported throughout all learning areas.

24. ICT should be identified as an essential skill that should be developed, used and applied across the curriculum. The teaching of ICT should include an appropriate balance of specialist teaching alongside purposeful opportunities to use, develop and apply ICT in all areas of learning. Most importantly, specific requirements for ICT should be located and prescribed in all areas of learning where ICT directly contributes to the key ideas and processes within that area of learning.
25. We believe this approach has three significant advantages:
- The use of ICT across the curriculum has the potential to enhance the teaching and learning of all subjects, leading to accelerated and deeper learning.
 - The use of ICT in a range of settings and for a range of purposes will help pupils to develop more adaptable and independent understanding of technology.
 - Integration within the statutory order for each area of learning will give greater assurance of acquisition and progression of the essential ICT skills for learning and life.

Digital literacy

26. Skill in the use of technology must be complemented by the development of appropriate knowledge and understanding. The combination of skill in using technology, plus knowledge and understanding, is what we call *digital literacy*. Pupils must develop digital literacy, to ensure their use is safe, confident, and appropriate.



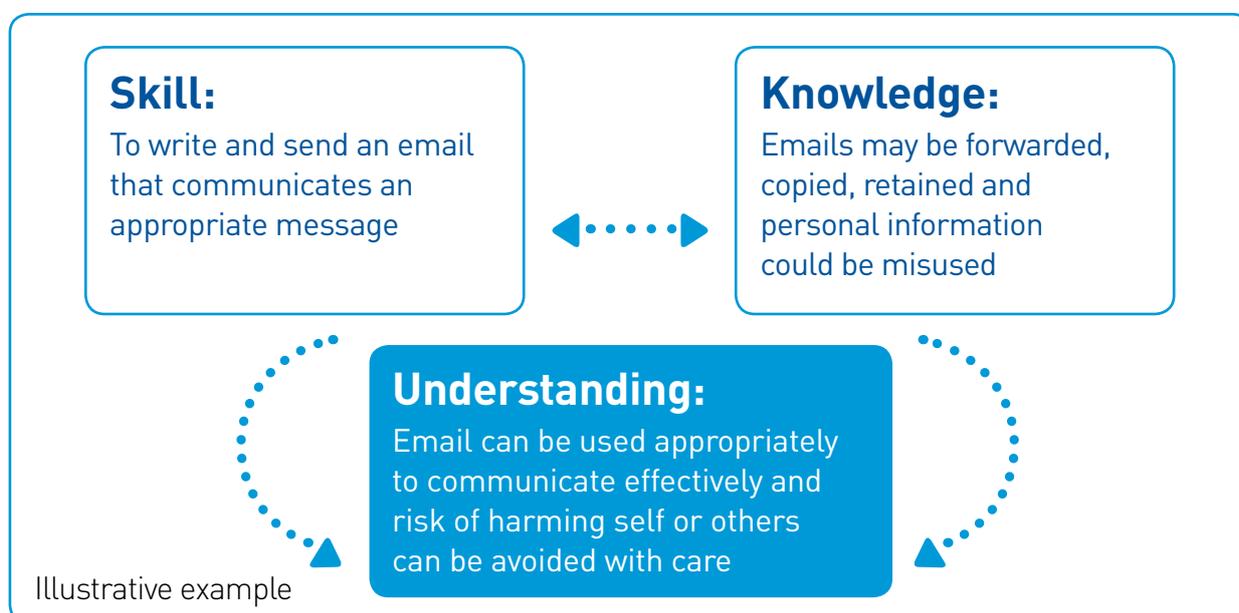
27. This full array of knowledge, skills and understanding will not be acquired by all pupils without good teaching and guidance. If digital literacy is not actively developed via the curriculum, the risk is that technology will be used in a superficial way in many schools, for instance only to enhance the presentation of work, and not for analysing and exploring information.
28. In order to ensure that all young learners are provided with the support and the opportunities to develop technological knowledge, skills and understanding, the curriculum must make explicit the requirement for teachers to utilise and develop the use of technology.

i **Key point: Knowledge, skills and understanding of ICT must be developed by repeated opportunities to develop and practise, with directed teaching and learning activities in all curriculum subjects.**

29. The development of digital literacy will allow pupils' use of technology to become increasingly reflective and considered. By the end of primary education, the young learner should have developed a degree of mastery as well as autonomy. For instance, only by understanding the different uses a range of software applications has, can a young learner develop the confidence to select the correct application for a particular learning activity. The risk is that this understanding will not be developed by all pupils unless there is good support from teachers. Without support, some pupils will leave primary education still lacking digital literacy.

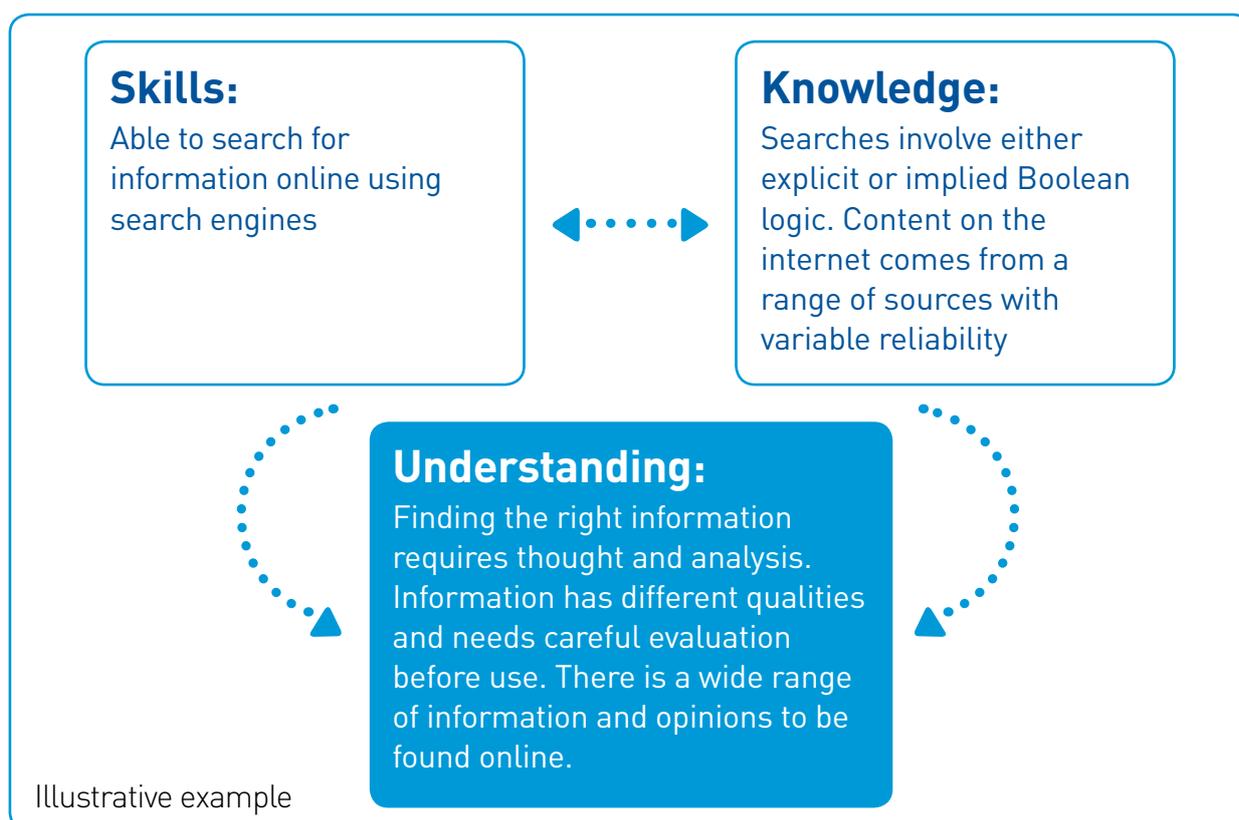
i **Key point: Pupils must develop digital literacy during primary education, in order to be independent learners for the future.**

30. More developed use of technology, which will result from full learning support across the curriculum, will have significant advantages for schools. In particular, we explore below how mature use of technology can help young learners to develop cognitive and learning skills essential for their futures.



31. The requirement to develop digital literacy among all pupils is demanding for teachers. They need to be convinced of the potential that technology opens up for them, and of the risks in failing to realise this potential. They may need support in turn to enable them to develop their own digital literacy.
32. We therefore need to put in place appropriate arrangements to ensure that all schools have the capability and confidence to undertake to develop the digital literacy to which pupils are entitled. It is essential to persuade school leaders and teaching staff to commit to the development of knowledge, skills and understanding of technology for all pupils.
- The development of digital literacy is a learner entitlement which must be guaranteed for all pupils.
33. In conclusion, we argue that technology as an essential skill for learning and life is too important, and too risky, to be left to chance. Appropriate support for this must be available for all primary learners, while not undermining the professional autonomy of teachers or the flexibility of institutions to respond to local needs. Getting this right will require striking a sensible balance between statutory curriculum requirements, support and training for the workforce and strengthened assessment and accountability arrangements.

i **Key point: The implementation of our recommendations will need to balance support for rigorously developing universal digital literacy with the need to give teachers and institutions appropriate autonomy and flexibility.**



Learning skills

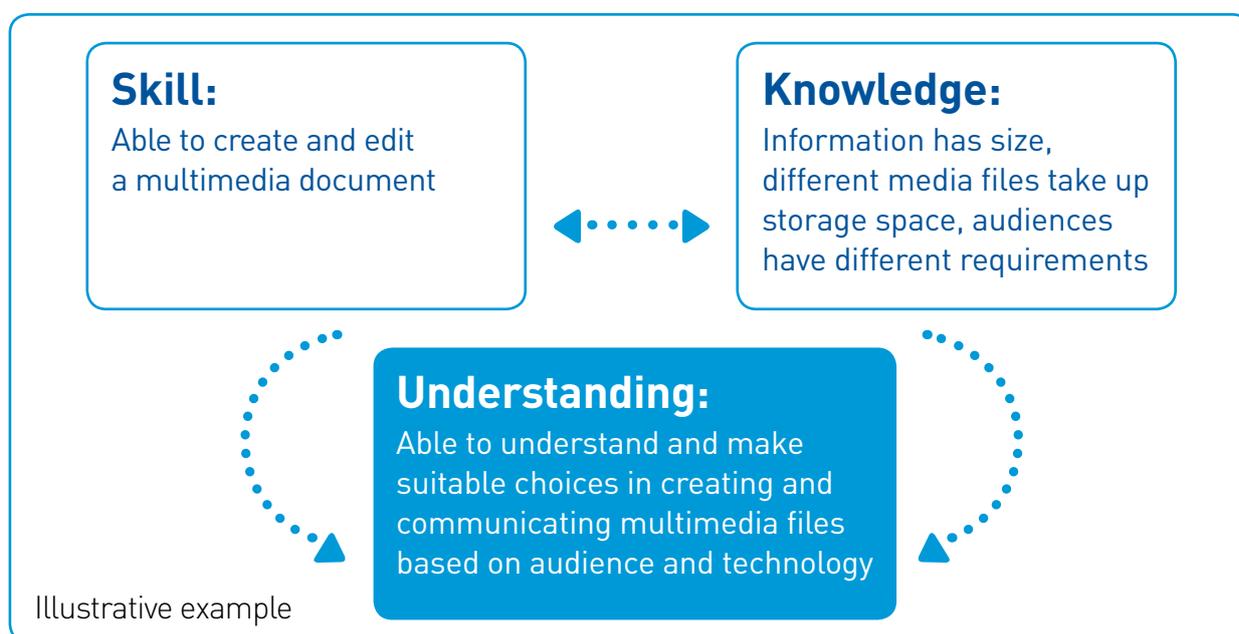
34. If the use of technology is embedded throughout the curriculum, young learners will gain wide-ranging opportunities to practise the learning skills they will need in the rest of their schooling and beyond. The exercise of these skills is not restricted to activities that make use of technology, but technology does provide particularly rich and rewarding contexts for such experiences. If primary pupils are given controlled opportunities to learn in digital contexts and with digital tools, they will have an excellent foundation for later and more independent learning.

Key point: Learners must develop a sense of themselves as learners using a variety of resources including technology.

35. In every learning area technology should become a focus for reflection, study, analysis and evaluation, where this is appropriate. Learners will then begin to use technology in more critical, reflective, and principled ways. They will be ready to tackle unfamiliar technology with some confidence, and with strategies for autonomous safe usage.

Key point: 'Digital literacy' capabilities can help the young learner to be more autonomous, and make learning more enjoyable.

36. The essential 'ICT skills for learning and life', which are central to these curriculum recommendations, must be about more than knowing how to use technology. They must be supported by knowledge and understanding – and this combination will enable pupils to develop their digital literacy.
37. The 'essential skills' listed on page 12 must therefore be considered as skills supported by knowledge and understanding.



38. It is important to realise that these essential skills are not developed or used sequentially, but simultaneously. For example, a young learner does not 'access' information independently of 'evaluating' it. Making an effective 'communication' typically involves an element of 'creation' and so on. The diagram on page 13 shows how the essential skills will interact to create mature ICT competency.

Defining the Essential ICT Skills for Learning and Life

39. In Becta's view the essential ICT skills for learning and life are the abilities to use technology to:

Find and select information from digital and online sources, making judgements about accuracy and reliability.

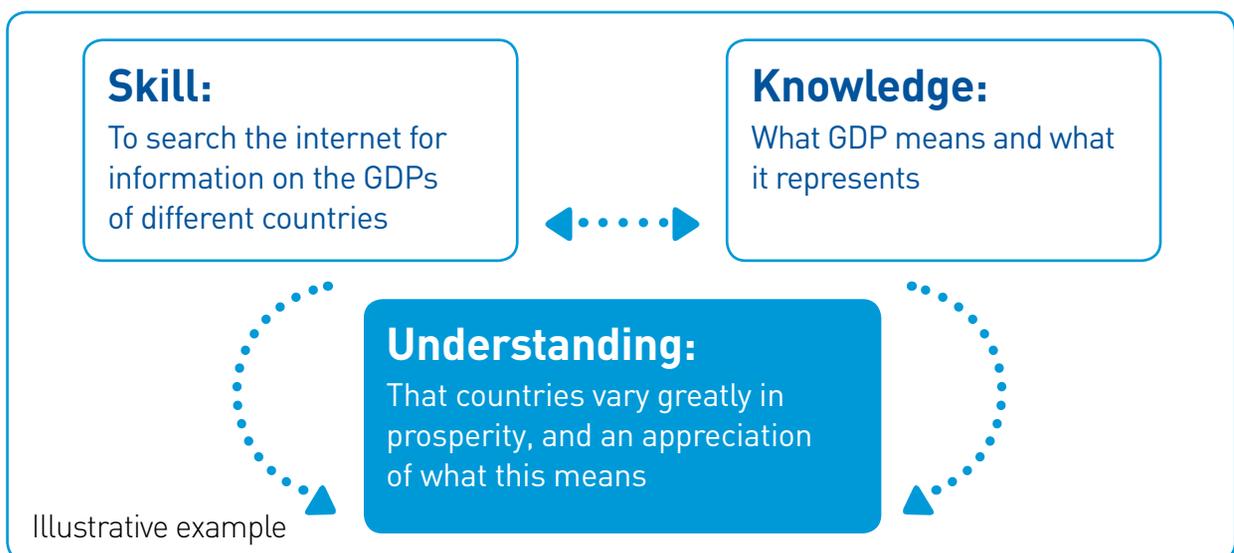
Create, manipulate and process information, using technology to capture and organise data, in order to investigate patterns and trends; explore options using models and simulations and combine still and moving images, sounds and text to create multimedia products.

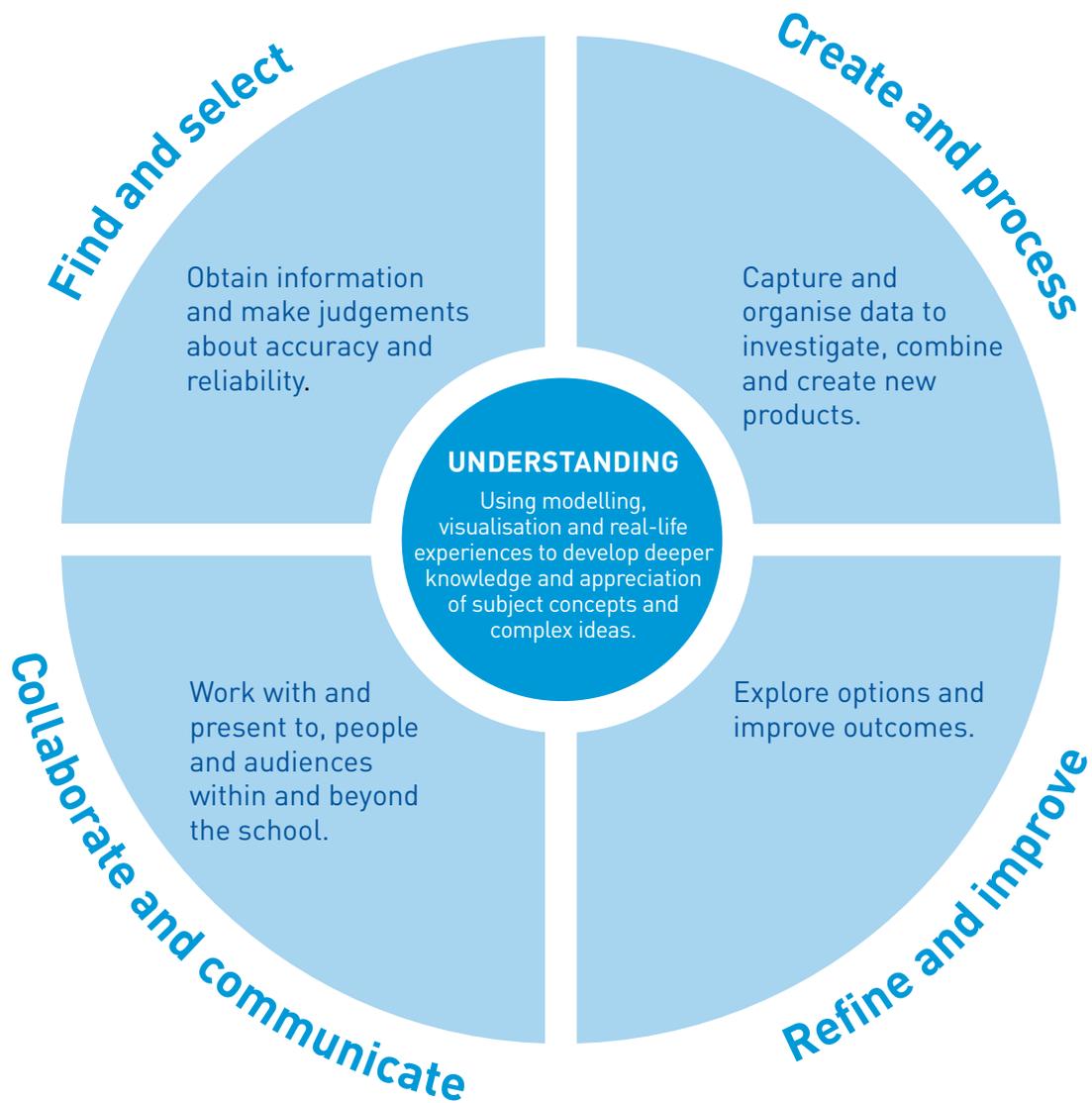
Collaborate, communicate and share information using connectivity to work with and present to, people and audiences within and beyond the school.

Refine and improve their work, making full use of the nature and pliability of digital information to explore options and improve outcomes.

All of these skills will develop in combination and lead to:

Understanding: using modelling visualisation and real life experiences to develop deeper knowledge and appreciation of subject concepts and complex ideas.





40. Learning confronts the learner with a number of demands for which knowledge, strategies and skills need to be developed. Examples include critical reflection, personal organisation, self motivation, and orientation to learning. The opportunities for more independent learning opened up by the use of technology can help pupils to develop these learning strategies.
41. The development of digital literacy is strongly linked to these wider learning strategies. As digital literacy is integrated into curriculum design and delivery, teachers will have more opportunities to develop pupils' learning strategies.
42. Of course, technology cannot guarantee deep learning, but it can provide useful tools and opportunities. The key is to engender an active search for sense and meaning in the learner.

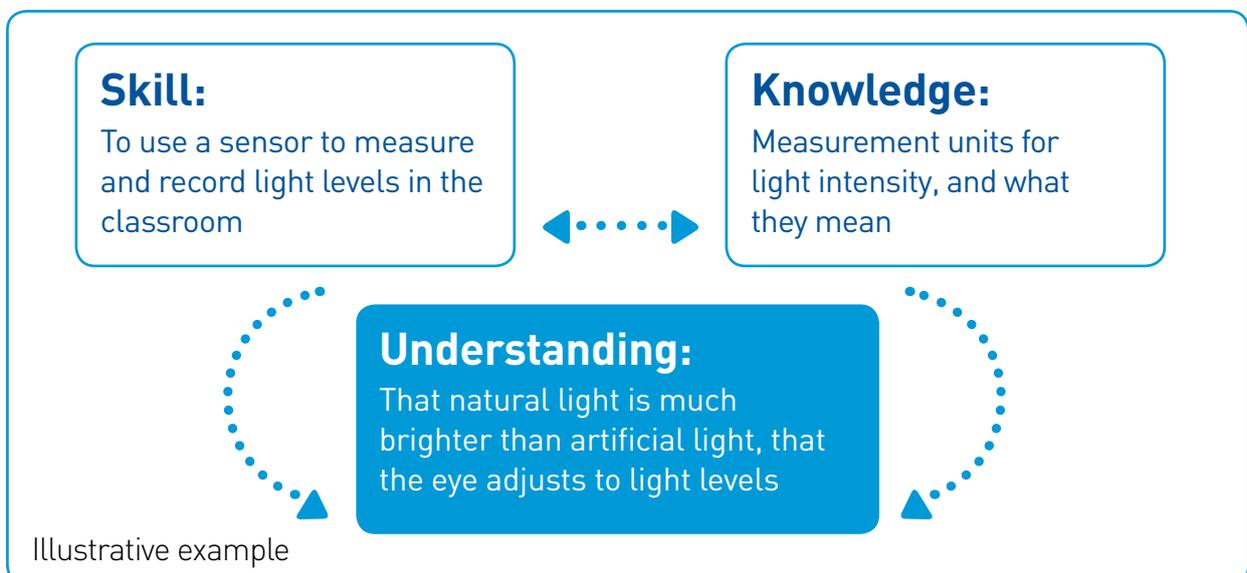


Key point: Use of technology in primary schools can lay the foundations for lifelong learning – but only if it is supported by an appropriate pedagogy (see page 19).

Embedding technology in curriculum design

43. It is important to ensure that the process and strategies of learning with technology are delivered as an explicit focus in scheduled lessons. Teachers in the process of teaching other subjects will occasionally have to break off, or change focus, to bring out a point related to the technology in use. Primary school teachers must be able and willing to undertake such activities. This may require additional support and guidance, as teacher confidence and expertise in the use of technology currently shows considerable variance.
44. ICT must therefore be embedded in the curriculum design process. Opportunities to use technology must be curriculum-relevant, timely, age-appropriate, effective and efficient. They must not be haphazard or superficial. The use of technology to extend and transform learning goals and processes must be considered at all stages of curriculum design and planning for implementation. The pedagogy of subject matter and the functionality of the technologies must be combined.
45. In the present National Curriculum arrangement, ICT is not fully incorporated in the general curriculum in a systematic manner. Learning in any subject must in the future include appropriate experiences with the kinds of ICT tools and practices that serve to meet the intellectual and practical demands of each discipline – where this is appropriate and adds real value to the quality of the learning experience and outcomes.
46. Successful integration of technology in curriculum design and delivery might be implemented in one of several different ways. Design teams could be established to provide nationally defined materials and examples of activities; the commercial sector, perhaps in partnership with local authorities, could meet the demands at a more local level; or schools might create their own curriculum planning teams to meet generally defined learning goals. Technical support will also be required, and models for achieving this will need to be considered.

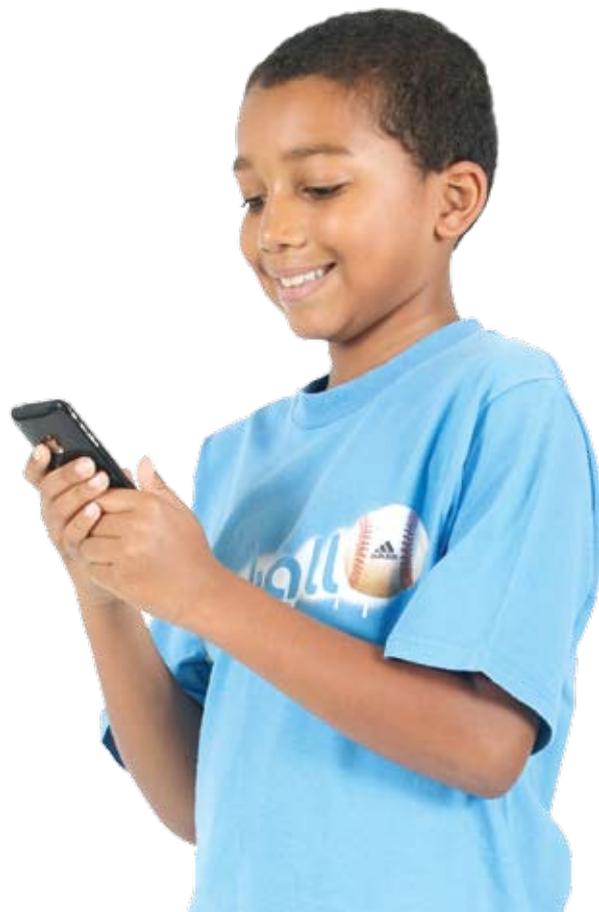
i Key point: Issues of implementation need to be explored in some depth and resolved. Becta is in a position to offer concrete support in this difficult process.



E-safety

i **Key point: Just as technology must be effectively harnessed to support learning across all subjects, digital literacy for e-safety must underpin the primary curriculum.**

47. 'Technology offers extraordinary opportunities for all of society including children and young people.' This opening statement from the Byron Review goes on to say that the internet allows for global exploration which can also bring risks, often paralleling those present in the offline world.
48. The term e-safety covers a broad range of issues around the need to ensure that children's and young people's experience and engagement with technologies is a safe and positive one. While parents, educators, government and industry all have a role to play in keeping children and young people safe, supporting them to become independent in online environments is critical to nationwide, effective e-safety. 'Independence' does not mean here that they are expected to deal with every incident themselves: it means that they develop social skills (including resilience); that they know how to identify and manage risk; that they understand their rights and responsibilities and know how to access help and advice if needed.
49. In this respect, e-safety is a key component of a broader digital literacy education. Digital literacy covers a range of knowledge, skills and understanding to ensure everyone can get the most out of their engagement with technology. It includes e-safety and well-being, but also includes collaboration and communication skills, rights and responsibilities, ethical and environmental understanding, commercial practices, privacy and security issues, along with the ability to find, evaluate and apply information.



50. Some of these skills can be highly complex. However, there are ways of supporting even very young learners to understand important and relevant concepts, such as keeping oneself safe and helping others when using technologies. Conceptually, the knowledge, skills and understanding supported within the framework of digital literacy are the same as those outlined in *Every Child Matters* – being healthy, staying safe, enjoying and achieving, making a positive contribution and achieving economic well-being.
51. The risks to children and young people are typically identified as belonging to four areas:
- **Contact:** This includes the risk of physical assault or abuse associated with online grooming to engage the interest and trust of a child or young person.
 - **Content:** This refers to illegal content, for example material that incites racial hatred, or age-inappropriate content.
 - **Commerce:** For example exposure to inappropriate advertising, online gambling and financial scams.
 - **Conduct:** Anti-social or illegal behaviour. This includes cyberbullying, the use of technology including mobile phones to cause embarrassment or distress. Cyberbullying incidents are a cause for concern in many primary schools and it is vital that schools understand the issues, and are familiar with strategies for prevention and response to incidents.
52. Research shows us that children are starting to use technologies from an earlier and earlier age. In the same way that we teach children how to be safe when they cross a road, supporting them to become independent when the time is appropriate, we need to equip them with the necessary skills and tools to stay safe when using online and mobile technologies.
53. Schools are seen as safe places for children to use ICT. The combination of classroom staff supervision, the use of filters, monitoring software and rules and procedures for using technology has meant that the likelihood of children coming across inappropriate material or making unsuitable contacts is greatly reduced. However, schools must educate for life beyond the classroom. The Byron Review has said that messages around e-safety must be extended to cover times that children are not at school or in the family home. Helping children to learn about managing their information online (for example, social networking service profile pages, photographs and films) and understanding the potential impact and audience of information they post online is crucial.
54. The internet offers valuable opportunities for research, in turn presenting the need to be able to critically evaluate information found online. Schools need to support young people in developing the knowledge, skills and understanding needed to approach all materials thoughtfully and analytically.

55. Children need support to make sense of the plethora of online information, and develop strategies to make independent assessments of validity and bias. Digital and media literacy play a key role in helping children and young people to broaden and deepen their knowledge, skills and understanding of new technology. This is an important instance of the cognitive understanding and higher order thinking skills which we have identified as crucial within a well-rounded primary education.
56. Schools are familiar with the need to educate children about potential 'stranger danger'. While this message still needs to be delivered, to be safe in all aspects of their lives children need to build the confidence, resilience and critical skills to deal with a wide range of potentially risky situations. E-safety is a necessary component of this overall capability for self-protection.
57. As well as needing a variety of skills and knowledge in order to use the internet safely and effectively, children will also need to understand the impact that online behaviour can have on others. Cyberbullying has been mentioned already, but the growing practice of sharing personal information and material such as photographs and video, is giving rise to a need for understanding of responsibility when publishing online. Even young children will need support to understand the concepts of privacy, of permanence once material is online, and appropriateness of behaviour.
58. In order for schools to be able to deliver e-safety effectively, teachers and those who work in schools need to have access to high-quality effective and up-to-date CPD, which takes account of the ways in which children are engaging with technology, within school and elsewhere. Again, Byron suggests that e-safety be identified as a national priority for the continuous professional development of teachers and the wider school workforce. Support materials need to be made available in the same way that they are for literacy and numeracy.
-  **Key point: Effective e-safety education is far more than just a set of 'don't dos' and warnings. E-safety should be delivered within the broader context of 'essential technology skills for learning and life' (including the development of associated knowledge and understanding), as a process of risk management.**
59. The drive to keep learners safe, and the commitment to make them autonomous and confident users of technology, are not in conflict. In fact these two drivers support each other. By giving young people confidence and critical skills we can make them both more independent and safer users.
60. We have shown that ICT skills for learning and life must include skills of evaluation as well as access to information. These skills must be underpinned by knowledge of issues such as information bias, personal digital rights and responsibilities, and of course understanding of security and e-safety. It is clear that a grounding in e-safety is an essential aspect of digital literacy.

i Our recommendations: protective screening of IT use in schools is necessary, but equipping our young people to move safely through the virtual world requires much more than this.

- Young people must be taught safe behaviours within the range of critical digital literacy knowledge, skills, and understanding.
- Practitioners also need to be supported in gaining digital literacy skills, and as is common in all professions, be encouraged to and supported in, maintaining up-to-date knowledge.
- Keeping children safe is a process of risk management which is most effective when empowering young people to look after themselves and contribute positively to their communities.
- Inappropriate contact is but one danger. Young people need to be aware of the broad range of risks, rights and responsibilities that accompany the opportunities presented by new technologies, in order to make safe and effective use of them.



Transforming pedagogy

61. As technology is fully utilised in the classroom we expect to see a transformation of pedagogy. This short section sets out some of the ways in which pedagogy in the primary classroom could be transformed by the impact of technology.

Personalisation

62. Technology makes greater personalisation of learning possible. When pupils work online, and their work is assessed and managed online, it is possible for each learner in a class to experience his or her own personal route to learning success. Teachers can have immediate access to rich information on each learner's progress, and can potentially direct each learner to the appropriate materials to support his or her learning journey.
63. Some learners, in some contexts, need their learning to be carefully paced. Others will want to go faster. Less secure learners may wish to practise and revisit skills and knowledge quite often. It can be practically and emotionally easier for a young learner to take risks and make mistakes when they are working online, with technology, than when they are working on paper and face to face with the teacher.
64. Personalisation is also useful in helping the educator and the institution to address the needs of a wider range of learners, including those from different ethnic and social backgrounds, or with different personal and special needs.
65. Use of technology as a tool for personalisation is not yet fully developed in education in this country. Developing more sophisticated personalisation will require considerable development of resources and increasing sophistication of learning platforms and content management systems, as well as support and professional development for teachers to extend the range of pedagogical approaches.

 **Key point: Technology will transform education by personalising it to the needs and preferences of each learner. Changes to the curriculum must reflect this transformation.**



Formative assessment

66. Integrating the data gathering, recording and representing functions of ICT in the curriculum will provide learners and teachers with opportunities for improved formative assessment. The use of technology for full assessment of learning activities will give teachers the means to track and evaluate patterns of achievement across different areas of learning.
67. Formative assessment will also contribute to the pedagogical knowledge of teachers by scaffolding their understanding of the 'deeper' structure of knowledge and skills, a structure that also constitutes a developmental account of what children learn.
68. Experts in subject pedagogy will be needed to explicate and illustrate the deeper structure of their domain knowledge. They will also have the knowledge needed to incorporate and illustrate activities likely to yield information useful for formative assessments and designed to provide each learner with personalised feedback and knowledge of impact. This is one way in which the effective integration of ICT in curriculum design will contribute to the personalisation of the learner's learning experience.
69. Working in collaboration with those with expertise in ICT, learning and teaching, design teams should include embedding of formative assessment as a goal of the design process from its inception.
70. Again this reminds us of the need to strike a balance between gaining the benefits of ICT and the need to avoid unrealistic and unworkable demands on teachers and schools. Linkage between curriculum innovations and the professional development of teachers will have to be forged if innovation is to be significant.



Key point: Better formative assessment has many benefits for pedagogy, but the commitment required to achieve these benefits should not be underestimated.

Learner collaboration

71. Collaboration between learners on joint projects is an alternative to whole-class teaching and to individual activities. While it does not replace either of these modes of learning, collaborative learning provides young people with the opportunity to develop additional skills and approaches. Examples include co-operation, the ability to give and receive constructive feedback, planning and communication. These skills are valuable in their own right as part of personal and social development, support learning across the curriculum, and are important in employment and social participation.
72. As with personalisation and assessment for learning, collaboration does not necessarily require the deployment of technology: these pedagogical methods were employed within classrooms before modern technology was available. However, appropriate use of technology can provide enhanced opportunities for collaboration, can help the teacher to manage collaborative learning, and can help learners to develop a wider range of collaborative skills.

73. For example, technology can give a team of learners joint access to shared files, provide facilities for tracking changes, allow reviewing and commenting, and enable easy editing. Technology also enables collaboration between learners who are not able to meet face to face, for instance from other schools. The technological facilities which are used to support collaborative working in business contexts can be employed to support collaborative learning.
74. However, technology alone does not guarantee appropriate and successful collaborative learning. This will depend on the appropriate use of the technology in the context of a well-founded pedagogy.

 **Key point: Technology can support collaborative learning, if it is deployed appropriately, and can make it easier for teachers to manage collaborative activities.**

CPD: Technology to support teacher self-development

75. Realising the vision we have set out here will make many demands on teaching professionals. There is a pressing need, when thinking about the future of the primary curriculum, to consider how teachers can be given professional development to enable them to rise to the challenges we have set.
76. Teachers will need opportunities for Continuing Professional Development (CPD) to help them to make best use of the continually changing portfolio of technologies. The ever-changing nature of technology means that teachers of all ages will require supplementary skills development throughout their teaching careers. However it is important that such development opportunities are not limited to specific technology applications, but are linked to the tasks which teachers face in their professional lives. For example, rather than learning a particular software package, as an abstract tool, it will be more helpful to teachers to learn how to utilise technology to improve significant aspects of their working lives such as lesson planning or administration.
77. As well as the development of skills in the directed use of technology Becta's evidence convinces us that CPD to help develop the pedagogical knowledge and skills of teachers will be vital in realising the benefits of technology. Evidence from the UK and from international sources tells us that technology will only bring about improved pedagogy when schools and teachers are prepared and ready to use it. Technology is not enough to guarantee improvement, but a desire to improve classroom practice can lead to better use of technology.
78. In addition to CPD to develop technological skills and new approaches to pedagogy, there are demands specific to the primary teacher which CPD could help with. Primary teachers will be required to support deeper learning across a wide range of curriculum subjects, some of which will not be areas of previous specialism. This means they will need accessible development opportunities across all learning areas.
79. Technology is already playing a major role in CPD not only in the UK but elsewhere (Denmark and Finland have particularly well advanced ICT-based programmes in place) and our recommendation is that the review process leads to implementation strategies that consider models for exploiting ICT in teacher development in the light of international experiences already gained in the area.

80. Models for ICT CPD need to be able to address major individual differences between teachers' needs and motivation levels. Teachers need to learn what works for them as their learning is highly situated. ICT CPD should grow out of a teacher's own needs and deep knowledge about their learners in their school. Subject areas should be catered for more equitably. Some are not well catered for, which has been linked with limited perceptions of what ICT can do to enhance subject-specific pedagogy. CPD needs to be in touch with everyday life, involving teachers in using technologies outside of school, so that their practice is informed by real-world knowledge and applications.
81. A potential barrier to ICT CPD is staff not knowing what the gaps are in their own ICT knowledge. Many LAs and schools have found an ICT audit mapped to the curriculum a valuable tool in helping staff gain a clear indication of the ICT skill, competencies and pedagogies they need to have. This can support the creation of individual targets as part of their performance management.

 **Key point: The benefits of technology will only be realised through appropriate classroom usage. Technology makes demands on teachers, but it can also be used to help teachers learn new skills and expand their understanding of both subject content and teaching strategies.**

Technology to manage the curriculum

82. The evidence from leading practice schools and research programmes is that schools' use of technology is maturing and becoming more integrated. It is therefore important to make assumptions looking forwards based on this evidence rather than on a static current position.
83. Increasingly schools are integrating functionalities of different technologies such as learning platforms and management information systems (MIS) for improved planning, monitoring, access, assessment and management of the curriculum. Safe and secure access within and beyond the school allows for staff, learners and their parents and carers to:
- **Develop and manage the curriculum** – using learning platforms staff in schools are able to collaborate and develop more flexible curriculum models with opportunities to engage the needs of all pupils. These can be shared and developed both within and beyond the school.
 - **Track progress** – increasing use of technology for keeping portfolios of work and assessment data is providing efficient and effective practices for tracking progress through the curriculum. Data can be used to monitor, analyse and diagnose the curriculum needs for cohorts or individual pupils. The information provides staff with a holistic view of learner progress against curriculum planning as well as keeping parents and carers more informed and engaged.
 - **Extend learning opportunities** – technology enables learning and access to the curriculum to continue beyond the school. Learning platforms allow continued collaboration between peers and access to personalised resources and approaches to support the needs of all learners.
 - **Enrich the curriculum** – technology offers access to personalised curriculum opportunities otherwise unavailable within the classroom, through interactive resources or access to specialists and experts – allowing for rich and diverse experiences.

Assuring progression

84. The Children's Plan states that 'the curriculum should help children move seamlessly... from primary to secondary education' (para. 3.5) and that 'By age 11, all children should be ready for secondary school' (para. 3.12).
85. Technology should be identified in the new curriculum as an essential skill for learning and life. It is therefore necessary for pupils' successful transition to secondary education that they are equipped with this essential skill, and are ready to use technology as appropriate to support their learning. Secondary teachers must be able to rely on the digital literacy of pupils, just as they can rely on the essential numeracy and verbal literacy skills that will be required to support subject learning. Young people on leaving primary education must therefore be able to make intelligent and discriminating use of technology, and they must be ready to use technology independently to support subject learning. This is a learner entitlement.
86. In order to ensure that all young learners are equipped with the essential technological knowledge, skills and understanding to which they are entitled, there must be a strong practical definition of the capabilities to which all pupils are expected to progress by the end of Key Stage 2. This includes the skills necessary to make use of technology, and appropriate conceptual understanding to enable young learners to reflect on their use and make appropriate choices in selecting and deploying technology.

i **Key point: Pupil entitlement for technological capability must be defined. This must not only be a definition of the end point of Key Stage 2, but also encompass an expected progression through the whole of primary education.**

87. An important issue for the primary curriculum is how this progression will be assured. Essential knowledge, skills and understanding will be delivered within lessons and activities which focus on learning areas such as 'Human Social and Environmental Understanding', and a decision will have to be made as to how this integration will be achieved and assured.

As part of the assurance process the assessment of ICT skills must be strengthened. Formative assessment of pupils' developing knowledge, skills and understanding must take place within the learning areas in which this has been developed. These formative assessments should then be combined to give a summative assessment of pupils' achievement at the end of Key Stage 2. Parents and others must be fully informed about the level of ICT attainment, as they would be for the other essential skills of literacy and numeracy.

88. Teachers will need support and guidance in precisely what needs to be delivered, and how pupils' knowledge, skills and understanding can be expected to develop and progress over the course of Key Stages 1 and 2.

89. Once the entitlement for all learners in relation to the essential skill of technological capability has been fully expressed, attention must be paid to how progression will be determined and assured for all pupils.
90. Digital literacy must be delivered by all teaching staff. We acknowledge that this is a challenge for educational professionals, and those who support them, but this challenge must be faced.



Key point: The assurance of learner progression is essential. Schools must monitor pupils' progress towards the level of digital literacy which has been determined to be 'essential for learning and life'.

Conclusion

91. In the existing National Curriculum, ICT is a subject with its own programme of study and assessment. Because it is an underpinning and essential area for all subjects, and for future learning and work, it has been recommended that it should be regarded as an essential skill for learning and life, alongside literacy and numeracy.
92. Learners will require opportunities to utilise technology in their own work, to develop the skills for safe and effective use, and to reflect on and understand this usage. Curriculum development will be required to ensure that such opportunities are provided, and to ensure that all pupils are given the opportunity to progress. Becta will support this curriculum development, and develop more detailed models of good practice. In particular, this means a fully developed picture of what progression in ICT looks like, and of the level of capability and maturity of use which is our goal by the end of Key Stage 2, and for adults emerging from the education system.
93. Classroom activity in support of this essential skill for learning and life must be characterised by progression – a coherent development from the most basic and introductory use in early school years to a mature and reflective capability which will prepare the learner for secondary education and lifelong learning. The development of mature capability cannot be left to chance opportunities arising in an unsystematic way, and it must be supported by an underpinning model of knowledge, skills and understanding, and monitored to ensure that no young learners are left behind.

i **Key point: Becta can help to develop a systematic model of skills progression and assessment which will ensure all young people leave primary education with the essential knowledge, skills and understanding to use technology for learning and life.**



94. If the support for ICT usage in the primary school remains unsystematic, variable and unreflective then there are two significant dangers: the first is that young people with ready access to technology out of school will develop an incomplete and unreflective capability, unsupported by adult guidance, with risks both to their learning progress and their safety. The second is that a digital underclass, lacking opportunities for wide-ranging use of technology, will be permanently excluded from a world mediated by ICT.



Key point: There are significant serious risks if the development of technological capability is not improved in primary education.

95. In conclusion, Becta welcomes the direction of the Interim report of this review, which reflects our views on the future development of the Primary Curriculum.
96. We believe that the realisation of the benefits of ICT for the Primary Curriculum will require actions from Becta, and from Government and partner agencies. Among the latter we propose:
- Assurance from Government that the Harnessing Technology grant which is available to schools to spend on developing their technological capability is appropriately directed in all cases at improving ICT resource.
 - Full use of the assessment and reporting system to ensure that schools monitor pupils' progress towards the level of digital literacy which has been determined to be 'essential for learning and life', and that parents and others are fully informed about the level of ICT attainment, as they would be for the other essential skills of literacy and numeracy.
 - Inspection arrangements and reporting should reflect the requirement for primary schools to prepare pupils for independent and mature use of technology in secondary education and beyond. ICT use across the curriculum should be the object of informed inspection.
97. Becta will undertake to:
- Work closely with QCA to clarify the end of KS achievement which is appropriate at the end of KS2.
 - Work to ensure that all pupils have access to technology in the home, via a programme of targeted support, so that teachers, schools, and providers can plan with an assumption of universal provision.
 - Campaign to ensure that parents and other educational stakeholders are informed about the benefits that technology can bring within education, and empowered to demand that the use of technology in schools reaches this standard in all cases.
98. And finally, a range of activities will require Becta to work in partnership with other groups and stakeholders. Because of the emphasis on essential ICT skills in the new curriculum, these changes must be supported by the National Strategies, to ensure that teachers understand how to deliver them across the curriculum. Becta will work closely with the National Strategies to develop a programme of support for teachers.

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