

**INITIAL TEACHER TRAINING NATIONAL CURRICULUM  
FOR THE USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY  
IN SUBJECT TEACHING**

**A. EFFECTIVE TEACHING AND ASSESSMENT METHODS**

- 1. Trainees must be taught how to decide when the use of ICT is beneficial to achieve teaching objectives in the subject and phase, and when the use of ICT would be less effective or inappropriate.** In making these decisions, **trainees must be taught how to take account of the functions of ICT** and the ways that these can be used by teachers in achieving subject teaching and learning objectives. This includes:
- a.** how the **speed and automatic functions** of ICT can enable teachers to demonstrate, explore or explain aspects of their teaching, and pupils' learning, more effectively;
  - b.** how the **capacity and range** of ICT can enable teachers and pupils to gain access to historical, recent or immediate information;
  - c.** how the **provisional nature** of information stored, processed and presented using ICT allows work to be changed easily;
  - d.** how the **interactive way in which** information is stored, processed and presented can enable teachers and pupils to:
    - i.** explore prepared or constructed models and simulations, where relevant to the subject and phase;
    - ii.** communicate with other people, locally and over distances, easily and effectively;
    - iii.** search for and compare information from different sources;
    - iv.** present information in ways which are accessible in different forms for different audiences.

**Trainees should be taught what the implications of these functions are for achieving teaching objectives in the relevant subject(s), e.g. in mathematics and science, the use of a calculator or a spreadsheet may remove the tedium of repetitive calculations and enable pupils to focus their attention on an emerging numerical pattern or the relationship between successive readings.** However, trainees must be made aware when pupils' skills in mental or written calculation are not being developed and therefore the activity may not suit the particular teaching objectives in hand.

**2. Trainees must be taught how to use ICT most effectively in relation to subject-related objectives, including:**

- a. using ICT because it is the most effective way to achieve teaching and learning objectives, not simply to motivate pupils or as a reward or sanction for good or poor work or behaviour;
- b. avoiding the use of ICT for simple or routine tasks which would be better accomplished by other means;
- c. knowing that, where ICT is to be used, appropriate preparation of equipment, content and methodology is required;
- d. avoiding giving the impression that the quality of presentation is of overriding importance and supersedes the importance of content;
- e. structuring pupils' work to focus on relevant aspects and to maximise use of time and resource, *e.g. teaching pupils to refine searches rather than allowing pupils to search freely on the Internet or on CD-ROM;*
- f. having high expectations of the outcomes of pupils' work with ICT, including:
  - expecting pupils to use ICT to answer valid questions appropriate to the subject matter being taught;
  - when appropriate, requiring pupils to save work, and evaluate and improve it;
- g. making explicit the links between:
  - i. the ICT application and the subject matter it is being used to teach;
  - ii. ICT and its impact on everyday applications.

**3. For those aspects of lessons where ICT is to be used, trainees must be taught to identify in their planning:**

- a. the way(s) in which ICT will be used to meet teaching and learning objectives in the subject;
- b. key questions to ask and opportunities for teacher intervention in order to stimulate and direct pupils' learning;
- c. the way(s) in which pupils' progress will be assessed and recorded;
- d. criteria to ensure that judgements about pupils' attainment and progress in the subject are not masked because ICT has been used;

- e. any impact of the use of ICT on the organisation and conduct of the subject lesson and how this is to be managed;
  - f. how the ICT used is appropriate to the particular subject-related objectives in hand and to pupils' capabilities, taking account of the fact that some pupils may already be very competent, *e.g. because of home access or through participation in extra-curricular ICT activities*, and some may need additional support.
- 4. Trainees must be taught the most effective organisation of classroom ICT resources to meet learning objectives in the subject, including how to:**
- a. use ICT with the whole class or a group for introducing or reviewing a topic and ensuring that all pupils cover the key conceptual features of the topic, *e.g. through the use of a single screen or display*;
  - b. organise individuals, pairs or groups of children working with ICT to ensure that each participant is engaged, that collaborative effort is balanced, and that teacher intervention and reporting back by pupils takes place where appropriate;
  - c. make ICT resources available to pupils for research or other purposes which may arise either spontaneously during lessons or as part of planned activity, ensuring that the resource is used profitably to achieve subject-related objectives;
  - d. position resources for ease of use, to minimise distraction, and with due regard to health and safety;
  - e. ensure that work done using ICT is linked to work away from the screen, allowing ICT to support teaching rather than dominate activities, *e.g. providing sufficient desk/floor space around the hardware to enable the ICT to be used with other materials; providing space to write as well as input from the keyboard; positioning ICT so that pupils are able to sit facing the teacher when required.*
- 5. Trainees must be taught to recognise the specific contribution that ICT can make to teaching pupils with special educational needs in mainstream classrooms based upon the need to:**
- a. provide access to the curriculum in a manner appropriate to pupils' needs;
  - b. provide subject-specific support.

6. **Trainees must be taught how to choose and use the most suitable ICT to meet teaching objectives, by reviewing a range of generic and subject-specific software critically, including how to:**
  - a. assess its potential for helping to meet teaching objectives;
  - b. judge its suitability for the age of pupils, their stage of development, and their prior experiences, taking account of language, social and cultural background;
  - c. evaluate the success of its use in relation to teaching objectives.
  
7. **Trainees must be taught how to contribute to the development and consolidation of pupils' ICT capability** within the context of the subject being taught through:
  - a. explicit discussion and, where necessary, teaching of the ICT skills and applications which are used in the subject;
  - b. using ICT terminology accurately and appropriately, and explaining to pupils any ICT terminology which arises from the application of ICT to the subject;
  - c. using ICT in ways which provide models of good practice for pupils, and insisting that pupils employ correct procedures when using applications.
  
8. **In order to understand how to monitor, evaluate and assess their teaching and pupils' learning in the subject when using ICT, and to evaluate the contribution that ICT has made to the teaching of their subject, trainees must be taught:**
  - a. how to **monitor pupils' progress** by:
    - i. being clear about teaching objectives and the use of ICT in achieving them;
    - ii. observing and intervening in pupils' ICT-based activities to monitor and support their progression towards the identified objectives;
    - iii. asking key questions which require pupils to reflect on the appropriateness of their use of ICT;
  
  - b. **how to recognise standards of attainment in the subject** when ICT resources are used, including:
    - i. recognising how access to computer functions might change teacher expectation of pupil achievements, *e.g. automatic spell-checking, image-making, graphical representation*;

- ii. identifying criteria by which pupils can show what they have learnt as a result of using ICT-based resources from the Internet or CD-ROM, and insisting that pupils acknowledge the reference sources used in their work *e.g. requiring pupils to interpret and present the information gained from a CD-ROM for a specific purpose rather than simply printing off information;*
  - iii. how to determine the achievement of individuals when the “product” is the result of a collaborative effort, through observation, record keeping, teacher intervention and pupil-teacher dialogue;
  - iv. how to ensure that assessment of ICT-based work reflects pupils’ learning and the quality of their work within the subject(s) rather than just the quality of presentation or the complexity of the technology used;
- c. how to use **formative, diagnostic and summative methods of assessing pupils’ progress in the subject where ICT has been used**, including how to set up ICT activities with targeted objectives for assessment and make provision in those activities for all pupils to demonstrate achievement, conceptual understanding and learning through the use of ICT.

**9. In addition, trainees on courses providing for pupils aged 3-8 and 3-11 must be taught the importance of introducing pupils in nursery and reception classes to the use of ICT and to recognise the contribution that ICT can make to this age group, including how to:**

- a. encourage pupils to become familiar with ICT and positive users of it;
- b. ensure that all pupils have opportunities to use ICT, and that their experience takes account of any home use or other previous experience of ICT;
- c. identify and teach the skills necessary for handling input devices effectively, *e.g. switches, mouse, keyboard;*
- d. use ICT to support the development of language and literacy, through the use of programs which develop reading and writing, *e.g. to reinforce letter/sound correspondence*, and encourage pupils to engage with stories, songs and rhymes presented on the screen, as well as through the use of high quality educational broadcasts;
- e. use ICT to support the development of numeracy through the use of computer programs and robots which develop and reinforce the use of mathematical language, and the recognition and exploration of numbers, simple mental operations and patterns;

- f. use ICT to support pupils' creative development through the use of computer programs which encourage them to explore and experiment with pattern, shape, pictures, sound and colour;
- g. encourage pupils working collaboratively with ICT to share responsibilities for making decisions and reaching conclusions, *e.g. as they progress through a simple computer adventure game.*

## **10. Opportunities to practise**

Trainees must be given opportunities to practise, in taught sessions and in the classroom, those methods and skills described above.

## **B. TRAINEES' KNOWLEDGE AND UNDERSTANDING OF, AND COMPETENCE WITH, INFORMATION AND COMMUNICATIONS TECHNOLOGY**

### **Knowledge, understanding and skills in using ICT in subject teaching**

Trainees enter initial teacher training with a variety of experiences in ICT. For many, their own knowledge and understanding of ICT may not be sufficient to ensure that they understand how to use ICT in ways which support good teaching, as set out in the QTS standards, including, for example, good pace, challenge, questioning and high expectations of pupils. It may also not be sufficient to ensure that they feel confident about, and are competent in using, ICT to secure progress in pupils' learning within the phase and in the subject(s) they are training to teach. It is likely that most trainees will be familiar with more traditional forms of ICT, *e.g. television, video, tape-recorders*, and will have experienced their use in education. The content of Section B, therefore, gives greater emphasis to computer-related ICT because it is new, and because trainees' knowledge, understanding and skills in this area may vary considerably from what is required.

### **Audit**

Providers should audit trainees' knowledge, understanding and skills in ICT against the relevant ICT content set out in paragraphs 12 to 19 below. Where gaps in trainees' ICT knowledge, understanding and skills are identified, providers must make arrangements, for example through supported self-study, to ensure that trainees gain the relevant knowledge and understanding during the course and that, **by the end of the course**, trainees are competent in using the ICT specified within the relevant phase and subject(s).

## **11. In relation to the ICT content set out in paragraphs 12 to 19, trainees must be given opportunities to:**

- a. evaluate a range of information and communication technologies, and the content associated with them, *e.g. television and radio, video, computers, the Internet, cameras and other equipment*, justifying the selection and use of ICT in relation to aspects of their planning, teaching, assessment and class management, including for personal professional use, *e.g. in downloading on-line materials for teaching or writing reports*;

- b. understand and use correctly the specialist terms associated with the ICT used in the subject which are necessary to enable them to be precise in their explanations to pupils, to discuss ICT in relation to the subject at a professional level, and to read inspection and classroom-focused research evidence with understanding.

Several of the following sections have been divided into two columns. The left-hand column specifies the knowledge and understanding of ICT which all trainees are required to demonstrate by the end of their course. **The relevance of different aspects of the specified content will depend on the subjects and ages of the pupils being taught, and providers should pay particular attention to those aspects which are most relevant in each case.** The right-hand column has been included to indicate the level of knowledge and understanding required and to give it relevance to teaching in different subjects. The TTA will provide, separately, more detailed subject-specific exemplification which can be used in conjunction with this document.

<b>12. Trainees must demonstrate that they are competent in those areas of ICT which support pedagogy in every subject, including that they:</b>	
<p><b>a. can employ common ICT tools for their own and pupils' benefit, e.g. word processing, e-mail, presentation software, data handling and can use a range of ICT resources, at the level of general users</b> (rather than as network or system managers), including:</p> <ul style="list-style-type: none"> <li>i. the common user interfaces, using menus, selecting and swapping between applications, cutting, pasting and copying files, and cutting copying and pasting data within and between applications;</li> <li>ii. successfully connecting and setting up ICT equipment, including input devices, e.g. a mouse, touch screen, overlay keyboard, microphone and output devices e.g. printers, screens and loudspeakers;</li> <li>iii. loading and running software;</li> <li>iv. file management;</li> <li>v. seeking and using operating information, including from on-line help facilities and user guides;</li> <li>vi. coping with everyday problems and undertaking simple, routine maintenance, with due consideration to health and safety;</li> <li>vii. understanding the importance of passwords and the general security of equipment and access to it.</li> </ul>	<p><i>e.g. connecting a printer to a computer with the correct driver; connecting an overlay keyboard and ensuring that it works;</i></p> <p><i>e.g. CD-ROM</i></p> <p><i>e.g. copying, deleting, naming and renaming files</i></p> <p><i>e.g. including checking the power is on; checking for loose connections; managing and replacing consumables; good practice in avoiding viruses;</i></p>

<p><b>b. know and understand the characteristics of information, including:</b></p> <ul style="list-style-type: none"> <li>i. that information must be evaluated in terms of its accuracy, validity, reliability, plausibility, bias;</li> <li>ii. that information takes up memory and that there are implications when saving and compressing files;</li> <li>iii. that information has to be stored somewhere;</li> <li>iv. that ICT systems can present static information or changing information;</li> <li>v. that information can be directly and dynamically linked between applications;</li> <li>vi. that applications and information can be shared with other people at remote locations.</li> </ul>	<p><i>e.g. drawing information from a CD-ROM (encyclopaedia or newspaper collection);</i></p> <p><i>e.g. a colour image contains more information than its black and white equivalent and can be saved in different ways to increase the amount of available memory;</i></p> <p><i>e.g. in memory, on disc, on a local server, on the Internet;</i></p> <p><i>static information e.g. a picture on the screen or a page of text; changing information, e.g. simulations, control programmes;</i></p> <p><i>e.g. changes to numbers in a spreadsheet can link directly to changes in a word processed report; a video clip can be linked to a button on a multimedia application; a picture or text may be linked to on-line information on a network or the Internet;</i></p> <p><i>e.g. for a collaborative project between pupils or teachers in the same or different locations;</i></p>
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**13. Trainees must demonstrate in relation to the subject and age(s) of pupils to be taught that they:**



<p><b>a. know how to use ICT to find things out, including, as appropriate for the subjects and the age of pupils to be taught:</b></p> <ul style="list-style-type: none"> <li>i. identifying sources of information and discriminating between them;</li> <li>ii. planning and putting together a search strategy, including framing useful questions, widening and narrowing down searches;</li> <li>iii. how to search for information, including using key words and strings and logical operators such as AND, OR and NOT, indexes and directories;</li> <li>iv. collecting and structuring data and storing it for later retrieval, interpretation and correction;</li> <li>v. interpreting what is retrieved;</li> <li>vi. considering validity, reliability and reasonableness of outcomes;</li> </ul>	<p><i>e.g. disk, CD-ROM, Internet; up-to-date information from a weather station; low status sources on the Internet with no editorial scrutiny; CD-ROM information which has been through some editorial scrutiny but may be out of date;</i></p> <p><i>e.g. translating enquiries expressed in ordinary language into forms required by the system;</i></p> <p><i>e.g. in searching a database or employing an Internet search engine;</i></p> <p><i>e.g. knowing the probable outcome of a calculation rather than just relying on the calculator;</i></p>
<p><b>b. know how to use ICT to try things out, make things happen and understand how they happen as appropriate for the subject(s) and the age of pupils to be taught:</b></p> <ul style="list-style-type: none"> <li>i. exploring alternatives;</li> <li>ii. modelling relationships;</li> <li>iii. considering cause and effect;</li> <li>iv. predicting patterns and rules recognising patterns, and hypothesising;</li> </ul>	<p><i>e.g. changing the variables in a spread sheet or a simulation;</i></p> <p><i>e.g. exploring how changes in variables such as weather and market forces might influence the crop rotation cycle planned by a farmer;</i></p> <p><i>e.g. in text editing and presentation; determining the effect of increases in the cost of raw materials when costing production on a spreadsheet; designing a weekly diet to meet nutritional requirements; programming a simple model using LOGO;</i></p> <p><i>e.g. hypothesising about a rule that underpins a pattern;, predicting and simulating; evaluating outcomes e.g. graphical outcomes, exploration of colour shape and form, exploration of sound;</i></p>

v.	knowing how to give instructions;	<i>e.g. knowing the importance of the grammar and syntax of instructions in ICT;</i>
vi.	sequencing actions;	<i>e.g. moving floor turtles or robots; following a sequence of actions to produce a result;</i>
vii.	defining conditions e.g. “if this happens, do that..”;	<i>e.g. programming feedback into a control device or putting conditions into a spreadsheet formula;</i>
viii.	understanding how feedback works and the difference between things that do and do not rely on feedback;	<i>e.g. an automatic window opener on a greenhouse; an appliance that will not work until the lid is closed, such as a dishwasher;</i>

<p><b>c. know how to use ICT to communicate and exchange ideas as appropriate to the subject(s) and the age of pupils to be taught:</b></p> <p>i. presenting ideas, including: identification of audience and purpose; deciding the best means with which to communicate;</p> <p>ii. exchanging ideas, including identifying the most appropriate medium, and information.</p>	<p><i>e.g. text, numbers, images, sounds or a combination; selecting the appropriate technology to produce the material; adapting the material to ensure that it achieves what it set out to do;</i></p> <p><i>e.g. fax, e-mail or a conferencing system, taking into account the number of people involved, urgency and cost-effectiveness.</i></p>
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<p><b>14. Trainees must demonstrate that they know those features of ICT which can be used, separately or together, to support teaching and learning in subjects, including:</b></p>	
<p><b>a. speed and automatic functions</b> - the function of ICT which enables routine tasks to be completed and repeated quickly, allowing the user to concentrate on thinking and on tasks such as analysing and looking for patterns within data, asking questions and looking for answers, and explaining and presenting results, <i>as appropriate to the subject(s) and age of pupils being taught</i>, including how ICT can be used to:</p> <p>i. measure events at long or short time intervals in order to compress or expand events which would normally take very short or long periods of time, and illustrate them to pupils at speeds appropriate to their pace of learning;</p> <p>ii. measure and record events which might otherwise be impossible to gather within a classroom environment;</p> <p>iii. explore sequences of actions and link the sensing of events with the control of actions;</p>	<p><i>e.g. measuring and recording the reducing height of a bouncing ball using freeze-frame video; or measuring and recording the changes in temperature and pressure throughout a weather front; performing rapidly repeating calculations in a spreadsheet to illustrate patterns of numbers; illustrating changes in the distribution of working populations;</i></p> <p><i>e.g. collecting data on the movement of people around a school over the period of a week; recording weather data from the passage of a weather front;</i></p> <p><i>e.g. building and controlling a working lift or programming the movement of a buggy;</i></p>

<p><b>b. capacity and range</b> - the function of ICT, as appropriate to the subject(s) and age of pupils to be taught, to access and to handle large amounts of information; change timescales, or remove barriers of distance; give teachers and pupils access to and control over situations which would normally be outside their everyday experience, including:</p> <ul style="list-style-type: none"> <li>i. the range of forms in which ICT can present information;</li> <li>ii. the range of possible appropriate ICT sources, including local sources such as CD-ROM, and remote databases such as the Internet and the National Grid for Learning;</li> <li>iii. how to judge the accuracy of the information and the credibility of its source;</li> <li>iv. how ICT can be used to gain access to expertise outside the classroom, the school and the local community through communications with experts;</li> </ul>	<p><i>e.g. voice, text, images, sounds or video;</i></p> <p><i>e.g. discussing the fact that anyone can set up a website and there is no quality control over its content;</i></p>
<p><b>c. provisionality</b> - the function of ICT which allows changes to be made easily and enables alternatives to be explored readily, and <i>as appropriate to the subject(s) and age of pupils to be taught</i>:</p> <ul style="list-style-type: none"> <li>i. how to make best use of the ability to make rapid changes, including how to create text, designs and models which may be explored and improved in the light of evaluation;</li> <li>ii. how to judge when and when not to encourage exploration and change using ICT;</li> <li>iii. how saving work at different stages enables a record to be kept of the development of ideas;</li> </ul>	<p><i>e.g. word-processing, computer aided design and manufacture, spreadsheet models, animations, sound or video presentations;</i></p> <p><i>e.g. whether the clarity and accuracy of pupils' writing might be improved through drafting and redrafting;</i></p>
<p><b>d. interactivity</b> - the function of ICT which enables rapid and dynamic feedback and response, <i>as appropriate to the subject(s) and age of pupils to be taught</i>, including how to determine the most appropriate media to use.</p>	<p><i>e.g. the changing values in a spreadsheet or the feedback provided from a simulation or measurements of factors in an experiment; the responses to queries of an Internet search engine.</i></p>

**15. Trainees must demonstrate that they are aware of the potential of ICT to enable them to prepare and present their teaching more effectively, taking account of:**

- a. the intended audience, including matching and adapting work to subject matter and objectives, pupils' prior attainment, reading ability or special educational needs; recognising the efficiency with which such adaptations can be made using ICT;
- b. the most appropriate forms of presentation to meet teaching objectives, *e.g. illustrating or explaining using: text; sound; still or moving pictures; live video links; illustrations, graphics or animations; numbers, graphs or charts, separately or in combination.*

**16. Trainees must demonstrate that they:**

- a. know and understand the ICT requirements of the pupils' National Curriculum in relation to the phase(s) and subject(s) to be taught;
- b. are familiar with the standards as set out in the pupils' National Curriculum for IT, relevant to the phase for which they are training to teach, and know the level of IT capability they should expect of pupils when applying ICT in the subject(s).

**17. Trainees must demonstrate that they know how each of the following is relevant to the specialist subject and phase for which they are training:**

<p><b>a. generic procedures and tools, including</b></p> <ul style="list-style-type: none"> <li>i. understanding the key features and functions used within the subject;</li> <li>ii. using ICT to prepare material for pupil use;</li> </ul>	<p><i>e.g. word-processors, graphics and desk-top publishing packages, spreadsheets, databases, multimedia and web page authoring tools;</i></p> <p><i>e.g. the use of a word-processing package to create templates to help pupils to write in a modern foreign language; setting up a spreadsheet to help pupils explore relationships and patterns; preparing a video or music sequence;</i></p>
<p><b>b. reference resources, including;</b></p> <ul style="list-style-type: none"> <li>i. how to search reference resources;</li> <li>ii. how to incorporate the use of reference resources into teaching;</li> </ul>	<p><i>e.g. reference CD-ROMs and World Wide Web sites on the Internet;</i></p>

<p><b>c. the ICT specific to the subject;</b></p>	<p><i>e.g. graphics packages and scanners in art; computer-aided design (CAD) software and computer-controlled equipment in Design and Technology; sequencing software and midi keyboards in music; dynamic geometry software in mathematics;</i></p>
<p><b>d. the major teaching programs or “courseware” to ensure that material is matched to the pupils’ competences;</b></p> <p>i. where content and activities are presented in sequence to teach specific topics;</p> <p>ii. where teaching activities are combined with assessment tasks and tests.</p>	<p><i>e.g. multimedia distance learning activities; a series of educational television programmes;</i> <i>e.g. integrated learning systems (ILS); distance learning packages.</i></p>

<p><b>18. Trainees must demonstrate that they are aware of:</b></p>	
<p><b>a. the current health and safety legislation relating to the use of computers, and can identify potential hazards and minimise risks;</b></p>	
<p><b>b. legal considerations including those related to:</b></p> <p>i. keeping personal information on computers, as set out in the Data Protection Act;</p> <p>ii. copyright legislation relating to text, images and sounds and that relating to copying software;</p> <p>iii. material which is illegal in this country;</p>	
<p><b>c. ethical issues including:</b></p> <p>i. access to illegal and/or unsuitable material through the Internet;</p> <p>ii. acknowledging sources;</p> <p>iii. data confidentiality;</p> <p>iv. the ways in which users of information sources can be (and are) monitored;</p> <p>v. material which may be socially or morally unacceptable.</p>	

**19. Trainees must demonstrate that they know how to use ICT to improve their own professional efficiency and to reduce administrative and bureaucratic burdens, including:**

- a.** using ICT to aid administration, record-keeping, reporting and transfer of information;
- b.** knowing about current classroom-focused research and inspection evidence about the application of ICT to teaching their specialist subject(s), and where it can be found;
- c.** knowing how to use ICT to join in professional discussions and to locate and access teaching plans, material and other sources of help and support, including through the National Grid for Learning;
- d.** knowing how ICT can support them in their continuing professional development.