NCTE recommendations for ICT in Primary schools

The National Centre for Technology in Education (NCTE) has provided the following recommendations to Primary schools to assist schools in the purchase of ICT equipment. The NCTE believes that the technology configuration it is recommending will provide schools with greater possibilities for ICT integration in learning and teaching. The installation of a teaching computer/laptop digital projector and visualiser in the classroom will enable the teacher to present rich and stimulating learning materials to the whole class while also facilitating group work and collaborative learning.

In line with the recommendations on the ICT Strategy Group report “Investing Effectively in Information Communications Technology 2008-2013”, the NCTE is recommending that each classroom should be equipped with a teaching computer, a short throw digital projector, a wireless keyboard and mouse and five classroom computers/laptops. A visualiser should also be provided to each classroom. Many schools place particular importance on integrating the use of the digital camera, digital video and audio e.g. Fís. In such situations schools should consider the purchase of a multi-media workstation (media production suite).

Please visit www.ncte.ie/ICTAdviceSupport where you will find up-to-date details and technical specifications on computer, laptops, digital projectors, printers and other equipment.

Technology configuration for each classroom

Each classroom should be equipped with a short throw digital projector and a teaching computer (laptop), a visualiser and a wireless keyboard and mouse. The digital projector should be fixed on the wall position and cabled to the teaching computer. There should be access to an acceptable white projection surface. This cost of this technology configuration within each classroom is approximately €4,470 (see table 1)

These recommendations are premised on the availability of internet access, via the schools broadband network, distributed throughout the schools via the school’s local area network (LAN). The network should include network points in each classroom.

Items of equipment recommended are:

Teaching Computer (Laptop)
The teaching computer (Notebook or Laptop) should be connectable to the LAN and to the fixed digital projector in order to access and show digital content.

Short Throw Digital Projector
Teachers use a digital projector, in conjunction with a laptop or desktop computer, to project the computer screen image on to a designed white surface or wall. Short Throw or Ultra Short Throw digital projectors are a relatively new type of digital projector and they are recommended for use in classrooms. They typically mount on a bar over the teaching position. If subsequently school’s decide to install interactive whiteboards, the short throw projector already installed should also be incorporated as part of interactive whiteboard installation.
Classroom PCs
Depending on the size of the classroom, a number of PCs should be available for pupil use in the classroom. The NCTE’s target pupil to computer ratio is 5:1.

Visualiser
A visualiser, often referred to as a document camera, is a tool that enables teachers or pupils to show a diagram from a book or any artefact to the whole class via a digital projector.

Wireless mouse /keyboard
A wireless keyboard and mouse enables individual or small group of pupils to use the technology and to input their contribution. They allow the classroom teacher to distribute access and opportunities for interactivity among the pupils from their sitting positions.

Speakers
The use of a teaching laptop will be enhanced if attached to a sound system. Laptop speakers are designed with a single user in mind and usually prove inadequate to project to a large classroom. A robust and quality sound system, with fixed speakers at both the front and the back of the classroom or distributed so as to facilitate quality sound throughout the classroom is recommended.

For example, the ICT equipment recommended per classroom, and the estimated costs are as follows. These costs are unit costs and do not include installation.

<table>
<thead>
<tr>
<th>Primary Classroom</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A teaching computer (laptop)</td>
<td>500</td>
</tr>
<tr>
<td>Digital short throw projector</td>
<td>1,200</td>
</tr>
<tr>
<td>5 classroom PCs</td>
<td>2,250</td>
</tr>
<tr>
<td>Visualiser</td>
<td>400</td>
</tr>
<tr>
<td>Wireless keyboard/mouse</td>
<td>60</td>
</tr>
<tr>
<td>Speakers</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>€4,470</td>
</tr>
</tbody>
</table>

Table 1: ICT Classroom costs
The costs provided in the table for the other items are unit costs, not based on aggregation. These costs would be expected to decrease when aggregation is factored in.
Audio/visual equipment for shared access in schools

Each primary school should be equipped with a multi-media workstation to facilitate the integration of audio/visual projects such as FíS.

Media production suite as a shared resource

Comprising of a computer with multi-media editing software, a stills and a video camera, tripod, speakers and a microphone, this equipment allows image capture, video work, digital editing and sound recording, slideshow creation, printing and filmmaking for FíS. The unit cost of this resource is €1,500 (approx)

ICT Equipment for shared access in schools

Schools require a server, a back-up storage facility, a laser printer and scanner.

Shared ICT equipment includes:

School servers
Servers in general and schools servers in particular provide 'services' or functions to other computers via the school local area network (LAN) and are more powerful and robust than desktop computers or laptops. More common server functions include storage of files, be they school, teacher or student files, where a server acts as a 'file server' and is used for network management.

Data Backup
All important data in a school should be backed up. This is to avoid loss of data through either human error or failures in technology.

Digital stills camera/Digital video camera
Images captured using a digital camera can be transferred to a computer for viewing, slideshow creation, printing, and for filmmaking.

Wireless tablet
A wireless tablet allows teachers and students to draw, illustrate or write and project this through the digital projector onto any projection surface.

Laser Printer
Printers are among the most common ICT peripheral devices found in Irish schools. NCTE recommends using laser printers over inkjet printers.

Scanner
A flat bed scanner would be useful to digitise content, for example, printed photographs, newspaper articles and other content which can be used for learning and teaching.

Procurement of ICT Equipment and ICT purchasing frameworks
To assist in achieving value for money (VFM) schools are recommended to refer to NCTE Advice and Support in relation to ICT purchasing Frameworks and are currently available to support purchasing of:

Desktop computers, notebooks (i.e. Laptops), monochrome printers and colour printers.
These purchasing frame-works make value-for-money purchasing easy. Schools are recommended to use these ICT equipment frameworks and should refer to the NCTE website for further advice on how to use them. The relevant link is www.ncte.ie/ICTAdviceSupport/Purchasing.

**Additional information including equipment specifications**

Additional information on the ICT equipment listed in the document can be found on the ‘ICT Advice and Support’ section of the NCTE Website, where approx’ 40 ICT Advice Sheets are available. The link is: www.ncte.ie/ICTAdviceSupport

**Server’s & Networking:**

More information related to this area can be accessed via NCTE technical course on Computer Networking (Basic and Client Server). Details of the course can be accessed at www.ncte.ie/ICTTraining/Courses/ComputerNetworkingBasicClient-Server

**Short throw projectors**

It is now recommended that short throw projectors are fitted to classrooms in both primary and post-primary schools. Advantages of short throw include:

- the elimination of the potential for eye damage which might occur due to children moving around the classroom and being too young to have the discipline not to look directly into the lens
- provides clearer visibility throughout the classroom for the teacher while the projector is in use
- eliminates shadow on the whiteboard
- overcomes the limitations of low ceilings and the relative high cost of installation where false ceilings exist
- wall mounted short throw projectors are quickly and easily fixed and are often more cheaply to install
- where schools are ready to purchase an interactive white board, a short throw projector, correctly installed, reduces the purchase cost of the IWB

**Considerations & Recommendations on Interactive Whiteboards**

An Interactive Whiteboard (IWB) is a large, touch-sensitive (thus interactive) board that, when used with a combination of a computer and digital projector, facilitates interactive ICT engagement. It resembles a traditional whiteboard. The computer, connected to the interactive whiteboard, can be controlled by touching the board directly or by using a special pen.

It is generally accepted that the use of IWBs in the classroom can lead to an increase in pupil motivation to learn and can assist in making learning a more enjoyable and a more interactive experience.

**School and teacher readiness**

IWBs have the potential to be an exciting and useful addition to a classroom. However the extent to which their potential can be realised is dependent on the abilities of the teacher. **Teachers should**
have prior experience of using a range of ICT equipment and resources in the classroom and should also attend professional development in the effective use of IWBs. Subsequently, research to identify online resources and lots of preparation time is required if the board is to be used well and to guard against superficial interactivity.

Purchasing Priorities and first steps
Schools which have classrooms without digital projectors or teaching computers should prioritise purchases in line with the classroom configuration recommended in this document. In summary, fixed digital projectors should be a high priority in classrooms. Digital Projectors provide good value for money and are essential to ICT enabled classroom learning, as well as being a prerequisite for an interactive whiteboard at a later time. Digital Projectors are used in conjunction with a teaching computer. They can also be used with wireless tablets. Given the range of costs per IWB package (from €1,500 to over €4,000 per classroom) schools should consider whether or not they are in a position to make full use of the boards or whether they should, as a first step, provide baseline technology configurations in classrooms.

Costs of interactive whiteboards packages
When purchasing IWBs schools should request details from a number of vendors in order to obtain best value for money. There are a number of related elements associated with an interactive whiteboard package, and costs vary depending on the package being purchased. The main elements are an interactive whiteboard itself (range of sizes) the digital projector (range of specifications), a sound system, software and resources package, installation, warranty, spares (eg bulbs, pens) and training. Lower cost packages from some vendors generally include some of these elements whereas some of the higher cost packages include all of these elements.

The technologies used in the boards themselves are either finger touch and/or pen touch. Boards come in different sizes. Digital projectors vary from lower cost standard models to higher cost short throw or ultra short throw models. There is a range of software packages available to suit Primary and Post Primary schools. The training provided can vary from basic training on how to interact with the board to pedagogically-focused training given by experienced teachers.

Interactive Technology Options include:

a) A Short Throw Digital Projector used with a good quality wireless mouse and keyboard in a classroom can achieve many of the benefits of an interactive whiteboard at a fraction of the cost. Interaction with the large screen image is done using the wireless mouse from anywhere within the classroom, and by pupils as well as teachers. Specialised mouse and keyboards combinations need to have a range of up to 10Metres to be effective from all areas in a classroom.

b) Wirelessly enabled ‘tablets’ or ‘slates’ are available from a number of the IWB providers. Costs range from €300 to €450, and some providers allow the school to use the software throughout the school following the purchase of one tablet or IWB by the school. One difference of the wireless tablet over a fixed IWB is that a teacher can interact with the tablet from anywhere in the
classroom, including from the back of the classroom. The tablet can also be used by pupils from their desks, or be passed around, from pupil to pupil without having to be ‘up at the board’.

c) **Infra Red whiteboard device add-on:** these are portable and low cost devices that attached to any standard whiteboard, they allow you to control your desktop applications and documents directly from the board. Costs start from approx' €700, and may not include the cost of a digital projector, installation or training.