Advice Document to Schools on the Implementation of the
Design and Communication Graphics Syllabus
(Revised March 2009)

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Technology
Subjects
Support
Service

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Design and Communication Graphics (DCG)

In September 2007 the Leaving Certificate Technical Drawing syllabus was replaced by a revised syllabus called Design and Communication Graphics. While retaining elements of Technical Drawing the revised syllabus introduces many topics and features which focus on current best practice in education, assessment and the broader worlds of work and further education.

Key Features

- Syllabus intended to have 180 class contact hours
- Compulsory core elements (including Computer Aided Design (CAD) /ICT)
- Five options (two to be studied)
- One 3 hour terminal exam (60%)
- A Student Assignment (40%) including a compulsory CAD element

Funding Structure

As the subject requires regular access to CAD/ICT facilities, funding has been made available to schools to provide hardware and CAD software for the teaching and learning of Design and Communication Graphics. To ensure the integration of ICT and CAD into the teaching and learning of the revised syllabus, the CAD computers should be located in the DCG room.

The funding has been allocated using a banded structure which is intended to allow one to one access (one student to one computer) to the hardware and software for each student of the subject. Each school's band was calculated based on the average number of students sitting the Leaving Certificate Technical Drawing examination in that school over the past three years (2006, 2005, and 2004).

Where schools are starting DCG for the first time or have a query about their funding allocation this should be documented and addressed to the Planning and Building Unit Tullamore.

Hardware and Installation Funding

Average number of students	5 or less	6 to 12	13 to 18	19 to 28	28+
Funding Band	13k	22k	30k	37k	43k

Schools initially received 80% of the funding allocation from the Dept of Education and Science, Planning and Building Unit, Tullamore, Co. Offaly as per their respective band as above. The remaining 20% issues once a letter confirming that the initial allocation has been spent on hardware and ancillaries, required for the teaching of DCG is received by the Building Unit.

Furniture allowance

For all schools which have received funding for DCG a further allowance has been provided to help with the purchase of the furniture and fit out required in upgrading a room for the teaching of the subject. This also follows a parallel banded structure, as set out in the following table.

Average number of students	5 or less	6 to 12	13 to 18	19 to 28	28+
Furniture Grant	€900	€1700	€2400	€3000	€3600

Software Allowance

In each case the final 20% drawdown will have €1030 added, to cover the cost of the Parametric CAD (SolidWorks) software.

Utilisation of Funding

This funding has been allocated primarily to provide one to one student access to ICT in order to achieve the teaching and learning outcomes in Design and Communication Graphics. Access to these resources to help support some of the ICT needs in other Junior and Senior Cycle technology subject areas should be considered once priority of access for Design and Communication Graphics is met. Once these requirements are met, scope may exist to meet some of the ICT needs of the broader school curriculum.

In using this funding to prepare for the teaching and learning of Design and Communication Graphics several factors need to be borne in mind, these will vary from school to school but some universal points for consideration are:

- Selection of desktops and or laptops

- Networking of computers

- Secure storage and backup of student work

- Subject department laptop (Teacher access)

- Data projector, A3 Printer, A3 Scanner and Digital Camera

- Good classroom layout and organisation

- Effective resource management

The ideal scenario for provision of access to hardware is a permanent installation of desktop and/or laptop machines in a dedicated Design and Communication Graphics room or in a standalone room to facilitate use by all technology subjects where feasible. As the CAD element forms a compulsory component of the subject and its assessment access is critical.

T4 can also offer advice on system requirements to meet the needs of the technology subjects especially in relation to the teaching, learning and assessment requirements. In tailoring the resource utilisation to best meet their own needs, schools may need to seek technical advice from a local ICT expert.

CAD Software

The software selected, by a tendering process, for use in the teaching and assessing of Design and Communication Graphics is called **SolidWorks** and must be ordered by schools from Solid Solutions Ireland.

Solid Solutions Ireland,
Unit 3,
Leopardstown Office Park,
Sandyford,
Dublin 18.
Telephone: (01) 2974440
Fax No: (01) 2930271
E-Mail : info@solidsolutions.ie

A copy of the order form is included at the back of this document (page 17). Copies of this document are available on the T4 website, www.t4.ie, or directly from Solid Solutions Ireland. Schools are required to pay for the software once it arrives. This cost will be reimbursed to schools along with the final balance of the funding as already mentioned.

Each school is provided with fifty licensed seats of the SolidWorks Education Edition software for school and teacher use. This is intended to ensure that teacher access is available both in school and at home. Where a school requires additional licenses they can be provided upon request by contacting Solid Solutions Ireland.

On completion of the order each school will receive a copy of the software media with associated installation and activation codes. It is important that schools keep the media and unique school activation code in a safe place as it may be required at a later stage. As computers supplied under the 2009 contract will not have SolidWorks already installed, schools should use the installation media supplied by Solid Solutions. Also, school will require the unique school activation code to upgrade SolidWorks 2006 Education Edition to the 2009 version. It is vital to complete an individual install on each computer.

Students can download the student version of the software – the Student Design Kit (SKD) - from the following below:
http://www.solidworks.com/pages/products/edu/student/SDL_form.html.
Students will be asked to register their details, which include their name, their school name, address and School License ID (a six digit number derived from the school's

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activation code for SolidWorks 2009). Once registered, a student is taken to the license agreement and then to the SDK download page. Once a student accepts the agreement, an email is immediately sent with the 365-day serial number, and the student is taken to the download page. The SDK times out either 1 year after installation or on November 30th of the 2nd school year following its release (whichever comes first). After the November 30th date, the SDK will not function at all, and the student will need to download the current version.

A 365-day SDK media (DVD) is not available to students. However, students can use a 60-day SDK with the 365 day serial number to install the software. Any schools that encounter difficulty with the download option should contact Solid Solutions Ireland for a SDK DVD.A student can register at the SDK website to get an email with their serial number. This number should then be used when installing the SDK with the DVD to obtain the 365-day activation.

There is no limit to the number Student Design Kit licenses a school may utilise.

Computer Hardware

In order to streamline the procurement process for schools and provide a consistent platform for student use of the software, T4 on behalf of the Department of Education and Science undertook a competitive tender process to insure the continued supply of the required CAD Standard computer hardware. This means that schools do not need to seek individual quotations for the purchase of the computers identified through this process.

Following this tender processes, the Hewlett-Packard Workstation - HP XW4600 was selected as the recommended desktop computer and the Hewlett-Packard Workstation – HP 8530W as the Laptop. These high specification CAD Computers were tested for suitability/compatibility in running the Parametric CAD software.

These computers come pre-imaged with:
- Windows XP Operating System
- Microsoft Suite including Office Plus – Perpetual License
- Symantec Anti-Virus - 1 year subscription License
- High end Graphics Card (Compatible with SolidWorks)

Future upgrades of SolidWorks will be made available from Solid Solutions at no additional cost to schools until 2011.

The specification of the HP Workstations is outlined below:

Model	Hewlett-Packard - Workstation – **High End CAD PC (XW4600)**	Hewlett-Packard - Workstation – **High End CAD LAPTOP (8530W)**
Workstations		
Operating system	Windows XP professional SP3	Windows XP professional SP3
Processor	Intel dual core 2.57Ghz	Intel dual core 2.4Ghz
Hard disk capacity	160 GB	160 GB
Removable storage	16x DVDRW+/- SATA Drive	16x DVDRW Inbuilt
RAM	2 GB	2 GB
Graphics	nVidia Quadro FX 370 - 256 MB Graphics Adapter	nVidia Quadro FX 570 - 512 MB Graphics Adapter
Ports	6 x USB with 2 front mounted	4 x USB ports
Network	Internal network card (RJ45)	Internal network card (RJ45)
Monitor	17" Height adjustable TFT flat screen	15.4" WSVGA Screen
Mouse	Optical mouse	Optical mouse
Warranty	3 years next day on site (full parts and labour)	3 years next day on site (full parts and labour)
Software Installed	Microsoft Suite (including Office Plus – perpetual license) Symantec Anti Virus (1 year) **SolidWorks not installed**	Microsoft Suite (including Office Plus – perpetual license) Symantec Anti Virus (1 year) **SolidWorks not installed**
COST	€760 per machine *including* VAT and delivery	€850 per machine *including* VAT and delivery

The preinstalled Symantec antivirus is subscription based. The initial subscription is valid for one year from the date of activation; following this future upgrades will require payment by the school.

All desktops and laptops come with a three year next day on site warranty (full parts and labour).

The computer can be ordered on-line, by email, by phone or by fax. A copy of the order form containing all contact details is included at the back of this document (page 17).

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As a general guide each school should plan for the installation of the number of computers defined by their funding band by spending approximately half their allocated funding on computers and the balance to make provision for Networking and essential ancillaries such as:

- wiring and installation (including materials such as a network switch, broadband routers and Server if required etc)
- Data projector , Printer/s, Digital cameras, scanners etc.

When ordering computers, determine the optimum number required with reference to current subject trends (including a computer for subject department use).
These are discussed in more detail on page 8/10.
Should a school decide not to avail of the above HP computers, the full quotation/tendering process for the procurement of alternative makes/models must be completed in the normal way by each school. Computers ordered in this way may not have software preinstalled.

Schools which offer any Leaving Certificate technology subject may also avail of these HP computers.

Ancillaries

To benefit fully from the introduction of new high spec computers, and ensure maximum use in the classroom, a range of related ancillary items are necessary. These ancillaries have not been part of a tendering process by T4 and must be purchased by individual schools in the usual way.

Extensive advice and reference sheets are also available from the National Centre for Technology in Education (NCTE) on www.ncte.ie

Data projector

A data projector allows teacher or student work to be projected on a screen or other suitable surface. It is an essential item in the teaching and learning of Design and Communication Graphics. Ideally it should be:

- Ceiling mounted
- 2000 lumens minimum
- 500:1 contrast ratio minimum
- XGA resolution minimum
- Have a video compatible cable (allows video or DVD to be projected on screen)

- Have a specified bulb life of not less than 2000 hours
- Have a warranty (up to three years is available)

A wall mounted control panel (instead of a remote control) is available for most models.

Screen

The data projector needs a suitable surface on which to project the image – in some situations a clear wall space painted matt white may be available. In other cases a projector screen, either wall or ceiling mounted should be provided. Thought should be given to its position to allow best viewing by the class and avoidance of direct sunlight falling on the screen (it makes viewing more difficult).

Printer/s

The capacity to produce A3 and A4 sized colour and monochrome prints is essential to the teaching and learning of Design and Communication Graphics. As part of their Leaving Certificate the State Examinations Commission requires that candidates submit A3 colour copies of their work. This requirement may be met in a number of ways:

- In all Design and Communication Graphics rooms a standard A3 colour laser printer should be considered. This will be suitable for printing much of the day to day class output, including student assessment material, and for production of worksheets and reports. Using an additional paper tray this also has the capacity to print A4 output as required

- Using business inkjet printer is likely to meet the needs of the subject in many schools. While the laser printer has greater capacity, the necessity for it should be balanced against its additional cost and the required capacity.

A "duplex" option is available for both types of printer. This enables printing on front and back of a sheet – this can save paper and can be useful for printing of booklet type reports or publications.

A3 Scanner

The capacity to scan documents is essential to the teaching and learning of Design and Communication Graphics. As part of their Leaving Certificate the State Examinations Commission requires that candidates submit an electronic copy of their completed assignment in pdf format. This requirement may be best met by using an A3 scanner to create a high quality electronic copy of their assignment. This will also ensure that the students will have a copy of their submitted work.

Docking Station

In most situations a laptop will be the most appropriate means of providing teacher access to the CAD and other softwares. A docking station on the teacher's desk allows a laptop to connect by providing instant connection to power, network and data projector as required. It dispenses with the need for plugging in and out of cables at the end of each class or day and may be positioned on the teacher's desk or at the back of the room if preferred. The latter position is particularly useful if using a data projector which is projecting onto a screen at the front of the class.

A docking station for the HP Laptop will cost approximately €100. More than one can be installed on a network if required.

Cameras

Access to digital cameras is required both for researching assignments, class work and in recording completed work. Because the image is in electronic form it can easily be integrated into other electronic documents and drawings.
A digital camera suitable for school use should have:

- Good resolution giving quality prints
- 3X optical zoom or better
- Macro setting
- The ability to record short video clips
- Battery and charger
- A mini tripod

Universal card readers

These allow photos from a memory card to be saved directly to a computer or other location without the need for special software. Universal card readers will accept most card types.

<u>Desktops or Laptops</u>

Advantages of desktops
- They are robust in use and do not suffer the dangers of damage by being moved, dropped or carelessly handled.
- There are fewer issues with regard to physical security.
- Individual damaged or defective components such as keyboard, mouse or monitor can be easily replaced.
- They have a larger monitor/screen.
- Time in use is not limited by battery life or the need to recharge.
- Classroom management is simplified as no time is lost in distributing and collecting/accounting for machines. The same number of machines is available to the teacher every time they enter the classroom – it is most unlikely that one or two have been borrowed or moved elsewhere.
- They are more suited to a permanent, hardwired, networked installation.

Advantages of laptops
- Where space is at a premium laptops are a viable option.
- They allow mobility which can facilitate independent student work at various locations.
- They can facilitate group work.
- Flexibility in timetabling – all Design and Communication Graphics class groups do not have to be given access to the same room
- Access to ICT for use in other subject areas may be possible (once priority of access for Design and Communication Graphics is met)
- They are more suited to a wireless networked installation.

Facilities to simplify the management of laptops in the form using storage/recharge cabinets are available.

DCG Network System

A DCG Network System in a school is comprised of a range of interrelated devices which will require a minimum level of understanding and management by the relevant teachers. The DCG Network may be an independent system or in many cases linked to the existing school network. Because of the technical nature of a school network it may be necessary to engage the services of a computer technician to establish the required system. Some of the key areas to be addressed are listed in the table below. Local arrangements and expertise will dictate the allocation of responsibilities for each of the areas in turn.

Teachers and students will require a system that can be used easily, efficiently, securely and safely. The local technical support arrangements for each school must comprehend this objective.

It is envisaged that each teacher will have an appreciation of a well configured system which will in turn inform the development and usage of an IT system individualised to their own school environment.

Consider each of the areas below in the context of the DCG Network system requirements.

Requirements of an effective DCG Network:
A basic understanding of the DCG IT system:-   • Network infrastructure – computers, cables, cabinets, etc.   • Server operating system – e.g. Windows 2003 Server and how it differs from client operating system.   • Configuration of network for users.
Auditing the equipment:-   • Keeping stock of all equipment and components.   • Being familiar with the operation of the hardware and software.   • Monitoring levels of consumables (paper, ink, etc.).   • Monitoring the security and integrity of user data.   • Ensuring compliance with licensing requirements.
Creation of individualised accounts for each user:-   • Creation of teacher accounts with appropriate privileges.   • Creation of student accounts with appropriate privileges and restrictions.
Maintaining an organisational structure for the user accounts:-   • Grouping of teacher accounts   • Grouping of student accounts (e.g. in class groups).

Provision of individualised and secure folders for each user:-
 • Each user will require his / her personal folder to store files.
 • Teachers may require additional folders to organise courseware including
     ➢ a shared folder for distributing files
     ➢ A "postbox" type folder could allow students to submit completed work without the danger of loss or interference

The ability of administrator(s) to reset passwords.
•   A new password may be assigned in the case of a forgotten or compromised password.
"*Locking*" the server to prevent unauthorised access:-
•   An unattended server should prohibit unauthorised users from logging on.
Logging onto the server – both locally and remotely:-
•   The administrator username and password should be held by school management.
•   The administrator should be able to log on to the server either by directly working on it or through a "remote desktop connection" from a client workstation which may be located in a different room in the school.
•   **Because of the sensitivity of DCG State Examination materials the network must only be accessible from within the school.**
Sharing of printers and other equipment on the server:-
•   The need for controlled sharing of printers, scanners and other network devices may arise from time to time.
Use of logon scripts to automate settings for users:-
•   An understanding of the commands used in logon scripts and their usefulness is desirable (e.g. connecting to folders).
The use of "Group Policies" to standardise settings:-
•   Separate policies can be put in place for teacher and student users.
•   The student policy can be universally applied to all student users, thereby reducing the administrative burden and potential for irregularities.
Automatic backing up of user files/data on a regular basis:-
•   The automatic backing up of student files is now critical to the State Examinations process.
•   A backup should be completed at least once a week and a copy stored safely.
•   The backup system should be checked periodically to ensure that restoration of user files/data is possible as required.
Folder structure for DCG Student Assignment:-
•   The T4 Guide to the DCG Student Assignment provides advice on the folder structure for the storage of files.
Verification and submission of the files to the SEC:-
•   Teachers will need to advise students in the collation of their files for the development, completion and submission of the DCG Student Assignment.

In summary, the advantage of a Server Network type system is its ability to store and manage all student work in a central location. This means that files can be managed and retrieved more easily and can also be automatically "backed up" on a scheduled basis. The security and capacity to store, backup and retrieve student work including materials for assessment is paramount at all times.

An ideal set up for the teaching and learning of Design and Communication Graphics can be described as follows:

- An appropriate number of desktop and/or laptop computers for the numbers of students taking DCG

- A dedicated Server Network system with backup drive

- An network connection point for access to a broadband network

- A broadband router

- A UPS (Uninterruptible Power Supply)

- An A3 colour laser duplex printer or business inkjet (network ready)

- An A3 Scanner

- A ceiling mounted data projector with wall mounted control panel

- A suitably positioned projection screen or surface

- A laptop computer for subject department/teacher use

- A docking station for teacher's laptop (a second docking port at the rear of the room could be considered)

- A hardwired network linking all machines including printer, scanner (and data projector if desired)

- A digital camera(s)

- A card reader(s)

APPENDICES

CAD SOFTWARE ORDER FORM

School Details (BLOCK CAPITALS)

School Name: _____

Address: _____

_____

_____

School Roll: _____

Telephone: _____

Fax: _____

E-mail: _____

Principal: _____

DCG Contact Name: _____

School Authorisation

Please forward School CAD Software Package to the school listed above

Signed: _____
Principal

Signed: _____
DCG Teacher

Send order form by fax, e-mail or post to:

Solid Solutions Ireland,
Unit 3,
Leopardstown Office Park,
Sandyford,
Dublin 18.
Telephone: (01) 2974440
Fax No: (01) 2930271
E-Mail : info@solidsolutions.ie

FAXBACK ORDER FORM – TO HP IRELAND
FAX NUMBER – 01-8485056

School Roll Number: _____

School Name: _____

Principal Name: _____

Telephone Number _____

Order contact person _____

Email address _____

Model	Hewlett-Packard - Workstation -High End CAD PC (XW4600)		Hewlett-Packard - Workstation -High End CAD LAPTOP (8530W)
COST	€760 per machine *including* VAT and delivery		€850 per machine *including* VAT and delivery
Quantity Required			

Order online- www.hp.com/ie/t4schools

E/mail – t4schools@hp.com

Telephone – 01-8166366 – Orders fulfilled by BT Ireland

Fax – 01- 8485056

Circular Letter 0056/2006

To: *Management Authorities of Second-Level Schools*

Leaving Certificate Technologies

1.   The syllabuses for the three Leaving Certificate subjects of Engineering, Construction Studies and Technical Drawing have been revised by the National Council for Curriculum and Assessment (NCCA). The names of the subjects have been changed as follows:

   −   Engineering has become ***Engineering Technology***
   −   Construction Studies has become ***Architectural Technology***
   −   Technical Drawing has become ***Design and Communication Graphics***.

The NCCA has also developed a new syllabus at Leaving Certificate for ***Technology***. This will act as a follow-on to Leaving Certificate level for the subject Technology which is currently only available at Junior Certificate level. This means that there will be four technology-based subjects at Leaving Certificate level.

2.   Two of the four syllabuses will be introduced into post-primary schools in September 2007. These will be *Design and Communication Graphics* and *Technology*. Both of these subjects will be examined for the first time by the State Examinations Commission (SEC) in June 2009. The syllabuses pertaining to these two subjects are available to download at www.education.ie

3.   In September 2007, *Design and Communication Graphics* will replace Technical Drawing for students commencing the Leaving Certificate programme in all post-primary schools.

4.   In September 2007, Leaving Certificate *Technology* will be introduced in a number of selected post-primary schools. The subject will be available to other schools in subsequent years as part of a phased implementation plan.

5.   A **Technology Subjects Support Service (T4)** has been established to support schools in the implementation of the revised/new syllabuses. The National Coordinator, who was recently appointed to the service, will be supported by a team of Assistant National Coordinators, Regional Development Officers and Associate Trainers. This support service is being hosted by Galway Education Centre. The support service is currently planning the roll-out of a professional development programme for teachers which will commence in September 2006.

6.   Grants will be made available to schools intending to introduce *Technology* and *Design and Communications Graphics* at Leaving Certificate level from 2007 to upgrade equipment and services. Details will be available from the Department's School Building Unit, Tullamore.

Expenditure should not be incurred on equipment and resourcing until further notice. This is because a single software supplier will be needed for the CAD elements of the programme, as this will form part of the assessment arrangements in the State Examinations. The Department will select the software through a central tendering process in keeping with public procurement requirements. Accordingly even where schools have received funds for equipment and facilities, they should not incur expenditure until further notice. The choice of hardware may be affected by the software selected. The Department will advise as to the appropriate software and hardware to be purchased. Enquiries regarding funding should be addressed to the School Building Section, Department of Education and Science, Government Offices, Portlaoise Road., Tullamore, Co. Offaly, phone number 057- 9324441/9324444

In circumstances where room upgrades to facilitate the subjects are required, schools should apply for capital funding under the Summer Works Scheme. The 2007 Scheme has been advertised and details are available on the Departments website www.education.ie The closing date for receipt of applications is 29th September 2006.

It is envisaged that the implementation of Leaving Certificate Technology will be confined in the first phase to schools which have already been implementing the programme at Junior Cycle.

7. Computer Aided Design (CAD) is a significant component in the syllabus of each of the four revised/new technology-based subjects at Leaving Certificate level, particularly with regard to *Design and Communication Graphics*. The NCCA and the National Centre for Technology in Education (NCTE) have undertaken research on the use of CAD in post-primary schools and the outcomes of this work are pending. When the research is complete, guidelines will issue to schools on how to progress with regard to the acquisition of appropriate ICT hardware and CAD software. Also, equipment specifications/lists will be updated accordingly.

8. Two surveys pertaining to technology education in post-primary schools were recently circulated to schools. The first is a survey that is being conducted by the **Technology Subjects Support Service** which aims to elicit information pertaining to the professional development needs of teachers in light of the implementation of the revised/new syllabuses. This information will assist the support service in planning for the delivery of a comprehensive programme of professional development. The second survey has been directed at those schools currently offering Junior Certificate Technology. This survey aims to elicit information regarding the current state of readiness of schools with regard to the introduction of Leaving Certificate Technology. Schools are asked, as a matter of priority, to return these surveys so that the implementation of the subjects can proceed as effectively as possible.

9. The implementation of a revised syllabus for an existing subject and/or the implementation of a new subject into the school curriculum require careful planning. Schools are encouraged to address the matter of syllabus implementation within the framework of their whole school planning process.

10. Please bring this circular to the notice of the teachers concerned.

11. Please also provide a copy of this circular to the appropriate representatives of parents and teachers for transmission to individual parents and teachers.

Margaret Kelly
Principal Officer

September 2006