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Digital Technology Infrastructure Guide for School Leadership

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Introduction to this Guide

PDST-TiE have developed a Digital Technology Infrastructure (DTI) Guide for schools which is written specifically for school leadership, including principals, deputy principals, the digital learning team and the DTI coordinating teacher. The purpose of guide is to present Digital Technology Infrastructure in a non-technical manner and to show how it can support schools in achieving their teaching and learning objectives.

Given the increasing complexity of Digital Technology Infrastructure (DTI) in schools, it is critical that a well thought out, planned approach is in place. Schools that have high quality external IT providers in place benefit greatly from this model, as IT providers can focus their technical expertise on the technical areas, such as having a high quality, robust and reliable DTI in place, and this enables schools to focus their energies and expertise on teaching and learning areas to support students.

Selecting suitable Digital Technology Infrastructure that complements a schools Digital Learning Plan can have a very positive impact in all aspects of supporting learning. However many schools lack confidence in making decisions regarding DTI as they think they don't have the necessary technical expertise to do so. Schools may think that they need to understand technical details to a reasonably high level before making decisions and this is often a barrier for them in making progress.

Key Points:

- Using the approach outlined in this guide schools can have a modern fit for purpose Digital Technology Infrastructure to support teaching and learning in their school.
- No DTI technical knowledge is required for schools to read and understand this document as it is written in non-technical 'plain english'.
- It is possible for schools to manage Digital Technology Infrastructure regardless of whether they have technical expertise or not.



New Digital Strategy, Digital Learning Framework (DLF), DL Planning

This guide supports the objectives of the New Department of Education's 'Digital Strategy for Schools to 2027', specifically 'Pillar 2' - DTI Infrastructure, in relation to DTI Infrastructure.



Information on Digital Learning Framework (DLF) and how it can be used for planning to embed DTI in into teaching, learning and assessment can be found at the Digital Learning Planning website <u>https://www.dlplanning.ie/</u>. The website helps schools to plan for improvements in digital learning. It supports the Digital Learning Framework, mapping standards and statements of effective practice to good practice video exemplars. It helps school leaders understand how technology can support the learning process.

In the same way as a school needs to have a Digital Learning Plan in place to guide their approach to teaching, learning and assessment, they should also having a complimentary Digital Technology Infrastructure Plan in place so that their Digital Technology Infrastructure priorities compliment and support their Digital Learning plan.

Benefits of Digital Technology Infrastructure

The benefits of a high quality, robust Digital Technology Infrastructure are:

- It supports improved learning outcomes
- It allows teachers to focus on teaching and learning rather than on technology issues
- Facilitates school leadership and digital learning teams to focus on teaching and learning
- A high quality, robust DTI requires lower levels of technical support, leading to cost savings
- Setting minimum technical specifications helps improve the quality of DTI
- Allows more time for schools and IT providers to focus on preventative maintenance & process improvement rather than on 'firefighting'
- Facilitates better working relationships with IT providers less stressful for all





Improving the Quality of Digital Technology Infrastructure

Overall Vision: Improving the quality of Digital Technology Infrastructure (DTI) and technical support for all schools, as this is the most effective way for DTI to support teaching and learning

PDST-TiE assist schools in managing DTI by providing:

- Technical guidance to schools on all aspects of Digital Technology Infrastructure
- Recommended minimum technical specifications and templates which can be used by schools when specifying the DTI they require from IT providers
- Technical advice and guidance to schools when they are evaluating proposals from IT providers
- Supporting existing procurement frameworks for:
 - Windows PCs & laptops, iPads, Projectors
 - And future frameworks for Interactive Flat Panels (IFPs) and WiFi

PDST-TiE Digital Technology Infrastructure Support Matrix:

The following table provides a summary of the advice, technical specifications, technical templates, technical advice on evaluation, and frameworks provided by PDST-TiE.

Digital Technology Infrastructure areas	Advice and Support	Technical Specifications	Technical Specification Templates	Technical Advice on Evaluation	Procurement Framwork in place
Laptops, Desktops (Windows devices)	>	>	>	>	>
Chromebooks	Y	◄	✓	>	No
iPads	Y	Y	>	>	>
School Wifi	Y	>	>	>	No
Schools Network	Y	Y	>	>	No
Projectors	Y	>	>	>	>
Interactive Flat Panels (IFPs)	>	>	>	>	**
Managed Print Service (MPS)	Y	Y	>	>	No
Telephone System (VoIP)	N	>	>	>	No
Cloud based back-up system	Y	>	>	>	No
Technical Support	N	>	>	>	No
Learning Platforms	Y	>	>	>	No
Data Management / CyberSecurity	Y	Y	>	>	No
Other Specific Areas (eg Servers)	Þ	N		Þ	No
Digital Technology Infrastructure Audit	Y	>	>	>	No
** (Currently in Progress)					





Overview of Digital Technology Infrastructure

The Digital Technology Infrastructure in a school consists (as shown) of a range of technologies to support teaching, learning, assessment and administration.

Questions school leadership should ask regarding Digital Technology Infrastructure

In order for schools to improve their Digital Technology Infrastructure (DTI) they need to review their current situation. The following is a checklist of questions that schools could ask to review their situation:

- Does the existing DT infrastructure meet school teaching and learning needs?
- Is there a high level of satisfaction among staff with school DT infrastructure?
- What technical infrastructure issues are impacting teaching and learning?
- What are the current top priority infrastructure issues that need to be resolved?
- Are these recent issues or have they been ongoing for a while?
- Has the school tried to resolve these issues?
- If the issues remain unresolved for a while has the school sought support from external parties or from our PDST-TiE support email at ictadvice@pdst.ie

Regarding 'Technical Support' the following is a checklist of questions that schools could ask to review their situation:

- Does the school have a suitable technical support provider in place?
- If not is the school seeking a new technical support provider?
- Does the existing model of technical support meet school needs?
- Do school leadership have a high level of confidence in the current technical support provider(s)?
- Do technical support provider(s) have the necessary high quality technical expertise in the relevant areas to support the school?
- Does the IT provider manage technical support in a professional manner?
- Do they have a strong customer focus, and treat the school as a valued customer?
- Do teachers have a high level of satisfaction in the current technical support provider(s)?
- What technical support issues are impacting teaching and learning?



- Are these issues ongoing or recent issues?
- Has the school tried to resolved these issues?
- What are the current top priority technical support issues that need to be resolved ?
- If there is a low level of confidence in the technical support provider, has the school considered changing to a new provider?

Improving and simplifying Technical Support

Reactive Model



- · Reactive, fire-fighting, 'break-fix' only
- A low-medium level of technical expertise
- Ad-hoc, unplanned
- Lack of process (logging, tracking)
- Poor communications, vague, lacking detail
- Expensive, unclear billing
- Poor track record
- Stressful, poor relationships, lack of trust

Preventative Model



- Strategic, planned, proactive approach
- Preventative maintenance
- · Strong technical team and expertise
- Clear processes (logging, tracking)
- · Good verbal and written communications,
- · High quality track record with other schools
- Good value for money, itemised billing
- Strong relationships, high level of trust, less stressful
- PDST-TiE has developed a new 'Technical Support Guide' for Schools. In the guide it is recommended that schools carry out an Audit of DTI in the school. A template Request for Quote (RFQ) for Technical Support including a DTI Audit has been provided. The guide is available on our website at: https://www.pdsttechnologyineducation.ie/technology-infrastructure/technical-support/



Regarding 'Data and Cybersecurity' schools need to be asking what measures they have in place to protect school data.

- What would be the impact of a cyberattack/data breach/data loss on a school?
- Has the school a plan in place to prevent or reduce the impact of an attack?
- A cyberattack could potentially impact all school data systems
- PDST-TiE has developed a new 'Cybersecurity Guide' for Schools, on our website at: <u>https://www.pdsttechnologyineducation.ie/technology-infrastructure/data-security/</u>

What are the main Digital Technology Infrastructure issues affecting schools?

Based on feedback from schools the following comments and questions are representatiive of the key Digital Technology Infrastructure issues in schools.

What type of student/pupil devices are suitable for schools? Student/Pupil devices cannot consistently connect to the internet, what could be the problem? We're concerned that our IT support provider doesn't have the technical expertise to resolve problems, what should we do?

Our Projectors are fading Do we need new ones or can they be upgraded?

Accessing the internet is slow in some school areas, could this be a <u>WiFi</u> problem?

Is Managed Print Services a better approach to having multiple printers in the school?

What type of Interactive Flat Panels (IFPs) are suitable for our school? What 'technical' supports are available from PDST-TiE We're concerned about cybersecurity, How should we protect important school data?



Roles and Responsibilities in relation to DT Infrastructure

This approach recognises that, in relation to DTI Infrastructure, there are a number of different roles and responsibilities, involving staff within the school, as well external third parties. The key roles and responsibilities in relation to Digital Technology Infrastructure are summarised in the following table. In smaller schools the Principal may have a number of roles, including the ICT coordinating teacher.

DTI Roles	Responsibilities regarding DTI	Technical Role (*)
School Principal	Provide overall leadership and priorities to all parties, overall decision maker, funding approval, non-technical role	No
Deputy Principals, Digital Learning Team, ICT Coordinating teacher	Support Principal leadership, provide input regarding priorities, may involve some technical responsibilities, where this capacity exists within a school	Where capacity exists
IT Providers	Technical role, respond to school priorities and requests, provide technical solutions based on schools priorities	Yes
PDST Technology in Education - Digital Technology Infrastructure Team	Provide objective technical and non-technical advice and guidance to schools, respond to school priorities and requests	Yes
Other	As may be necessary	

(*) Some schools may have technical IT expertise within their staff, for example where a staff member may have IT qualifications, worked in IT, or has a particular interest in technical aspects of IT, however in general most schools don't have that level of expertise.

Technical Support – Roles and Responsibilities

Examples of Technical Support activities that could be carried out by school staff, where capacity exists to do so	Technical Support activities which are typically carried out by IT providers
Basic troubleshooting regarding a wide range of situations	Detailed troubleshooting regarding a wide range of
where problems occur including broadband. Carrying out	situations where problems occur
activities as directed by the Schools Broadband Service Desk.	
Checking cabling where issues occur. Double-checking that	School Network troubleshooting, network upgrades,
problems exist before they are escalated to IT providers	Network segmentation using VLANs; WiFi troubleshooting;
	IT upgrades and configuration changes
Ensuring that school Anti-Virus software is up to date and that	School Server related issues. Firewall related issues.
scanning runs are being run regularly outside of core school	Updating/re-configuration of network, WiFi, server,
hours	firewall etc
Regular checks that software is up to date	Security checks on devices, network and WiFi
Basic level of support for Printers , checking power and cabling,	Managed Print Services (MPS). Second level support on
error codes, paper blockages, toner cartridges, consumables	Printers. Remote monitoring of DTI
Basic level of support for Projectors , checking power and	Second level support on Projectors.
cabling, error codes, lamp unit. Facilitating remote access (RA)	
for IT providers	
First level support for a number of agreed technical support	Second level support for all agreed areas.
activities.	
Updating content to the school website	Ensuring school website is securely hosted, backed up, and
	software is up to date



Objectives for Digital Technology Infrastructure in each area

Having clear objectives for each DTI area helps clarify its purpose. The following table provides a summary of the objectives for each area.

DTI Area	Objective specific to this Digital Technology Infrastructure (DTI) Area
School Network, including local firewall	The school network is the 'internal connectivity backbone' for all other ICT infrastructure within
	the school. A reliable, future proofed school network is critical.
IT Cabinets, Cabling	Well organised, tidy, well maintained and professional set up will reduce IT issues
Network Diagram	This helps the school better understand their school network
School WiFi	WiFi is required throughout the school so that teachers and students can access online content
	from anywhere. A reliable, future proofed WiFi system is critical.
Teacher Computing Devices	Teachers devices need to be fit for purpose to support high quality teaching and learning
	outcomes
Student Computing Devices – which are owned	Suitable devices need to be available to meet the learning needs of students throughout the
by the school	school day
Learning Platform set up and configuration	A suitable Learning Platform is required to meet teaching and learning objectives
School Projectors, Interactive Panels,	High quality technology for 'Presenting in the Classroom' is critical in classrooms so that
Visualisers (Audio Visual)	teachers/students can present high quality engaging content
School Server (if applicable)	School Server may be required to support specific IT activities
Printing in the school	A high quality Managed Print Service (MPS) helps support teaching and learning
Data Backup and restore process, Cybersecurity	Ensuring that school data is protected from a range of risks including cyberattack, equipment
/ Data Management review	failure, and other related data loss risks
Anti-Virus (AV) Software	Anti-Virus software for Windows devices helps protect devices from 'malware' attack

Recommended minimum technical specifications

Having recommended minimum specifications for each Digital Technology Infrastructure area has many advantages for schools. The following table provides a summary of the PDST-TiE recommended minimum technical specifications in each area.

Digital Technology Infrastructure	Summary of Recommended Minimum Technical Specifications in each area
Area	
School Network, including local	Gigabit Ethernet throughout the school; No daisy-chaining of switches, Ethernet LAN cable runs not to exceed 100Metres; Fibre between
firewall	buildings; Firewall set-up/configuration to be reviewed; Network segmentation / VLAN structure is recommended where appropriate
IT Cabinets, Cabling	General cabinet and cabling areas to be organised, tidy, with clear labelling for equipment, switches, cables, patch panels
Network Diagram	A school network diagram to be provided
School WiFi	A modern centrally controlled (ideally cloud based) WiFi system; Schoolwide coverage; Separate SSIDs to be in place for Admin, Staff,
	Students, Guests
Teacher Devices	Teacher devices to be checked to ensure they are fit for purpose and up to date ; Windows devices should be a minimum of Windows 10
	Professional, 8GB memory; SSD Drive of minimum 512GB; Specs provide for Chromebooks and iPads/Apple devices
Student Devices – which are owned	Student devices to be checked to ensure they are fit for purpose and up to date; Windows devices should be a minimum of Windows 10
by the school	Professional; 8GB memory; SSD Drive of minimum 256GB; Specs provide for Chromebooks and iPads/Apple devices
Learning Platform	Learning Platform set up and configuration to be reviewed; Recommendations to improve processes to be outlined to the school
School Projectors, Interactive	Projectors and other AV equipment review to be carried out and any recommendations provided
Panels, Visualisers (Audio Visual)	
School Server (if applicable)	Server to be set up securely to reduce risk of cyberattack; Server hardware to be checked to ensure it has the resources to support
	school demand; Server software to be up to date; Server backup to be reviewed.
Printers	Printer review to be carried out and any recommendations provided. A high quality Managed Print Service (MPS) helps support teaching
	and learning
Data Backup and restore process	Data Backup set up and configuration to be reviewed; Recommendations to improve processes to be outlined to the school
(Cloud service to be recommended)	
Cybersecurity Review, Data	Cybersecurity set up and configuration to be reviewed; Recommendations to improve processes to be outlined to the school
Management review	
Anti-Virus (AV) Software	Anti-Virus software for Windows devices to be checked to ensure it is licenced, up to date and fit for purpose, and that anti-virus
	updates are happening as planned
For more detailed specifications	More detailed specifications on some areas can be accessed at www.pdsttechnologyineducation.ie/technology



How can schools check the quality of their Digital Technology Infrastructure?

- How can schools know if their DTI is fit for purpose, meets min' technical specifications
- If everything seems to be working, is that sufficient ?
- Schools need expert technical input to check DTI
- Even if everything 'seems to be working OK', there may be 'hidden' issues
- DTI instability can result from factors such as:
 - increased usage/demand, degraded performance, external factors, undiagnosed problems, configuration errors, out of date software, hardware issues, increased cybersecurity threats etc
- A DTI audit is the PDST-TiE recommended process to review/check DTI status
- The audit is necessary to ensure DTI stability and meeting min' technical specifications
- DTI Audits need to be carried out by IT provider(s) with the relevant levels of technical expertise, and who have a good track record with schools

Example of Digital Technology Infrastructure (DTI) Audit Summary Report

This example shows a one page summary overview from a typical DTI audit report. A one page snapshot of costed recommendations

Digital Technology Infrastructure (DTI) Audit: Summary Checklist	Fit for purpose	Minor upgrade	Needs software upgrade	Significant upgrade	Not fit for purpose	Further investigation may be required	Urgency / Priority	Notes: Details of recommended changes	Estimated Cost
School Network		i i		Х			P2	5 switches need upgrade to 1Gbps	
School Wifi			X	X			P1	WiFi APs need to be upgraded	
Teachers Devices	8					x	P1	Six teachers devices need upgrade	
Student devices						X	P3	A number of options provided	
Learning Platform	X					X		Microsoft 365/OneNote	
Projectors	Х							All projectors checked and OK	
Printers / Photocopier		i i		i i i i i i i i i i i i i i i i i i i	X		P2	Managed Print Service (MPS)	
Cloud based backup			X		X		P1	Upgrade recommended	
CyberSecurity / Data Risk			x	X		x	P1	Recommendations detailed in Report	
Overall Costs									Totals

P1: Priority 1
P2: Priority 2
P3: Priority 3

- The audit report provides details of the work necessary
- Details to bring each DTI area to recommended minimum technical standards
- Recommendations and costs in each of DTI areas
- Highlights urgent or priority issues

PDST-TiE has developed a new 'Technical Support Guide' for Schools. In the guide it is recommended that schools carry out an Audit of DTI in the school. A template Request for Quote (RFQ) for Technical Support including a DTI Audit has been provided. The guide is available on our website at:

https://www.pdsttechnologyineducation.ie/technology-infrastructure/technical-support/



The following section gives a brief summary of different DTI areas, and provides schools with links where they can find additional information on the PDST-TiE website.

Computing Devices

Fit-for-purpose computing devices for teachers and students are critical to support teaching and learning. It is important that teachers are equipped with devices that allow them to carry out activities to support teaching and learning outcomes that align with the schools Digital Learning Plan, but also devices that they are comfortable with.Student devices need to support a wide range of activities that allow students to engage effectively in classes, in project work and other learning activities. Student devices need to be WiFi enabled, mobile, robust and need to have long battery life, so that they can be used throughout the school day.



(Google) (Available from a range of suppliers)

iPad (iOS)

(Apple)

Windows (Microsoft) (Laptops, Surface) (Surface available from Microsoft, Laptops from a range of suppliers)

Hybrids (Available from a range of suppliers) 'Hybrid' devices

Additional information on this area can be found at the following PDST-TiE links: https://www.pdsttechnologyineducation.ie/technology-infrastructure/computing-devices/

https://www.pdsttechnologyineducation.ie/technology-infrastructure/technical-and-purchasingconsiderations/

Presenting in the Classroom: Projectors, Interactive Flat Panels

Projectors: High quality projectors are critical to support teaching and learning in Post Primary classrooms. A new Projector Procurement Framework has been put in place by the Department of Education (DE) to make it easier for Schools/ETB and other Education Clients to purchase high quality, fit for purpose projectors from approved quality providers. Schools can order Projectors from approved suppliers, without having to seek quotes from other suppliers. The details that we've published for schools and ETBs can be found at: <u>https://www.pdsttechnologyineducation.ie/projectors.</u>

Five type of projectors are included, including Portable/Long Throw, Ultra Short-throw (both interactive and non-interactive), Laser Projectors (long lifespan), and High Lumens (for school halls or larger areas).

Interactive Flat Panels:

Though mainly used in Primary school classrooms, Interactive Flat Panels (IFPs) may also be used in Post Primary schools, though are generally too expensive for most situations.

IFP Purchasing Considerations: A new IFP Procurement Framework

The Department/PDST-TiE are currently working to develop a new Interactive Flat Panel Purchasing Framework for schools. While we currently don't have a date as to when this framework will be available, upon availability it will promoted via our website, and newsletter to schools. We'll be adding additional information to this section as developments occur.

Additional information on this area can be found at the following PDST-TiE link: <u>https://www.pdsttechnologyineducation.ie/technology-infrastructure/presenting-in-the-classroom/</u>



School Network

A fit-for-purpose School Network (also known as a school local area network or LAN) is critical to supporting all aspects of teaching and learning. This network connects the various DTI elements such as computing devices, fixed network and WiFi network and other DTI elements throughout the school. It also connects the school network to the internet via the schools broadband connection. When schools are seeking to upgrade their existing network or install a new School Network they need to specify a system that is technically fit-for-purpose for their school situation, and one that can support their expanding future needs.

Key Points:

- A fit for purpose School Network is critical for schools
- School Networks must be fit-for-purpose for a school multi-user learning environment
- Suitable IT providers need to have a good track record with schools, and be able to supply references from other schools where they have installed and support similar systems.
- Schools considering significant upgrades to their School Network, and who are seeking advice should contact PDST-TiE at <u>ictadvice@pdst.ie</u>

Additional information on this area can be found at the following PDST-TiE link: <u>https://www.pdsttechnologyineducation.ie/technology-infrastructure/WiFi/</u>

School WiFi

Key Points:

- Fit for purpose WiFi connectivity is critical to supporting teaching and learning.
- Post Primary Schools are one of the most demanding environments for WiFi
- WiFi systems must be fit-for-purpose for a school multi-user learning environment
- WiFi systems suitable for home/domestic use are not suitable for schools
- Suitable WiFi providers need to have a good track record with schools, and be able to supply references from other schools where they have installed and support similar systems.
- The Department of Education's WiFi procurement framework was in place from 2016 to 2020, however it has expired, as frameworks are generally not allowed to be in place for more than 4 years. Planning is underway for a new WiFi procurement framework which is hoped to be in place by mid-2023.
- Until then schools considering purchasing a new WiFi system, and seeking advice should contact PDST-TiE at <u>ictadvice@pdst.ie</u>

Additional information on this area can be found at the following PDST-TiE link: https://www.pdsttechnologyineducation.ie/technology-infrastructure/WiFi/



Learning Platforms

Learning Platforms (also known as Learning Management Systems) have become essential tools/applications to support teaching and learning in schools. They provide a rich set of tools to support schools and are critical aspects of cloud based DTI Infrastructure. The two main learning platforms used in schools, are Google Workplace for Education and Microsoft 365/OneNote.

M	31						-
Gmail	Calendar	Meet	Docs	Sheets	s Slides	Forms	Classroom
		F		4	0	0	4
Assignm	ents Site	s Gro	ups D	rive	Admin	Tasks	Jamboard
PDST Website: Google link: https://www.pdst.ie/DistanceLearning/Platforms/google Direct link to Google: https://edu.google.com/workspace-for-education/editions/overview/							
Contraction and productivity							
PDST W	ebsite: M	icrosoft	link:				
https://www.pdst.ie/DistanceLearning/Platforms/Microsoft							

Direct link to Microsoft:

https://www.microsoft.com/en-ie/education/products/office

Managing Printing in the School

Printing costs is a school can be significant, especially in larger schools. Improving how printing is managed can significantly support teaching and learning in the school. A Managed Print Service (MPS) is generally more appropriate for larger schools as an alternative to having many smaller printers throughout the schools. A Managed Print Service (MPS) is a system/contract of print services (normally outsourced to a third party company) to manage all printing, faxing, scanning and copier devices on your network, school premises etc. in a cohesive way.

Additional information on this area can be found at the following PDST-TiE link: <u>https://www.pdsttechnologyineducation.ie/technology-infrastructure/printing/</u>

Data Security / Cyber Security

These are critical areas for all schools. Data security is concerned with managing school data to make sure it is secure, and to protect it from being deleted, lost or stolen. From a school perspective data security aims to protect school systems, devices and the data stored on these systems from data loss, damage or theft.

Schools need to ensure that important school data is not lost, damaged or compromised and that the systems or devices that the data is stored on are protected. Cyberattacks are attempts carried out over the internet by third parties to steal or compromise systems or data. Cybersecurity uses technologies, processes and controls to protect systems, networks, devices and data from cyberattacks. It aims to reduce the risk of cyberattacks and protect school data from attack.

When a computer becomes infected with ransomware, the data/files are encrypted (or locked) so that they can't be accessed. Advice is provided below for schools on how to reduce the risk of data loss and cyberattack.

Additional information on this area can be found at the following PDST-TIE links: https://www.pdsttechnologyineducation.ie/technology-infrastructure/data-security/

PDST Technology In Education Website:

All information in this guide, including links to additional information on the different areas can be found on the PDST-TiE website at <u>https://www.pdsttechnologyineducation.ie/technology-infrastructure/</u>



For additional Digital Technology Infrastructure related queries schools can email ictadvice@pdst.ie

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