Options for Displaying Mobile Devices on TV and Projector Screens

This guide is intended to help school decision-makers decide how best to display the image from mobile devices such as tablets, phones or laptops onto a TV or projector.

Sharing content with others facilitates activities such as collaboration, providing feedback, presenting information and demonstrating understanding.

Many teachers will already be familiar with using cables to connect with a data projector or whiteboard but now there are many other options. The proliferation of mobile devices has led to a number of solutions to 'play', 'throw', 'cast' or 'mirror' screens. This guide will provide an overview of the common solutions along with some pros and cons of each one for different situations.

You may also be interested in our guide to Deciding Whether to Choose a TV or a Projector for a Classroom.

Contents

Once you have read this guide you are welcome to contact the Connected Learning Advisory to get more personal assistance. We aim to provide consistent, unbiased advice and are free of charge to all state and state-integrated New Zealand schools and kura. Our advisors can help with all aspects outlined in this guide as well as provide peer review of the decisions you reach before you take your next steps.

- For more information visit www.connectedlearning.org.nz
- Check out our resources at resources.connectedlearning.org.nz
- Call us for personalised service on 0800 700 400
- Make a personal inquiry via our online form at query.connectedlearning.org.nz
- Email info@connectedlearning.org.nz

Wired Connections

Image: wikipedia.org

Some devices will be able to connect directly to the TV or projector using a cable. They may need an adapter (sometimes called a dongle) to convert from one socket type to another. If there are a variety of devices in the room to be displayed then a variety of cables and adapters might be needed. Wired connections tend to be very reliable until the wires fray and pins become loose. The downsides of a wired connection are that they limit the connectivity to within only a few metres from the screen, and the cables can be annoying and hazardous.

Document Camera or Visualiser

Image: blocchi-sa.com

This is not a technically elegant solution but many teachers find it just as effective to put a mobile device under a document camera or visualiser to show what is on the screen. This then projects the mobile device screen onto the big screen. The advantage here is that, as long as the camera is in place and is working, the set up is nice and simple. The document camera can also display things that can't "cast" like a book, picture or science experiment so it is a useful tool to have.

Specialist Software

Image: hemmans.com

It is possible to connect a variety of mobile devices to a display via a 'master' laptop or desktop computer running specialist software.

For example, if a teacher's laptop is always connected to the projector or TV, it can run software that the mobile devices connect to and display their screen on the TV or projector. Examples of software for this includes AirServer, Annotate, Mirroring360, Reflector 2, X-Mirage and Google Cast for Education. The key advantage of these solutions is that the teacher is always in control of what is being shown on the screen. A downside is that the laptop is 'tied up' when a mobile device is being used on the TV or projector. To overcome this, you could provide a computer that is permanently connected to the TV or projector to run this software so that it can display students' mobile devices.

Other software solutions include LanSchool, ABTutor Control and Hapara Highlights. Each of these has a more comprehensive feature set than only providing screen mirroring.

Specialist Hardware

Images: wikipedia.org

There are a number of specialist hardware solutions that are used to display a mobile device on a bigger screen. Common examples include the Apple TV, Chromecast, 'Miracast' solutions (that support the 'Miracast' protocol) and an increasing number of devices that support multiple platforms but which require an app to be installed on devices to work.

The mobile devices connect wirelessly to them and are able to 'play', 'throw', 'cast' or 'mirror' their screens. Some projectors or TV's may have in-built capability but, unless it uses the Miracast protocol, this can be limited to particular proprietary standards, such as Sony's or Samsung's systems that only work between their own brands of TVs and mobile devices.

In general:

- AppleTV - work best with Apple devices (like iPads and MacBooks).

- Chromecast devices - work with Chromebooks, Windows or Apple laptops that run the Chrome Browser or mobile phones and tablets such as iPads running

Chromecast-compatible apps. Note that screen mirroring from an iPad to a Chromecast is not possible.

- Miracast devices - work with devices running Microsoft Windows 8.1 and later along with some Android phones and tablets but they do not work with Apple's devices.

- Multi-platform devices - tend to be more expensive than individual devices and will require an app to be installed but you may only need to purchase one of them.

The key advantage of hardware solutions compared with software solutions is that the hardware is always in place and ready to be used in the classroom. A disadvantage of hardware solutions is that they can be stolen or 'go walkabouts'.

Advice When Considering Your Solution

1. **Test and trial -** always get hands-on with the proposed technology solution in real-life situations.

2. **Find out the experience of others** - request feedback from other schools using your Personal Learning Network, Twitter, the Virtual Learning Network etc.

3. **Liaise with your technical providers** - ensure they understand what you'd like to achieve and to ensure you know what the technical limitations or things to overcome might be.

Other things to think about are listed below:

Logistics

- How will you store and power the device?

- What parts can go missing? How can you keep it secure?

- Who has control of the settings? Requiring a passcode to connect to the displaying device can prevent students from hijacking another room's display.

- How to get audio working? We tend to focus only on the display aspect of screen mirroring but sound is equally important so should be considered.

- What support will be required? Teachers will likely need some help to get started and to know where to go for help when they need it.

Wi-Fi and other Technical Configurations

- Some extra technical information may need to be considered, for example, AirPlay requires specific ports to be open on the network for the special Bonjour protocol that AppleTV uses (and frequently they are not configured to be open).

- The mobile devices and the display devices often need to be on the same network (subnet). This might mean that they will all need to connect to the same Wi-Fi SSID.

Compatibility and Connectivity

- Check compatibility with different mobile device types to ensure the solution meets your needs.

- Check compatibility with your projector e.g. Commonly older projectors only have VGA connections so a VGA to HDMI converter may be required.

- Check connectivity to the network. Cabling in a display (hardware) device to a wired Ethernet port to connect it to the network is likely to provide a better result than connecting it via Wi-Fi.

Performance and Features

- The system must be reliable and easy to use if it is to be used by anyone.

- Some systems allow multiple mobile screens to be displayed which could be useful.

- Some systems enable recording the session and saving it as a movie file.

- Education-specific functionality and suitability might be important e.g. Adverts for movie rentals should be removed.

Costs To Consider

- Device and/or software costs.

- Set-up costs - some solutions can be centrally configured and managed e.g. Apple TVs can be managed with Apple's Configurator software or third party Mobile Device Management solutions.

- On-going time - for example, time may be needed to keep the configurations up-to-date because, typically, an update to the

	operating system of the mobile device can require a subsequent update of the display device's software or firmware.
	- Version upgrades of the particular software used may require additional costs.
	- Factor in the costs of having a back-up system for connectivity such as cables and dongles.
Useful Links	● [Ways to show your iPad on a Projector Screen](#) - Learning in Hand Blog
	● [Mirroring Devices](#) - Computerworld Website
	● [Deciding Whether to Choose a TV or a Projector for a Classroom](#) - Connected Learning Advisory Guide
	● VLN discussions:
	[Apple TV, Airserver, Chromecast...](#)
	[Presenting student work on big screen](#)

This guide has been produced in response to a number of specific queries about solutions from schools. It should not be read as a recommendation or endorsement of any specific product. The Connected Learning Advisory is a Ministry of Education supported service that provides schools with technology information relevant to their queries and does not recommend one product over another.