

# WHITEPAPER: CHOOSE THE RIGHT DISPLAY FOR EDUCATION OR BUSINESS USE





This whitepaper explains all the key considerations connected with the purchase of display equipment – flat panels and projectors – that are used in business and education. It guides you step by step through each element, including usage environments, display types, technology pros and cons, and pricing issues.

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## INTRODUCTION

Like many technical markets – cameras, computers and cars, for example - the display market is heavily populated and can be confusing to the unwary. The important thing is to put the audience’s needs front and centre of your decision-making, then adjust your decisions consciously when considering price and convenience for the buying organisation.

## FUNCTIONALITY AND COMFORT

Visibility should be the display buyer’s primary concern. Think of the smallest text you’re likely to want to display and then ask yourself whether the nearest and furthest audience member will be able to read it equally clearly. In this situation, a 60-inch diagonal screen is probably only comfortable up to a distance of 3 metres whereas a 100- or 150-inch screen is good from 5 to 7.6 metres. However, you can triple that distance for less precise viewing. Everyone needs to be able to see clearly and be comfortable, especially for long periods.



### Viewing distances for different screen sizes

Screen (diagonal inches)	Text (e.g.) content	General content
60	60	9m
100	100	15m
150	150	22.8m

## QUESTIONS TO ASK

The display devices might be flat panels or projectors and each brings its own strengths and weaknesses. One fundamental difference between devices is whether they emit light or simply reflect it. Most tablets, notebooks and flat panel displays, for example, have a light source built into the screen, usually an array of LEDs. Projectors, eReaders and paper work on reflected light which is easier on the eyes, especially for extended exposure.

Rather than take a fresh approach, some buyers will seek to replace what they already have – a ceiling mounted projector in a particular position, for example. Or their perceptions of what's available today may be coloured by their experiences with older technology. It could simply be that they're working with old equipment which

is losing its brightness and isn't very visible unless the curtains are drawn and the lights dimmed.

Technology is continuously improving and a direct replacement might well be a satisfactory move. However it would be foolish to ignore the alternatives. Someone used to seeing a projection screen obscured by the presenter's shadow might not realise some modern projectors can be sited so close to the screen that the presenter will rarely cast a shadow. They'd have to be standing very close to the screen.

Similarly, people may not realise that it's possible to interact with a projection screen using a pen, just as they do with a traditional flat panel display.

The best way to approach the choice of new display equipment is with a completely open mind, and to ask yourself the questions below.

- How detailed will the displayed information be?
- How far from the screen to the furthest audience member?
- If replacing existing equipment have you considered modern alternatives?
- Do you need to interact with the screen?
- Do you want to minimize 'presenter shadow'?

## YOUR BUDGET AND VENUE WILL DETERMINE YOUR CHOICES

Budget has to come into your decision-making. It's a question of finding the right place on the price/performance continuum. At one extreme you have feature rich/premium price products and at the other you can buy just the essentials at a budget friendly price. The venue will also determine the best solution for you.



### OFFICE:

A presentation to a small group of people could probably be done satisfactorily with a laptop with a decent size screen. In a breakout room or small office, a wall-mounted flat panel could well do the job.



### CLASSROOM:

A modest classroom might be fine with a traditional interactive whiteboard or a projector and screen/wall.



### CONFERENCE ROOM:

This would probably require a projector although, if your pockets are deep, you can create an array of flat panels. This might prove uncomfortable for people sitting close to it though.



### PARTITIONED ROOM:

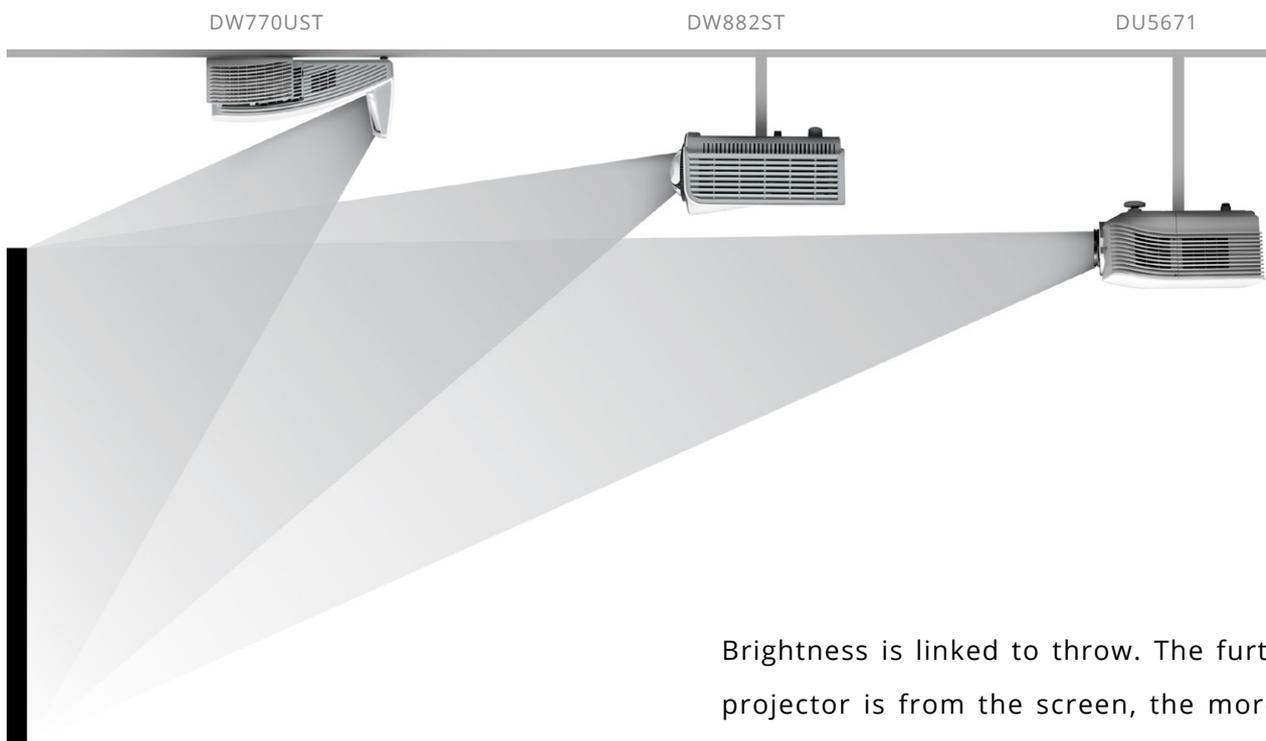
In one of those rooms, typical in hotels and large offices, that has bi-fold doors to double the space, a projector is almost certainly appropriate, especially one which can readily adjust the dimensions of the projection image.

# PROJECTOR CONSIDERATIONS

## POSITIONING

All projectors create a pyramidal beam of light that is smaller in volume the closer the projector is to the screen. Each projector specification will include two important ratios: throw and zoom. The throw ratio helps you calculate the distance between the projector lens and the screen. It works on the image width. An image width of 250cm would require the projector lens to be between 100 and 500cm

away from the screen, depending on the projector type – traditional (long throw), short throw or ultra short throw, usually abbreviated to UST. For those projectors that feature it, the zoom determines the minimum and maximum clear image sizes a projector can create from a fixed position. Mobile projectors have an inbuilt advantage in this respect.



Brightness is linked to throw. The further the projector is from the screen, the more initial brightness it needs for the projected image to look good. A typical office or classroom projector would probably lie between 3000 and 6000 lumens. A small meeting room might need between 2500 and 4000.

These are your broad brush positioning considerations when thinking about buying a display device.

**RESOLUTION:**

Typical resolutions are WXGA and 1080p. WXGA, at 1280 x 800 pixels, is fine for simple presentations on smaller screens but you'd probably be better off with 1080p, at 1920x1080, for anything more ambitious.

**INTERACTIVITY:**

Interactive flat panel displays come ready-equipped for pen or finger controls and annotation. Some projectors can provide the same functionality through the use of an invisible infrared 'curtain' over the front of the wall or whiteboard, which is the preferred surface because of its guaranteed flatness.

**CONNECTIONS:**

Apart from standard connections such as power and interactivity devices, you need to know what kinds of device will be providing the signals to the projector and by what means. It could be a mobile phone, a computer or a media device, for example. Some projectors support the NovoConnect wireless system - an excellent way for multiple presenters to collaborate through their own preferred devices. HDMI is probably the most common method but VGA, WiFi and other standard connections may be needed.

**LOCATION:**

Depending on the device, it may be mounted on the ceiling, the wall or on a table/stand. What makes some UST projectors attractive is that not only can they be mounted on the wall close to the screen; they may also project sideways or upside down. Unlike long throw projectors, the others can be wall- or ceiling-mounted.

**LIGHT SOURCE:**

The primary choices today are between laser and lamp. Lamps generate heat and need cooling which means they're best ceiling-mounted or standing on a flat surface. The lamps have a shorter life but can be replaced. Laser projectors lend themselves to unusual mounting positions if required.

**INSTALLATION:**

All installation is straightforward although fixed projectors require a little more precision than flat panel displays. The lifetime benefits of a UST projector probably outweigh a small amount of extra effort in the alignment of the mounting in the first place.

# PRICING

Pricing is related to the technology used but, interestingly, it's less related to the results achieved. For example, a very large interactive flat panel screen would be far more expensive than any of its interactive projection equivalents.

A simple way of looking at pricing is the cost per square metre displayed. The price per extra square metre rises in the case of flat panel displays and falls with projectors, because the same projector can display a range of sizes. For example, a UST

projector screen will typically lie between 80 and 100 inches diagonally.

You also need to check the warranty being offered with your chosen display device. How long does it last? Can it be extended? Is it a 'return to base', a 'collect, repair and return' or a 'swap out'? Prices will vary and your decision will be based on whether you can keep going without a display device. Some projector providers automatically give 5-year education warranties on their equipment.

## PROJECTOR / FLAT PANEL

200" 11,0307 m<sup>2</sup> | Price (€) 1,500 | Cost/m<sup>2</sup> (€) 136

120" 3,9634 m<sup>2</sup> | Price (€) 1,500 | Cost/m<sup>2</sup> (€) 378

100" 2,7625 m<sup>2</sup> | Price (€) 1,500 | Cost/m<sup>2</sup> (€) 543

98" 2,6474 m<sup>2</sup> | Price (€) 20,000 | Cost/m<sup>2</sup> (€) 7,555

86" 2,033 m<sup>2</sup> | Price (€) 4,500 | Cost/m<sup>2</sup> (€) 2,213 86" Price (€) 1,500 | Cost/m<sup>2</sup> (€) 738

80" 1,77 m<sup>2</sup> | Price (€) 1,500 | Cost/m<sup>2</sup> (€) 847

75" 1,5438 m<sup>2</sup> | Price (€) 3,200 | Cost/m<sup>2</sup> (€) 2,073

65" 1,1664 m<sup>2</sup> | Price (€) 2,000 | Cost/m<sup>2</sup> (€) 1,715



## CONCLUSION

Buying a display device, whether flat panel or projection, is not a difficult process as long as you work through it systematically. The choice is massive but if you narrow down your options by the factors discussed in this paper, you should end up making a satisfactory choice.

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### FOR MORE INFORMATION, PLEASE CONTACT:

#### **Vivitek EMEA**

Zandsteen 15 | 2132 MZ Hoofddorp | The Netherlands

tel: +31 20 800 3960 | fax: +31 20 655 0999

e-mail: [info@vivitek.eu](mailto:info@vivitek.eu)