



# Interactive Display Technology for the Classroom

Which option is right for you?

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## Interactive Display Technology for the Classroom



### Introduction

Interactive technology in the classroom is a good thing. Student response, teacher feedback and a host of research all support this intuitively logical claim, rapidly becoming accepted as a matter of fact for successful 21st century education. Interactive whiteboards (IWBs), introduced in 1991, represented a transformative shift in the way students and teachers interacted with information as well as with one another. With the ability to display anything on a computer to an entire room, plus the ability to manipulate that content directly on the surface of the screen, IWBs delivered unprecedented opportunities for empowering teachers, engaging students and promoting collaboration.

Teachers report that increased student attentiveness and engagement is the number one benefit to teaching with interactive whiteboards,<sup>1</sup> and a majority of educators – around 77% in one survey – believe that an interactive display in the classroom is very important or an absolute must.<sup>2</sup>

One landmark study of 85 teachers across 170 classrooms, found a student achievement gain of 16 percentile points when IWBs were used. This jumped to 26 points when well conceived graphs, charts, videos, and other visuals were used to reinforce information; and when “interactive reinforcers” and audience response polling were added, achievement rose a whopping 31 percent.<sup>3</sup>

### Interactive Display in the Classroom

Well suited for any type of classroom, lecture hall or distance-learning environment, the possible uses for interactive displays are virtually endless. Among the many features offered are:

- Teacher-directed viewing and navigation of any website, app, video, or document to support learning objectives
- Dramatic emphasis of key learning points with onscreen highlighting and annotation
- Save and print capability, for instant handouts, supplementary notes, and absent students
- Facilitation of group projects and individual presentations
- A collaborative work environment for text documents, spreadsheets, design projects, etc.
- Video conferencing connectivity
- Text/data entry via floating onscreen keyboard
- Onscreen editing and recording of changes or additions
- Support for effective special needs education and classroom differentiation
- Student feedback and assessment with optional audience response accessories

### Types of interactive display boards

With the recent arrival of two new technologies – large format touchscreen LED displays and interactive projection technology – educators now have three options for bringing interactive display to the classroom. Each delivers comparable interactive functionality via different technological means.

#### **Projector-based IWB**

The original interactive whiteboard system is still the most widely used and most familiar means of delivering interactive display to a classroom. This system consists of a large display board connected to a computer and projector. The computer's desktop is transmitted via the projector onto the board's surface, where users can control the computer with a pen, finger, or other device. In this system, the interactive capabilities are embedded in the display board itself but the content must be transmitted to the board via the projector.

#### **Interactive touchscreen LED**

Until recently, projector-based systems were the only available IWB technology, with some variation in implementation among suppliers. Large-format touchscreen LED displays, introduced in 2012, offer a new alternative with expanded benefits, reduced maintenance requirements and better overall TCO. With this option, the only component needed for full functionality is the LED display itself, although special "pens" may also be used.

#### **Interactive projector**

Embedded with interactive technology previously only found in IWBs, interactive projectors transform virtually any flat surface into a collaborative canvas. Users can write, draw, and annotate directly onto the projected image, typically using an interactive pen or "wand" to

#### **Interactive Whiteboard Features**

Well suited for any type of classroom, lecture hall or distance-learning environment, the possible uses for interactive displays are virtually endless. Among the many features offered are:

- Full HD 1080p resolution
- Interactive technology embedded in display board
- Required components: Interactive board and projector
- Integrated system requiring display board and projector
- Typically a static, ceiling-mounted resource

#### **Large-format Touchscreen LED Display Features**

- Full HD 1080p resolution
- Interactive technology embedded in display
- Interactivity requires only the LED display; no other components necessary
- A wall-mounted or carted solution
- Lower energy consumption
- Reduced maintenance, with no bulbs or filters
- Eliminates shadows/glare introduced by projectors

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manipulate content. This method of interactive display requires only the projector and special pen, using any available dry erase board, pull-down screen, blank wall or other flat display surface.

### So which is best?

Today, the question administrators and IT teams ask is no longer whether interactive display boards have a place in their schools' classrooms, but how best to implement them. That is, of the options available today, which technology is the best? The simple answer is: none. None of the three options is by default better than the other. Which leads to the more complex answer: it depends.

Each of the three available technologies presents advantages and limitations compared to the others. The key to choosing the best fit for a given installation is carefully evaluating your particular circumstances, including budget, type of content likely to be displayed, room size, type of audience, ambient light, and other environmental factors.



### Interactive boards: IWBs and LEDs

Both the classic interactive whiteboard and large format touchscreen LEDs have the clear advantage over interactive projectors when it comes to resolution. Most offer high definition display, and are therefore ideal for delivering crisp, vibrant video. By

### Interactive Projector Features

- Lowest cost
- Interactive technology embedded in projector
- Required components: projector and interactive pen
- Eliminates risk of damaging costly interactive screen
- Flexible use with any flat surface
- Mobile or ceiling mounted resource
- Robust & easier to service
- Easy integration with existing IWB system
- Compatible with most existing interactive software

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contrast the top resolution currently available in an interactive projector is WXGA. When clarity of image is critical, such as for design, engineering, art and architecture curriculums, the need for full 1080p HD display will exclude interactive projector technology as an option.

Large-format touchscreen LED displays are a relatively new board-based option for enabling interactive classroom display.

This “all-in-one” interactive technology offers several advantages over the traditional, projector-based interactive whiteboard. With no projector to maintain, touchscreen LED boards reduce both costs and staff time related to calibration, replacing bulbs, and cleaning filters. Downtime is also minimized, with no unexpected bulb burn-outs or waiting for bulbs to be replaced. Further adding to the lower overall TCO compared to a traditional IWB, LED displays consume far less energy and are significantly easier to install and service.

A projector-less solution, touchscreen LED displays also eliminate the shadows cast when someone approaches a projector-based board and spares those at the front of the room from blinding projector lights. While short- and ultra-short throw projectors have come a long way when it comes to reducing shadows and glare, for some classroom environments these distractions can present a significant challenge and a large format touchscreen LED may be the ideal interactive solution.

Compatible with any laptop, iPad, or other tablet, interactive LED displays are simple to set up – in most cases instructors just connect the board and they’re ready to go. And while many LED boards include special styluses, most do not require them, working as easily and intuitively with a fingertip as an iPad or Smartphone.



### Interactive projectors

The interactive projector (IP) offers educators an exciting alternative for classroom interactivity. And while IPs may not yet offer the HD impact of an IWB or LED board, interactive projectors deliver comparable interactivity with a notably lower price tag, along with several other unique benefits. And for some content types, IPs may even be a better choice than a fixed interactive

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board. When large amounts of data, rather than video, will be displayed – for example in a finance or economics class – a projector offers the ability to vary the size of the text for optimal viewing from anywhere in the room.

In contrast to traditional IWBs, many education users find interactive projectors to be a much more flexible, portable resource. While IWBs and LED boards can be mounted on a rolling cart, these interactive technologies are typically considered a static resource. In particular, interactive whiteboard systems – which require



both a projector and a board to function – are difficult to share among different classrooms. Significantly lighter, smaller, and sturdier, interactive projectors on the other hand can be much more easily transported from one location to another, conveniently turning virtually any flat surface into an interactive instructional workspace. And for applications suited to permanent installation, IPs can be easily ceiling mounted, for space-saving interactive display that never needs calibration.

Not only are IPs easy to move from room to room, their compact form means they can be quickly packaged and shipped should a repair

be necessary – for faster, less costly servicing than with a traditional IWB. However it is worth noting that an IP, with the interactive technology housed in the projector, is far more robust and less likely to incur costly damage than an IWB or LED screen system, where users interact directly with the technology-embedded screen itself. Interactive projectors offer further flexibility by way of their compatibility with most interactive software (such as SMART and Promethean) and their ability to easily integrate into existing IWB systems

– for a cost-effective upgrade to more advanced projection capabilities.

### ***Types of IP pen technology***

Two differing technologies enable the functionality of the interactive “pens” (also called light stylus or wand) used with interactive projectors:

RF (radio frequency) and IR (infrared).

- **RF projectors:** RF technology accounts for 10%-15% of interactive projectors currently in use. While RF never requires calibration, making it an easily portable solution, it suffers from what is considered by current standards to be very poor pen accuracy. Compared to IR technology, RF pens introduce a much larger “offset” or “drag” between movement of the pen and the corresponding movement of the onscreen pointer.

- **IR projectors:** IR projectors are in use in 85% - 90% of all current installations. This technology operates at a more stable frequency, offering more reliable function and better pen accuracy. This increase in pen accuracy delivers an experience on par with using an implement with a touchscreen device. It also allows the use of larger board sizes up to 87 inches diagonal, whereas with

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the older RF technology, the larger the projection surface used, the lower the pen accuracy. IR projectors are typically ceiling mounted but can be portable, and they must be recalibrated every time they are moved.

### Conclusion

When it comes to interactive display technology, more options to choose from is a good thing. Each offers distinct advantages and benefits. The final choice will come down to budget, space constraints, content considerations, and user preferences. If budget permits and high-definition output is important, an IWB or touchscreen LED is the logical choice. For more cost-effective, eco-friendly Full HD display, an interactive LED offers a simpler, easier to manage solution with lower power consumption than traditional IWBs. For greater flexibility and the lowest initial cost, interactive projectors provide an outstanding alternative.

1 PMA Research Report. Survey of U.S. K-12 Educators Shows Strong Interest in Interactive Functionality for Classroom Projectors, Accessed 3.4.14 at <http://www.pmaresearch.com/press-releases/survey-of-u-s-k-12-educators-shows-strong-interest-in-interactive-functionality-for-classroom-projectors/>

2 Interactive Whiteboards Enhance Classroom Instruction and Learning, Accessed 4.14.14 at: <http://www.neamb.com/professional-resources/benefits-of-interactive-whiteboards.htm>

3 Marzano, Robert J., The Art and Science of Teaching / Teaching with Interactive Whiteboards, November 2009, Volume 67, Number 3, Multiple Measures Pages 80-82, Accessed 2.25.14 from <http://www.ascd.org/publications/educational-leadership/nov09/vol67/num03/Teaching-with-Interactive-Whiteboards.aspx>

