

Finding the Ideal Front-of-Classroom Interactive Display



This paper reviews the evidence supporting the importance of interactive display in the 21st century classroom, compares and contrasts the features offered by three most used interactive display technologies and offers guidelines for selecting the best fit.

— Erik Willey, 01/05/17

Introduction

The use of interactive and collaborative technology in the classroom has become a baseline requirement for most effectively educating students to participate and succeed in the 21st century. While many technologies play a part – Chromebooks, iPads, huddle stations and more – the interactive front-of-room display remains a critical component. Delivering the ability to display computer content to an entire room, plus the ability to manipulate that content directly on the surface of the screen, interactive displays represent a transformative shift in the way students and teachers interacted with information as well as with one another. Today, the IWB is joined by several interactive display technologies that offer the ability to empower teachers, engage students and promote collaboration.

How Important is Interactivity Today?

Hands-on learning works, and designing classrooms and curriculum for active learning has become a major push across K-12 and higher education environments. Project-based teaching, collaboration and interactive technology all contribute to the proven benefits of hands-on, do-it-yourself learning.¹

Today's employers expect employees to work in teams and collaborate effectively. The traditional one-to-many lecture format fails to foster these skills and education is quickly moving to adopt constructivist approaches, with students working together to make connections and develop knowledge. This shift is backed by significant research and educator experience alike, which confirm that the traditionally designed (lecture format) classroom – and the transference model it represents – lacks what is needed to prepare engaged 21st century citizens.

Instructors and administrators are working to apply this knowledge to new classroom design practices, leveraging flexible furnishings and collaborative technology to create spaces that promote active engagement and meaningful learning.

In one recent national survey of pre-K-12 teachers, 94% said that classroom and instructional technologies are extremely important or very important.² Among these technologies, the front-of-room display plays a critical role. Not simply the high-tech counterpart to the static black- or whiteboard, interactive displays deliver a host of advanced benefits. Teachers report that increased student attentiveness and engagement is the number one benefit to teaching with interactive front-of-room technology,³ 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.⁴

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.

- Teacher-directed viewing and navigation of any website, app, or video
- Onscreen highlighting and annotation
- Save and print capability
- Facilitation of group projects and individual presentations
- A collaborative work environment
- Video conferencing connectivity
- Text/data entry via floating onscreen keyboard
- Onscreen editing and recording
- Support for effective special needs education and classroom differentiation
- Student feedback and assessment with optional audience response accessories

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.⁵

Types of Interactive Display Boards

Not long ago, the interactive whiteboard (IWB) reigned as the classroom standard. Today, large format interactive flat panel (IFPs) displays and interactive projection (IPJ) technology offer alternative means of bringing interactive display to the classroom.

Each delivers interactive functionality via substantially different methods.

Projector-based IWB

Introduced in 1991, the original interactive whiteboard system is still widely used, although many systems are reaching their end-of-lifecycle. 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 Flat Panel Displays

Until relatively 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, offered a new alternative with expanded benefits, reduced maintenance requirements and better overall total cost of ownership (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 manipulate content. More recently, systems have become available that enable finger-touch capabilities. This method of interactive display requires only the projector and special implement, using any available dry erase board, pull-down screen, blank wall or other flat display surface.

Interactive Software

All interactive display technologies rely on embedded interactive software to deliver annotation (or “inking”) capabilities and other collaborative features. IWB makers such as SMART, Promethean and Mimio have historically required annual licensing fees and restricted software use to their specific product. As the interactive display market evolved to include new technologies, many IWB manufacturers began to periodically tweak their licensing and usage requirements, however most continue to include licensing and usage restrictions. Competing technologies, on the other hand, are often free from such fees and restrictions. As such, in today’s market the specific capabilities offered by proprietary software have become an important differentiator among technologies and manufacturers.

So Which Type of Interactive Display is Best?

Administrators and IT teams no longer question whether interactive display boards have a place in their schools’ classrooms, but how best to implement them. Each of the available technologies present relative advantages and limitations. The key to choosing the best fit for a given installation is to carefully evaluate the particular circumstances, including budget, content to be displayed, room size, audience, ambient light, and other environmental factors.

Interactive Whiteboards

One of the primary advantages of the IWB is its familiarity. Many instructors have used an IWB in the past, are currently using one, know others who have used them or were exposed to them during their own teaching education. This familiarity can help shrink the learning curve and increase instructor comfort with the technology. However, as the frontrunner in the interactive display market, newer technologies have been developed to address IWB weaknesses and offer added benefits.

Once the go-to interactive education technology, many schools are now faced with the need to replace IWBs that are nearing the end of their lifecycle. Not only do newer options deliver added advantages, outdated IWBs are often a significant cost burden, requiring ongoing and added maintenance, replacement parts and technician time. Loss of teaching time due to maintenance and recalibration is another significant negative impact.

Interactive Flat Panels

Since their introduction in 2012, large-format touchscreen LED displays (also known as interactive flat panels) have become a popular option for enabling front-of-room interactive classroom display. An all-in-one solution,

IWB summary:

- Full HD 1080p
- Integrated system requiring display board and projector
- Require maintenance
- Additional costs for bulbs and filters
- Require image calibration
- Typically a static, ceiling mounted resource
- Usually require an annual software licensing fee
- Typical 3-year lifespan due to cost of new bulbs, increasing product failures

this technology (marketed by ViewSonic as ViewBoard) offers numerous advantages over the traditional, projector-based interactive whiteboard as well as interactive projectors.

With no projector to maintain, IFPs reduce both costs and staff time related to calibration, replacing bulbs and cleaning filters. Class downtime is also minimized, with no unexpected bulb burn-outs or downtime waiting for bulbs to be replaced. IFPs often consume less energy and are significantly easier to install and service, with virtually no maintenance required. Finally, IFPs can be trolley mounted, enabling efficient resource sharing and making them a cost-conscious solution. IWBs and interactive projectors on the other hand are almost always a static, ceiling-mounted resource. Freedom from licensing fees is another important contribution to the TCO equation, with most IFP functionality delivered with no licensing fees of any kind.

Interactive flat panel displays bring both added image clarity and greater enthusiasm to the classroom. Excitement and interest are generated by the appeal of the huge, iPad-like device, which functions as easy as a familiar tablet. Visibility, image quality, and brightness surpass that of most IWBs and projectors and the fan-free operation is quieter and less intrusive. As a projector-free solution, IFPs 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 in reducing shadows and glare, for some classroom environments these distractions can present a significant challenge and an IFP can be the ideal interactive solution.

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

Along with these benefits, IFPs can be expected to reliably function at least 2-3 times longer than a typical IWB or projector. The LED backlight in ViewSonic ViewBoards, for example, are rated to last for over 30,000 hours of average classroom use, for more than a decade of active use. The lifespan of an IWB depends on the useful life of its two components, the projector and the board. Instructors and education IT administrators typically report beginning to experience problems with IWBs around the 3-year mark and many plan for a 3-5 year useful life. Some occasionally report up to 7 or 8 years of useful life from their IWBs. There is, however, a great deal of agreement that after about 3 years the cost of new bulbs outweighs the cost of replacing a projector.

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One important factor in the long life of LED displays is that they have no moving parts. By contrast, projectors rely on cooling by fans, which are particularly likely to fail after extended use, and whose lifespan is even shorter in dusty environments such as many classrooms. Here's how one education IT company's team of engineers classifies typical IWB useful life at varying ages (along with estimated cumulative replacement requirements at that time):¹

- 3 years – a high probability of the projector and board still operational to within the user's requirements. (3x bulbs addl. replacement cost)
- 4 years – the projector is likely to fail. (3x bulbs in total + new projector replacement costs)
- 5 years – the IWB grid or motherboard is likely to start degrading requiring frequent re-calibration. (4x bulbs in total + new projector replacement costs)
- 6 years – the IWB requires daily re-calibration. (5x bulbs in total + new projector replacement costs)
- 7 years –the IWB motherboard or grid is likely to fail. (6x bulbs + new projector replacement costs)
- 8 years – the projector fails again as does the IWB motherboard or grid or both. (7x bulbs + 2x new projector + new IWB replacement costs)
- 9 Years – does not usually occur

IFP summary:

- Full HD 1080p / 4K resolution
- An all-in-one solution. .
- Wall or cart-mounted
- Easy installation
- Reduced maintenance
- No bulbs
- No filters or calibration
- Greater reliability
- Longer lifespan
- Lower energy consumption
- Eliminates shadows/glare
- Quiet, fan-free operation
- Typically do not require software licensing fees

ViewSonic® ViewBoard® Advantages

ViewSonic ViewBoards offer several distinct advantages.

- **Out-of-the-box ease.** Built on a Google Android platform, ViewSonic ViewBoards are designed to get classrooms going right out of the box, with no need to install or add software, apps, or a PC.
- **Education-specific interactive software.** Designed specifically to address educator and student needs, ViewBoard for Education interactive software delivers an abundance of features that enhance lesson development, engage students and promote active learning. It's also the first (and currently only) interactive software with fast, easy direct-to-Google Drive save.
- **No licensing fees.** With the one-time purchase of a ViewBoard IFP, schools have an all-in-one interactive solution that includes the media- and browser-ready display and ViewBoard for Education collaborative software.

"ViewBoard IFPs and ViewBoard for Education software are 100% compatible with Google Classroom and all related apps. "

- **Seamless interface with Google-based Classrooms.** ViewBoard IFPs and ViewBoard for Education software are 100% compatible with Google Classroom and all related apps. In fact, ViewBoard is explicitly designed to complement Google Classroom with groundbreaking features like a one-touch save to Google Drive.
- **Outstanding ViewSonic image quality.** ViewSonic ViewBoards deliver stunning still and video images, with 1080p / 4K resolution, making it easier for even those at the back of the room to experience every detail. With up to 350 nits of brightness, they outshine IWB projectors and deliver outstanding visibility, enabling instructors to leave lights on for better eye contact and note taking. An antiglare coating further enhances comfortable viewing.
- **Designed for durability.** ViewBoard IFPs are made with a highly durable tempered glass overlay for a level of strength not always found with IWB systems. Rounded corners add protection against bumps, bruises and snagged clothes.
- **Flexibility features.** ViewBoard IFPs can be trolley mounted, enabling efficient resource sharing and making them a fantastic cost-conscious solution. For collaborative versatility, ViewSonic ViewBoards offer 10-point touch for use by multiple students with their fingers or styluses. For easy, device-agnostic use, ViewBoards are compatible with any laptop, iPad or tablet. Finally, most ViewSonic ViewBoards can be expanded with an optional ViewSonic slot-in PC powered by an Intel Core i5 processor with Windows 10 OS or an Intel Core i7 processor with FreeDOS OS, for added computing power and touch functionality.

Interactive projector summary:

- Lowest initial purchase cost
- Best cost-per-screen-inch value
- Ideal for large spaces
- Scalable image quality for data and off-angle viewing
- Interactive technology embedded in projector
- Required components: projector, screen and (sometimes) interactive pen(s)
- Flexible use with any flat surface
- Mobile or wall / ceiling mounted resource
- Robust & easier to service
- Easy integration with existing IWB system
- Compatible with most existing interactive software

Interactive projectors

Interactive projectors (IPJs) offer educators a useful, low-cost alternative for classroom collaboration, with the lowest price tag of the three technologies. They also deliver the lowest cost-per-screen-inch, delivering big, budget-friendly interactive display. The ability to deliver projected sizes up to 150" makes interactive projectors an ideal fit for large classrooms and auditoriums. For some content types, in fact, projectors may be a better choice than a fixed interactive board. This is particularly the case when large amounts of data will be displayed, as in a finance or economics class, where a projector offers the ability to vary the size of the text for optimal viewing from anywhere in the room. And with any type of content, projection offers outstanding visibility, with stay-true images, even for those seated at an off angle.

Portability is another plus with interactive projection, especially in contrast to traditional IWBs. While IFPs and IWBs can be mounted on a rolling cart, interactive whiteboard systems – which require both a projector and a board to function – are particularly difficult to share among classrooms. Significantly lighter and smaller, interactive projectors can be much more easily transported from one location to another. For applications suited to permanent installation, IPJs can be easily wall or ceiling mounted, for space-saving interactive display that never needs calibration.

Not only are IPJs 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. 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.

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 (with HD interactive projection coming to market in the near future). For more cost-effective, eco-friendly full HD display, an interactive IFP offers a simpler, easier to manage solution with a longer lifespan and a significantly better overall TCO than traditional IWBs. For flexibility, the best value for large images, and the lowest up front cost, interactive projectors provide an outstanding alternative.

For more information, contact ViewSonic sales at salesinfo@viewsonic.com or visit www.viewsonic.com

Sources:

- 1 How Students Learn, [teachervision.com](https://www.teachervision.com/new-teacher/teaching-methods/48337.html), Accessed 11.11.16 at: <https://www.teachervision.com/new-teacher/teaching-methods/48337.html>
- 2 PBS Survey Finds Teachers are Embracing Digital Resources to Propel Student Learning, [pbs.org](http://www.pbs.org/about/blogs/news/pbs-survey-finds-teachers-are-embracing-digital-resources-to-propel-student-learning/), accessed 11.11.16 at: <http://www.pbs.org/about/blogs/news/pbs-survey-finds-teachers-are-embracing-digital-resources-to-propel-student-learning/>
- 3 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/>
- 4 Interactive Whiteboards Enhance Classroom Instruction and Learning, Accessed 4.14.14 at: <http://www.neamb.com/professional-resources/benefits-of-interactive-whiteboards.htm>
- 5 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>

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