

The Evolution of Learning Space Technology

Moving beyond the Room PC



Many of us remember the days when classroom technology was nothing more than an overhead projector for displaying transparencies. That’s a far cry from today’s technology, which enables professors to manage a baffling variety of content sources and devices. This White Paper explores this technological evolution and focuses on how classroom technology is moving into a new phase where access to content is paramount, and where a new breed of device is set to replace or supplement the room PC as the hub for accessing content.

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THE EVOLUTION OF A CLASS

The analog class

Some of us can remember the glory days when a professor would walk to the front of the room, grab a piece of chalk or dry-erase marker, and proceed to make unintelligible scribbles that would have contained vast wisdom had we been able to decipher them.

In those days of the Analog Class, the tools of the trade were simple: chalkboards, flip charts, overhead projectors and dry erase boards among the most popular. To prepare for a class frequently meant printing and handing out a packet of documents...and then realizing that you had left out something important. To document and share the lecturer's content meant transcribing the written scribbles into copious notes which would then be sent to class participants via snail mail.

These weren't the best of times.



The digital classroom

The arrival of the laptop computer in the 1990's ushered in a new era of collaboration. The mainstay of the classroom during this period was the combination of a laptop, a projector, and a deck of PowerPoint slides. Again, many of us have fond memories of this combination, and of enduring such frustrations as not being able to get the image to focus or fixing the keystone, not knowing the function key combination to transfer the image from the laptop to the projector, and trying to recover from the sudden burnout of the projector's bulb.

Despite all the frustrations, this era did help establish a new type of collaboration where class participants could evaluate and modify content as they discussed it. Content in classrooms became more fluid, more flexible. And PowerPoint was crowned the King of Content.



**The Evolution of Classroom Technology:
Class Technology Goes Digital**

The multimedia classroom

Over the many years of enjoying PowerPoint presentations delivered via a laptop and projector, lecturers and students increasingly wanted to leverage more types of content: A clip from a DVD. Real-time stock reports. Broadcast audio and video. Files from the campus network. Classes were slowly evolving beyond PowerPoint and into a new age where content was rich and diverse.

This evolution from Laptop + PowerPoint to a wide variety of content sources represented the final step in the transition from digital classrooms to multimedia classrooms. The differences are outlined below.

	Digital Class	Multimedia Class
Content	PowerPoint slides and other Office documents	Office documents, PDFs, video clips, audio clips, web-based content, broadcast audio & video
Devices & other content sources	Laptop	Networked PCs, web-based storage apps, laptops, tablets, smartphones, USB drives, DVDs, Blu-Rays, CD-ROMs
Room technology	PCs, overhead projectors, speakerphones, video conferencing systems	LCD displays, networked room PCs, dedicated presentation systems (e.g. AMX Enzo), speakers, speakerphones, video conferencing systems, document cameras, user interfaces (touch panels & keypads), VCRs, AV controllers
Expectations	Technology is a nice benefit as long as I can get it to work	Technology is a necessity and it must work

The main challenge with the multimedia class is a technical one: **How do I access all that content from such a wide variety of source devices?** How do I access files on the campus network? Where do I plug in my USB storage device? Before today, the answer has been the bane of IT departments everywhere: The Room PC.

THE ROLE OF THE PC IN THE CLASSROOM

→ What personal computers were designed to do

It may sound simplistic, but the original purpose of personal computers was to *compute*. In the early days, PCs were stand-alone devices that people used for calculating (primarily via spreadsheets) and word processing.

Over time, PCs evolved into being devices that not only compute, but *communicate*. They became devices that people used to send and receive emails.

Shortly after becoming communication tools, PCs evolved into *information access* tools that were also great for *content creation*. In effect, we now use personal computers and laptops for all four of its evolved functions: To compute, to communicate, to create content and to access information.



→ What personal computers were not designed to do

The widespread use of PCs in conference rooms led to the proliferation of overworked and understaffed IT departments to take care of them. PCs are high maintenance devices, requiring constant software updates, security measures and hand-holding for them to function correctly in an enterprise setting.

The problem is that personal computers were not designed to serve as the hub for all the real-time multimedia content and devices in the modern classroom. To put it most simply, the primary problem is that a PC that's been idle takes a long time to boot or power up, while professors do not have time to wait for software updates, restarts, complicated login procedures or other delays. They want to start the class **now**.

At the same time, IT support teams cannot afford to spend their time visiting classrooms to troubleshoot problems with PCs. They have enough on their plates already.

"TO ERR IS HUMAN, BUT TO REALLY FOUL
UP REQUIRES A COMPUTER."

— BILL VAUGHAN

BYO WHATEVER



BYOD or BYOC?

With the PC's shortcomings as a hub for classroom connectivity, we must examine the root cause of what is stressing the capabilities of the classroom PC: Bring Your Own Device, or BYOD. From an IT perspective, BYOD is where faculty or students connect their smartphones, tablets, personal laptops and other devices to the campus network.

BYOD has major implications on IT infrastructure, including classroom and presentation technology. Within the context of a class, it's not only the act of connecting devices that's important – it's the act of accessing content in general. That's why BYOC – Bring Your Own **Content** – is perhaps a better categorization than BYOD in a classroom or classroom setting.

Classroom technology needs to accommodate devices and access content equally well. Inability to connect devices and access content are among the most common reasons for a class to be categorized as a failure; and the root cause is usually the room PC.

BYOC and the room PC

The BYOD/BYOC phenomenon reinforces why PCs are not well suited as content hubs: They are great for creating content and accessing information, but not quick and agile enough to support real-time access to content during classrooms. That’s why many methods have evolved for accessing content during a class, including:

Device	Methods of Accessing Content
<i>Laptop</i>	<ul style="list-style-type: none"> Connecting directly to a display or projector and accessing local files from the laptop Connecting to a table top AV box mounted on the conference table via HDMI or DVI cable
<i>Portable Storage</i>	<ul style="list-style-type: none"> Accessing files from a USB storage device connected to a USB port in a table top AV box Accessing files from USB connected to a room PC or laptop
<i>Campus Network</i>	<ul style="list-style-type: none"> Accessing network resources via a networked room PC Accessing network resources via a networked laptop connected in one of the methods shown above
<i>Internet</i>	<ul style="list-style-type: none"> Accessing files and other content from the internet via a networked room PC or laptop
<i>Media Devices</i>	<ul style="list-style-type: none"> Delivering content via a DVD player, Blu-Ray player or other device
<i>Broadcast</i>	<ul style="list-style-type: none"> Playing broadcast content from a cable box or “Apple TV” type box

These are all effective methods for accessing content; however, many of them frequently fail because they rely on our old friend, the PC, as a connectivity hub. Whether connecting a USB drive, accessing files on the corporate LAN or accessing the web, the room PC has serious shortcomings: Software updates, complex login procedures and long boot times, to mention a few. And as a result, room PCs can be nightmares for the IT support staff.

The question is: If the room PC isn’t optimal for accessing content in a classroom, what’s the alternative?

THE FUTURE OF CLASSROOM TECHNOLOGY

What capabilities does a modern classroom require?

Before we describe the future of classroom technology, we should explore what users of the technology actually require in addition to managing content during the class. To this we can add two capabilities that are essential in organizations today: Managing multiple locations and optimizing resources.

Activity	Description	Examples
Manage Multiple Locations	Interact with people regardless of their location	<ul style="list-style-type: none"> • Video Conference • Audio Conference • Webinar
Manage Content	Easily access and share content	<ul style="list-style-type: none"> • Access files • Access web-based content • Play videos • Play music • Stream live audio and video
Optimize Resources	Optimize the use of classrooms	<ul style="list-style-type: none"> • Schedule classrooms • Determine room availability • Power down when not in use • Automatically power up prior to class

The role of the control / automation system

Managing such a diverse set of capabilities requires an integrated system that can handle the different source and output devices, enable students to participate remotely, and optimize the use of classroom facilities. Such a system generally consists of a touch panel or keypad to select devices and control the room ambiance, a controller or switcher to manage the behind-the-scenes switching between devices, and table top AV box for connecting devices to the system. These are the essential components to which many institutions add a room PC to manage connectivity.



**Touch panel, switcher / controller and table top AV box:
Modern tools of the trade**

Replacing or Supplementing the PC: AMX's Enzo™

The trio of the touch panel, switcher / controller and connectivity box will remain the backbone of any successful classroom technology solution for the foreseeable future. But if IT organizations and users seek a replacement or supplement for the room PC, what is it? What type of device can perform similar functions to a PC while avoiding its shortcomings?

This new wave of technology is here today, in the form of devices whose primary purpose is to access content from various sources and show it on the display, without requiring a PC. One such device is AMX's Enzo, which is a new solution purposely designed for the collaboration space to easily access content and documents stored on USB, on the web, or in the cloud.



AMX's Enzo: Specifically designed for accessing content in a classroom

What makes devices like Enzo

different?

New devices like Enzo are specifically designed to avoid the pitfalls of a room PC for students as well as the IT organizations who support them. In order to be successful, devices like Enzo must include several key capabilities that optimize the class experience as well as the sharing of content, including:

- **"Instant-On" File and Web Browsing** – Attendees must be able to access web content or USB thumb drive files within seconds of entering the room. There should be no waiting for the product to boot up, and no lengthy process for users to log in.
- **IT Friendly** – These devices must be designed to avoid OS updates, viruses and other PC-related maintenance hassles and costs, and must be enterprise manageable over the IT network.
- **End of session data purge** – To be successful, such devices must eliminate disclosure of confidential information by purging all files and links to internal and external content when the class ends.
- **PoE, Pass-Through Ethernet and Small Form Factor** – In order to ensure widespread adoption, such devices should be easy to install practically anywhere, with a small footprint that's easy to mount within a room without being obtrusive.

Replacing or Supplementing the PC: Pros & Cons

The decision to replace a classroom PC or supplement one with a dedicated content management device depends on many factors, which are discussed below.

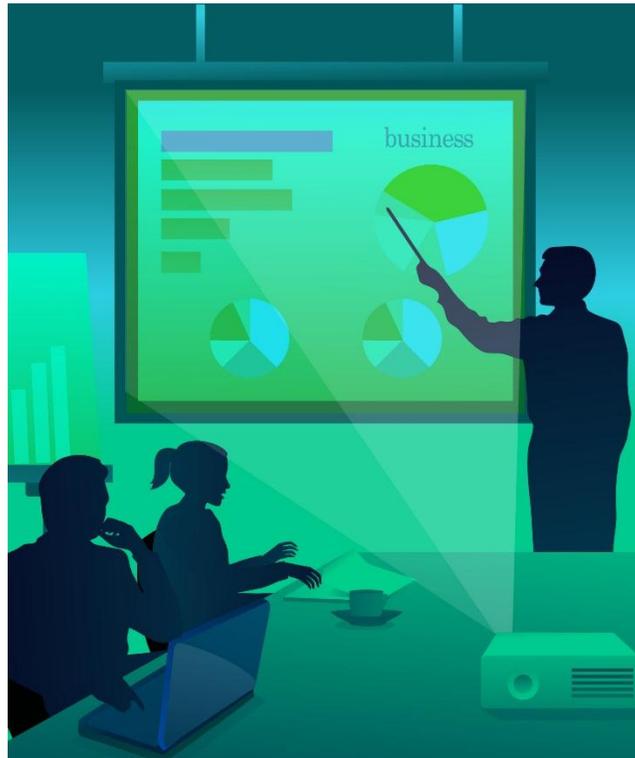
Action	Pros	Cons	When to Consider
<i>Supplement PC</i>	<ul style="list-style-type: none"> • More options for displaying complex content • Access to more programs & applications 	<ul style="list-style-type: none"> • Retain IT support and user headaches • More expensive 	<ul style="list-style-type: none"> • Large rooms with complex technology • Need to display highly specialized graphics & images • Need to run many programs / applications during class
<i>Replace PC</i>	<ul style="list-style-type: none"> • Reduces cost • Reduces IT support headaches • Frees PCs for other uses • Reduces delays in starting classrooms • Simplifies user experience with the room • Ability to present wirelessly 	<ul style="list-style-type: none"> • Limited number of applications & programs • Cannot display some complex forms of content 	<ul style="list-style-type: none"> • Rooms without complex technology • Organizations with stretched IT resources • Need an option to present wirelessly and share information with many

CONCLUSION

Modern institutions are rapidly moving beyond a presentation during a class was limited to slides shown via a projector connected to a primary drivers of this new behavior, the rich content and the BYOD or BYOC revolution, to make multimedia classes much more exciting difficult to manage.

The tool typically used to manage this broad content and devices, the room PC, was not this purpose and is therefore inadequately take on this function.

The new pedagogical styles and technology facilitated by AMX’s Enzo, may eliminate the of the PC. These devices provide rapid access to simple and intuitive user interface, and are in a new revolution in the way we manage classes.



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spectrum of designed for positioned to

implications, shortcomings content with a poised to usher content in

TAKE ACTION

To learn how AMX’s award-winning products can help your organization manage the new world of BYOD, BYOC and rich content, we invite you to explore the information on our website.

The **LEARN** page (<http://amx.com/education/learn.aspx>) includes a broad range of general resources on the AV industry, as well as Product Guides covering most major AMX products. In particular, you might be interested in AMX’s classroom solutions as discussed above:

- [Enzo](#). Describes the amazing “always on” content management device discussed in this White Paper.
- [Enova® DVX Family](#). Describes our ultra-reliable line of All-in-One-Presentation Switchers.
- [Resource Management Suite \(RMS\) Overview](#). Describes our software package for real-time remote monitoring of AV assets.
- [AMX Modero® Family](#). Describe the industry’s most awesome lineup of touch panels.
- [HydraPort®](#). Describes our configurable architectural connectivity products.

The **PLAN** page (<http://amx.com/automate/plan.aspx>) includes an interactive tool that allows you to visualize the typical conference room configurations that AMX offers, and to explore which room configuration is best suited to your needs.

You can always **CONTACT A SOLUTIONS ADVISOR**, who will be glad to guide you through the process of identifying, specifying and purchasing your ideal conference room or classroom AV solution. The “Contact an Advisor” link is at the top of every page of the AMX website. Options to connect include chat, phone and email.

