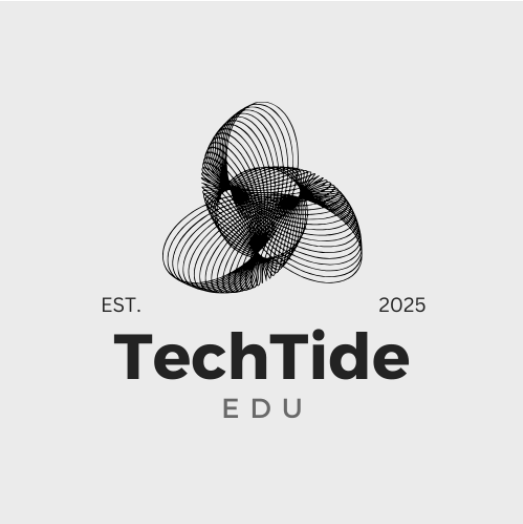
TechTide's Marshak Proposal



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"It is our mission at TechTide EDU to make technology accessible to school faculty as much as possible. As technology advances, young learning minds gain more and more ways to advance their learning, and it's our duty to make that happen."

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Introduction

The main goal of the hardworking people at TechTide EDU is to make sure the education facilities nationwide have the utmost to date technology so that not a single teaching staff will feel inconvenienced when they're teaching, nor will any learning minds feel as though they can't learn as fast as their peers. Over the years it's become increasingly apparent that accessible technology allows students to be far more engaged in their learning, as well as helping teachers and professors more flexibility in lesson planning (SOEOnline, 2024). They even allow classes to be hosted and joined anywhere and anytime, such as during the lockdown of 2020-2021. But technology such as smart boards or laptops, or tablets, are not only expensive, but are also relatively recent additions to the education system. This means it's not as close to being ubiquitous as teachers and students would like, which could have varying results to education standards in the country. This brings us to the Marshak Science Building at CCNY, a good example of this that could very well use our services.

Problem

The specific problem that our company is tackling is the lack of useful technology, specifically in the Marshak Science Building on the City College campus. This issue has been prevalent in classes, such as, and not limited to, General Chemistry recitation classes where the lack of technology causes a classroom change. Opting for a classroom where there is technology for students to help students understand the course material.

Solution

Our company's approach to this problem is through integrating smart devices that are already available into classrooms. Switching and transitioning "old-fashioned" and "outdated" classrooms into modern and accessible ones for both students and faculty with engineering innovations, such as installing smart boards into classrooms, and the distribution of smart technologies.

Technical Description

TechTide EDU's proposed smart classroom system is built around the components: interactive smart boards, iPads with styluses (Apple Pencils), and wireless screen sharing. These technologies function together to improve the way instructors teach and students learn. Each part plays a role in the daily classroom process and involves specific steps to operate.

Smart Boards

The first and most prominent component is the interactive smart board, a large flat-panel touchscreen display installed at the front of each classroom. These boards typically range from 75 to 86 inches in diagonal size and are mounted on the wall at eye level for clear visibility. The

the exterior is built with a durable, anti-glare glass surface, surrounded by a thin metal frame. Each board includes multi-touch capability, allowing up to 10 points of contact, so multiple users can write or interact with the screen simultaneously. The smart boards are equipped with an embedded operating system (usually Android-based) and also support external devices via HDMI or USB. The software interface includes access to interactive whiteboard apps, annotation tools, file sharing platforms, and integrated web browsers. Instructors use them to write notes, display multimedia presentations, solve problems, and navigate digital content during class sessions. This setup replaces the traditional whiteboard, projector, and PC station with a single integrated unit.

Fig 1. Smart Board

The process begins when the instructor powers on the board and opens their preferred application—such as SMART Notebook or even Google Slides. During the lesson, instructors can write directly on the screen with a stylus or their finger. Key steps include accessing content from a USB drive or cloud storage, presenting material, annotating on the fly, and saving the session to share with students later.

Smart boards require minimal upkeep, mostly limited to software updates and cleaning the screen with microfiber cloths. All units will be under a maintenance contract through the vendor, with on-call technical support for troubleshooting hardware or software issues.

Wireless Screen Sharing

To eliminate cable clutter and allow flexibility, the system includes a wireless screen sharing solution.. These are small rectangular receivers (roughly 4 x 4 inches) that plug into the smart board's HDMI port and connect to the college's secure Wi-Fi network. They are mounted discreetly behind or beside the board and powered through an outlet. The function of the wireless display unit is to mirror any user's device screen—whether it's a laptop, iPad, or smartphone—onto the smart board without needing a wired connection. This supports seamless transitions during presentations, class discussions, and collaborative work.

Fig 2. Ipad with stylus

During a typical session, an instructor opens the screen sharing function on their device (e.g., AirPlay for Mac/iOS) and selects the classroom display. Within seconds, their screen is projected wirelessly to the smart board. The device can be disconnected with a single tap. This makes it easy to alternate between the instructor and students when displaying work, enhancing class participation.

These devices require virtually no maintenance aside from occasional firmware updates. They are reliable, intuitive, and work across major platforms .

iPads and Apple Pencils

The final key element of the smart classroom system is a set of iPads equipped with Apple Pencils, designed to offer mobile, hands-on interaction. The iPads are 10.9-inch models with Retina displays, encased in rugged protective covers to withstand daily classroom use.

Each iPad will be preloaded with educational apps such as Notability, GoodNotes, OneNote, and Google Drive, allowing users to take notes, draw diagrams, or annotate lecture materials in real time. The Apple Pencil enables pixel-perfect precision with tilt and pressure sensitivity, which is ideal for scientific diagrams, equations, or visual problem-solving tasks. Instructors use iPads while walking around the classroom to engage students from anywhere in the room. They connect the iPad to the smart board via the wireless screen sharing system. As they write on the iPad, the annotations appear live on the board for the entire class to see. This allows instructors to maintain eye contact with students and respond to questions immediately, creating a more dynamic and responsive environment.

To ensure accessibility and ease of use, the proposal includes providing classroom sets of iPads, stored in charging carts located in each smart room. These carts serve as both storage and power stations, ensuring devices are fully charged and secure between uses. Access will be managed by faculty and lab technicians, with devices loaned out to students or instructors as needed during class.

The iPads are low-maintenance, but the carts provide centralized charging and can be locked after hours. Regular updates will be managed by CCNY’s IT department to ensure software security and compatibility.

Cost & Resource Analysis

Entry Level Implementation for 20 Classrooms

Item	Unit Cost	Quantity	Total Cost
Smart Boards	$3,400 (Average)	20	$68,000
Faculty Devices	$1,250 (Average)	500	$625,000
Tech Trainers	$83,711	2	$167,422
Total Estimated Cost			$860,422

This chart reflects estimated costs, and can be adjusted based on the stakeholder's decisions. However this is the basic entry level to introducing and transitioning to technology in a campus environment (Marshak Proposal).

Expanded Budget: Software, and Maintenance

Category	Unit Cost/Estimate	Quantity/Scope	Total Cost
Software Licensing			
Learning Management System (LMS)	**$5-$20***	**500 Students**	**$2,500 - $10,000/year**
Productivity Suite	**$5-$10***	**500 Students**	**$2,500 - $5,000/year**
Specialized Education Software	**$50-$250**	**Depends on software**	**Variable**
Ongoing Maintenance			
IT Support/Maintenance	**Varies (salary)**	**Annual**	**Variable**
Device Maintenance	**Varies (repair and upkeep of devices)**	**Annual**	**Variable**

This chart reflects the estimated costs that the stakeholder is willing to expend on their budget, with multiple varying costs.

Software Licensing (Specialized Education Software) - Varies due to the amount of options that the school can choose from. Costs also consider how many students, and how much usage there is for the software to ensure cost effectiveness.

Ongoing Maintenance - Separate from trainers, where maintenance ensures that the technology longevity is ensured for cost effectiveness and sustainability of resources. This includes both hardware and software maintenance, and includes training IT staff to help resolve these issues in the future.

Environmental Impact:

At TechTide EDU, we care about both improving education and protecting the environment. While bringing smart technology into classrooms has many benefits, we also want to make sure it is done in a way that is sustainable and resource efficient.

Electronic waste - When old devices like projectors and computers are replaced with new ones, they can become electronic waste, which is harmful if not handled properly.

What we'll do:

- Recycle old equipment through certified programs that safely dispose of electronics
- Donate working but outdated devices to schools with fewer resources, when possible

Long-term viability - Technology doesn't last forever, but we want to make sure it's easy to maintain and avoid future financial or environmental burdens.

What we'll do:

- Include long-term maintenance plans that cover repairs, updates, and recycling
- Keep software updated to avoid replacing devices too soon
- Let CCNY's IT team manage devices to prevent waste or loss

These solutions will remain viable and effective over the long term with new development of technology that will be easier to learn and pick up due to its predecessors. Alongside technology that is made to last a long time, needing less maintenance and costs to purchase new ones. Allowing the budget to be adapted and adjusted accordingly in the future

Implementation & Results

a. **Phase I: Planning (Month 1 – 2):**
    i. Evaluate classroom needs and current infrastructure.
    ii. Identify which rooms in the Marshak building will be upgraded first.
    iii. Collect feedback from professors and IT staff to finalize equipment and software choices.
b. **Phase II: Procurement & Setup (Month 3 – 4):**
    i. Purchase smart boards, iPads, Apple Pencils, and necessary software.
    ii. Install smart boards
c. **Phase III: Testing (Month 5 – 6):**

i. Select a few classrooms and professors to test the new system. Gather feedback from both faculty and students to identify bugs or issues.

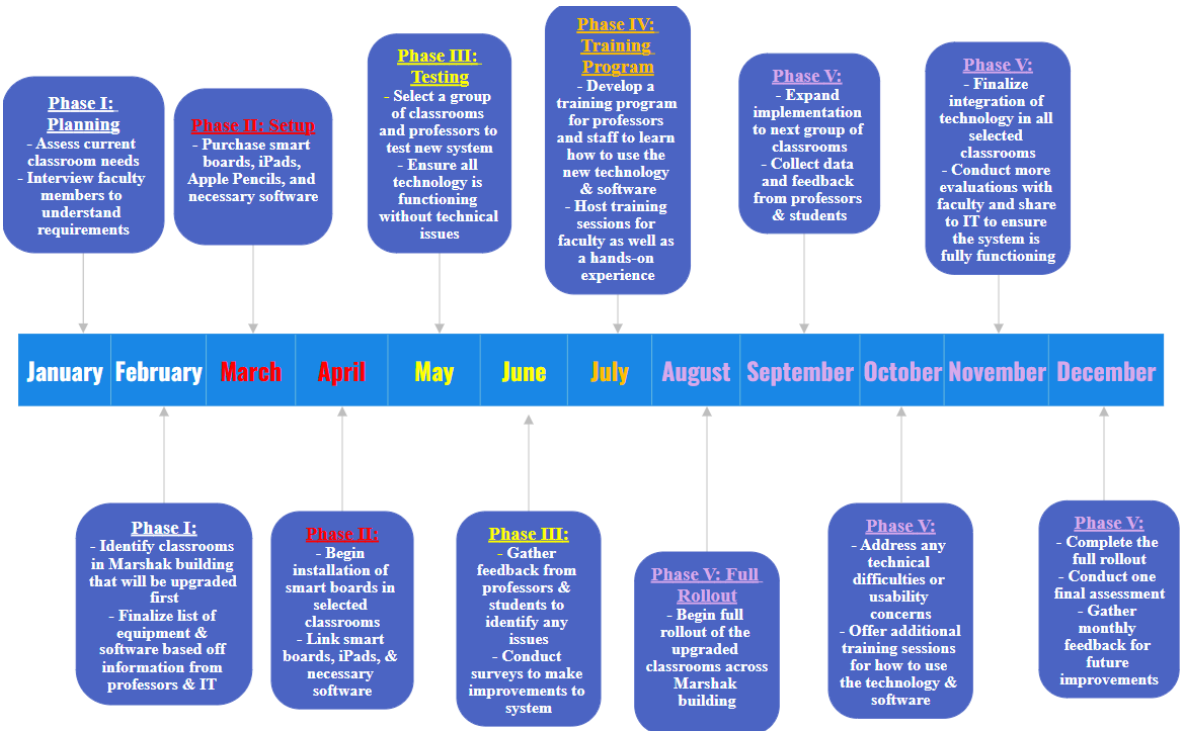
d. Phase IV: Training Program (Month 7):

i. Offer training sessions for professors and staff.

e. Phase V: Full Rollout (Month 8–12):

i. Begin building-wide implementation.

The potential challenges TechTide EDU may face when it comes to implementing this solution include resistance to change, technical issues, and budget constraints. Some professors may prefer traditional teaching methods and feel uncomfortable with switching to a new method of teaching. When working with technology, technical issues are inevitable and can show up at any phase of implementation which can disrupt the learning process for both professors and students. Additionally, budget constraints may pose a barrier since the high upfront costs for acquiring the necessary resources or technology could deplete the amount of funding available.



The solution proposed for the Marshak building aims to provide measurable benefits by enhancing student learning by providing classrooms with technology such as smart boards along with iPads for students to access course materials, such as worksheets. By integrating these technologies into the Marshak classrooms that lack it, students can easily access resources provided by their professors which creates an efficient learning experience. Our solution is innovative due to its ability to reduce environmental impact by minimizing the need for printed worksheets, while still ensuring accessibility for professors and students. Comparing our approach with the Los Angeles Unified School District's (LAUSD) iPad program, they faced significant challenges due to poor planning, insufficient teacher training, and limited feedback

(Blume, 2015). Our phased implementation allows for thorough testing and much feedback before the full rollout which minimizes the potential issues in the future. TechTide EDU has the potential to serve as a model for other institutions aiming to modernize their classrooms due to its carefully planned implementation as well as taking feedback from both professors and students along the way to adjust the system and make improvements in the future.

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