STANFORD GRADUATE SCHOOL OF BUSINESS

Building an Investment Lab

*Change Lives. Change Organizations. Change the world.*

Building an Investment Lab

Source: University Finance Lab Survey (2014)

From 2009 through 2013, over 200 academic institutions in North America installed a special-purpose trading room on campus. While these rooms vary in size, orientation, and purpose, they all have one common goal: to enhance experiential learning in the financial curriculum.

Given the steady growth of these lab facilities over the past decade, it should be fair to conclude that this educational approach has become established as more than a simple fad, and as more institutions plan to build or upgrade their facilities, there is a need for guidance on how to get started. This guide is designed as a starting point for academic administrators so that they can get an understanding of what is required by this very special resource.

Number of Installed Labs Since 2000
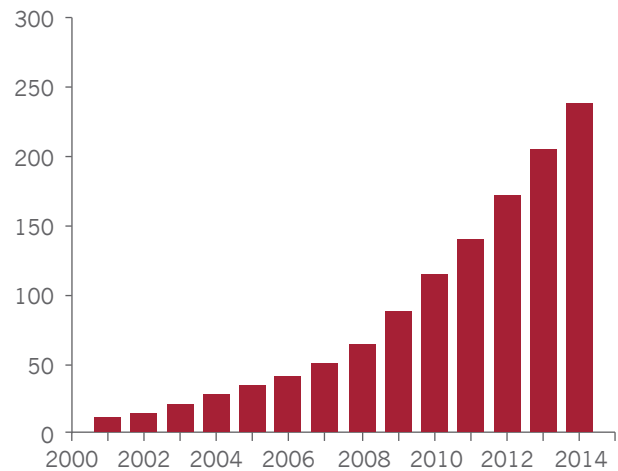
The Cost

The approximate physical cost that one should consider for a lab is $3,000 per workstation, plus the physical building cost (square footage) of the room. The $3,000 per workstation factors in the cost of the physical machine and monitors, the desk, chair, and A/V projection costs associated with each workstation, and server/router/ networking requirements.

The physical build-out cost of the lab should be considered secondary to the operating cost of the lab, which can range from $50k to $350k per year. Suggested operating costs are as follows:

Lab Professional/Human Capital	$75,000
Software	$125,000
Hardware Depreciation/Capital Fund	$25,000
Operating Events, Speakers, etc.	$10,000
Continuing Education, Conferences	$10,000

Physical Layout

There are three predominant layouts for labs: a "bench" layout, a "pod" layout, and the traditional "horseshoe" layout. We will consider how each of these layouts would function in a basic 30' x 40' rectangular room.

Unlike a traditional lecture, experiential learning exercises require the instructor and class to perform operations on their workstations simultaneously. That means the physical layout must be conducive to: a) the instructor monitoring the students' progress, and b) the instructor being able to access individual workstations to help students get caught up when they fall behind. Among other issues, we will discuss how each of these layouts facilitates these factors. While the room layout won't change the pedagogical value of the material being taught, I strongly believe it dramatically affects the efficacy of the classroom experience and the resulting retention rate of the class content.

Kevin Mak instructing students at Stanford's Real-time Analysis and Investment Lab (RAIL)

The Bench Layout

This is the layout that I strongly prefer over any other option, and the two facilities that I have run at Stanford Graduate School of Business and University of Toronto both feature this design (*see Figure 1*).

The bench layout mimics the actual layout of a Wall Street trading desk, where individuals sit side by side and facing each other on the trading floor. The benches are laid out in a columnar style, and for teaching purposes it is best when these columns are aligned perpendicular to the instructor. This serves several purposes. First, it allows an easily navigable Instructor Access Path. It is crucial that the instructor physically has clear access to help individual students who are falling behind or require additional assistance. The access path is also important as it allows the instructor to easily walk around the room and monitor students' screens.   Second, this gives

the instructor a direct line of sight to view what is on students' screens and creates unobstructed Instructor Sight Lines. These visual cues are extremely helpful for the instructor to understand whether students are properly progressing through instructions or whether the instructions need to be repeated. It also implicitly threatens students to stay on task, since the instructor can see if they've diverted their attention to unrelated websites. Third, it focuses the students' attention on their screen, instead of the instructor, with clear Student Sight Lines. With experiential learning, the students should be acquiring knowledge primarily through what they're doing on the computer and what they see on the monitors, not what the instructor is saying.

This layout is also conducive to group work and discussion because students can easily turn to each

Figure 1. The Bench Layout

other and discuss issues. Also, when students walk into the room, they are given subconscious cues that this isn't a traditional classroom. This is a double-edged sword, as it is considerably harder to get the students' attention once they've begun working on the workstations.

The Pod Layout

This layout (*see Figure 2*) has similar advantages to the bench layout, as students aren't physically aligned to be staring at the instructor. The pod layout also encourages students to discuss topics with each other (sharing their pod). However, looking at each other's screens is awkward and always requires physical shifting and movement to really see what someone is trying to illustrate. Some students will likely have their back facing the instructor, which is not desirable.

Sightlines from the podium cover a reasonable number of the screens so that the instructor can keep in touch with the students' pacing. However, the ability to see obstructed screens is very cumbersome and requires a complete circuit around the room versus the bench layout, which requires walking the width of the room.

One "feature" of the pod layout is that it uses space less efficiently. For those with a large room and a small budget (or small class sizes), this layout is advantageous as it minimizes costs and avoids the room feeling empty. For those who are space-constrained and require a high student headcount, this layout is definitely far from optimal.

Figure 2. The Pod Layout
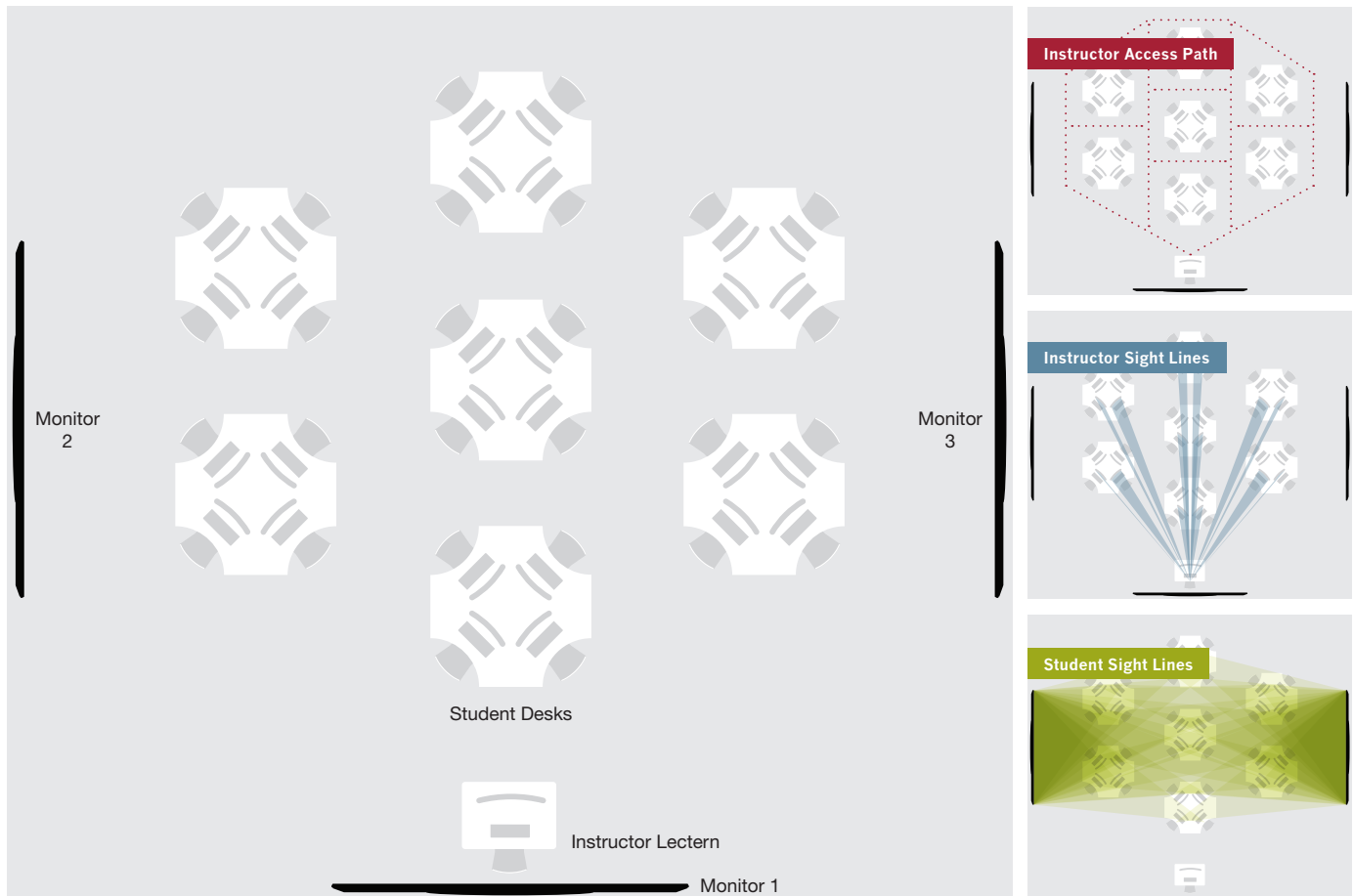
The Horseshoe Layout

This is the traditional lecture style layout (*see Figure 3*) that is very conducive to classroom discussion. While the classroom benefits are quite obvious, the absolute drawbacks from an experiential learning standpoint are numerous. The instructor does not have the ability to monitor the students' screens to ensure they are staying aligned with the classroom materials, or working on class work whatsoever. Accessibility toward the "middle" of the classroom is cumbersome, making it difficult for the instructor or teaching assistants to access students and help them. And small-group discussion is generally limited to those immediately next to each person. The primary function of this layout is to facilitate classroom discussion, which it does admirably, but many of the experiential learning requirements are lost.

Single vs. Dual Workstations

When determining the width of each workstation, designers should consider whether they plan to seat one or two students at each workstation. If space permits, wider desks (54"+) where two students can share one workstation typically work very well and make the room scalable. At RAIL, we have 24 workstations and 48 seats. For traditional classes that occasionally visit the lab, we often have all 48 seats filled. For more lab-integrated courses where students are evaluated based on their performance using the terminals, the class limit is 24. Sharing a workstation during an evaluation isn't very practical.

Figure 3. The Horseshoe Layout
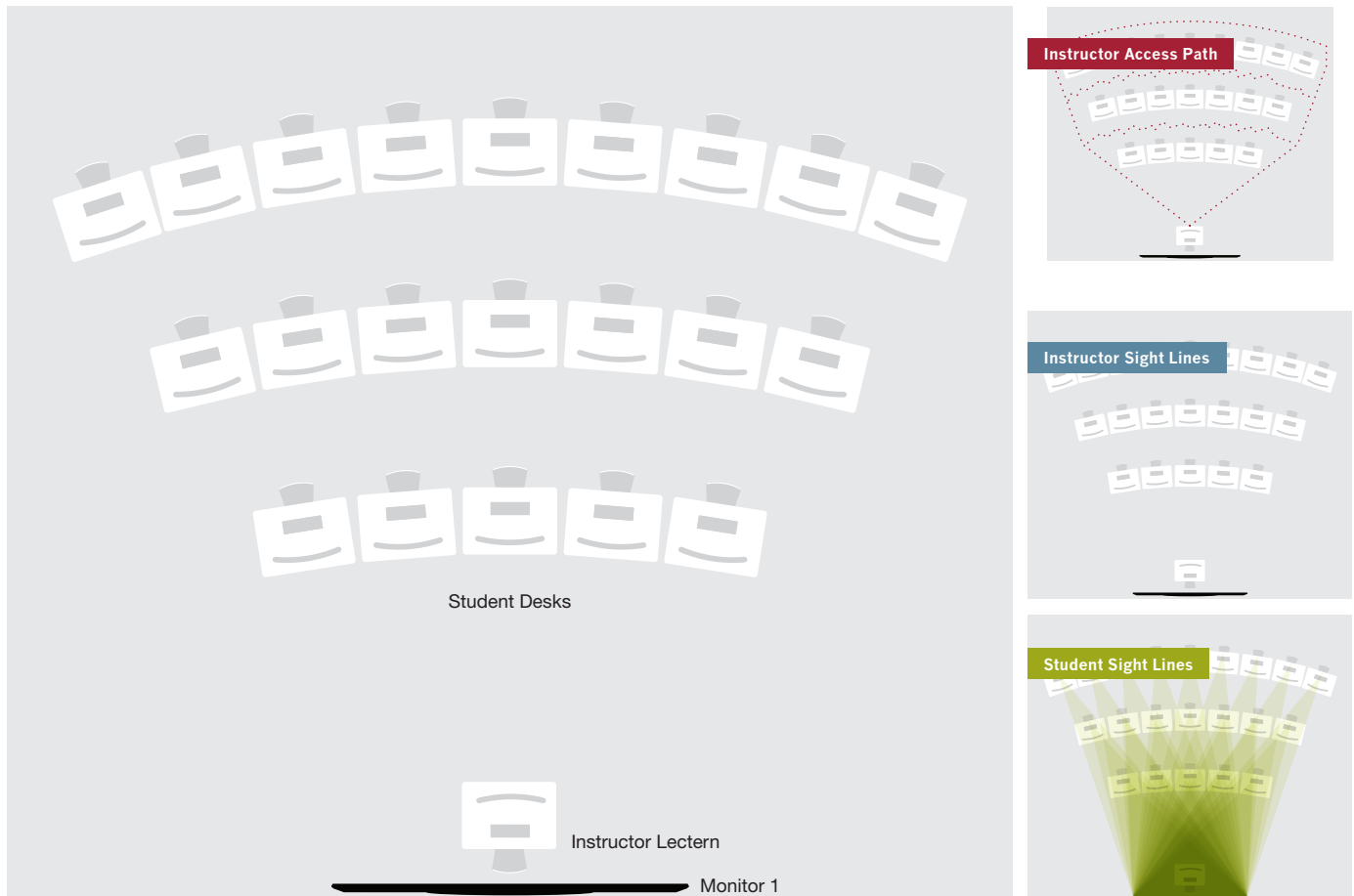
Display Technologies

When building a trading lab, the most enjoyable part of the capital planning process is purchasing display technologies. These are typically a scrolling LED ticker and a handful of wallboards. I cannot stress enough that while these technologies have essentially no pedagogical value, they are an important element in a trading lab. First and foremost, they signal to donors, students, and the greater community that "this is not just a computer lab." A passerby cannot see that there are extremely sophisticated (and expensive) data applications in the lab, but scrolling tickers and wallboards are highly visible and illustrate that. Second, they create an environment that students take more seriously, and also simulate the real-world where noise (visual or auditory CNBC commentators) is ever-present. During investment simulations, I typically leave the TVs on CNBC with the volume up specifically to create this environment.

The Software

The software packages that you choose to subscribe to are highly dependent on the budget at your disposal. My informal survey shows annual lab costs range from $50k/year for bare-bones installations to $400k/year. Labs typically have significant cost-sharing with libraries and financial research centers, so these estimates are highly dependent on how costs are distributed or shared with the library or research data administrators. Lab software typically breaks down into three categories:

Data Feeds, Databases, and Analysis

Barra
Bloomberg
Capital IQ
FactSet
Morningstar
Telemet
Thomson Reuters

Research Data/Analytics Packages

Matlab
R
Stata

Simulation Platforms

Financial Trading Software (FTS)
Rotman Interactive Trader/Portfolio Manager
Stock-Trak
TraderEX

Each of these software platforms has its own merits, and I suggest meeting with each vendor to discuss the solutions that are most appropriate for you. For the most part, vendors provide significant educational discounts and pricing is highly variable. At a minimum, you generally would like to have at least one application from each of the categories above.

Staffing and Human Capital

The primary driver of whether a financial trading lab is successful is the organizational structure designed to support and champion it.

Trading labs fall within the "If you build it, they will come" motto, with one important exception. It mostly applies to the students and not the faculty. Students will eagerly register for any courses that are using the lab, but convincing faculty to teach in the room is considerably more difficult. The operational risks involved with running a class in the lab are numerous.

For example:

1. Technical points of failure are an order of magnitude higher since the workstations are ultimately (and implicitly) the responsibility of the person administering the class (generally the faculty member).

2. Using live data and regularly updated applications result in data and platform irregularities that are the norm, rather than the exception.

3. Students require a significantly higher amount of assistance and support versus a standard classroom in order to participate.

4. Simulations generally reflect the actions of the students, which are often unpredictable. What if a few rogue actors continually disrupt your class by committing foolish trades?

The organizational model that we employed at University of Toronto was having a founding academic director (Professor Tom McCurdy), a lab manager (myself), and a handful of undergraduate lab assistants. McCurdy was the primary champion of the lab, and led by example by teaching his own courses in the facility. In addition, he persuaded many fellow faculty members to consider using the lab for their courses. As manager, it was my responsibility to follow up and meet with potential faculty members, discuss their curricular needs, and help them build lesson plans that integrated the theoretical objectives with lab resources. I would then train lab assistants to be familiar with the entire lecture so that they could assist students in real-time (or after the class) if they encountered difficulties. Our goal was that faculty should have a high-level understanding of how the resources in the lab were being integrated into the course, without them having to understand the nuts and bolts of each software application.

As a guest lecturer, the manager would assist the faculty member with delivering the lecture through software tutorials, class discussions, or demonstrations while the faculty member ensured that the materials were aligned with the rest of the syllabus. During these demonstrations and tutorials, lab assistants would circle the room and help students get caught up if they ever fell behind in the complicated

sequence of steps. The result was that the entire class was able to effectively navigate and use the software or demonstration and understand, experientially, the learning objective.

My experience is that trading labs that have full-time managers (or extremely dedicated faculty members who act as managing directors) have, by far, the highest likelihood of their lab succeeding. From my talks with other university faculty and administrators I would estimate over half of the trading labs that have been built are not being used to a significant extent, and the primary reason is a lack of curricular adoption. By tying the manager's employment directly to measurable goals (how many classes were held in the lab), you can create the proper incentive structure to guarantee adoption of your lab. I have executed this model at Stanford GSB with great success as well.

Summary

Building a lab is an investment for a school that always pays off. When measured in terms of donor appreciation, prospective student interest, and general market signaling, the physical build-out costs are negligible compared to the implicit returns. While many schools have realized this, a subset of those have taken the time to slowly and meticulously plan the usage of their lab to maximize the return on their investment. I hope this document provides you with a starting point for that journey.

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