Building Usability and User-Experience Testing Facilities in Professional and Technical Communication Programs

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Abstract. In this retrospective, the author looks back over 20 years of experience designing, building, and maintaining usability testing and user experience research facilities. The author identifies five major areas that have significantly impacted the designs he has created which he labels: 1) Methodological Myopia, 2) Cost Recovery and Mission Drift, 3) Methodological Stifling, 4) Hand-To-Mouth Staffing, 5) and Mission Critical Non-Disclosure Agreements. Because of the negative impacts these five areas have on technical communication programs and their usability testing facilities, the article ultimately argues 21st Century facilities avoid the classic usability testing design with two rooms divided by one-way mirrors. It argues instead for spaces designed for methodological flexibility such as a large collaboration space surrounded by smaller studios and provide specific guidance to help technical program administrators create sustainable and pedagogically sound usability and user experience testing facilities.

Keywords. usability testing lab, user experience design, think-aloud protocol analysis, eye-tracking, facility design

Over the past two years, there has been a significant increase in the number of technical communication programs that have begun planning and designing usability testing facilities for their programs. We don’t have an exact count of the programs actually considering the construction of such a space (after all, it’s difficult to count facilities that haven’t been constructed yet). As someone who built one of the first usability testing facilities in our field back in 1993, I’m often contacted by friends and colleagues seeking advice on how they should build and maintain usability testing facilities at their home institutions. Based on these experiences, I’m seeing a rush to build usability labs. This essay serves as a guide to help the administrators of technical communi-
cation programs better understand the dynamics of adding a usability lab to their programs so they can make more informed choices about how to address usability within the context of their programs and allocate/plan funding accordingly.

**The Rise of Usability Testing**

The reason for the dramatic increase in usability testing labs isn’t really difficult to understand. Usability testing has long been an interest among programs in technical communication. However, since 2010, helping students demonstrate their competencies in professional communication in order to help them get certified by the Society for Technical Communication (STC) has made the development and construction of usability testing facilities desirable for many faculty and program directors. As most of us know, the STC began offering a certification program for “Certified Professional Technical Communicator” (CPTC) back in 2010, and since then they announced their first recipients of the certificate at the 2012 STC Summit in Chicago.

Naturally, we academic community members who educate professional technical communicators were and continue to be tremendously interested in the criteria the STC’s Certification Commission used for their credentialing. Even though the STC has temporarily put the certification program on hold while they reexamine its processes, many faculty and program directors (myself included) have long held the view that usability testing was a mainstream skill all professional communication graduates ought to possess. As a result, we were very pleased that the first of the five competencies that the Certificate Commission expected as part of becoming certified as a technical communicator was “User, Task, and Experience Analysis.”

Of course, not all of the programs are deciding to build usability testing facilities because they want to help their graduates achieve their STC certification goals. The STC’s Certificate Commission requires their candidates to have at least one year of work experience after receiving an academic degree before they’re eligible for the CPTC. This effectively creates a disconnect between the earning a degree and receiving the certificate. Thus, most of the program directors aren’t expressing an interest in building usability testing facilities specifically for certification reasons.

Instead, what they do say is the STC’s adoption of usability as one of its core competencies has been the tipping point for the faculty in their

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1 See ‹http://www.stc.org/images/stories/pdf/maintainingcertification.pdf›.
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programs, convincing them that usability testing and UX analysis are now recognized in industry as a mainstream skillset. Faculty and administrators are motivated by a desire to keep graduates competitive on the job market. Sadly, it’s at precisely this point where I’m seeing many faculty and program directors begin to go astray.

Problematically, the types of usability testing facilities many of my colleagues dream of building are inefficient for preparing students to work in mainstream UX research today or in the future. Consequently, for the remainder of this essay, I want to share some of my experiences and, perhaps more importantly, some of the mistakes I’ve learned from over the last quarter of a century working with usability testing technologies and research methodologies. Specifically, I discuss five areas that most significantly impact my thinking about designing usability testing facilities. These areas are:

- Methodological Myopia
- Cost Recovery and Mission Drift
- Methodological Stifling
- Hand-To-Mouth Staffing
- Mission Critical Non-Disclosure Agreements

As the discussion of these five areas will make clear, a one-size-fits-all usability testing facility does not exist. Instead, I’ll provide a high-level overview of the major features of an affordable usability testing and UX research facility.

Methodological Myopia

One of the first problems I encountered as I helped colleagues think about the type of usability testing facility they wished to construct was a discrepancy between the “dream” facility and the reality of supporting actual research methodologies. We often forget just how many types of usability testing methodologies exist. When most people use the term “usability testing,” they really mean, “think aloud protocol analysis.” As a result, the type of usability testing facility they dream of building involves one of the most expensive designs and one of the least methodologically flexible.

Labs designed for think-aloud studies usually have an office-type environment where test participants sit and conduct their work. Microphones and video cameras are usually embedded in the room, mounted in the ceilings and on the desktops. In the most efficiently designed labs, the flooring is elevated so the staff can run new wires easily and convert the
space into different types of use environments for study. A one-way mirror separates the naturalistic user space from the test administration space.

In the suggested configuration, the test administrator or data logger sit in a room on the other side of the mirror to observe the participant without being seen and without unduly influencing the participant’s behavior. Instead, the test administrator usually speaks into a microphone and his or her voice projects into the participant’s office space through hidden speakers in the room. The data logger uses software like TechSmith’s Morae to capture key comments the participant makes and tag the comments on the video as it’s collected. Because this classic design was made famous by testing facilities such as the one IBM constructed at Boca Raton going back into the 70s, it is usually the first image of a usability testing lab that comes to mind.

Although separating the user’s observation space from the test administrator’s space with one-way mirrors is one of the first designs people consider, some more elegant designs include a third room behind the test administration space. The third space is used to separate executives, software engineers, project managers, or marketing representatives from the data loggers and test administrators. The third space also allows important stakeholders to observe the test through windows, yet it forces them to observe without interfering in the test administrator or data logger’s work. Frequently, executives, software engineers, marketing representatives, and others involved in the project’s development want a space where they can sit and observe the study being conducted. They need to observe without distracting the test administrator from collecting and coding the data and without biasing the test participants’ behaviors by asking inappropriate or leading questions, blurring out solutions to problems the participant struggles to resolve, laughing or snickering at the participant’s behaviors, and/or introducing new tasks into the research design.

This type of tri-partite design with its reconfigurable user space, isolated data logger space, and executive observation room is often our dream facility because it does an amazing job of supporting both traditional and active-intervention think-aloud protocol analyses. And there is still a need for facilities designed in this way. Recently, for example, I completed a usability study of low-fidelity wireframe prototype of an application designed to help students write more effective research papers on their cellphones. We needed to test the navigation system and the mental

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2 See ‹http://grouplab.cpsc.ucalgary.ca/saul/681/1997/jas/labs.html› or ‹http://www.ovostudios.com/labdesign.asp for a diagram of this type of design›.
models on which the interface was designed, and active intervention protocol analysis was the ideal method for studying the research questions my client had. In addition, because the Director for Marketing wanted to observe several of the studies as the data were being collected, the tri-partite design would have been ideal. The Director of Marketing could observe the studies without my being conscious of her also observing the administration of the study.

I acknowledge the usefulness of tri-partite designs and confess I secretly have kept some of the closed circuit cameras, motorized ceiling mounts, and control boxes from the old testing facility IBM used in Boca Raton in case I might need them for my campus. Nevertheless, the tri-partite design doesn’t help much with the research methodologies I use when I’m conducting other types of usability tests for clients. A “dream” design like the tri-partite space doesn’t help when I need to do a card sort study with 6-8 users simultaneously or when the test administrator needs to be in the room fitting the equipment to the participant and calibrating the tracker for eye-tracking studies. It’s actually an impediment.

Additionally, the design doesn’t help with data collection during a diary study where participants are asked to keep journals of their use of a product. A tri-partite design is also useless for data collection from users to create a journey map of their experiences with a client’s product. Nor will it serve conducting remote usability studies where often only a workstation with a dual monitor is needed because the participant is in another city and is being interviewed online with software like WebEX. Indeed, when push comes to shove, I’ve been forced to conclude that a “dream” design really leads methodological short-sightedness. Like a pair of excellent reading glasses that allow its user to read small print up close, a “dream” design allows researchers and students to collect and examine data from think-aloud protocols in minute, well-focused detail. Yet, if the perspective and the viewing distance for the data changes, then the tri-partite usability testing facility design doesn’t bring the phenomena my clients want me to study into any sharper focus.

**Cost-Recovery and Mission-Drift**

The startup costs of a usability research and teaching facility like the tri-partite “dream” facility described here can easily reach $100K-$250K in terms of erecting walls, installing mirrors, sound proofing rooms, purchasing new furniture, acquiring current software, and so on. This figure may sound obscenely high, but it’s easy to underestimate startup costs. To illustrate unexpected expenses, consider that I once spent $6,000 just
installing a high-output, low-noise blower for the heating and cooling system because the normal ventilation systems in traditional classrooms are so noisy they disrupt audio recording. I’ve even encountered enormous expenses when we were converting a classroom space from an older building on campus and had to core drill through four floors and install new circuit breaker panels because there weren’t enough electrical circuits in the building to support the facility. Unexpected renovation costs are omnipresent and unavoidable.

Even if you keep the costs under $100K, is the $100K justifiable? Can the $100K investment be justified in terms of the amount of use the facility will get? It’s important to realize an institution’s central administration is almost certainly going to demand creation an externally-funded revenue stream because of the expense. Nearly every institution with whom I’ve consulted (including mine) has a central administration that requires the program director to develop a business plan that will project a sufficient revenue stream to justify the initial expenditures necessary to build a facility of this type. Even if you simply rented out your facility to companies who wanted to use it for their testing, it’s difficult to recover the initial startup costs.

The going rate for fully equipped facilities can range from $1,500-$2,500 per day for a commercial group to conduct their usability testing. At those rates, you would need to rent the space around 100 days to recover the cost of the initial investment. However, that startup cost still doesn’t take into consideration the costs your institution would incur for advertising the space’s availability; the administrative overhead involved in billing for the space; or the indirect costs for network services, electricity, parking, waste disposal, and other routine services that cut into your profit margin. It also ignores the fact that your program can’t use the facility for your pedagogical or research purposes during those 100 days of external use. After all, faculty aren’t going to be able to teach in the space if it’s being rented by someone else.

Offering full-service usability testing services on a contractual basis is an even more challenging prospect because the competition with consultants and vendors like User Analytics, Usability.com, usertesting.com, and others, is so great that most academic institutions are priced out of the market from the get-go. Your academic institution tries to recover the costs of the faculty member to supervise the study, stipends and tuition remission for one or more graduate assistants to collect the data and conduct.

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3 See, for example, ‹http://www.wyoming.co.uk/london/rates/>.
the research, honoraria or payment for the test participants, and the funds for the indirect costs and administrative overhead which a university’s Office of Sponsored Research is going to charge. To recover these costs, you’re typically looking at $20K per six-week-long study with 12 participants engaged in think-aloud protocols. Yet some of my clients tell me commercial vendors are charging approximately $8K-$10K for similar work. Others, who don’t believe $20K for such a study is unreasonable, still question whether they should take the risk of contracting for students who are learning their profession when there are seasoned professionals available at similar rates. What’s more, if your institution is not in an urban area where lots of high-tech companies are looking for usability testing services, you’re not going to find enough clients for whom you can conduct studies and generate a revenue stream.

Now, my point here isn’t simply that programs are going to find it difficult, challenging, or even impossible to create a business plan that can recover the costs of building a usability testing facility. Obviously, programs like those at Clemson, Southern Polytechnic, Texas Tech, Washington State, and others, are just a few examples of institutions that have had at least some degree of success. What’s more, as a long-time advocate for integrating more usability testing pedagogy into our curricula and for making user research mainstream, I don’t want to discourage programs from pursuing the resources needed to be successful. Instead, my point is that, if you’re not careful, once you start down the path of building a usability testing facility designed to conduct think-aloud protocols, you can find that you’ve experienced “mission creep.” Instead of building a resource your program can use to provide students with opportunities to develop experience and expertise in usability testing methods and technologies, faculty can find they’ve created a business requiring revenues, advertising, salaries for personnel, insurance for contract disputes, and other programmatic resources that suck all the oxygen out of the pedagogical mission.

Any business plans wholly attempting to recover the costs of building a usability testing facility are an insidious trap that needs to be avoided. We must avoid being put in the position of creating units in our programs that compete with the very businesses and industries in which we hope to place our graduates. When the central administration demands a business plan (as they almost certainly will), then we can and we should provide them with at least some modest cost recovery mechanisms they can expect. Yet rather than making cost recovery mechanisms the sole return on investment argument made in our business plans, I recommend the plan include deliverables such as:
• the number of graduates from the program who obtain positions requiring usability testing skills;
• the number of masters theses, dissertations, and research papers produced by studies conducted in the facility;
• the number of conference presentations given by faculty who use the facility;
• the number of refereed publications generated by faculty who use the facility;
• the number of students who took courses which met in the facility; and so on.

By incorporating these kinds of deliverables in our business plans, we can help the upper administration understand, just as Biology majors need labs with Bunsen burners and microscopes to develop marketable skills in their fields, technical and professional communication students also need to be provided with the tools they need to conduct the kinds of research studies that bring name recognition and prestige to their home institutions.

Methodological Stifling

Eye-trackers are an extraordinary research tool, and they have become so popular and well known that I’ve had a number of potential clients approach me with requests for usability studies that also employ eye-tracking techniques. Often, clients have seen heat maps or gaze plots on the Internet, and they’re curious to collect data on where their customers are looking when viewing the client’s website or software application. As a result, I’ve had to borrow eye-trackers and other equipment necessary for research projects. There are situations where there simply is no substitute for showing a client a video of a reticule of where a user looked as the user’s eye traveled around the screen.

The problem today is—despite the fact the costs of eye-trackers have dropped dramatically over the past few years—it’s still the case that the high end systems that are easy to set up, are easy to train your staff to use, are easy to calibrate with a wide variety of users, and don’t lose calibration after the slightest head movement still cost over $25,000. Although popular vendors like Tobii or SMI give lower out-of-the-box costs for, say, a head-mounted eye-tracking system, by the time you figure in the additional software costs, support costs, training costs, and other expenses necessary to actually utilize the system in field research with actual clients,
their final costs are much higher. Similarly, the $99 eye trackers available from companies like Eye Tribe only come with SDK’s for Windows, Android, or OS X. Thus they require you hire full-time software engineers to program the tools your students and your faculty need to use the systems, once again driving the deliverable costs of such systems out of reach of many programs.

However, I fear the real cost of these enormous infrastructure investments is the encumbrance they place on methodological creativity. Too often I’ve seen a research team force a project into a predetermined design because they have to justify the laboratory and equipment they acquired. In other words, rather than creating a new and potentially more creative research method that might address a client’s research questions, researchers tweak and adjust the study into an approach, justifying their use of the expensive eye-tracking equipment they just purchased—equipment they know will become obsolete and need to be replaced in two or at best three years. Being forced to cost-justify an expensive “hammer” while it’s still shiny and new provides reason to find as many “nails” as you can, rather than investing more resources in designing a radically new tool.

Now, I’m not trying to suggest people who purchase eye-trackers aren’t servicing the needs of clients. Indeed, we all define clients’ problems and research questions in ways that enable us to provide useful information to them by taking advantage of the tools and resources available to us. Nevertheless, I do worry the extreme cost of the most popular commercial eye-trackers prevents us from pursuing new and innovative research methods. The expense of the systems and the pressure to recover and/or justify costs discourages us from taking the additional financial risks necessary for innovation, and so it stifles methodological creativity.

I also worry the costs of these systems is leading some program directors to make poor pedagogical tradeoffs. We can purchase one of the popular commercial head-mounted eye-tracking systems and get it set up for $25,000, but it’s extremely difficult to teach an entire seminar with 12 graduate students or an undergraduate course with 19 students when you only have one eye tracker. It’s not impossible. I did it last semester by putting students in groups and using a Google calendar for some creative scheduling and reservations of the equipment. However, there’s little doubt the students’ productivity was severely hampered, and because they had to share the system, they were only able to obtain one group project experience using the equipment for a single eye-tracking research project.

4 See ‹https://theeyetribe.com›.
study during the semester. Logistically, it wasn’t possible for them to do more research projects with the equipment. As a result, students told me they learned a great deal about the limitations of eye-trackers, such as how difficult it is to calibrate the hardware and how difficult it is to collect aggregated data from lots of different users when the researcher can’t control what screens users will view when they are browsing a website in a naturalistic fashion (e.g., heat maps basically force researchers to use static images in their studies).

Because of the students’ limited exposure to the equipment, I can’t honestly say they were able to learn how to conduct studies well. They really needed to be able to repeat their studies and revise their research designs to improve their competency with both the equipment and the type of research designs the instruments required. In other words, just as we expect students to learn to write technical reports more proficiently by first writing and then rewriting the documents, it seems counterintuitive to expect students to become competent usability researchers when we can only provide them with a shared, one-time experience using the research instruments.

In terms of making pedagogical tradeoffs in the design of a usability testing facility, imagine the same $25,000 had been spent on 15 laptops outfitted with HD webcams and usability testing software like Ovo Studios Logger or multiple copies of Morae Recorder and a few installations of Morae Manager. Alternatively, the funds could be spent on less popular and less costly systems like those being developed by Grinbath out of Texas Tech. Although such systems may be more difficult to set up, utilize, and maintain, such an approach has the advantage of providing teaching faculty with multiple systems that individual students could check out frequently over the course of a semester. Students may not be getting hands on experience with the most popular eye-trackers used by deep-pocketed commercial organizations. Yet, by giving students easy and frequent access to the basic tools they need, we would be allowing each student to pursue multiple research studies over the course of a semester so they can become competent with the research methodologies.

**Hand-To-Mouth Staffing**

Of all the problems I’ve had to address with the designs of my usability testing facilities, I believe the most vexing problem, and the one I’ve had the least consistent success addressing, has been staffing the facilities. My experience has been fairly easy to obtain one-time funding from sponsored research grants or other sources. Foundations and corporate clients
have been prepared to foot the bill for expenses like software upgrades or maintenance contracts, new or replacement A/V recording equipment, cash for participants in a particular study, travel to present our results to clients, printers, supplies, and a variety of other costs involved in starting up a new project. After some explanation, foundations and corporate clients have even been willing to pay the overhead or “indirect costs” universities charge for services like electricity, waste disposal, parking services, telephones, and accounting/administration services. What I have rarely been able to fund to my satisfaction, however, is the recurring cost of staffing the facility.

Most program directors with whom I’ve consulted over the years are at least partially interested in building usability testing facilities because they see them as a potential means of finding external sources of funding for graduate assistantships. These sponsored assistantships are an asset to a program because they can be used for recruiting high quality students. The best students typically want the types of experiences and industry contact that sponsored assistantships provide, and programs can increase their enrollment numbers without burdening the graduate budgets of their home departments. When they work, sponsored assistantships are a win for everyone involved. They not only benefit the students and academic programs, but they also benefit the industry client by providing them with the research deliverable specified in the contract as well as access to well-trained students whom they often employ at end of the contract.

The problem, however, is one of logistics and timing. Unlike the relatively flexible pay periods for part-time, hourly employees, graduate assistantships require semester-long employment periods. Because they are often tied to tuition remission, assistantships or fellowships generally need to begin at the start of an academic semester. Worse, in order to use the assistantship to recruit students, a program director usually needs to have the contract for the sponsored assistantship in place several months in advance of the time when the student begins the assistantship. In my program, for example, most of the admission decisions regarding applicants who begin the program in August are made in February and March. Consequently, in order for me to offer the assistantship to an incoming student, I need to create a contract with an industry partner almost six months prior to the date when the student could begin working on the research deliverables for the client. What’s more, once the student starts the assistantship in, for example, August, it takes a few weeks to receive the necessary training for setting up the equipment, using the software for data logging and coding, obtaining certification by the university’s Insti-
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tutional Review Board (for working with human subjects), and becoming proficient in usability test administration.

Obviously, finding industry partners who are willing to wait several months before the personnel are in place to conduct the research they need is a major impediment. Indeed, since 1993, I’ve only been able to create two academic-industry partnerships, sponsoring research assistantships, far enough in advance to use them for recruiting purposes. In both cases, the clients were large corporations whose ongoing research needs allowed us to make three-year commitments for sponsored research. Additionally, both organizations were large enough to have a significant number of products being developed, needing a usability testing center for research conducted on the organization’s behalf. By entering into a long-term agreement where our facility was essentially serving as a standing resource for the client’s ongoing needs, I was able to obtain recurring funds for three graduate assistantships each semester. Thus, after the initial startup period, I could develop a rotation schedule ensuring at least one well-trained and experienced graduate research assistant always on the facility’s staff.

Identifying clients who have both the resources and research needs necessary to fund long-term agreements for an external usability center is a rare occurrence—so rare that it feels a bit like winning the lottery. Creating a staffing model for a new facility based on the likelihood your program is going to find such a client isn’t very realistic. Besides, even if you can find an industry partner willing to enter into this type of agreement, it’s unlikely they will sustain the agreement for more than three years before deciding to hire the graduates from your program and build their internal usability testing facilities (which is basically what happened to us). In my experience, new clients nearly always approach me in the middle of a semester, and they have product development cycles requiring us to begin and end the research study well outside periods where a sponsored assistantship used for recruiting is possible. Consequently, I’ve had to develop alternative staffing models.

One approach is soliciting funding for assistantships from the department or college in the form of “seed funding” that can be recovered once an external funding source can be located. Essentially, the graduate assistant or undergraduate fellow is funded internally and conducts research studies on behalf of the university, testing the effectiveness of the university’s admissions website for example. Then, once the program’s faculty locate an external client to sponsor a research study, the funding for the assistantship transfers to the industry sponsor. The now trained
and qualified assistant begins working on the client’s research project and abandons or postpones the internal research study.

The obvious advantage of this model is the allowance for students to obtain some training before they are thrown into a sponsored research project. There are serious liabilities here, including the fact that abandoning an internal research project is demoralizing for the student research assistant and can so thoroughly antagonize the people who own the site being studied that they will be hesitant to work with you again. Worse, asking the dean or department chair to front the seed money for the assistantship with the promise that the cost will be recovered later is precisely the sort of thinking leading to the kind of “mission drift” problems I discussed previously. It creates unrealistic and counterproductive expectations with upper administration and works against your pedagogical goals for the usability testing facility.

A third approach to staffing that I’ve attempted involves creating a group of volunteer students who staff the facility in return for access and the right of first refusal for any sponsored assistantships which may develop. In this model, I send out a call for participation to all the students in the program and invite those who would like access to the usability testing facility for their personal research projects to join a special interest group (SIG) that meets regularly to work on usability studies together. Naturally, students who participate in the SIG receive extensive and personalized training in the use of the usability testing facility’s equipment and software, enabling them to immediately accept any assistantship offers faculty may develop during the semester. In addition, they receive keys to the facility and access codes to the facility’s reservation calendar, thereby allowing them exclusive access needed to conduct research for their theses, publishable papers, or dissertations.

Unlike the previous two models, the downsides to the SIG model are that it doesn’t provide the program with readily available assistantships used for recruiting. Plus, it also requires the faculty member who runs the SIG to donate time for training the students and overseeing the collaborative research studies conducted by the SIG. On the positive side, however, this approach encourages both students and faculty to engage in more academic research that leads to more publishable papers and more dissertation projects involving user-experience observation. Hence, the third option avoids the problems of cost recovery and mission drift and is, therefore, more consistent with the pedagogical goal of preparing graduates with mainstream usability testing research skills.
Mission-Critical Non-Disclosure Agreements

It’s rare for industry clients to approach me to work on a sponsored research project that doesn’t involve a product or service mission-critical to the company. Few companies are willing to pay for usability studies for a product not viewed as a high priority by management. For this reason, companies are compelled to protect their investments in the products or services being tested, and they are willing to go to extraordinary lengths to protect their intellectual properties. The stakes are high for high-tech companies today where small startup companies lack the resources to compete with the Googles, Facebooks, Apples, and other giants of the high-tech world. The only way to compete is to use the Instagram model—small startups must out-innovate the big companies, build a product like Instagram, file patents, and then sell to Facebook or some other giant that needs to pad its patent portfolio. Small wonder, therefore, companies don’t want students who might be taking a usability class in the facility where their product is being tested to casually walk by and sneak a peek at, for example, an interface and unique UX interaction that the company’s software engineers have been working on for the past two years.

Protecting intellectual property is such a *sine qua non* for industry clients that, when a program is building a new usability testing facility, the design must take into consideration demands from corporate clients for signed non-disclosure agreements (NDAs) from anyone with access to their intellectual property. Additionally, you’ll need to prepare for federally mandated Institutional Review Boards, responsible for the protection of human subjects, that have become increasingly concerned about digital data being leaked or stolen from research facilities because of the potential violation of the privacy and confidentiality of study participants.

Over the past five years or so, nearly all university IRBs are no longer satisfied with simple password protection on laptops and workstations that can be stolen. In addition to providing physical security for the data collection systems, now they are also requiring any digital data collected in a research study use 256-bit data encryption with software such as Bit-Locker for Windows, DiskCryptor, FileVault2 for Mac, or Linux Unified Key Setup. Usability testing data frequently takes the form of digital video clips, often requiring multiple gigabytes of storage for each participant’s data. It’s not unusual to need a 2 terabyte external drive for the storage of raw data from a single usability study—data that must be protected.

It’s safe to assume the usability testing facility needs to be used by multiple researcher teams for different studies and to assume students
need to access the facility during certain specified hours for studies they be conduct as part of their class activities. There are several items needed to ensure each research team using the facility is able to protect their client’s intellectual property as well as their test subjects’ private and confidential data. First, it’s very important the workstations, laptops, and mobile devices the research teams are using with their test participants have some type of cloning system. For example, on the Windows workstations we use in my lab, we use Symantec’s ghoSt to create an image of the hard drive that participants use to test a client’s products. During a study, we create multiple ghost images of the workstations, including the base image of the workstation with the non-confidential software loaded on it that students and faculty normally use during their classes. I also create another image of the workstation with the client’s private, confidential software loaded on it. We keep the ghost images of each unique software load on separate external hard drives that are physically locked in secured locations. Depending on how the workstation is used, the appropriate software is deployed.

When the workstation needs to be used for a study where the client’s confidential software is going to be tested by a usability study participant (who has signed an NDA and informed consent statement), the workstation is cloned using the appropriate ghost image from an external hard drive. After the participant is through, and the study session is concluded, the second important issue can be addressed. At the end of each testing session, the test administrator copies the participant’s confidential data and digital video clips from the workstation’s internal hard drive onto another external hard drive. These files are encrypted and the external hard drives are once again physically locked in a secure location that can only be opened by members of that particular research team. In other words, because each research team has its unique IRB protocol, physically secure storage unique to the members of that research team must be provided by the usability testing facility. Finally, after the participant’s confidential data have been encrypted and secured, the test administrator clones the workstation once again, only this time using the base image lacking the client’s proprietary software. This final ghosting process effectively removes all traces of both the client’s proprietary software and the participant’s confidential data, and it restores the workstation’s internal hard drive to condition allowing it to be used by students taking classes in the facility.

**Designing from a Program Director’s Perspective**

I’m often asked what I would design if I was starting from scratch and building a new usability testing facility today. As I hope is clear by now, I
would not build a facility designed primarily to collect think-aloud protocol analyses the way I did my first lab. Neither would I invest in renovating a classroom at my school so it had one-way mirrors, soundproofing, speakers and cameras mounted in the ceiling, and microphones embedded around the room. That was my dream facility in the 1990s and would have served me well at the time. However, I simply haven’t needed that kind of facility to conduct the research my clients have been asking for in the past decade. Today, my clients are more interested in making informed design decisions about their users’ needs so early in the product development process the beta units and high-fidelity prototypes necessary for think-aloud protocol analyses in a naturalistic environment simply aren’t available for testing. I’m doing far more task analyses, functional analyses, diary studies, persona designs, and context analyses than the traditional “usability study.” When I do conduct think-aloud protocols, they’re nearly always active-intervention think-alouds with low-fidelity prototypes that don’t require much more research equipment than a computer for the test participant, another computer for the data logger, an HD camera with a high quality microphone, Morae, and external drives for data encryption and ghosting.

My recommendation to program directors designing usability testing facilities today is to design for methodological flexibility first. Although it may sound heretical, rather than starting the design by thinking about the space where users are going to be observed and recorded, I prefer to start by thinking about the large collaboration space where my staff and I meet with product development teams; the same space where we conduct card sorts, focus groups, and participatory design activities with clients. I find this is the space that gets used the most in my facilities, and what people most require from it is the ability to share everything from websites and interfaces, to product demonstrations, to hand-drawn sketches, to cell phone screens.

For these reasons, I generally recommend installing large, 70-inch to 80-inch flat panel monitors at least on each end of the room so groups of 12-14 people can easily view the monitors. Both audio and video connectivity for laptops is obviously a requirement, and in order to display cellphone screens, tablets, sketches, and books, we use either an ELMO or Ziggi HD USB document camera to project displays to group for discussion and feedback. The document cameras and laptops also have the advantage of allowing us to share screens from mobile devices or from hard copy books with people who may be participating remotely through teleconferencing systems like Adobe Connect or WebEx. The walls around the room
are designed with corkboard covered in fabric so Post-It notes from focus groups or storyboards from interaction design meetings can be tacked up on the walls for easy viewing. Finally, the flat panel monitors around the room can also be used in lieu of one-way mirrors to observe any testing going on in the observation studios.

The observation studios are small, soundproofed rooms where the think-aloud protocols and observational testing takes place. The studios are immediately adjacent to the larger collaboration space and are entered through secure doors. The studios allow for privacy; are large enough to support at least three people with laptops; and are easily configurable so they can be set up like a living room/den where users might play video games, an office space with a desktop system, or even a dorm room where students prepare for classes. Video feeds from the observation studios can be sent to the monitors in the larger collaboration space allowing large groups of observers to view the studies being conducted in a studio. However, because the studios are quiet and private, they are also used at the end of research studies to analyze and code results from digital videos, to record voiceovers and any narration needed for highlight videos, and to produce the highlight videos or PowerPoint presentations needed for a client. The studios serve a dual purpose: first as testing spaces for participants, and second as office space for the research teams.

Finally, the third major space in the facility ties back to my earlier points about mission critical NDAs, the need for secure storage lockers for ghost hard disks with client’s proprietary software on them, and the IRB’s need for hard disks with participants’ encrypted videos on them. But in addition to storage for this equipment, I’m never prepared for how much additional storage space we need for other equipment, furniture, and paperwork necessary to run a multipurpose usability testing facility. The filing cabinets needed to securely store the informed consent statements and NDA agreements each participant signs are a significant space consideration of their own. Also, the space needed for storing and recharging the batteries for the laptops used by the testing teams as well as the iPads, Surface tablets, and Android tablets used in mobile testing requires a major space and electrical circuit commitment. Add to these items the miscellaneous items usability studies need such as wireless microphones, microphone stands, HD webcams, extension cords, network cables, video light setups, digital cameras, eye-tracking hardware, and so on, and if your experience is like mine, it will only take two or three years before you’ll find you need more storage space and have to rent off-site space. My recom-
mendation here is to calculate what you think you will need for storage, and double it.

**Conclusion**

This overview of some of the major issues that have come to inform my thinking about how to design a 21st Century usability testing facility should help prevent your faculty and industry colleagues from making many of the mistakes I’ve made. Naturally, there is no such thing as a one-size-fits-all usability testing facility since the resources available to a program are always unique, and since the floor plans, HVAC, networking, and electrical systems in every building I’ve ever used are also unique and require special planning. Nevertheless, I hope I’ve been able to map out some of the landmines involved in planning and managing a usability testing facility. I’ve also shown some of the ways programs can actually afford to build usability testing and UX research facilities.

I recently renovated the collaboration space in my facility and installed two 80-inch flat panel monitors, a 40-watt ceiling mounted sound system, new electrical circuits, new network ports, and a control system for under $23,000, including labor. So it doesn’t have to take hundreds of thousands of dollars to build research labs anymore, and if your program can address the 5 major problems areas I’ve described above, then I hope this discussion will help you find ways to put a usability testing and UX research facility within your program’s grasp so that your graduates can demonstrate they have developed the mainstream usability and user experience testing skills industries require of certified professional communicators.

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