Proposal for a University of Austin Hackerspace

Executive Summary

We propose that University of Austin obtain an industrial / retail style, immediately available building as an interim to the academic campus. The space should be outfitted with a decent coffee and tea cafe with comfortable seating, a set of shelves nearby where the nucleus of a library can grow, and a set of nearby labs and workshops (a hackerspace).

The need of a physical space for informal discourse is obvious. The benefits of attaching it to physical laboratory, shop, and computer facilities should also be emphasized.

The STEM aspects of starting a new University will have unique challenges in bootstrapping. While Mathematics, Economics, and much of the Liberal Arts can nutured by bringing the right people together, aspects of Biology, Engineering, Chemistry require physical infrastructure to attract and support their growth.

If the new University waits for the institutional structure that established universities have to create and maintain lab space – i.e., individuals and groups with the reputation to produce funding, facilities committees with long term building plans, etc – then the new University will by dominated by the Liberal Arts and theory and may find it very difficult to broaden to the other fields, and the STEM portion of the endeavor may lag the Liberal Arts by years.

If a coffee shop salon is the bootstrap environment for the Liberal Arts, the equivalent for the sciences and engineering in the hackerspace. The unfettered access to a full range of tools and shop environments fosters a type of free experimentation and exploration that is different from the disciplined research programs, in the same way free-ranging conversation explores topics further from the mainstream than an organized seminar series.

The coffee lounge which will be the informal intellectual center of the students of Forbidden Courses should be co-located with the lab and shop facilities to foster the broad intellectual exposure of a true University.

The project will have a predefined end in three years; that is enough time to serve it's purpose as jump starting a technical and scientific intellectual culture, and if it is useful beyond that, a department of the new University can take adopt it.

Location

We propose obtaining the building that previously housed Fry's Electronics in North Austin at 12707 N Mopac.

The building is iconic, with a giant surreal piano above the main entrance, which will help in getting social media coverage, and is well known to the local tech community.

Importantly it has a coffee shop already in it; Fry's had a large cafe in the center of the store.

There is more than adaquate square footage. A large bay that was formerly for auto installations can be used as a shop for the dirtier tasks (welding). Rooms at the back are already roughly configured to be useful for classrooms, seminars, and conferences. A computer repair area can be made into an electronics lab. Office space is already set up.

There is a lot of parking; this is important if the location is to host events and a large number of students, and other cheap industrial style space is likely to have a much tighter parking to square footage ratio.

It is reachable by bus.

Access and Governance

Any current student of the University (those enrolled in the initial Forbidden Courses) will have access while enrolled, and access for the remaining three years for a monthly fee.

We suggest not opening up to anyone other than University students and personnel. The Hackerspace will be desirable merely on it's own, but we don't want to adulterate the quality of the community with people who only want occasional use of tools or a startup incubator / co-working type environment. Those people should have to take the Forbidden Courses; that trade off, whereby a young student who has a narrow desire is forced to experience wider and unanticipated intellectual exposure in exchange for that access, is a key characteristic of a university.

As much as possible each of the areas described below will run by the students using them; to use a particular area they will have to join the group running it, and take whatever orientation or safety classes that are set up and run by that group. This is to reduce the need for expensive staff and to encourage exploration. This approach cannot scale beyond a certain point, but should work for this size for a few years.

Equipment and Personnel

The general approach with equipment is:

- Functionality above all.

- Avoid tools that require such extensive training, that it is a barrier to use.

- Quality should be above what a dedicated individual would be able to obtain by themselves.

- Capital investment should not exceed what is reasonable for an expected three years of use.

The general approach with personnel is:

- They must have some belief and affinity in the mission of an academic free thought / free speech environment. We will avoid those who just want a job, or are mainly interested in the technical tools; they should be interested in the people they will meet, as the main side-benefit of the position.

- Hire for a defined period – six months for most positions, longer for the top level – and encourage an outlook of constantly being aware of how many days were left in your position and an attitude of making the most of every day.

A resume is attached, others can be provided if there is interest in this proposal.

Cafe

It can be minimally supplied so long as it has decent food as well as the usual drinks. The main purpose of it is to avoid providing an excuse for leaving the building in search of food or drink, and to provide the serendipitous encounters that are the high value, hard to measure reason for the cafe.

It will be open 24 hours, but perhaps staffed for less, with vending machines or other self-serve access at night.

The seating will be arranged to encourage encounters and make it hard to sit alone where you cannot overhear other conversations. Other space such as the offices can be used if private collaboration is necessary.

Library

The physical stacks will be just outside the Cafe, freely accessible in "open stack" format.

There will be minimal catalog sufficient to give an donors confidence that their items are tracked and will not be lost. For the same reason the library will be "non-circulating", i.e. the books cannot be removed from the area.

The collection will be built organically from contributions and requirements from various lecturers, the manuals for tools, etc; no attempt to make a large initial purchase.

We have in mind a professional, degreed librarian who may be available part time to establish the collection, but will fall back to doing it informally if necessary.

Computing Center

The primary goal will be to allow for students to host servers on fast internet with reliable power.

A room with appropriate power and ventilation will be provided, the actual equipment will be up to the students.

Equipment that will be provided to students will be a massive amount of networked storage, and a number of high end desktops suitable for CAD and other engineering design applications.

The ability to self-host computer servers after a student has taken classes, until the hackerspace is dissolved, will be one of the benefits that attracts startup minded students, and keeps them returning and participating in the community.

Electronics

The area will be provided with:

- A number of soldering stations
- Microscopes for inspecting work
- Oscilloscopes and logic analyzers
- Solder ovens
- A small mill for single-sided circuit boards
- Programmers for FPGAs
- A small stock of common development boards and other components

Physical Shop

The goals are as much functionality as possible, avoiding any safety issues which would in the long term shut off functionality, and relentlessly encouraging students towards more advanced and sophisticated techniques.

For traditional wood and metal working, only hand tools will be allowed, for anything that involves a human touching it. To use the efficiency and speed of a powered tool, users much use a robotic version. Thus ones options for sawing might include a variety of hand saws, and a large CNC router or a laser cutter that would cut the wood with the user at a computer terminal, but the usual electric table saw would not be available.

As a general rule, there would be enough tools to get by for most traditional things, and a constant encouragement to learn to program and use an automated tool to go beyond that.

Specific items:

- 3D printers; these are no long cutting edge, but often the first robot students will learn to fully control.
- A large laser cutter; similar to 3D printing, this is one of the first robots students might master.
- A large and small CNC metal lathe and mill. Only CNC (robotic) versions of these tools will be allowed.
- A large CNC router suitable for wood and plastic.

- One or more small high-precision metal mills.

- Electric kiln / annealing oven.

Biology and Chemistry

A few areas with their own ventilation will be provided. This area will require more extensive safety training and policies.

Purchased equipment will include two or more hoods and glassware, and possibly spectrographic analysis equipment, incubators, cold storage, autoclave and sterlization equipment.

Budget

The cost and availability of the building is unknown and like any commercial real estate in Austin it will not be cheap.

The staffing costs are estimated as:

Position	Number of Personnel	Yearly Salary	Total x 3 Years
Cafe	2	$30k	$180k
Equipment Safety and Maintenance	2 half time	$30k	$180k
Bio / Chem Safety and Maintenance	1 half time	$30k	$90k
General Management	3	$100k	$900k
			1.35 Million

(No multiplier for benefits and taxes has been applied.)

The equipment / facilities costs are estimated as:

Area	Initial Cost	Yearly Upkeep	Total x 3 Years
Initial Build-out (HVAC repair, etc)	$60k		$60k
Ongoing overhead (utilities, etc)		$180k	$540kb
Cafe	$20k	$12k	$56k
Electronics	$50k	$15k	$95k
Physical Shop	$150k	$30k	$240k
Bio / Chem	$150k	$30k	$240k
			$991k

These are all wild estimates without full information, but should serve to give an idea of the scale of the project.

Alternatives

Physical alternative locations might include the old BG-40 Nike missile base south of Bergstrom Airport [1], or simply an empty few acres of land somewhere within 20 miles of Austin.

An empty location could be provided with a few portable pre-fabricated buildings (such as the "Derksen" style cabins) with solar power. This might fit well with the temporary nature of the endeavor.

For most industrial space available in Austin, sufficient parking may be limited.

End Game

Nothing lasts forever.

Hackerspaces often shutdown, fade, or evolve as the people involved get older and more conservative and institutionalized.

Three years from now the University of Austin will be well on its way to establishing Departments, Colleges, and other structures, which will build their own labs, shops, and facilities.

A defined end can produce a healthy discipline and focus. Important projects are not continuously put off for some ephemeral "better time" because we know our days are numbered, and expensive but appealing projects do not get investment under the belief that they will "eventually pay off."

Rather than a futile attempt to build for all time, we propose to put a defined end to the project, and shut it down three years from inception. Any equipment can be distributed to the appropriate Departments of the University, or auctioned off. If a particular Department of the new University desires to continue the Hackerspace, they can take it over.

Next Steps

If there is any potential to seriously pursue this with a reasonable amount of funding, let us know and we will follow up with the resumes of all of us and meet in person to begin planning. The acquisition of the physical location should be done as speedily as possible, so the first order of business would be determining the availability of the potential sites.

[1] https://en.wikipedia.org/wiki/Project_Nike, http://www.themilitarystandard.com/missile/nike/sites/bg-40-ifc.php