ZatLAB - A Proposal

definition ‘Hack’ *verb* \ˈhak\

1. a creative and clever solution to a tricky problem or limitation
2. to manage; cope.

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1. Introduction

During a recent visit to Za'atari, standing atop a hill overlooking the camp we were approached by three young kids. This during school hours so of course it begged a question. Their response? 'We ESCAPED!' We chuckled both at the enthusiasm of the delivery and the irony of this expression but despite the lightness of the moment there remained an odd congruence.

These were no mere truants. Their minds like most young minds were screaming for stimulation and engagement. Yet they made the decision to seek learning outside the traditional framework - Huck Finning around the camp, engaging strangers, chasing bigger stimulus.

On the ride back to Amman with a UNHCR liaison, we were discussing the remarkable resourcefulness and entrepreneurial spirit of the Syrian people - literally turning the only thing they had within reach, sand and rock, into concrete. When she related the very limited access the refugees have to computer learning - dots began to connect: the boys on the hill, the collective motivation of this culture…Silicon Valley.

I began to imagine a place where stimulus is delivered faster than the boys on the hill could ever run. I began to imagine a place where this incredible concentration of intellectual capital, quickened by the disorientation and displacement of war could coalesce, into something meaningful. I began to visualize a hack out of the camp, a portal into the 21st century. That vision is ZatLAB.

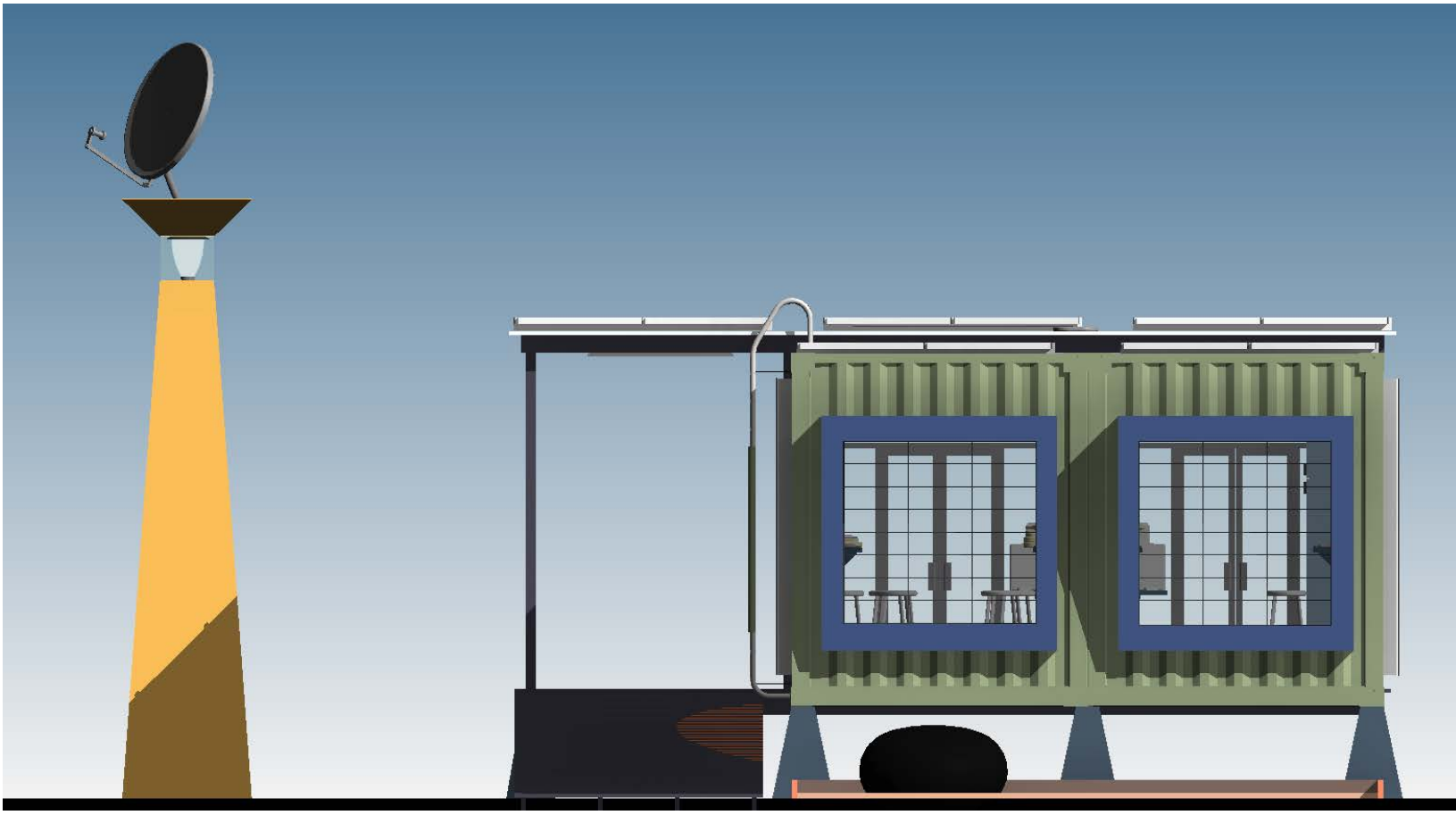
2. The New Literacy

For the past 1,000 years or so, the single most important entry requirement into professional culture has been the ability to read and write. The ability to assimilate and share ideas through the written word has been indispensable to our progress. And while it still remains a necessary condition for advancement both as individuals as well as collectively, in the wake of the digital revolution, there is a new kind of literacy required to advance in society – computer literacy. The ability to manage and manipulate digital data is increasingly defining one's place in the social and economic echelon. More than any other skill, computer literacy is the key to winning in the 21st century.

3. Current State

As of December, 2014 there were very limited computer resources in Za'atari camp. Two organizations, FCA and NRC offer computer training. NRC has 4 labs with 13 computers each. FCA has one lab with 11 computers. Both offer ICDL courses in word processing, spreadsheets and slide presentation - essential skills required in today's world. No one is offering higher level courses.

63 learning computers for a student and adult learning population of 60,000+ amounts to one computer for every 1,000 students. By comparison, in developed nations this ratio is **one computer for every 6 students**.



4. ZatLAB - Concept

ZatLAB is a self-contained, self-powered, modular, portable, scalable and repeatable intensive learning environment and ideas incubator. It was conceived of as a means to impart computer based skills to camp residents and channel this to power into future progress. ZatLAB is predicated on the belief that the most important skills of the 21st century hinge on the ability to manage digital data in one form or another.

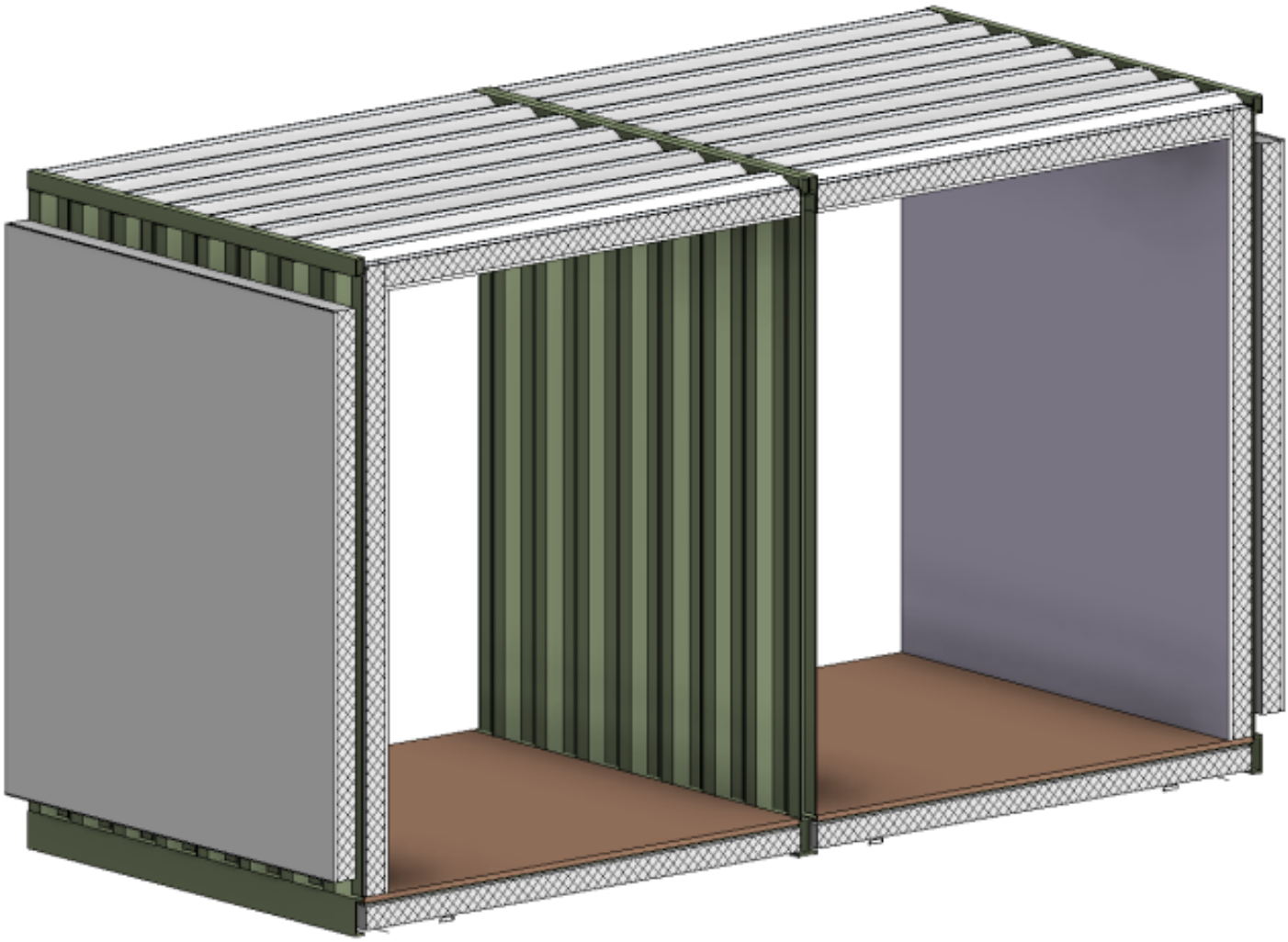
ZatLAB is a building. ZatLAB is a site. ZatLAB is a unique, bright spot on an otherwise monochromatic palette. It is a machine for transforming the massive intellectual potential of the Syrians into prosperity. ZatLAB is an 'Exit' door.

Proposed are 11 labs, one in each district at Za'atari beginning with a pilot lab to be delivered in July of 2015. A ZatLAB in each district will reduce the ratio of computers to students an order of magnitude **from 1 to a 1,000 down to 1 to 100**. The projected reach of a ZatLAB operating in each district is 5,500 students a semester and over 16,000 students receiving intensive training a year.

A. Infrastructure

ZatLAB consists of two 8' (2.4m) wide, x 9'-6" (2.9m) high x 40' (12.2m) long steel shipping containers. This enclosure was chosen because it is physically secure, low maintenance, long lasting (50+ years), virtually impenetrable to the elements, relatively inexpensive and extremely versatile in its use. It can be easily transported, set up in multiple locations during its lifetime, connected with other modules and configured in multiple ways including hybridized with site built elements or other manufactured modules.

The containers are insulated with 8” of EPS board on the long exposed walls and 6” on the floors and roof giving the units an average R value in excess of 26 - twice the insulation value of commercial freezers. EPS is a 100% recyclable lightweight rigid cellular plastic that contains 98% air. It is completely inert, will not become friable like fiberglass and will maintain its performance for the life of the unit. Additionally the units are coated in an insulating, reflective paint which greatly reduces solar gain.



The containers are mated at their long dimension reducing 25% of the unit’s exposure. Insulated and shaded glazing is confined to the ends of the units to provide filtered daylight which will offset the need for artificial lighting and allow for maximum whiteboard space along the long walls.

Clear floor area equals 281 square feet (26 square meters) per module or 562 square feet (52 square meters) total conditioned space.

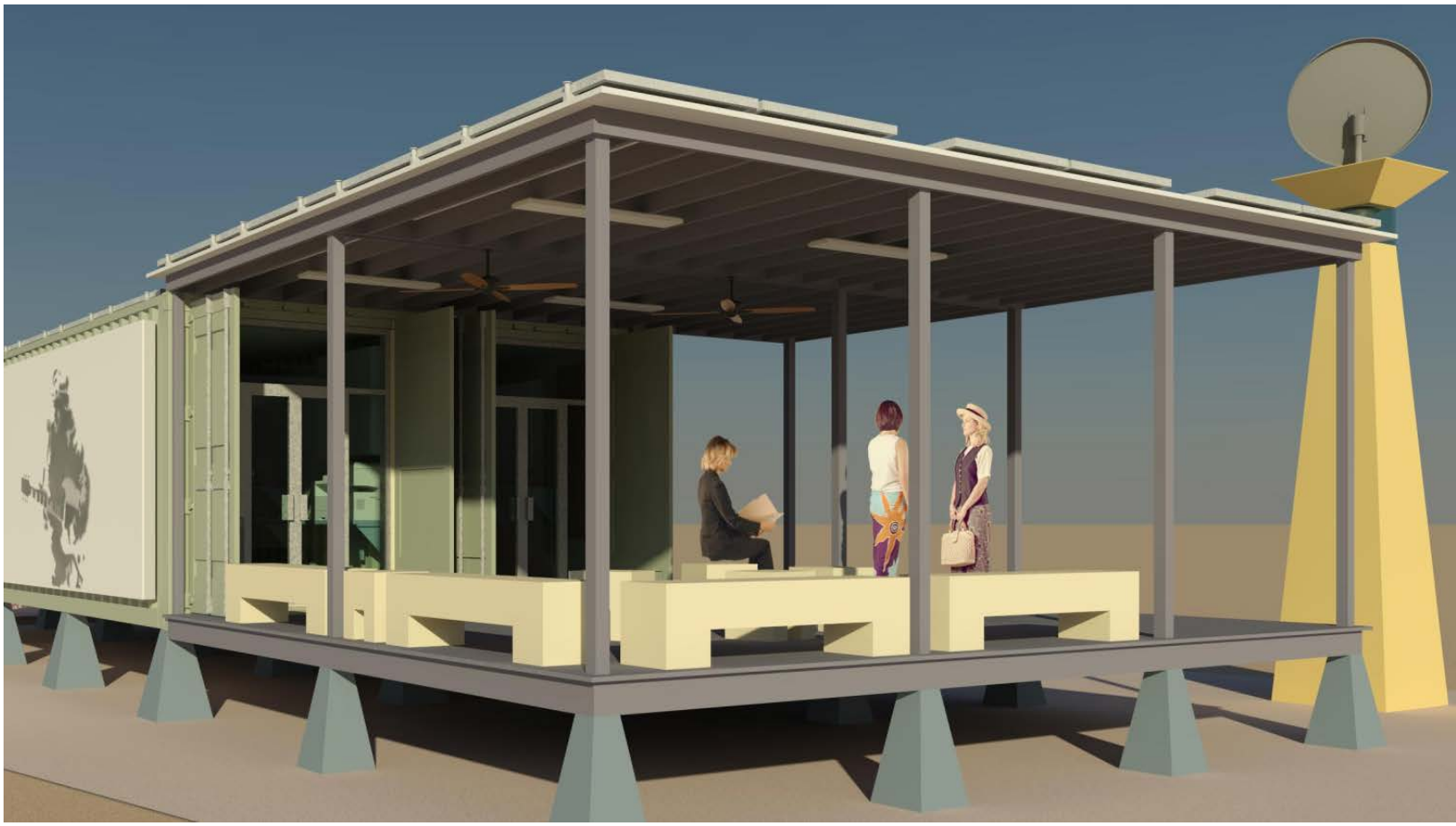
Interior finishes are high grade plywood on the walls and floor. The floor is coated with a travel-resistant epoxy resin for easy maintenance. The walls are coated with a high gloss, scuff resistant epoxy coating where exposed.

Acoustic materials are applied to the ceiling and lower walls to offset the amount of hard surface (flooring, whiteboards).

The bench counters are veneered with an anti-glare plastic laminate over medium density fiber board (MDF).

The entry storefront is designed to minimize heat gain / loss by use of a less-than-standard size door: 1'-7" x 6'-4" (48 x 193cm). Wheelchair access is made possible by opening the normally fixed panel to provide 38” (~1m) of clear area. In front of the storefront glazing is a second strip door made of clear plastic strips that allow you to pass through but inhibits air movement creating a mini airlock.

A site assembled, wood frame deck and canopy provides 400 square feet (37 square meters) of additional floor area or enough space for an outdoor classroom. This area will otherwise function as a queuing / congregation space and informal collaboration space. A walk-off grate at the entry to the labs allows sand and dirt to pass through the floor system prior to entering the lab.



The patio floor deck, roof deck and ramp will be prefabricated off-site, disassembled and shipped inside one of the containers. Parts will be pre-drilled and marked for easy assembly. All wood used in the construction of the ZatLAB will be FSC certified.

The lab shell is further buffered by a span of marine plywood on its long exposed sides. These 'shields' have 3 functions. First they protect the exterior applied insulation. Second they mitigate noise transmission and third, they become a canvas for artwork. The pilot ZatLAB will feature work by the world-renowned street artist ChemiS. Themes will ultimately celebrate empowerment through knowledge. Future ZatLABs will maintain their own unique identity by virtue of the designs on their long exterior walls which explore similar themes.

The units are supported on 30" high (.76m) concrete piers. These piers are grounded to subsurface, site-cast concrete pads. Elevating the units allows the air to circulate under the unit reducing heat transfer from the ground during the hot months.

The design contains 2 ancillary elements. First the tower which will function as the security guard's station and generator garage but also to mark location. At night a beacon will illuminate the grounds as a security measure. We understand there may be some religious sensitivity so the scale is kept as low as possible to still function from a security standpoint. The fixture will have a light cut-off to avoid trespass beyond the immediate area. Additionally, there will be area lighting for 24 hour operation of the lab.

The second site element is a Japanese meditation garden which is framed in view from the interior by the large portals at the end of each lab. A site built concrete wall studded with colorful light refracting glass marbles provides a backdrop for a flowering tree and feature rock. The tree will be irrigated from air conditioning condensate.

B. Climate

The units are conditioned by a wall mounted heat pump / air conditioner in each module. These are high efficiency units capable of maintaining 72F (22C) degrees in the hottest months and 68F (20C) in the coldest months.

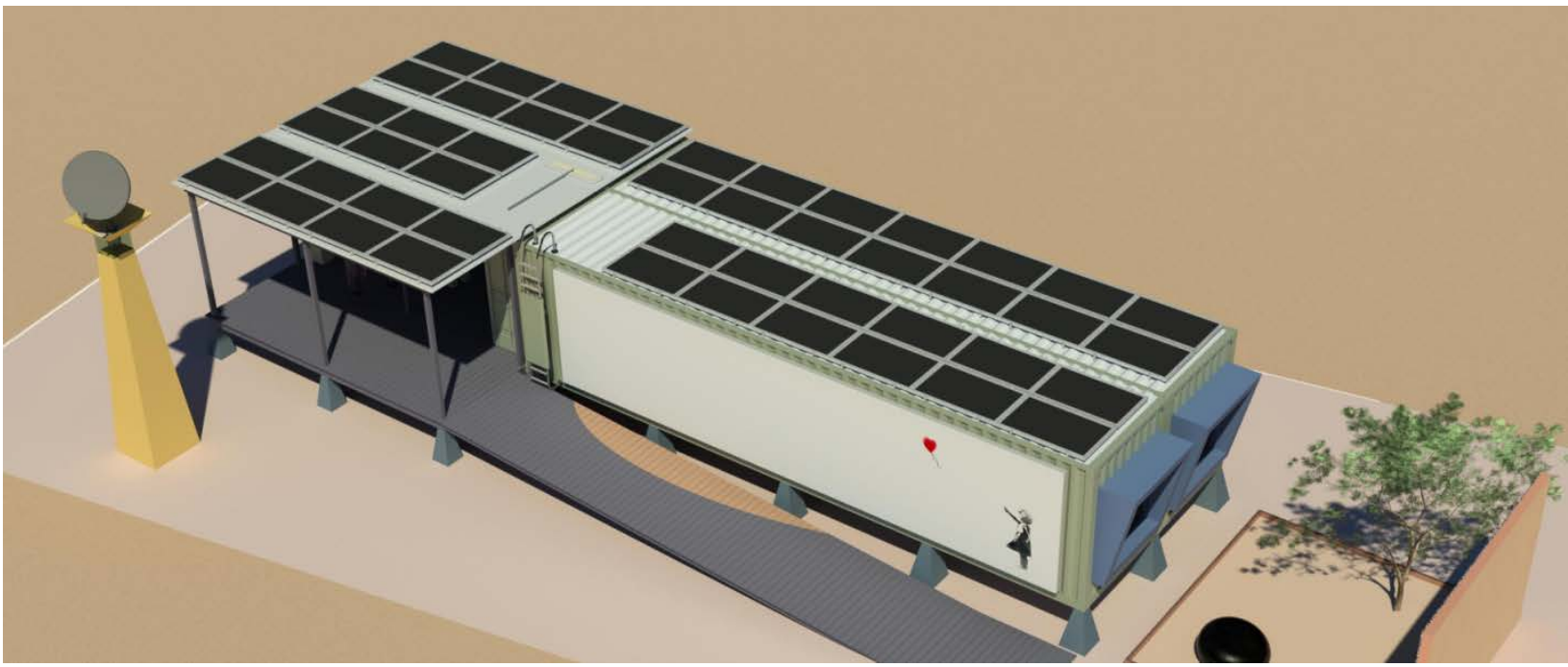
The patio is provided with ceiling fans for air movement in the hot months and clear, roll-down curtains at the perimeter to winterize the space in the cold months.

C. Power

A 12 kilowatt photovoltaic (PV) system will power the units year around. The system is sized for the worst case conditions which occur in December and January. Beyond these months the system will be producing an average of 4kw and up to 6kw of surplus energy. Some of this energy will be kept in reserve to buffer starting surges and accommodate small appliances and charging units. The balance will either be sold back to the electric utility to help finance costs, donated to neighbors or used to make ice which can be sold or used in the swamp cooler to reduce cooling loads or semi-condition the patio.

36 - 600 amp hour sealed AGM storage batteries will be tucked under the bench counters in both labs (18 per lab). These will act as heat sinks further reducing the cooling / heating capacity required. An integrated ladder provides easy access to the roof for cleaning the panels.

Provided also will be a 10 kilowatt diesel generator for those times when there is dense cloud cover for multiple days.



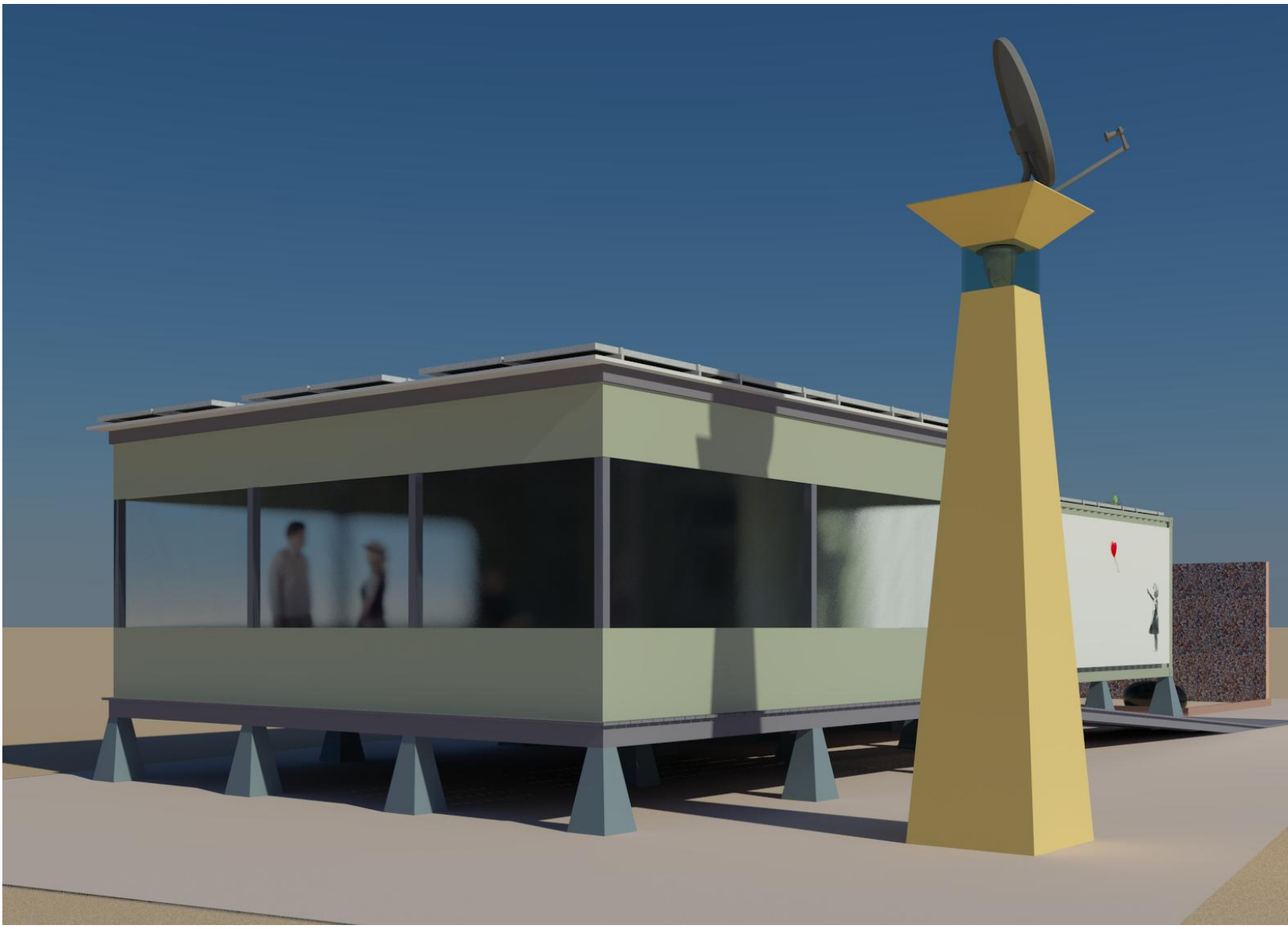
D. Connectivity

Distance learning requires ~2 Mbps per student to stream video or ~100 Mbps for both modules. Until fiber reaches the camp this is beyond the capacity of the local internet service provider. A proxy server will be used to cache web content which will greatly reduce the required bandwidth. ZatLABs located in areas inaccessible to a land wire connection will rely on satellite as a stopgap. Whitelists will be used to limit bandwidth as satellite thresholds are less than 20 Mbps.

E. Comfort / Support

Unless the labs are sited close (within a 2-3 minute walk) to existing public toilets, new toilets will be installed proximate to the labs. Toilets will be site built per WASH specifications.

A water cooler is programmed for the patio. Hot and cold water will be available from April-September and as power supply permits in the months with less sun hours per day.



Shown with winterizing curtains

F. Security

Steel shipping containers provide a high degree of security requiring a cutting torch or special saw to penetrate. There will be inner locks at the storefront door and high security lock boxes on the heavy shipping container doors. The glazing panels at the ends of the units are secured by 5/16" thick x 3" deep (7mm x 76mm) flat bars.

An audible alarm will be provided with contacts at both openings. It will also be programmed to auto dial the police in the event of a breach.

Security lighting will illuminate the deck and areas adjacent to the labs. The facility will be self-policed during operational hours. A 10' high security fence has been programmed to create a secure perimeter. Consistent with other educational facilities at Za'atari, a security guard will be required after hours.

5. Equipment

The lab is zoned into two modules capable of supporting up to 28 work stations per module. Each module is autonomous having its own air conditioner, computer network, printer, entry and security.

G. Computers

Laptop computers were chosen over desktops mainly because they consume a fraction of the power. They are sufficient for both distance learning, software development, solid modeling and other CPU intensive applications. 6-8 computers will have increased capability for animation, rendering and software requiring more horsepower. One laptop in each module will be the designated server for that lab. This will also function as the instructor's workstation and a control station for the slide projector. Laptops will be cable locked to the benches for security.

H. Network

A Windows OS will be used both on the individual workstations and as the network software. Network connectivity will be through an enterprise WIFI router in each module as this setup uses much less power than switches required for a hard-wired network.

I. Whiteboards

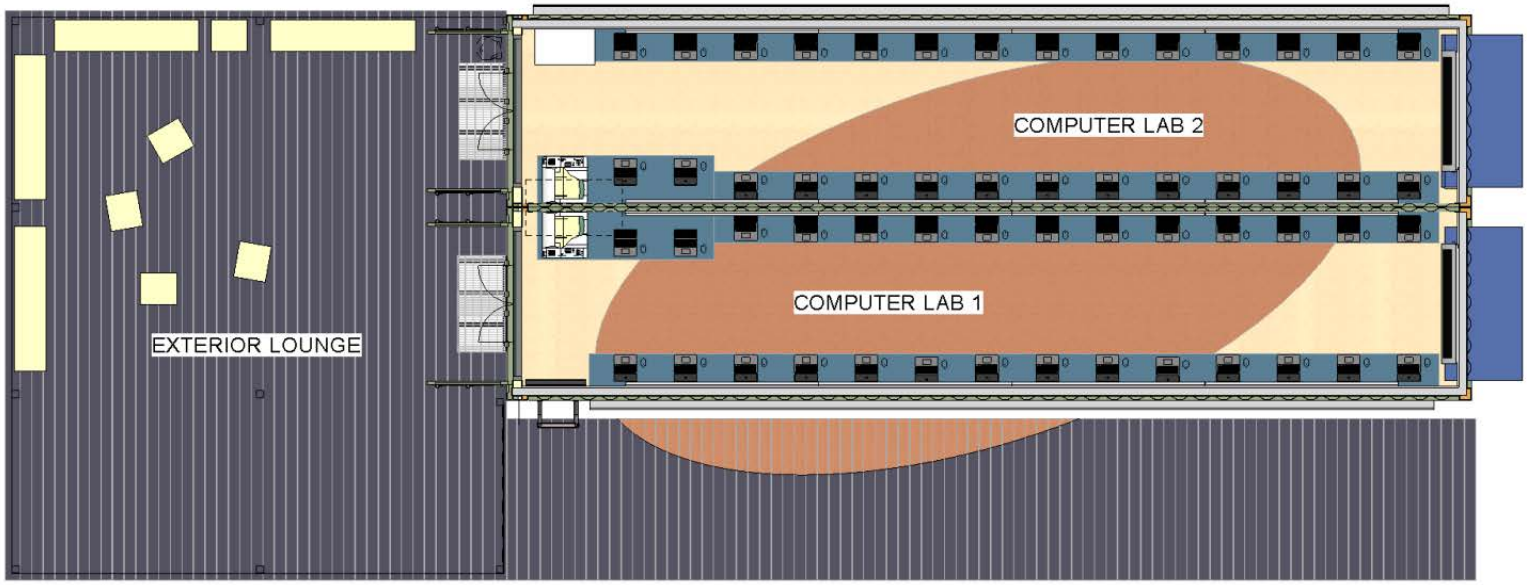
In software startup and incubator culture, whiteboards (dry-erase) are essential to sharing ideas, ideation and general communication. Here they will serve the same purpose as well as support old-fashion instructor notes, doodling, flow charting, diagramming, admin / student memos and messages. The white, reflective boards will also reflect light into the units thereby reducing the lighting power load.

J. Projector and Screen

Each module will contain a ceiling mounted projector. At the portal end and just below the air conditioner there will be a retractable screen which by virtue of its location will have a room darkening affect.

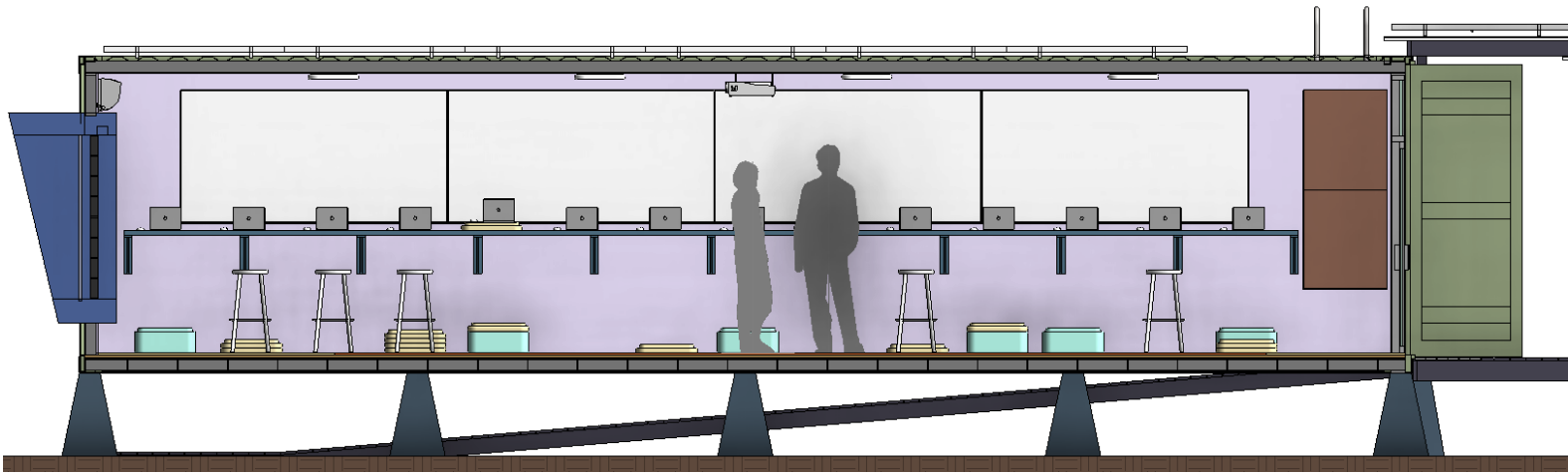
K. Paperless Lab

Although a printer is shown in each lab, all documents and work will be stored on student and faculty USB sticks. Depending on the nature of the curriculum the printer may be replaced by another work station.



6. Lab Function

ZatLAB can accommodate up to 4 classes simultaneously with 13 persons per class and 2 instructors circulating in each lab. Acoustical dampening materials on the ceiling and walls below the workbench will mitigate noise. Generally though, there would a single, 25 person, 50 minute class per module.



L. Lab Loading

The number of classes that can be taught each week are limited by availability of practice workstations as each class requires twice as much practice as class time. The following is a breakdown of options.

3 Credit Hour Courses Per Week	Total Lab Hours Per Week[1]	Lab Hours Per Day[2]	Total Students Per 15 Week Semester[3]
18	162	13.5	450
20	180	15	500
22	198	16.5	550
24	216	18	600
32	288	24	800

[1] Based on the general rule that for every hour of class time, 2 hours of study or practice are required to assimilate the information. Courses are designed to preserve this ratio in order for the student to maintain a 90% achievement rate

[2] Based on a 6 day school week

[3] Based on 25 persons per class

20 classes per week are optimum. Full time operation (24 hours a day, 6 days a week) would accommodate 32 courses and 800 students per semester but would stress both the power system and the equipment. Loading above 24 classes per week will require an auxiliary power source during the winter months and increased maintenance of the equipment.

M. Class Zoning

There are numerous zoning configurations but for simplicity It is envisioned one module will be a dedicated to teaching and the other, a practice / work module. But modules can be zoned by the clock as well.

As there are additional demands of teaching students in a segregated society, classes can alternate female / male or in blocks of time i.e. females in the morning, males in the afternoon.

N. Workstations

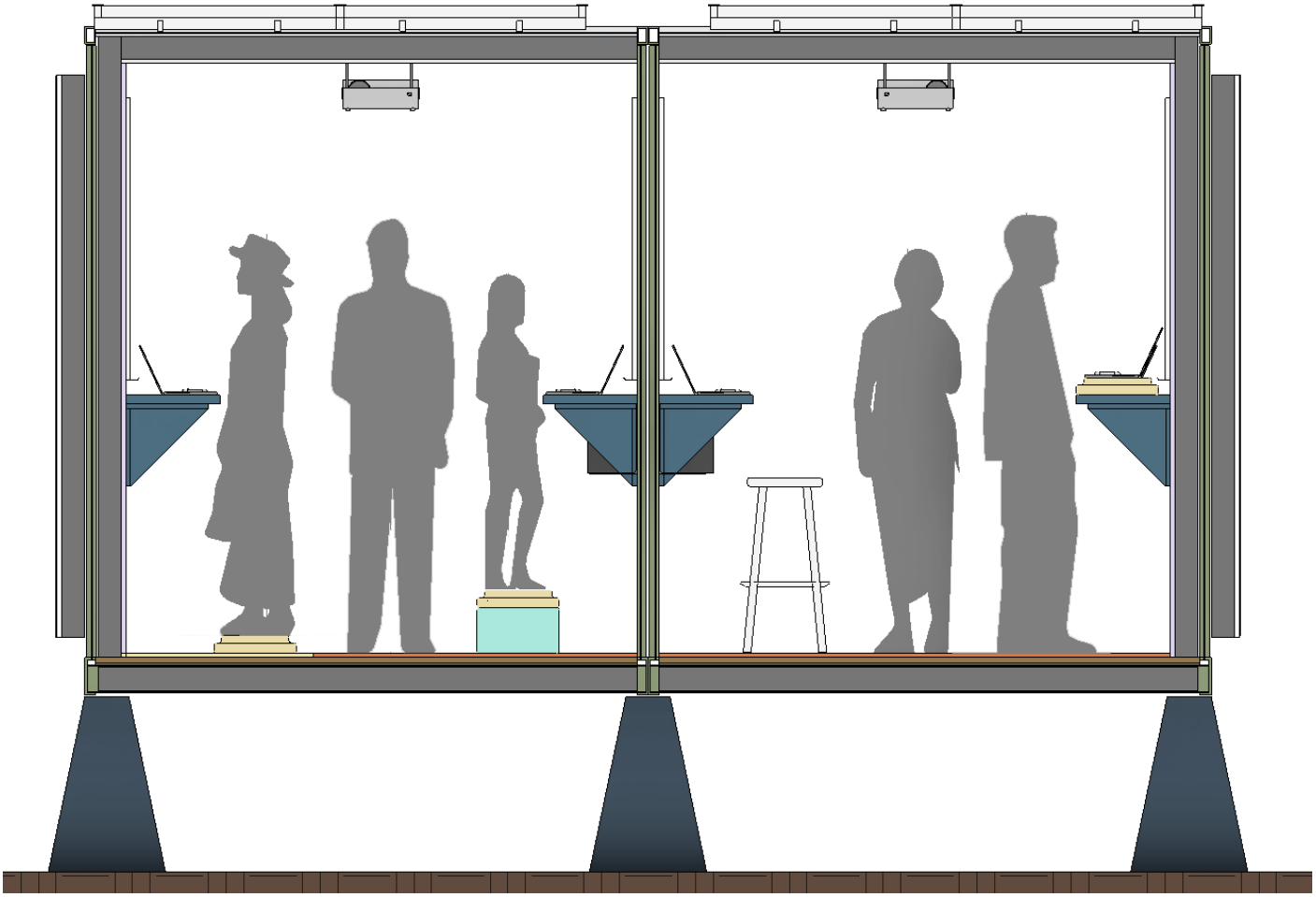
Stand up workstations are driven by the Sitting = Death science that has been emerging since 2009 and are becoming the rule in developed nations. In the practice lab standing will discourage 'camping'. That said, some stools will be provided for those with health issues.

Lab counter height will be fixed at 44" (1.1m). Various height, lightweight, stackable molded plastic risers will be provided to accommodate students of any height optimizing ergonomics. Risers will be of various heights and can also be placed under computers to achieve the proper arm posture for taller users.

30" high counters are shown in both modules to accommodate up to 4 wheelchair bound students.

O. Administration

Staff offices will be located off-site at the partner's base camp or location. Instructors will use a USB stick as their virtual office.



7. ZatLAB Mission

As the project developer, ЯeBootKAMP is dedicated to preventing a lost generation of Syrians - under educated and economically dependent. Although programs in the arts and humanities are essential to mental wellness and personal development, ЯeBootKAMP has chosen to focus on producing graduates with highly marketable technology skills. This is driven by industry growth projections which show tech industries growing 18% by 2022 compared to all other industries at 10.8% translating into 685,000 new tech jobs in the next 8 years.

Entry level salaries for both front and back end developers are off the chart. A recent survey of *intern* salaries at 2 dozen tech companies in the United States revealed monthly salary and perks upwards of $10,000 a month. Compensation packages for full time positions average 30-50% higher. ZatLAB's mission is to provide the tools and skills to exploit this demand for current and future workers in the tech industry.

P. Target Sectors

In order to meet this demand ЯeBootKAMP envisions ZatLAB will function as a para-professional training facility - more bootcamp than university - providing job-ready technical skills for a wide range of tech-based industries. Technology sectors and areas demonstrating the most demand:

Internet

- Web development including mobile application design
- Front end UX / UI design
- Backend programming
- Front end translation services of popular applications into Arabic

Computer Technology

- Software development / Java development
- Technical support
- Systems / network administration

Technical and Creative Arts Support

- Architecture and engineering support - drafting, modeling, rendering and animation
- Rapid prototyping including modeling and fabrication
- Robotics / drone support
- Graphic design and image manipulation
- Game design, animation and support
- Virtual reality (VR) production
- Music industry support

Healthcare Information Technology

- Medical device development and support
- Clinical systems including electronic medical records, nursing clinical documentation, radiology, ER management, pharmacy
- Biomedical support
- Medical informatics

Infrastructure

- Database administration
- IT Project management
- Data mining / Analytics / Business intelligence
- Information Security Compliance / Governance

ZatLAB will not be competing with University Computer Science programs as these schools will be producing higher level systems designers, engineers, and analysts. However ZatLAB can be a springboard into a higher academic program. Para-professional programs offer a more direct avenue towards supplying the base of the technology pyramid. Supporting the top of the pyramid is ZatLAB's primary purpose.

2 courses in Solidworks + Rhino = job at fabrication lab for $60k per year.
A course in Arduino + Unix + C++ = a job at a robotics firm for $70k per year.
A course in Javascript + 2 in Ruby = writing apps for a startup at $80K per year.
2 courses in Revit + 3DS Max = job at an architecture firm at $75k per year.
HTML5 + MySQL + MATLAB + Python = job at analytics firm for $95 per year.

The Return on Investment for para-professional tech workers is simply unmatched by any other professional or vocational program.

Q. Too Young To Code?

How young is too young to code?

Lving in a place where 12 year olds are designing apps, ЯeBootKAMP's vision may be a bit skewed Evidence suggests learning a computer language is not unlike learning a spoken language. Programming is being advanced as the new literacy and a necessary skill for navigating in the 21st century. Code.org, Tynker.com and others offer courses in app building and game design for **kids as young as age 5**. MIT targets Scratch Jr. and CHERP at toddlers. In both the US and Europe, the 3 Rs (reading, writing and arithmetic) are increasingly being viewed through the coding prism. Early entry age into an activity correlates with success in that activity be it music, sports or academics. **Every day a Syrian child is NOT learning computer based skills is one more day lost to a future job competitor.**

R. Courses

ЯeBootKAMP envisions registration and schedule would follow the traditional 3 semester per year model and courses would be broken down as follows:

1. Fundamental computer skills for kids 5 and up including older adults. This includes introduction to the web, word processing, spreadsheets, slide presentation, photo manipulation and for kids, one hour of coding a day. Introduction to HTML and C programming.

2. Foundation theory and advanced level programming classes for kids age 8 and up. Courses in C, C++, Java, Perl, Python, MATLAB, PHP, C#, Objective, Arduino.

3. High level web development courses for ages 12 and up including advanced courses in HTML/CSS, Ruby, SQL, Javascript and toolkits like AJAX, jQuery.

4. Technical arts courses for students 14 and older. These would include applications specific to the design professions including the Autodesk Suite (Revit, Autocad, Maya and 3DS Max) and Sketchup for architects and engineers. Solidworks, Unity, Rhino, Massive and Maya for CAD/CAM. Adobe Creative Suite for the graphics / publishing industry. ProTools for the music industry and Premier or Final Cut Pro for the film industry.

5. Network administration courses for students 16 and older. Windows, UNIX and Linux.

6. Health information technology (HIT) for students 16 and older. This would follow the track of traditional programs in HIT but in bootcamp format and would shallow dive into the most popular EMRs, billing software, and medical equipment interfaces.

For a sample curriculum see Appendix B.

Although ZatLAB is focused on growing talent for the tech industry, students will also have the opportunity to use the lab for classes in any discipline, including college preparatory classes via distance learning.

8. ZatLAB Healthcare Incubator

Of all the advancing branches of the technology industry, one in particular is outpacing the others by an a wide margin. Healthcare IT will be valued at almost $57 billion dollars in 3 years requiring a massive infusion of technology support.

Responding to current demand and forecast growth of this sector, ЯeBootKAMP plans to use part of the lab as an incubator / accelerator – specifically healthcare IT. This means we not only train students to design apps but they have the option of becoming involved in a real application of their skills once they have completed their training. This would involve a mentorship program with a remote Healthcare IT partner and local medical professionals in North Jordan. Examples of projects include:

- A mobile application that connects all healthcare providers at Za'atari camp. This may include integration of an Electronic Medical Record (EMR), natural language processing, scheduling, messaging and billing or equivalency.

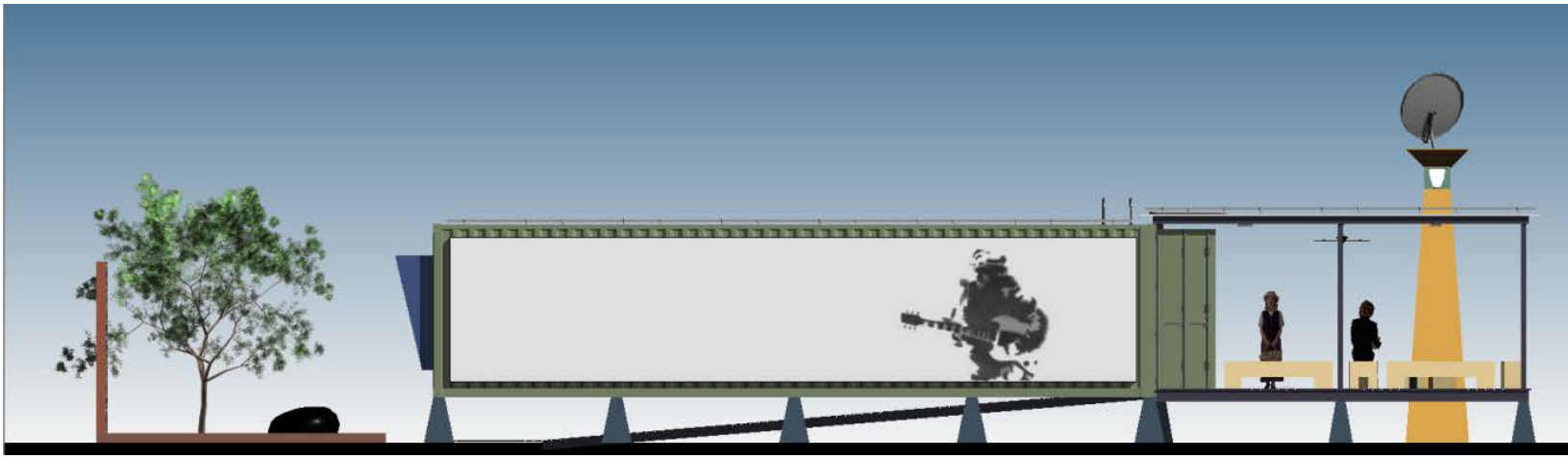
- An application that monitors the status and progress of newborns, pediatric patients and / or campers with injuries and chronic disease.

- An emergency alert system that connects to external ambulance services

- Translation and cultural tailoring of popular nutritional and fitness tracking apps.

- Healthcare Information Exchange (HIE) network to connect to external facilities like Marfaq hospital.

The goal is ultimately to render these labs self-supporting - converting Syrian motivation and brain power into dollars returned to the lab and into the pockets of the refugees. More than just a skill-set, ZatLAB incubator is a REAL and immediate bridge to economic independence and a sustainable means to preserve the lab's future and function.



9. ZatLAB Partners

ZatLAB will be an opportunity to grow or augment existing computer training programs already extant in the camp. FCA and NRC currently offer basic computer training and are invited to participate in the operation of the lab. Further, ZatLAB will be open to use by other education partners within the camp who share ZatLAB's mission to train para-professionals in computer skills. An important partner will be the Innovation and Planning Agency. Their Open Innovation Center, FabLab, is a fabrication laboratory projected to come online in 2015. ZatLAB's program will dovetail directly into the FabLab by providing trained modelers to power the lab.

ЯeBootKAMP will initially rely upon education partners to drive the lab and administer the bulk of the curriculum. Partners will be education based NGOs on the ground at Za'atari, or local universities / technical colleges. In the absence of instructors to teach higher level programming courses we will rely on distance learning administered through a proctor or instructor. We are also working to establish relationships with code.org, codeacademy.com and others to offer defined tracks of study which yield something just as useful as a degree for opening up doors in the tech world - certificates of completion and competency.

The goal is to recruit (and to encourage our partners to recruit) as much instructional talent from the camp as possible. However given the demand for computer jobs, it is likely talent will be scarce which will necessitate either training up those with some minimal skills or hiring Jordanian specialists. It is understood

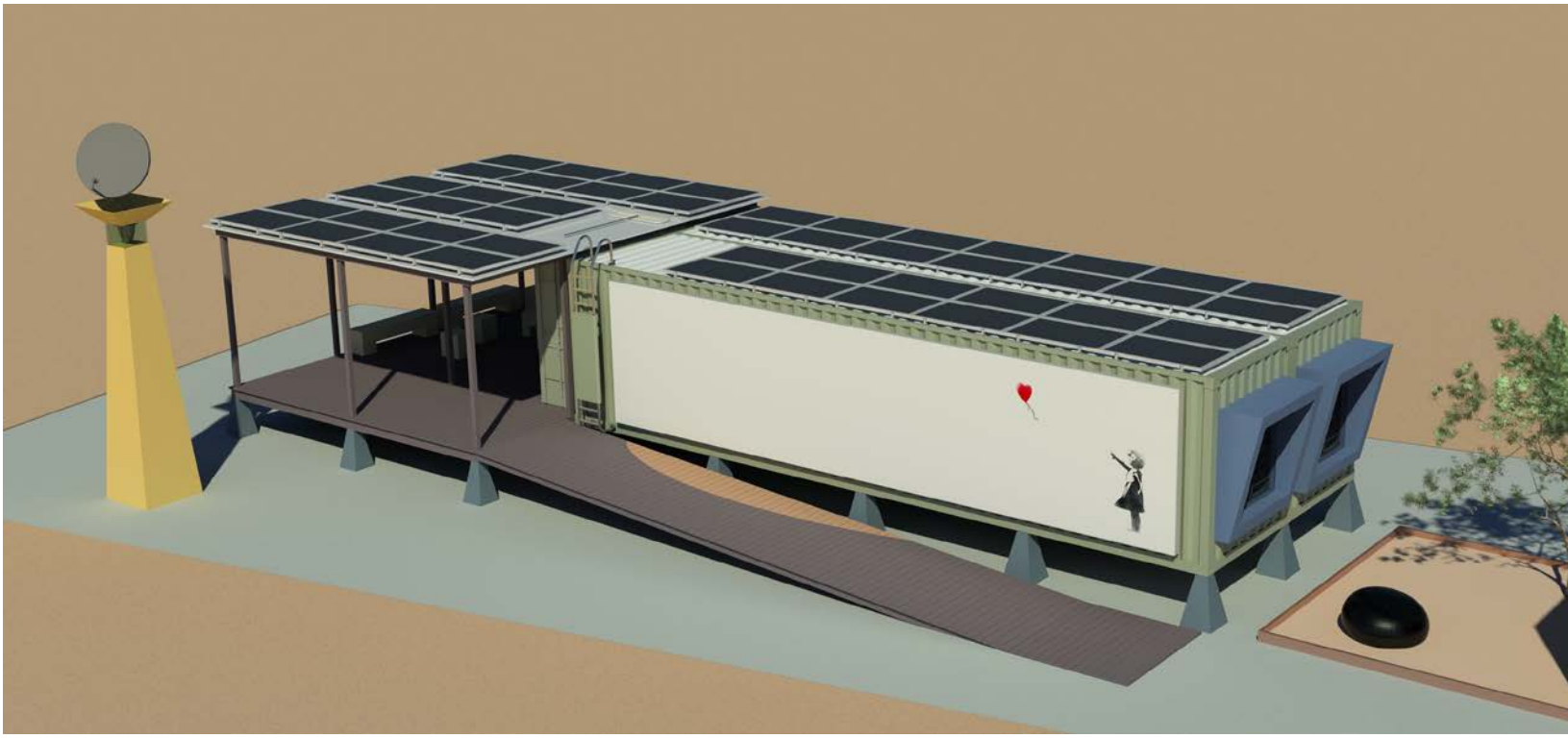
Syrian refugees are not permitted to work in Jordan so we will have to negotiate any employment of refugees with the government. Otherwise we will rely upon NGO partners operating in Jordan, university partners or the hiring Jordanian nationals. As ZatLAB and ЯeBootKAMP gain traction, we are prepared to offer instructor training to ZatLAB graduates wishing to pursue a career as a computer educator. This training can be as basic as sending a graduate to a specialized bootcamp to become expert in Ruby, javascript or Revit.

10. ZatLAB Mentorship

Once operational ЯeBootKAMP will initiate a program to connect Silicon Valley professionals and other tech centers with aspiring students at Za'atari. The vehicle remains undefined but it will likely be through an existing social media forum. The goal will be to establish a dialog and opportunity for students to ask questions, acclimate themselves to tech culture and begin to build a network which could ultimately spawn an internship or future employment.

11. Career Placement

To mitigate against ZatLAB graduates competing for tech sector jobs within Jordan, recruitment conduits will be laid between Za’atari and the tech centers of the world. Much like the US sponsorship for East Indian tech workers in Silicon Valley, this program will match the recently minted programmers, database administrators, building modelers, animators, and other technicians with sponsors in the Americas, East Asia. Europe, Australia and elsewhere. Recruitment will be handled by an independent employment agency specializing in tech worker placement.



12. Host Population Benefit

ЯeBootKAMP is sensitive to the stresses being placed on the host population and is proposing a 9 point strategy for benefiting the host population:

1. ZatLAB will have an adult education component available to Jordanians working inside the camp or supporting it indirectly. Available will be computer courses in programming, web development, networking and vocational technology. These camp related Jordanian nationals will have across to a broad range distance learning subjects from vocational to college preparatory.

2. ZatLAB will be partnering with Universities in North Jordan with programs in computer science, digital design, architecture and engineering. These schools will have the opportunity to use ZatLAB as a satellite branch and recruiting ground for future graduates.

3. There is a strong likelihood Jordanian nationals will be hired as ZatLAB instructors.

4.Subsequent to the pilot ZatLAB, construction components such as photovoltaic systems, computer equipment, landscaping, fencing, millwork, foundation piers, furnishings and construction materials will be sourced locally. This will include the fabrication of complete units in the Mafraq region.

5. The Healthcare IT Incubator will be composed of a partnership between ZatLAB graduates and local hospitals and/or physicians groups. This IT startup will develop healthcare related applications for the management of patient medical information in the local region and beyond and directly benefit the host population.

6. Useful life of the ZatLAB structure is 50 years and its power system, 25 years. Upon decommission of the camp the labs will be deeded to the Mafraq governorate for their use.

7. ZatLABs are planned for the 11 Districts in Za'atari. Assuming the funding stream is steady, as a modular, manufactured structure, we will enjoy a certain economy of scale. Savings from volume purchasing of materials and equipment can be aggregated to the end of offering the Mafraq governorate the option to purchase labs at or below cost for exclusive use of by Jordanian nationals.

8. It is likely the resourcefulness and entrepreneurial spirit of the Syrians baked in the ZatLAB incubator will hatch start-ups some of which may enjoy commercial success. A percentage of any revenues generated emanating from ZatLAB will be earmarked for a fund established to provide similar intensive programming environments for the Jordanians.

9. There will be a small recruitment fee paid by the employment agency for placed ZatLAB graduates. This fee will also go into the general fund for Jordanian computer education.

13. Conclusion

ZatLAB is many things. It's a beginning. A safe haven. Normalcy in midst of dislocation. Distraction in the midst of disorientation. Place in the midst of placelessness.

It is also a machine for transforming the iconic Syrian motivation and entrepreneurial spirit into prosperity.

As we seek to establish a conduit from Za'atari directly into tech communities both regional and international, we look forward to the day when those kids on the hill, upon graduation from ZatLAB, shout in unison 'WE ESCAPED!'

Appendix A

ЯеBootKAMP

ЯеBootKAMP is a California based non-profit promoting independence and empowerment of refugees through education.

Team ЯBK brings together a diverse set of professionals from the Middle East, Asia and the United States. The team includes architects and designers, tech industry strategists, political policy advisors and education experts.

ZatLAB Designer and Project Coordinator Hugh Bosely has been contributing to the built environment for 35 years as an architectural designer, developer and general contractor. He has extensive experience in modular design and building delivery.

Appendix B

For the first few semesters of operation, ZatLAB curriculum will be weighted towards introductory level courses. Follows is a sample curriculum as students begin to advance into the program.

	Course Name	Ages	Course Description	Software	Languages
INTRODUCTION	Introduction to Computers	5-10	Basic concepts. Word, spreadsheet, presentation and image processing. Basic programming	MS Office Suite, Adobe Creative Suite	HTML, JS
	Introduction to Computers	10+	Basic concepts. Word, spreadsheet, presentation and image processing. Basic programming	MS Office Suite, Adobe Creative Suite	HTML/CSS, JS,
PROGRAMMING	Introduction to Programming	8+	Beginning and intermediate level programming. Introduction to various programming languages		C, C++, Java, Perl, Python, MATLAB, PHP, C#, Objective C, Arduino
	Advanced Programming - C, C++	8+	Intermediate to advanced techniques		C, C++,
	Advanced Programming - Java I & II	8+	Intermediate to advanced techniques		Java
	Advanced Programming - Perl / Python / PHP I & II	8+	Intermediate to advanced techniques		Perl, Python, PHP
	Advanced Programming - MATLAB I & II	8+	Intermediate to advanced techniques		MATLAB
	Advanced Programming - Objective I & II	8+	Intermediate to advanced techniques		Objective
WEB DEVELOPMENT	Introduction to Web Development	12+	Basic concepts, UX/UI and intro to HTML/CSS, Ruby, SQL, Javascript	Dreamweaver	HTML/CSS, Ruby, SQL, Javascript
	Web Programming: HTML / CSS	12+	Intermediate to advanced techniques		HTML/ CSS
	Web Programming: Javascript	12+	Intermediate to advanced techniques		Javascript
	Web Programming: Ruby	12+	Intermediate to advanced techniques		Ruby on Rails
	Database Management: SQL	12+	Intermediate to advanced techniques		MySQL

	Mobile Application Design	12+	Current trends, responsive design		jQuery
	Web Toolbox	12+	Aggregation of tools		AJAX, jQuery etc.
VOCATIONAL	Building Modeling I	14+	Introduction to building modeling	Sketchup, Revit	
	Building Modeling II	14+	Advanced building modeling.	Revit, 3DS Max, Rhino	
	Solid Modeling I	14+	Introduction to solid modeling	Solidworks, Maya	
	Solid Modeling II	14+	Advanced solid modeling	Solidworks, Maya, Massive	
	Graphics I	14+	Graphic creation and manipulation	Photoshop, Illustrator, InDesign	
	Music Production I	14+	Song production, recording, mixing	Pro Tools	
	Film Production I	14+	Film production, effects	Final Cut Pro	
	Animation I	14+	2D & 3D creation and techniques	ToonBoom, Blender	
NETWORK	Introduction to Networking	16+	Basic concepts, approaches, systems		Windows, UNIX
	Systems Programming - UNIX /Linux	16+	Advanced networking		UNIX, Linux
	Systems Programming - Windows	16+	Advanced networking		Windows
HEALTHCARE IT	Introduction to Healthcare IT	16+	Systems clinical, pharmacy, radiology		
	EMRs	16+	Concepts, terminology	Various	
	Medical Equipment Interfaces	16+	Medical device and sensor programming		
	Billing	16+	ICD-10-PCS, software and best practices	Various	
	Analytics	16+	Data governance, mining, metrics		
	Mobile Health Applications	16+	Design and interface		