Design and evolution of creative capacity building program for refugee youth empowerment

by

Srimayi Tenali

Submitted to the
Department of Mechanical Engineering
in Partial Fulfillment of the Requirements for the Degree of

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ABSTRACT

There are over 5,000 unaccompanied refugee minors in Greece who have fled violence from Syria, Pakistan, Afghanistan, and Iraq. In addition to pre-existing trauma and psychological challenges, living in shelters and streets has further put youth at risk of trafficking, exploitation, and substance abuse. In 2017, MIT D-Lab partnered with Faros, a Greek NGO, to develop a design workshop for the unaccompanied minors. At the end of training, they demonstrated an improved capacity to identify and solve challenges, work in teams, and recognize self-potential. Since then, this week-long design workshop has evolved into a multi-stage, modular training program taught over several months. The purpose of this study was to identify the successes and failures of each developmental stage of this program to determine overarching trends for building a design curriculum for vulnerable youth populations. Analysis revealed that cultural significance, flexible structure, and addressing social and behavioral concerns are among the key elements for effectively reaching refugee youth. By documenting the evolution and implications of these factors, we hope to provide a baseline for future education work with this unique and vulnerable population.

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Title: Professor of Mechanical Engineering; Undergraduate Officer

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1. Introduction

There are over 5,000 unaccompanied refugee minors in Greece, the majority of whom are young boys who have fled violence from Syria, Pakistan, Afghanistan, and Iraq. A lack of appropriate shelters in Athens has resulted in over a fifth of them living on the streets, putting them at risk of trafficking, exploitation, and substance abuse. In 2017, MIT D-Lab partnered with Faros, a Greek NGO providing shelter, food, and psychosocial support to refugee minors to carry out a design workshop for the youth. D-Lab utilized the Creative Capacity Building (CCB) methodology, which promotes community-driven innovation. By supporting and training individuals to be active creators and problem-solvers, CCB aims to empower communities and redefine the typically passive humanitarian aid structure. The workshops ranged from woodworking projects designing community furniture to basic circuit training and electronic troubleshooting. At the end of this training, youth demonstrated an improved capacity in using the design process to identify and solve challenges, work in teams, and build and prototype solutions. In addition, staff noticed increased confidence and recognition of self-potential and agency to solve problems.

As a result of this success, Faros and MIT D-Lab partnered to open the Horizon Center, a vocational training center in Athens. Since this initial effort, the program has grown from a week-long workshop to a multi-stage, modular training program meant to be taught over the course of several months. Twice a year, a D-Lab team has traveled to Greece to design and implement new curriculum, retrain the center staff, and update previous work as needed. However, being a student-driven project, the team has suffered from a high turnover rate with little documentation around changes and updates. This thesis therefore aims to document and analyze the evolution of the MIT/Faros collaboration through interviews and study of curriculum. Ultimately, it will summarize key takeaways and high-level principles of developing a design curriculum in such a context, meant to reach broader issues such as youth psychosocial well-being. This study investigates the types of lessons that youth best respond to and the ideal curriculum structure for maximizing participants' engagement and learning. We hope that this thesis can be used as a recommendation of how the CCB methodology can be extrapolated to similar humanitarian situations around the world.

2. Background

2.1. REFUGEE CRISIS IN GREECE

Armed conflict and widespread violence have forced thousands to flee to Europe from war-torn regions of Afghanistan, Syria, Iran, and parts of East Africa. Typical migration routes into the Mediterranean region are shown in Figure 1, and both Greece and Italy have served as gateways into Europe. In 2015, at the peak of this unprecedented migration, Greece was merely a transition country, an entry point into the European Union (EU) [1]. In the past five years, however, many countries within the EU have adopted stricter border policies that prevent vulnerable individuals seeking sanctuary from crossing. The responsibility of accommodating thousands has thus fallen predominantly on Greece, especially as Turkey, though not part of the EU, has recently also placed new restrictions on entering and exiting. Greece has been transformed from a temporary home to a host country for over 57,000 known refugees who live both in the mainland and on several of the Greek islands [1].

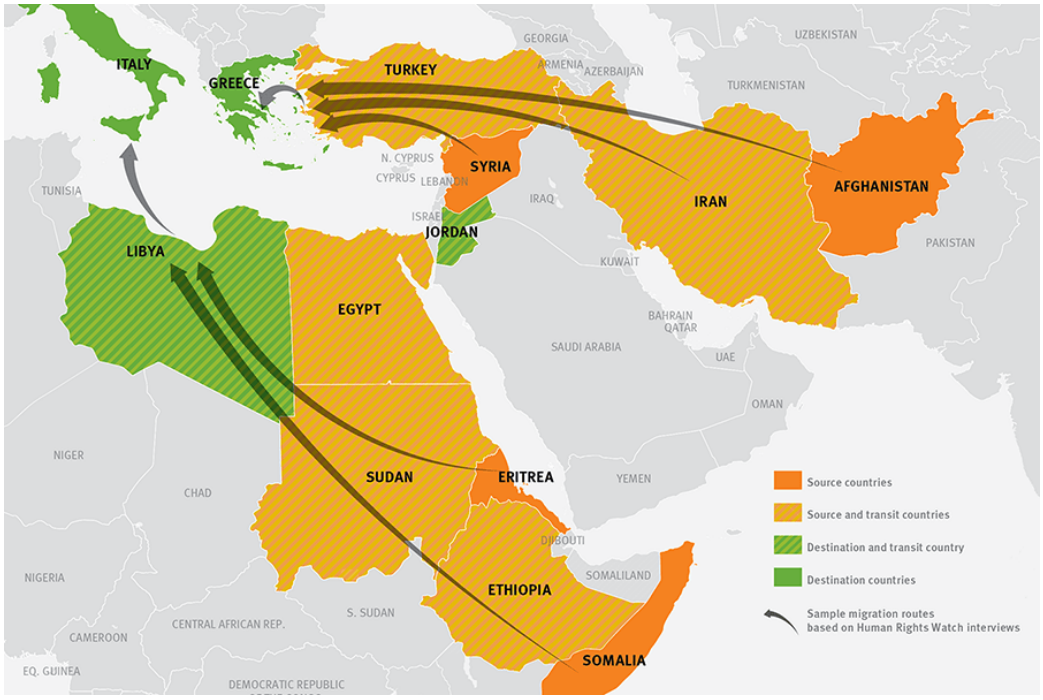


Figure 1: Sample refugee migration routes from violent regions. Afghanistan, Iran, and Syria are the most common source countries for refugees in Greece, which has now become a final destination for the vulnerable population. [2]

Upon arriving to Greece, conditions are dire for many refugees. Asylum seekers must wait to be processed at reception centers, but these are unsanitary, unsafe, and vastly overcrowded — as of February 2020, camps in the Greek islands were reported to be over capacity by nearly 800 percent [3]. In addition, due to a severe lack of resources, camps and centers do not have enough social

service providers, such as translators and interpreters, medical professionals, and social workers essential for functioning. Immense overcrowding has led to inhumane and deplorable conditions in both the islands and mainland in terms of access to basic resources, including an absence of sufficient and safe bathrooms or single-gender shelters. Fights are common between differing groups of refugees, with one camp's social worker reporting that "there is probably one stabbing per day… most of them we just don't hear about because this kind of thing has become so commonplace"[3].

In Athens, thousands opted to live in squats rather than risk government camps, forming communities of their own in abandoned schools, hotels, and apartment buildings. Largely located in Exarcheia, the Athens neighborhood historically home to anarchists, the squats rely entirely on donations and local volunteers. Though haphazard, the squats enabled a greater sense of freedom, ownership, and cultural expression for many, and were reportedly safer than the governmental camps [4]. However, in July 2019, Kyriakos Mitsotakis of the conservative party was elected as the new Prime Minister, and the new administration has taken a far more drastic approach to those seeking asylum [5]. Multiple squats and informal settlements were shut down in the summer of 2019, putting more refugees on the streets of Athens than ever before. In addition to lacking rudimentary care, refugees are also susceptible to sexual violence, drug trafficking, and other forms of exploitation. Especially at risk are women and youth, two vulnerable populations that comprise a majority of arriving refugees (Figure 2).

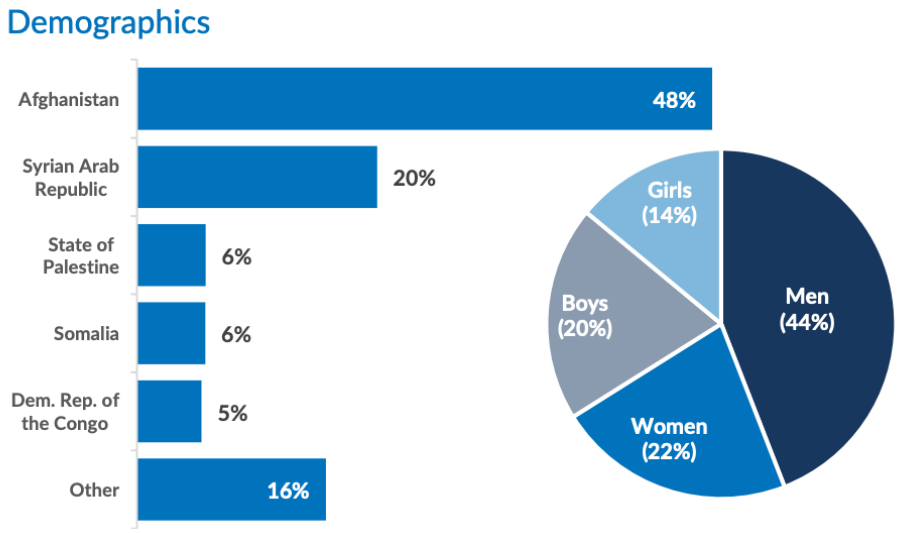


Figure 2: United Nations High Commission of Refugees (UNHCR) Weekly Snapshot of Refugee Demographics from 30 December 2019 to 05 January 2020. Women, girls, and boys comprised 56% of the total arriving population seeking asylum [6].

2.2. SITUATION OF UNACCOMPANIED YOUTH

A particularly vulnerable population group is unaccompanied minors (UAM), defined according to the Greek Presidential Decree 220/2007 as "any third-country national and stateless person below the age of eighteen who arrives in the territory of Greece unaccompanied by an adult responsible for him and for as long as he is not effectively taken into the care of such a person or a minor who was left unaccompanied after having entered Greece" [3]. As of January 2020, over 5,300 minors were registered as unaccompanied and awaiting decisions regarding asylum or family reunification [3]. This number is likely an underrepresentation, as youth without appropriate paperwork to confirm their age are sometimes recorded as adults by border agents.
Only 40% of UAM are considered to be living in safe situations (Figure 3). Even they are unlikely to be receiving the psychosocial support and mental health care that is necessary to overcome severe PTSD and trauma from the violence of their home countries as well as the dangers during their migration.

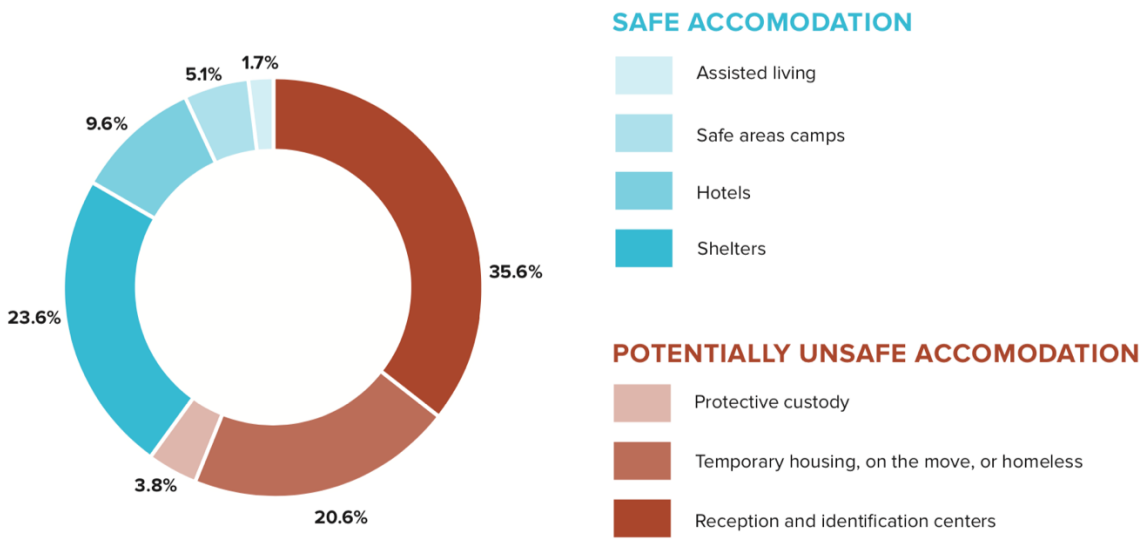


Figure 3: Living situation for unaccompanied minors in Greece. 40% are in safe accommodation, whereas 60% are in potentially unsafe living conditions, as reported by Refugee International. Data from 31 December 2019 [3].

For UAM, in addition to the lack of safe accommodations and greater risk of exploitation, difficulties in the family reunification process application and a significant shortage of guardians creates an acute challenge. In 2018, a "Guardianship Law" passed, requiring that every UAM have an established guardian to help the child with administrative procedures and ensure their basic safety. However, the Greek government has delayed implementation twice, and the law was set to be deployed in full force in mid-2020. For now, though guardians are meant to handle approximately 20 cases at a time, the ratio of guardians to children has been reported to be as low

as 2:1160 [3]. Hundreds of youth must thus navigate an increasingly hostile asylum process alone, often without translation, and end up moving frequently between different forms of accommodation for safety. To address these explicit issues, Prime Minister Mitsotakis announced the "No Child Alone" policy in November 2019, which primarily included a plan to construct facilities for long-term accommodation for at least 4,000 UAM [3]. These centers were envisioned to also provide education, medical care, and psychosocial support. These policies are steps in the right direction, and if implemented successfully, could serve as a useful model for handling UAM cases in general. However, the Greek government is widely overburdened and does not have sufficient resources to care for large numbers of vulnerable populations. Despite repeated calls to action to other EU member states to contribute, a lack of response has left Greece struggling to handle the responsibility.

2.3. REFUGEE EDUCATION PRACTICES

Of particular concern in the case of UAM is education and psychosocial support. 77% of refugee children in Europe interviewed by UNICEF in 2019 listed that attending school was one of their top priorities [7]. However, more than half reported that they had been out of school between one and two years prior to arriving in the host country while nearly a quarter said they had no formal education at all, placing them at a performance level far below that of their peers. In addition, the language barrier rendered many unable to communicate effectively. In schools, the youth are also susceptible to societal marginalization, discrimination, harassment from both peers and teachers, and internalization of stereotypes, thereby requiring increased psychosocial support in order to learn or work effectively [8].

Young refugees have a high prevalence of physical conditions and nutritional deficiencies. Both during their migration journey and upon arrival to Greece, they are extremely at-risk of developing post-traumatic stress disorder (PTSD), anxiety, depression, and other psychiatric disorders. Uncertain asylum status, familial separation, and abuse and exploitation are threatening stressors that could further create symptoms or exacerbate pre-existing problems such as autism spectrum disorders or sleeping problems [9]. Managing the well-being of these youth is additionally difficult given the language barriers. While physical conditions are generally more concretely treatable, mental health has been an unaddressed problem for all refugees and especially for the youth who try to assimilate into Greek society through schools or programs. UAM who have been through war and a forced migration have significantly different developmental needs than regular children of their age group. Resource-constrained public schools often fail to meet these increased needs.

The traumatized youth have struggled to survive and maintain themselves, damaging their sense of identity, self-esteem and self-confidence. At a crucial age, the youth are left without mentorship

or support, and unfortunately many have turned towards harmful coping strategies, self-harm, and difficult behaviors as defense strategies [10]. One higher education study in Sub-Saharan African refugee camps found that students generally "reported gratitude for the [educational] experience but uncertainty about the future, and widely different contextual challenges to pursuing education" [11]. In a forced migration context, school can be treated as a psychosocial intervention just as much as it is an educational experience. More thought must be given to both curriculum and delivery, as education can be a powerful tool for reclaiming agency and improving resilience.

3. Participatory Design: A New Approach to Education

3.1. USER-LED DESIGN AT MIT D-LAB

MIT D-Lab was founded in 2002 on the basis of consistently pursuing hands-on, real-world projects and enabling students to study and develop appropriate technological solutions to problems in the developing world. Through 20 different courses and fieldwork in over 25 countries, D-Lab has established three main pillars: education, research, and innovation [12]. Within the pillar of innovation lies D-Lab's *Humanitarian Innovation* practice. While the vast majority of current humanitarian aid is focused on meeting basic needs in a top-down manner, D-Lab is pioneering a grassroots approach of involving the affected population in the solution.

Fundamentally, the user is integrated in the design process and their feedback and preferences are a key input for designers. Beyond mere user-centric design, however, D-Lab has strived to further involve the user in the design process. Their curriculum aimed to empower people with little or no formal schooling to design and build simple prototypes of useful items for daily life, from rat traps to solar-powered cell phone chargers. This process, known as Creative Capacity Building (CCB), intends to bring affected individuals to the forefront of actively developing projects, products, programs, and technologies to improve their own daily lives, restore confidence and agency, and drastically alter the way that relief organizations choose to give aid. D-Lab identifies the following as the key goals of participatory design:

1. "Better end products, programs, and systems because input from the users leads to more responsive solutions
2. Improved psychosocial outcomes, because the act of design can be a transformative process for refugees, restoring agency and building confidence" [10].

Through the International Development Innovation Network (IDIN) program, D-Lab led 19 co-design summits, working with individuals from 72 different countries [12]. Thus D-Lab has honed and refined its approach to user-led design for adults in developing countries. A deeper comparison of the forms of participatory design is shown in appendix A. Two of the key approaches to participatory design are:

> **Co-creation, or design with users**: community members work in design teams alongside subject experts as equally contributing members in this immersive, hands-on problem-solving. By combining the experts' technical and stakeholder knowledge with the community members' contextual, cultural, and experiential knowledge, the end product is innovative, nuanced, and effective.

Creative capacity building (CCB), or user-created design: community members lead the entire design process independently, from ideation and building to feedback and iteration. The activities are similar to co-creation, but are condensed, simplified, and allow for a more flexible user schedule. In addition, working to problem-solve independently and practicing applying learned skills immediately was observed to be a transformational tool in rapidly building confidence. The steps of the CCB process are shown in Appendix B.

In numerous projects in the global south, D-Lab has found that this form of user-centered and user-led design curriculum serves not only to improve short-term psychosocial outcomes, but also to create a path to self-resilience and long-term restoration of humanity. The following patterns emerged as psychosocial benefits: acquisition of new skills and knowledge; changed self-perspectives; greater confidence and increased agency with problem solving; desire to teach others and share knowledge; development and expansion of relationships; building social capital [10]. For these reasons, D-Lab was eager to explore the potential of participatory design education for refugee youth.

Being a nascent field, co-creation and CCB are yet underdeveloped. Including the affected population in design and decision-making is generally agreed as ideal for improving both innovation and aid. However, specific strategies or models do not exist, so much of the work done in this space is disjointed. Applying the participatory design model to newer vulnerable populations is yet unstudied. This paper will summarize and analyze the evolution of D-Lab's with refugee youth in Athens as a case study to serve as a baseline for future projects.

3.2. FAROS

In Greece, numerous organizations are working towards supporting refugee youth in different aspects of life. Some focus on providing shelter and basic needs, including food and healthcare. Others provide administrative support, guidance on seeking asylum, lessons, and translational services. Faros is one such non-governmental organization in Athens that provides humanitarian care, social services and shelter to vulnerable populations. Faros is supported by and partnered with numerous other organizations, including UNICEF, International Rescue Committee, International Aid Services, Velux Foundation, Western Union Foundation, Tech Stars, and UNHCR. The mission of Faros is to provide individualized, tailored support to every refugee child. To do this, Faros has offered four types of services. Through **street work**, Faros social workers and psychologists conduct outreach work to locate unaccompanied youth living on the streets or in squats to address any urgent needs as well as inform them of the drop-in services offered at the

center. The **drop-in center**, located in the center of Athens in order to be easily accessible, primarily serves as a safe place for refugees to turn. More formally, Faros also has a full **shelter** for unaccompanied refugee boys of ages 10-17, providing a home and encouraging them to partake in productive and emotionally restorative activities.

In addition to creating safety, Faros's **education** arm aims to help youth discover their own worth and build perspectives for the future. In this vein, Faros planned to teach the youth vocational skills, training them for future employment and educating them in business skills for income generation to ultimately make a living in Greece or elsewhere in Europe.

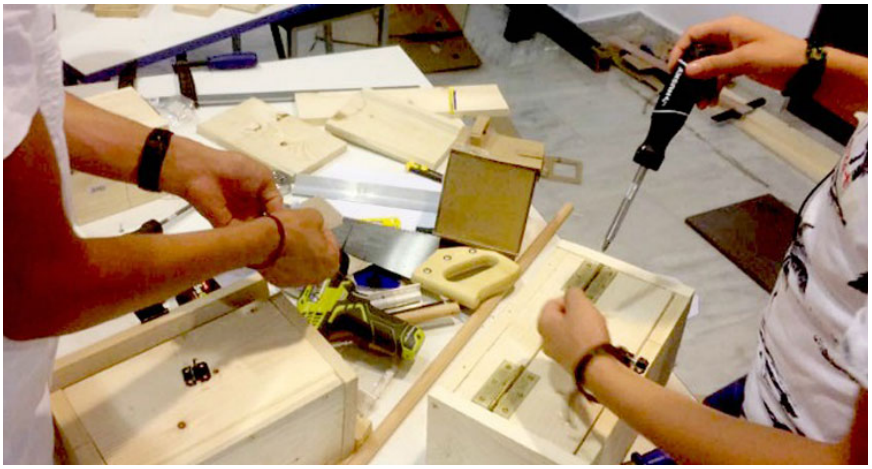
3.3. PILOT PROGRAM: D-LAB AND FAROS

After connecting via a humanitarian conference at the end of 2016, D-Lab and Faros decided to collaborate given their aligned interests. They predicted that teaching the youth fundamental design skills for product development rather than solely vocational training could increase their confidence and esteem, mirroring the impact of design trainings in the development context that D-Lab traditionally worked in.

In August 2017, Faros and D-Lab ran an eight-day summer innovation workshop in Athens for 15 unaccompanied refugee youth. Six D-Lab members (three staff, three students) adapted a tradition CCB curriculum for minors in an urban context. First, in order to build basic woodworking skills and learn the design process, the participants designed and built lockable wooden boxes with limited allotment of wood (Figure 4a, 4b). Participants started out with design ideation and then building cardboard sketch models. This critical step taught the youth the value of prototyping, and complex octagonal designs were abandoned for right angles as the limitations of tools were realized. The youth also repeatedly faced unexpected issues with measurement due to fundamental lack of practice with counting or using a ruler, but with instruction were able to overcome the challenge [13].

The second phase of the program was further personalized. Each participant was asked to first identify a problem in their own lives, then to similarly follow the design process in order to design a solution and build a functional prototype in groups. The four final projects were a solar powered fan (Figure 4c), a model of an Afghan irrigation system, a battery-powered hat fan, and a solar-powered water cooler. At the end of the workshop, a showcase was held, and each team had the opportunity to present their innovations. UNHCR representatives attended this workshop, and upon seeing the immense progress the boys made within just a few days, committed to providing a seed grant to establish a permanent training center.

(a)



(b)

(c)

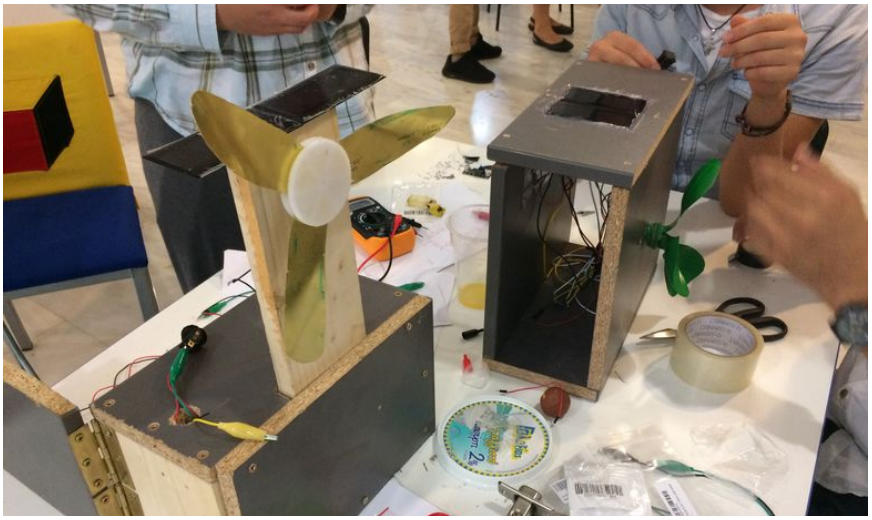


Figure 4: Prototypes built by refugee youth during the pilot summer workshop held by D-Lab and Faros in 2017. The participants presented their work in a showcase following the workshop[14]. (a) demonstrates the lockable box building process. (b) shows examples of final box prototypes. (c) is an in-progress solar powered fan prototype[15].

The following key takeaways were identified from this initial effort that would shape the program moving forward:

The youth were able to make useful prototypes that solved real problems. When given the choice of what to create, all participants chose to design something useful for them and their families that they perhaps could not easily access otherwise. As with traditional CCB workshops, the opportunity to create useful products that solved daily-life problems seemed to build confidence in the youth. In a final evaluation session, participants directly emphasized that learning the design process and new technical skills gave them hope for the future and strengthened their self-confidence in being able solve problems and tackle challenges.

Building and making things by hand was therapeutic. Despite initial frustrations over challenges with learning to use new tools safely, ultimately the majority of youth successfully learned how to operate tools and conveyed that the activity was calming and centering. In addition, working together fostered good friendships and social relationships. The youth that were not able to overcome the frustrations to successfully build may be the ones most in need of therapeutic assistance.

Structural modifications are necessary to adapt the training for adolescents with little experience in regular class attendance. Several of the youth left during the first day during the introductory session, which was a presentation-heavy overview of the design process in order to prepare for the hands-on activities. While adult learners respond well to such framing, it was clear that the rhythm of the curriculum needed to be adjusted to capture and retain youth interest.

Overall, the program was considered to be a large success, and D-Lab would continue to work with Faros to develop an appropriate design curriculum for refugee youth. Urgent next steps included pursuing additional financial resources in order to establish a training center and acquire necessary design materials.

4. Horizon Center Program Evolution

4.1. WORKSHOP-FOCUSED TRAINING (2017 – 2018)

Following the initial workshop success, one member of the research team stayed in Greece for a month following the summer workshop. She ran a series of lessons and presentations in a workshop that was located in the basement of the Faros shelters, as well as a few isolated sessions in some other shelters and at the Eleonas refugee camp, which is located at the outskirts of Athens. The goal was to reach youth that were not included in the original cohort. In addition, she managed the usage of D-Lab and Faros tools and materials, and aided participants with their personal design projects [15]. She also collaborated with existing science classes. Faros instructors also ran lessons for the youth on both woodworking and tailoring, as the workshop space contained basic woodworking tools and sewing machines. The classes were very informal, with top-down instruction.

In December 2017, a D-Lab collaborator traveled to Greece to lead two weeks of CCB workshops through Faros for refugee youth from both their own program and other local organizations. The individual, who worked at a grassroots innovation center and maker space in Colombia, had significant experience with participatory design and brought those principles to Faros. This program ran in a similar drop-in fashion and built on the previous work. Every afternoon, a different activity would be held, ranging from screen-printing designs on shirts to building baking soda powered bottle rockets. The youth demonstrated deep interest in these hands-on activities and seemed to greatly enjoy themselves. The team noticed that the overall confidence and abilities of the participants also seemed to grow over the course of the workshops.

These unstructured classes continued at Faros with newly hired woodworking and tailoring instructors to replace the MIT collaborators who left. A key issue with the program overall continued to be the space. Working in the basement of the Faros shelter was cramped and limiting, and more tools and resources were necessary to reach more of the youth. In April 2018, Faros and D-Lab held a critical vision meeting in which they finalized the intents and goals of this program beyond sporadic instructional lessons. Thus, the Horizon Center was formally created to serve as a school for refugees that had a design-based training program and also connected youth to essential services. The Horizon Center would not only bring in UAM, but would strive to keep them in, constantly updating content and resources in order to serve a long-term support system for the youth rather than a pit-stop for intermittent lessons. Ultimately, the Horizon Center's goal would be to send them out — to schools, internships, or employments. After passing through the Horizon Center, youth could hopefully integrate well into regular society in whatever country they ended up in [13].

Faros found a building that could be a suitable home for the Horizon Center and spent much of 2018 intensely fundraising and renovating in order to formalize the program. Meanwhile, the D-Lab team worked with newly hired Faros staff to train them in CCB methodology and adapt the curriculum for the unique youth demographic. Two teams from D-Lab traveled to Athens for this effort. The first team was led by Amy Smith, Founding Director of D-Lab, and Martha Thompson, D-Lab's Humanitarian Innovation class instructor. In a five-day workshop in September 2018, they helped Faros with planning the first year of operation and mapping out the refugee ecosystem in Athens in order to maximize impact.

In October, a second team went to Athens to pilot a nine-day Digital Design and Fabrication Workshop (DDFW) in 3D printing for both Faros instructors and UAM. Heewon Lee, Roy Ombatti, and Justine Boudreau led a workshop that was split into morning and afternoon sessions and hosted 20 students. In the mornings, basic computer skills were taught to the participants, many of whom had not had any experience using a mouse or trackpad, or who had never heard of software such as Microsoft Office. In the afternoons, the youth would learn and practice electronics skills, such as wiring and soldering, and put their knowledge into practice by building a 3D printer from discarded electronic parts in groups (Figure 5). By building the entire machine, the participants were able to comprehensively understand how 3D printing works. At the end of the program, the youth were able to make personalized designs in 3D Building, a CAD software, and printed them on the machines they had previously constructed.

During this workshop, the training team was struck by the visible psychological change in the youth. In addition to growing pride and confidence, the youth clearly demonstrated an improved ability to focus and apply themselves and to effectively collaborate in teams, despite initial reluctances to work with strangers. The boys taking part were able to build friendships with not only their fellow students but also the trainers despite differing cultural backgrounds and even language barriers [16]. Instructors also observed that the youth were now thinking broadly about their skillsets and how they could improve their lives with design. For example, one student chose to design parts to fix his friend's glasses — participants were not only able to grasp the vast potential of technology, but also started to make a psychological shift from designing for themselves to helping others. Other boys specifically mentioned that they would want to teach these skills and help their community members improve their livelihoods as well.

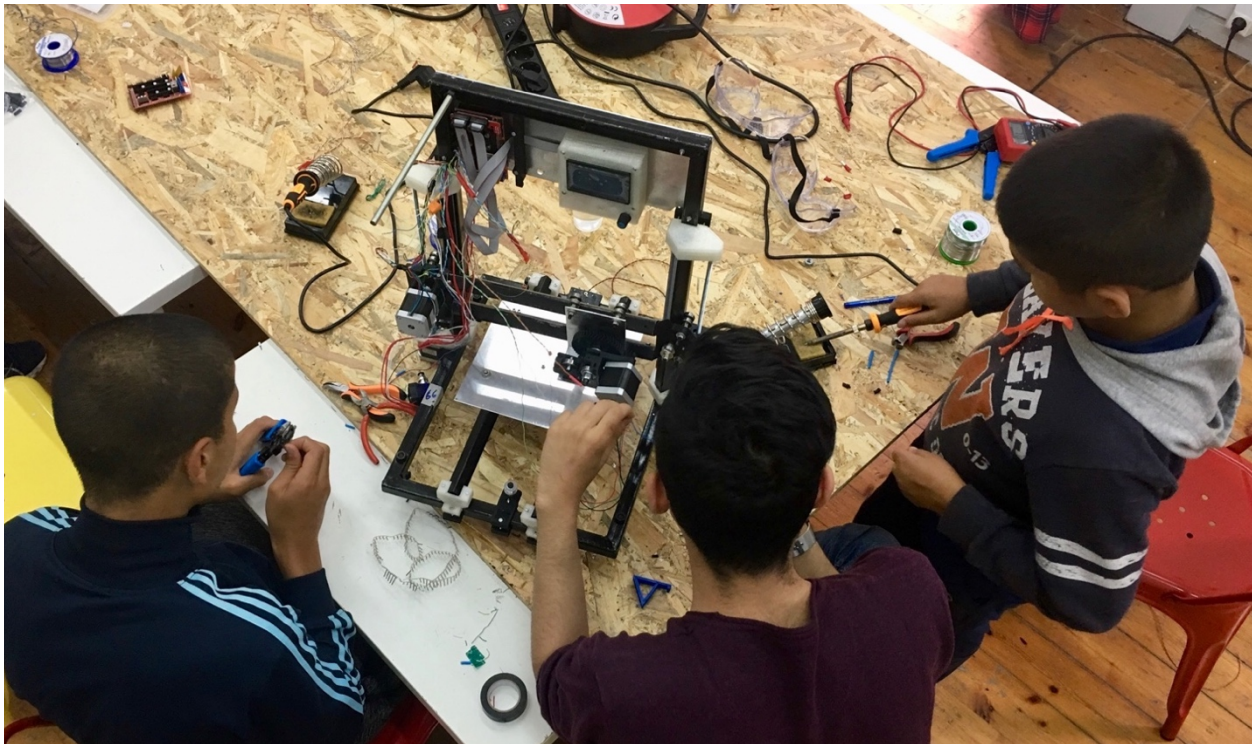


Figure 5: 3D-Printer built from discarded computer parts during Digital Design and Fabrication Workshop in 2018. Participants put newly learned soldering, electronics, measuring, and design skills into practice to build an entire machine and comprehensively understand how 3D printing functions[17].

After participating and getting trained in both CAD and 3D printing in the workshop, Faros staff continued to run lessons for the refugee youth in both computer skills and 3D printing for the remainder of 2018. Villanueva also returned at the end of the year to generate additional interest for the new program, which would officially open in 2019. She taught the design cycle through the key steps of gathering information, generating ideas, sketch modeling, choosing the best idea, and prototyping. At the end of the workshop, a design showcase was again held so that the boys could showcase the projects they had developed.

In general, the Horizon Center did not have a consistent structure for the lessons. Through the end of 2018, new design content relied completely on an MIT-team, and Horizon Center instructors were limitedly involved. The Faros staff at the time were not embracing the CCB methodology and expressed a lack of confidence with teaching it. Skills-based training, such as tailoring and woodworking, were run consistently. A few of the UAM would come in each day, learn one skill — for instance, how to tailor a t-shirt — and then leave. Design aspects of the program was dependent on the D-Lab team, who could only come to Greece a few times during the year [16]. The following were the critical lessons from this early phase of the program:

Youth were not returning to the center after attending a few workshops or lessons. Skill-based lessons provided helpful individualized support, but did not actively interest, bring in, and retain those who were not already invested in learning these skills. The design process seemed to be well-received by UAM of all ages and skill levels, so a **deeper incorporation of design could benefit the program.**

Youth were at extremely different fundamental skill levels in terms of literacy, math, and focus. Especially for teamwork-based projects, workshops were hard to run smoothly when the participants responded at such varied paces. There are an insufficient number of instructors to help those who needed additional support or translation, but if the pace of the overall class is too slow, many boys do not return the next day.

4.2. BASIC TRAINING AND INTRO TO DESIGN (JANUARY 2019)

To address this varied baseline of skill level for the participants, when beginning in January, a Basic Training (BT) stage was added before the youth could start working on projects. A full copy of the roadmap can be seen in Appendix C. This would serve to even out the participants' familiarity and confidence with tools, including rulers, computers, drills, and sewing machines, as well as to ensure safety precautions before letting youth have free access to potentially dangerous equipment. All new students would have to undergo this Basic Training prior to design courses, but BT would still include small projects so that the participants could have items to take home. Therefore, the youth would remain engaged while they put in the initial effort to build their foundations.

In January 2019 and August 2019, D-Lab's Humanitarian Innovation class students took a trip to build curriculum and teach at the Horizon Center. They predominantly ran basic training courses covering topics such as: woodworking, sketch modeling, electronics skills, silk screening, graphic design, filming, and CAD/3D printing in the form of different projects. Students would learn each BT skill in one class and could then progress into the next stage of the curriculum, Intro to Design. The following are some examples of projects that were held:

Designing and making a soccer jersey: used graphic design, silk screen printing
Building a power bank that also served as a phone stand: used electronics, CAD and 3D printing, and sketch modeling (Figure 6)
Making an LED sports scoreboard: used electronics skills, woodworking
Filming stop-motion videos: used graphic design, sketch modeling, and filming
Designing and printing nametag keychains: used CAD and 3D printing

Figure 6: One participant holds up his power bank prototypes to showcase his iteration process for designing during the January 2019 workshop. On the left: a rudimentary sketch model of a phone power bank. On the right: a refined sketch model with accurate dimensions and space to embed electronics.

Once the students completed the Basic Training program, they moved to the next stage, Intro to Design. The main purposes of Intro to Design were to learn to apply fundamental skills towards actual projects and to study the design process, from ideation to a final project. Thus far, the youth had been given instruction and ideas for projects with room for creativity. A series of three projects was explored:

Project 1: Design a lamp for yourself. This project helps participants to practice the design process steps with themselves, including critical steps such as giving and receiving feedback and iterating on designs. A sample project is shown in Figure 9.

Figure 7: Example of finished lamp designed Project 1 in the advanced design curriculum, "design a lamp for yourself."

Project 2: Design a speaker for a friend. This project aimed to take design to the next level with two critical changes. The class went on a fieldtrip to the market in order to source materials and consider the financial costs and benefits of designing. In addition, since the youth were building not for themselves but for one another, they gained deeper experience of how to understand a user and think on their behalf, as well as how to give and receive feedback effectively in order to both make something useful and receive something enjoyable. Sample projects are shown in Figure 10.

Figure 8: Examples of finished speakers, created as part of Project 2 in the advanced design curriculum, "design a speaker for a friend."

Project 3: Design a chair as a team. This project went on to become famous at the Horizon Center. Key changes with this effort were that the participants were now working in a large group and thus gaining valuable lessons on communication, teamwork, and delegation. In addition, a showcase was held for the youth to practice presenting their work to the community. During the showcase, an interested passerby offered to purchase the chair that had been built. The youth practiced their negotiation and finance skills and ultimately sold the chair for € 250. Prototypes of the chair and the final product are shown in Figure 11. Hearing that the advanced design youth had successfully earned money through the skills that they were learning at the Horizon Center was inspirational for many other UAM, and this chair is now used as an example of an effective design process from start to finish.

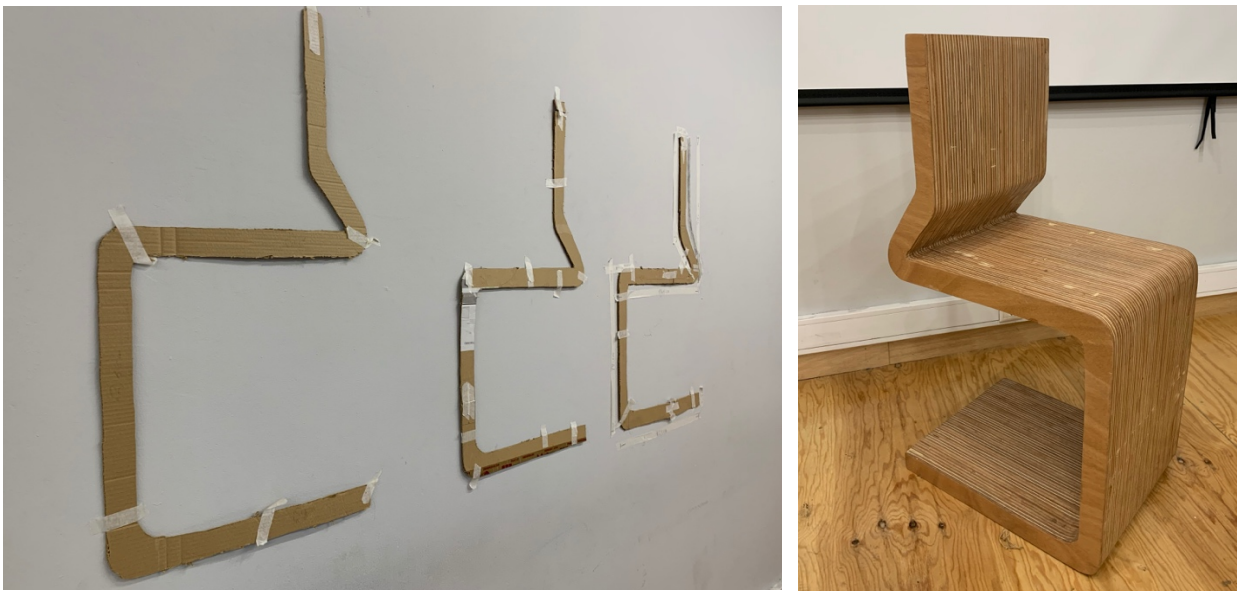


Figure 9: Prototyping and final chair designed by a team of advanced design participants. This chair was later sold for €250 and became an inspirational story at the Horizon Center.

Similar projects were run by Horizon Center instructors when D-Lab students were not present, but effectively managing the UAM without the additional support proved to be quite challenging. In addition, one class was insufficient for the youth to truly internalize the concepts in the lesson and be able to apply them creatively as required by the Intro to Design projects. Thus, the structure of BT was modified to be a 3-month long training period in which the students would extensively study and practice the skills. The following takeaways were identified from this phase of the program:

The Basic Training phase did not fully address the foundational gaps observed previously. Functionally, it worked well to resolve technical gaps in participants' knowledge. However, it failed to take psychosocial needs into account. Many UAM were simply not mentally ready to learn yet and couldn't focus in the classroom setting for extended periods of time. In the chaos of the classroom, it is difficult for instructors to understand boys' individual needs and help. **Some difference in the screening stage or some sort of precursor to basic training is recommended to address these emotional needs.** In addition, since BT was mandatory and workshop spaces were limited, this phase became a huge bottleneck for youth to enter the Horizon Center, creating a long waiting list despite plenty of space in upper level courses.

Youth greatly value their core identities, religious backgrounds, and home countries. When lessons carried a sense of cultural significance, youth demonstrated far more interest. Most youth left due to unlivable conditions but retain an overarching sense of

pride in their culture. From speaking the language to placing a national flag on almost every design, their passion was evident as they learned. For example, the soccer-related build projects and research tasks involving their national history were met with far more enthusiasm than randomly selected topics.

4.3. ACTIVITY CLASS (SEPTEMBER 2019)

Beginning in September 2019, another phase was added to the Horizon Center design curriculum: Activity Class, a hands-on session that would evaluate a student's psychosocial readiness to learn and be in a classroom environment. Held weekly, the Activity Class could be repeated as many times as an individual participant needed before they would progress to Basic Training. Examples of Activity Classes are building a marshmallow bridge in teams, creating a cardboard fidget spinner (Figure 7), designing racecourses for marbles, and making an egg cage for a drop challenge. Essentially, the class would be a fun creativity challenge that did not require any language skills or prior background in mathematics or literacy.

Figure 10: As part of the newly instated Activity Class, one minor builds a fidget spinner out of cardboard and spare nuts while also being introduced to the Horizon Center program.

Each class would be project-based and aim to meet the following goals:

1. Introduce the Horizon Center and the Basic Training program. Clearly explain the purpose of the center and the possible outcomes of participating in such a program. Establish rules and a safe space.

2. Enable the youth to discover their learning style and potential. Given plenty of time and one-on-one support from instructors, they can work through the tasks given at their own pace. A social worker or psychologist will be present to additionally take notes on the participants and clarify existing behaviors and fundamental learning levels. If any

participant exhibits destructive or potentially harmful behaviors, they will be asked to repeat the activity class until they are able to calmly and kindly finish the challenges.

3. Begin to build self-esteem and overall confidence. Activity class instructors will provide above greater levels of acknowledgement of the boys' abilities and qualities and will encourage mirroring and self-reflection.

4. Build relationships. As the youth get to know one another, we will conduct activities to help them process their feelings, thoughts, and emotions. Through fun games and challenges, the youth can make friends and break the ice so that they feel more comfortable at the Horizon Center.

Once a student completes the Activity Class, the Horizon Center staff use a flowchart to determine next steps (see Appendix D). The individual's readiness to learn and the availability of space in basic training courses are the primary considerations in deciding where to place a student next. In the case that a participant demonstrated clear trauma or psychological disorders, or developmental or cognitive needs, they were transferred to an appropriate medical service that could properly address their needs. The complete flow of the program at this stage is summarized in Figure 8.

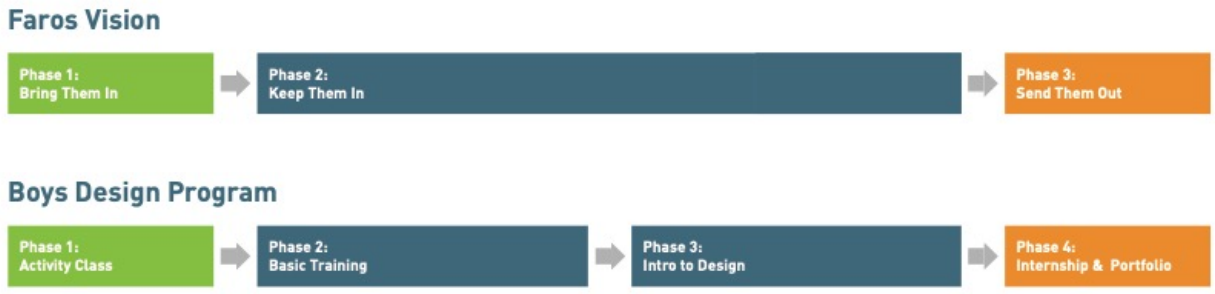


Figure 11: Design curriculum stages as of 2019, now including both the basic training and the activity class.

The updated structure worked well to bring in refugee youth in need of help and successfully addressed both their emotional needs and technical gaps. The progression from simple projects and learning to use tools to complex and financially valuable items was rewarding and inspiring for the boys. The number of basic training classes were tripled in 2019 to accommodate the growing refugee population and interested group, and the following BT courses were offered: Technical Drawing, Ideation, Woodworking, Tailoring, Electronics, Sketch Modeling, CAD & 3D Printing, and Video.

The following key takeaways were identified from this phase of the program:

Such a highly regimented and linear program structure led to increasingly large waiting lists and dropout rates. In 2019, the Horizon Center served 242 participants in the design program. When planning, the center aimed to serve 300, so the program fell short. The team identified that the main cause of the difference was the regimented structure of the program. While adding the activity class and basic training phases was essential for improving the overall flow, many UAM were stuck on a waiting list for months before room opened up in an activity class due to the linear nature of the program. During the fall of 2019, the waiting list reached numbers as high as 100. Participants could only be registered at the start of every 3-month cycle of Basic Training, so by the time some individuals on the waiting list were contacted, they had moved out of Athens and could no longer be helped. In addition, a linear flow depends on regular attendance, which was not always possible for this demographic. Youth who missed lessons could not keep up with their peers and thus would be forced to either repeat phases of the program or would simply drop out.

The activity class enabled the Horizon Center team to clearly assess the youths' emotional maturity and readiness to learn effectively. For those participants who did have greater psychological needs, the activity class served as a stabilizing stage for the Horizon psychosocial staff to address the concerns head-on. For others, the activity class was merely an enjoyable way to meet new friends and learn about what the program could offer through a hands-on project. This should be incorporated into any evolution of this program.

Ideation skills need to be introduced early on in the program, as thinking creatively and abstractly was a great challenge for almost all participants, even for those who excelled at more technical skills. Previously, these skills were not introduced until the middle to latter stages of the program. For this vulnerable group, thinking of new ideas proved to be very challenging. When presented with inspirational samples, many chose to pursue almost identical projects and struggled to come up with variations of their own. If ideation is presented and practiced from an early stage, the participants will have a few months of time to improve and work on this skill further, before they are essential to the program stage.

4.4. MODULAR REDESIGN (JANUARY 2020)

To combat the long waiting lists and increased dropout rate, an extensive redesign of the program flow was conducted, and the team opted to create a modular structure that would constantly input new youth. Basic training was split into three levels, each with multiple projects and lessons offered concurrently (Figure 12). This enables new youth to enter the program every week or two, rather than only every three months. Poor attendance is also addressed with this structure, as participants can attend and progress entirely at their own pace. Even by attending only 25% of available classes, a student can still finish the basic training stage within six months.

Figure 12: Modular structure of Basic Training program. Youth can move freely between classes as long as basic requirements have been met, enabling greater freedom and capacity of the center overall.

In Level 1, participants are taught fundamental skills necessary for the rest of the design program, which are ideation & sketch modeling, technical drawing, and computer basics, by a design instructor. These are taught through three individual modules (A, B, and C) which must be taken in order, but a participant can move between the three classes as needed, based on their schedule and what courses are offered each day. This alleviates much of the resource constraints that limit intake sizes. For example, there are a limited number of working laptops available at the Horizon Center, but if the computer class is full for the day, the participant can switch to a different class being offered that day. Since the youth travel between classes and constantly meet and learn with new individuals, this also alleviates some of the social pressures of learning in the same cohort. Youth are no longer comparing themselves to the same group as they progress, and it is less of an emotional concern when some youth successfully leave Greece. Before this change, the Horizon team observed that some youth were distraught when their friends were able to be reunified with their families because it felt like a failure on their own end.

In addition, the modular design aimed to gamify the program in an effort to make the structure more exciting and appealing for the youth. If a student successfully completed a class such that the instructor felt confident in their comprehension, they would receive a stamp for that class. The Horizon Center also integrated the stamps into the student ID system, so as the youth scan their ID cards when entering the center, they (and everyone behind them) will visually see their progress projected on the entry screen. The youth were encouraged to collect all the stamps and would compare with their friends as they did for other video or phone games, looking forward to not only completing all the classes, but actually mastering them in order to receive the stamp.

Level 2 and Level 3 are entirely modular, which no required order of completion. Level 2 is composed of a singular lesson taught by a design instructor introducing the basics of the new skill to the participant and presenting a simple project. Once a student has completed the Level 2 class for a subject, all three of the Level 3 projects (A, B, and C) are open to the student. These projects are largely self-taught projects with assistance from design instructors and mentors. Instructional guides have been written for each project. In order to progress to Intro to Design, a participant must complete at least two projects from each subject. Apart from these structural changes, the content and materials of the program were largely kept the same. More projects had to be developed to accommodate the self-instruction of Level 3.

In January 2020, a new D-Lab team piloted this program at the Horizon Center while also training the design instructors to run the same program independently. New students can be added to the program every two weeks, as planned. Operating this modular system is challenging but possible with the existing design instructors at the Horizon Center and does not depend on the presence of the D-Lab team. Additional content was delivered successfully, and the same psychosocial rewards and benefits were observed from the newest students. In addition, a new program of mentorship was introduced for the first time. The Intro to Design and Advanced Design cohort participants were asked to step in as mentors for Level 2 and Level 3 lessons. This was specifically very helpful in cases where translation was difficult, or when the basic training participants were at significantly different paces.

The Activity Class was also slightly changed at this stage. Rather than only being held for participants new to the program, the class was offered weekly for all the youth at the center. This was extremely useful for community building, as the new class featured teams of two new students, two youth in the BT program, and an intro to design student, meant to act as a mentor. The mentor youth would guide the team through a simple design process to introduce the creative thinking flow and complete a fun challenge. The class would end with a showcase and reflection session to

talk about experiences from the activity. For the new youth, many of the same benefits were observed, but there was also a dramatic increase in retention rate for basic training, presumably because they had a change to observe the existing community and what the program could lead to directly rather than being told of it via a presentation. For long-time participants, the class was a creative and fun break from the lessons. This modification enabled Horizon youth to meet people outside of their immediate lessons and further develop relationships and communication skills.

The following key takeaways were identified from this phase of the program:

With specific classes for ideation early in the program, participants demonstrated improved capacity to think creatively. Ideation and sketch modeling were combined as one lesson since the two are very interlinked. Students who struggled to come up with any new ideas on the first lesson could iterate, give feedback, and generate multiple ideas by the last module.

The modular system created greater flexibility and customization that can best match the participants' needs. The three levels of BT created a longer program but cemented the participant's skills in each area and increased their confidence in their abilities as they progress through advanced stages of the program. Those who did not sufficiently demonstrate mastery of the subjects are asked to repeat a class, which can be done inconspicuously since students do not attend all classes with the same cohort. The possible flows through Basic Training is summarized in Figure 13.

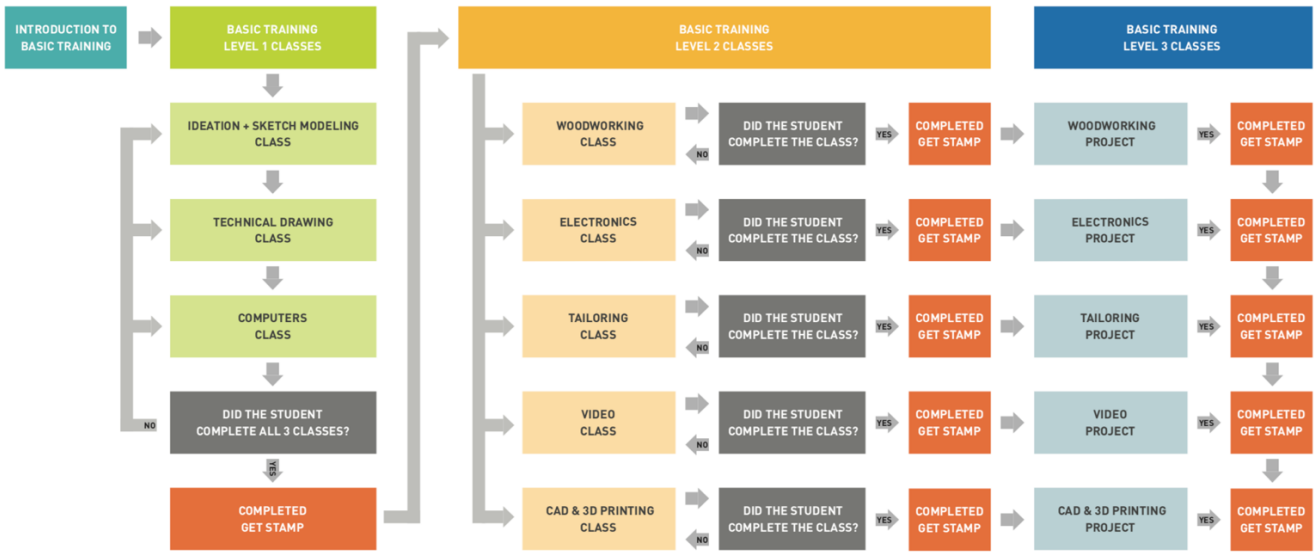


Figure 13: Flowchart of the three levels in the Basic Training program. Youth can move freely between classes as long as basic requirements have been met, enabling greater freedom and capacity of the center overall.

5. Conclusions

5.1. OVERARCHING LEARNINGS

As observed through the evolution of the design program at the Horizon Center, several key modifications are necessary in order to make the CCB methodology applicable and meaningful for unaccompanied refugee youth, a demographic very different from the typical adult audience of CCB.

1. **Before youth are ready to dive into traditional CCB design challenges, sufficient preparation time must be given to address both their foundational technical gaps and psychosocial well-being.** The Horizon Center tackled this issue with the implementation of an early stage Activity Class and a series of Basic Training courses that would be a precursor to the design curriculum. The Activity Class enabled the Horizon psychosocial team to assess the participant's emotional and behavioral readiness and ensure that support given was appropriately matched to their psychological state. Some of the youth are severely traumatized or have significant developmental or cognitive needs that require specialized attention. Basic Training lessons smoothed the variance in technical background, ensuring that participants mastered essential fundamental skills such as operating a computer and measuring with a ruler before progressing to advanced stages.

2. **Modularity must be worked into the system in order to enable progression despite poor attendance or performance.** Youth in this urban context face a number of external pressures including safety concerns, travel costs, and school- or work- related time constraints. For this reason, they are not always able to regularly attend lessons. When the Horizon Center operated linearly, many of the youth dropped out of the program because they had missed some portion of the lessons and could no longer keep up. When asked to repeat the program and come back in a few months, few ever returned. Aside from being repetitive and disheartening, having to repeat the program felt like a personal failure to many of the youth who expressed concerns about what their friends would think. Meanwhile, despite the availability of space and resources, due to the basic training classes only being offered at the start of the three-month period, interested youth were stuck on the waiting list. The switch to a modular program was very promising for accommodating different home backgrounds and schedules and empowering participants to progress at their personally ideal pace. In addition, the Horizon Center can serve as a learning space for them to practice regular attendance, accountability, and following a structured regimen as much as possible.

3. **Youth require additional emphasis on hands-on activities and projects of cultural or social significance in order to stay interested.** Traditional CCB often spends considerable time framing the lessons and uses presentation-style teaching to drive home key points. Youth who have undergone immense trauma during travel and have not been in a classroom setting in months or years greatly struggle with such a format. Therefore games, hands-on activities, take-home projects, and other dynamic teaching formats are essential to capturing and maintaining their interest, even for more fundamental skills that are typically taught with worksheets or practice problems. Introducing competition and racing to complete worksheets was found to place undue pressure on slower performers, especially during the basic training stages. More thoughtful integration of game-like activities and fun projects is necessary to fairly encourage all participants. Incorporating aspects of culture and social significance, such as referencing their home countries or creating soccer-related examples, was met with more success and notable interest.

5.2. REMAINING CHALLENGES AND NEXT STEPS

In summary, the program at the Horizon Center has been observed to be successful in training hundreds of youth in many skills and helping them to regain self-confidence and agency. By serving as a place where the UAM can be treated just as youth, and not as refugees, the Horizon Center has observably been able to restore humanity to the affected population. With additional grants from Velux and Network for Children, the Horizon Center has grown into a space with considerable resources and tools. The current classrooms and workspaces are shown in Figures 14 — 16. Several challenges remain, however, with continuing to improve the program in light of recent international events.

Figure 14: Current woodshop at the Horizon Center.

Figure 15: Sketch modeling tools and supplies at the Horizon Center.

Figure 16: 3D design space at the Horizon Center with two FlashForge Inventor 3D printers.

Unfortunately, the modular system was only in operation for approximately one month, so additional information about its effectiveness is yet to be collected. Due to the recent COVID-19 pandemic, the Horizon Center has temporarily shut down in adherence with local laws and safe public health practices. D-Lab is working on transferring the lessons to an online platform such that the students can continue practicing the design process from their respective homes. In addition, the online lessons aim to provide up-to-date information about the pandemic situation at hand and promote safe practices with hygiene and distancing. This holds the potential of reaching other vulnerable populations and UAM across Europe, which could be extremely beneficial for thousands of refugees to integrate into new communities. In the long-term, an online curriculum

and platform is thus very promising, but in the interim, the state and safety of the youth is very concerning.

Due to the resource constraints within the Horizon Center for this program overall and the desire to best serve the youth, changes are made immediately and frequently. There is little documentation to summarize why certain modifications were made or what drove changes and what the outcomes were aside from meeting notes. This thesis has made an effort to catalogue the key changes and lessons of each stage of the Horizon Center program. It is recommended that all such changes are concretely documented and analyzed with more frequency that annual reports alone, since so much is subject to change within just a few weeks.

Aside from this health crisis, the Horizon Center faces a main challenge with quantitative assessment. Effects are not measured, and the only measurement metrics are quantitative summaries of youth served in every quarter. Technical assessments have been considered, but these were not chosen as tests and exams place yet another stress on already burdened UAM. Since the modular system requires demonstrable technical capacity to move from level to level, a larger concern than technical mastery is psychosocial development. The program has thus run based almost entirely on qualitative observations and general trends catalogued by the instructional and psychosocial teams. Conversations with those of the youth who are open about their feelings and situation have been instrumental is understanding the impact of the program.

Though multiple attempts have been made to measure the progress of the youth, including a touchscreen app, sticker-based surveys, and verbal assessments, they have been largely unsuccessful in generating meaningful data or evaluations. For instance, when asked to share how confident the youth were in their abilities in a certain subject, some youth said they were already perfect at every subject, while others stated that they were not good at anything [16]. Similar discrepancies were observed when youth were asked about what they liked. Given answers varied significantly from what the instructional team had seen occur during the weekly lessons. It is thus not yet understood how to effectively and best monitor progress given the unique situation of the youth and the constraints of the Horizon Center. A crucial next step will be to develop survey methods for this troubled demographic to better tailor the program for their individual needs and growth.

Lastly, the Horizon Center must flesh out the third and final step of their program: “Send them out.” An idea currently in development is to set up short internships (~ two weeks long) for the youth with local partners such that they can gain experience and exposure to different career paths. These opportunities will need to be identified and matched with youth. For those UAM who want

to study more, the Horizon Center has begun conversations to partner with local colleges to arrange full scholarships for youth who have completed the design program, contingent on the individual passing the appropriate qualifying secondary examinations. Apart from coordinating these opportunities, the Horizon Center must embark on the difficult task of determining how and which youth can receive them, as there may not be enough for everyone. In addition, for those youth who have left Greece, the Center aims to conduct outreach. In order to do this, a detailed list of the available makerspaces and resources to keep learning must be compiled and accordingly passed on to interested youth in other parts of the EU.

Ultimately, the Horizon Center and D-Lab work has established an effective and meaningful program to bring creative capacity building training and design to a vastly under supported group, unaccompanied refugee minors. As this program continues to develop, its learnings help build the understanding of how to modify a CCB curriculum for this unique population and how a design education can be life-changing and agency-restoring for the vulnerable youth.

Appendix A: Participatory Design Comparison

Participatory Design Approaches			
Key Considerations	**User-Centered Design**	**Co-Design**	**User-Created Design**
Technical nature of the product or program	Can be more technical	Can be more technical	May not be as technical
Time required for user to participate	Low	High	High
User feels **ownership** of the product	Low	Medium	High
Building capacity of participants to develop their own solutions	Fewer opportunities	More opportunities	More opportunities
Language and translation issues	More of an issue	More of an issue	Less of an issue (if all team shares the same language)
Buy-In from a **variety of stakeholders**	Potentially greater	Potentially greater	Lesser
Resources required	Medium level of resources	More resources	Medium level of resources
Intellectual property issues	Must be considered and addressed		
Group Power Dynamics	Must be considered and addressed		

Appendix B: Creative Capacity Building Process Overview

Appendix C: Design Curriculum Roadmap

Modified By: Heewon Lee
Modified Date: 6.6.2019

Design Program Roadmap

Horizon Boys

Phase 1: Activity Class

Objective:
All new comers to the Horizon Center (H.C) will have an opportunity to participate in the daily activity classes. In this class, instructors will provide the newcomers with information sessions, therapeutic activities, arts & craft activities, etc. Through this class we want the new comers to feel welcomed & safe and get exposed to the H.C design program. During this stage the H.C staff will ask frequent visitors if they will be interested to join the Basic Training program.

Team: Marianna, Activity Class Volunteer, Translator

Duration: Monday to Friday / 2-4 PM

Participants:
-All new comers to the Horizon Center

Process: TBD

Program:
-Information Sessions
-Therapeutic Activities
-Arts & Craft Activities
-Language (Greek & English)
-Life Skills

Outcome:
-Feel welcomed & safe
-Selecting potential students for the design program

Phase 2: Basic Training

Objective:
Training the students on various basic skill sets in order for the them to gain confidence in using tools and making things.

Team: H.C Instructors

Duration: Monday to Thursday / 4-6 PM

Participants: Students who have taken the Activity Classes / Students who have shown regular attendance in the Activity Classes

Process: Students will be given a 2 month period to complete all courses. This will allow the irregular attending students to finish the courses and making sure less people drop out of the program. Since the Intro to Design program requires a minimum 8-10 students/class the students who finish the Basic Training courses earlier will need to wait till the minimum number of students are reached. During this time, these students will be given advance lessons on each of the Basic Training courses.

Program:
-Basic to Computers
-Tailoring
-Woodworking
-Technical Drawing
-CAD & 3D Printing
-Computer Graphics
-Electronics
-Sketch Modeling
-Language (Greek & English)
-Life Skills

Outcome:
-Confident in using tools
-Trained in tools & workshop safety
-Confident in making things
-Understand the basics of all the

Phase 3: Intro to Design

Objective:
Guiding the students through a number of design projects (project based learning) using the design process. In this class the participants will utilize the various skills they have learned through the Basic Training classes.

Team: H.C Instructors

Duration: Monday to Thursday / 2-6 PM / Each project is 1 month long

Participants: Students who completed the Basic Training program / Students who have shown regular attendance in the Basic Training program / Requires a minimum 8-10 students to run a class (considering 20% dropout rate)

Process: Each project will follow some of the stages of the design process

Program:
-Design for Yourself (Lamp Project)
-Design for a Friend (Speaker Project)
-Design as a Team (Chair Project)
-Advance Basic Training
-Language (Greek & English)
-Life Skills

Outcome:
-Understanding there is a process behind designing things
-Understanding how to utilize different Basic Trainings to design a product
-Confident in generating ideas, giving and receiving feedback, and presenting ideas to others

Phase 4: Advanced Design

Objective:
Guiding the students through the CCB (Creative Capacity Building) design process.

Team: H.C Instructors

Duration: Monday to Thursday / 2-6 PM / 1 month long

Participants: Students who completed the Intro to Design program

Program:
-Using the split CCB module curriculum.
-Will identify a common problem the participants are facing
-We will also introduce them to more advance tools and programs they can use
-Participants will make a team of 5 by themselves
-Participants will also have access to the various workstation to work on their projects on their free time

Outcome:
-Understanding the Design Process
-Confident in generating ideas, giving and receiving feedback, and presenting ideas to others
-Producing high quality projects & presentation

Phase 5: Training & Portfolio

Objectives:
Giving the students a number of technical classes where they can explore and build stronger knowledge on specific tools.

Team: Out sourced (volunteer workers)

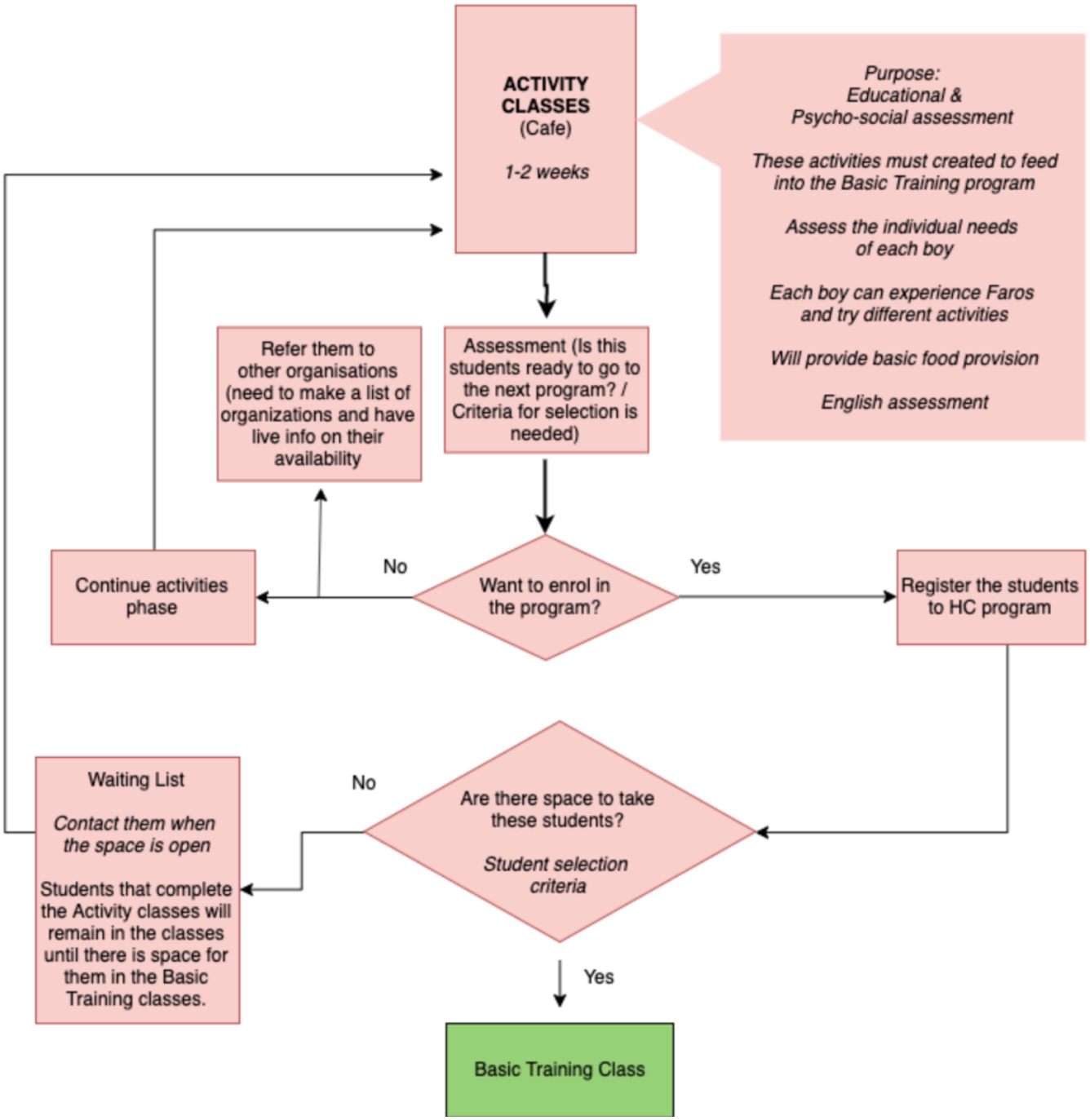
Duration: TBD

Participants: Students who completed the CCB program

Program:
-TBD

Classes:
-Adobe Photoshop, Illustrator, InDesign, Premiere, After Effect
-CAD & 3D Printing
-Arduino / Coding
-Photography
-Videography / You Tube
-Tailoring
-Website Design
-Woodworking
-Metalworking
-Etc

Appendix D: Activity Class Flowchart



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