

Regional Growth Strategy

Written and Presented By:

Scott Swaaley

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Basic information

Name & Role:	Scott Swaaley, Physics & Engineering Teacher, Founder of GRITLab
Name of School:	High Tech High
Location:	San Diego, CA
Grades Served:	Full Time: 9th Grade | Through other: 9-12
Name of Program:	GRITLab
Month and Year of Program Launch:	Experimentation/Pilot: August 2012 | GRITLab: December 2013
Thumbnail Description of Program:	GRITLab is a place where skillset meets mindset. Where students and teachers alike come to build professional skills, developing positive mindsets, and work together towards improving the nature of education.
Total Amount of Funding Requested:	$285,000
Estimated Cost/Student:	Impact (direct only): $160 / Student Impact (including indirect impact): $6.71 / Student
# of Students Served per Year:	56
# of Students Served Since Inception:	266
Estimated # of students served directly between 2015 and 2020 without expansion:	355
Estimated # of student served directly by 2020 with expansion:	Students (Academy): 896 Students (Community Innovation Lab): 900 Total: 1,796
Estimated # of students served indirectly by 2020 with expansion:	Via Trained Educators: 40,000

Estimated # of teachers trained in or out of school by 2020 with expansion:	680
Estimated # of "hits" for any publications, videos, or manuals promoting the program or demonstrating some aspect of the program (if applicable; this will mostly likely be stated as a goal; be realistic)	Current Pre-Release Documentary Trailer Views (One Potato Productions): 11,000 Estimated Documentary Views (Reel Link Films Documentary): 150,000 Estimated Documentary Views (One Potato Productions): 150,000 In-person visitors per year: 9,000 (10) Website/Curriculum hits: 60,000 (11) Speaking/Workshops: 900 (12) Print: 10,000 **Total: 390,900**
Grant eligible 501(c)3 non-profit that will serve as fiscal agent for this grant and who will be submitting this proposal on your behalf	The High Tech High Foundation

Existing Program Overview

Educational Imperative

Not so long ago our society embraced a broader set of skills in schools. Auto shop, wood shop, art, sports, and music courses were ubiquitous in schools across the country. In fact, many of these courses were developed into complete career technical training tracks that enabled students to immediately enter the respective workforce. Yet these programs have been in sharp decline over the past two decades and are becoming increasingly rare now that Career Technical Education is losing all of its funding in California as of July, 2015. What happens to the students whose skills fall outside our culture's now narrow perception of academic excellence? These students leave school without our traditionally desired skillset and, more importantly, they leave with an extremely fixed mindset. Even those students that succeed in the traditional education system find themselves ill equipped to find and keep an honest white collar job after college.

Creating meaningful change in education is even more critical when considering today's STEM related jobs, perhaps because of the more demanding and quantifiable nature of STEM work. According to a study by Change The Equation, for every unemployed person in California, there exists 1.4 STEM related job openings[iii]. Our new economy needs individuals that have specific mindsets and certain technical skills which are best encouraged as part of a demanding curriculum with inspiration from innovative teaching environments dedicated to problem solving and project development. Or, as William Heard Kilpatrick describes, "…wholehearted, purposeful activity proceeding in a social environment."

Core Program Features

Currently housed as a 9th grade program in High Tech High (HTH)[1], GRITLab directly impacts fifty-six students a year through full-year instruction and a handful of others through in-school workshops and extracurricular projects. Current outreach and distribution efforts include online resources, conference engagements and workshops, media releases, teacher trainings, and local networking. As I have worked to refine and increase the reach of my program I have come to a crossroads where the magnitude of my efforts are not sustainable for a single person. As a result, I have spent a great deal of time identifying potential partners and collaborators for this effort. With the help of the Paul Allen Foundation, I can build an infrastructure that would help me to not just sustain the program, but increase its reach exponentially.

However, even at its current limited scale, GRITLab has gained recognition through targeted collaborations, a great deal of publishing and submission of resources, and the serendipitous arrival of two film crews that are releasing two independent education documentaries that feature my program.

[1] High Tech High is a San Diego based charter school system globally recognized for its successful and sustained implementation of project based learning. Since it's opening in 2001, High Tech High has grown to 13 schools spanning kindergarten through 12th grade..

Vicki Abeles - the filmmaker responsible for the 2009 education documentary Race to Nowhere - has been following my program for a part of her next film documentary due to release in Q1 of 2015. Greg Whiteley - the filmmaker responsible for the 2014 political documentary Mitt - is also following my program as part of his upcoming education documentary due for release in 2015. The Teaching Channel has also featured my program as part of their Deeper Learning video series. The development of my program has also been supported by a series of recognitions and awards. In 2012 I received a STEM Innovative Educator award from McGraw-Hill, and project-development support from The San Diego Foundation. In 2014 I received recognition from the Paul G. Allen Foundation as an inaugural member of the Paul Allen Distinguished Educators and was selected by Lemelson M.I.T. to mentor and lead a 2014 InvenTeam. Through these awards and a number of conference presentations my program has been well received and even resulted in my first unsolicited invitation to speak in Vermont this fall for the Rowland Foundations national conference. These recognitions are a result of a very intentional crafting of my classroom projects and culture.

In the course of my education and professional career, I have observed that many people, students and adults alike, struggle with meeting some very basic personal and professional responsibilities. In response to those observations, I have crafted the culture of my class to highlight the following core outcomes. If you were to walk into my classroom, this is what you would see:

- Proactivity & Passion – Entrepreneurship is more than just starting a company – it's the ability to recognize a problem, a need, or an opportunity and to passionately pursue a solution.

- Purposeful Activity – While there are many approaches to a successful education, my focus is on goal-oriented and purposeful activity, with students working diligently towards self defined outcomes.

- Self-Prompted Reflection –The ability to reflect on one's progress without external prompting. This is a complex skill, even for adults, yet I believe it to be an essential component of learning.

- Technical Competence - Whether focused on spreadsheets, graphical design, carpentry, electrical circuits, or mechanical devices, students work towards college-level technical competence.

- Interdisciplinary Work - Science, Technology, Engineering, Art, Mathematics, and Manufacturing projects are designed to integrate with a great humanities curriculum which ensures students maintain a historical and cultural perspective alongside their development of technical skill.

- GRIT & Perseverance – Many assignments and projects in my class are designed to be near impossible to complete on the first attempt. Students that confront failed attempts, participate in the critique process, and partake in iterative design, soon realize that the 'good enough' mentality is not sufficient when their future demands much more.

Core Program Strategies

The outcomes above are achieved through a systematic approach to education but, as is true with most innovations, my approach is built upon the shoulders of giants. My approach starts with some institutional policies known as the High Tech High Design Principles. These principles are based on the findings from the Department of Education's New Urban High School Project and are consistent with the constructivist philosophy of education. These Design Principles are:

- Personalization – Strong teacher-student relationships in a learner-centered classroom.
- Adult World Connection – Engaging students in the adult world outside of the classroom and bringing the adult world into the classroom for mentorship and enrichment.
- Teacher as Designer – Teacher's perspectives, interests, and passions are brought into the classroom through multidisciplinary teams and collaborative integrated projects.
- Common Intellectual Mission – A diverse and integrated community with common intellectual and professional goals.

The design principles above and the project-based setting of High Tech High serve as the foundation on which GRITLab's "where skillset meets mindset" methodologies are built. As such, students develop a wide range of concrete skillsets that not only prepare them for their future but also develop a capacity for hands-on learning and the confidence that stems from saying "I made that!". Skillsets range from year to year but commonly include: carpentry, electronic design and fabrication, programming, technical writing, file management, project planning, prototyping and design, and many others. However, skills are worthless in a vacuum, so to compliment their skillset, students also develop GRIT. Borrowing from the work of Paul Stoltz, the components of GRIT include: Growth Mindset, Resilience, Instinct, and Tenacity. It's this combination, "where skillset meets mindset', that truly empowers students in a virtuous circle. New skills lead to increased confidence which leads to agency which leads to the acquisition of more skills and GRIT.

The deliberate and synchronous development of these mindset and skillsets is achieved through adherence to a developing group of considerations, referred to as my *Adversity by Design* curriculum. These additional considerations, when layered upon the broader design principles described above, are what brings the magic to GRITLab and helps to ensure its effectiveness.

Replicability

The expansion of GRITLab is about more than just replicating a classroom experience. It's about using the philosophy I've developed to make a large scale impact in education through experiential learning for both students and educators. As the philosophy and learning protocols are developed through the initial phase of the grant cycle, the program becomes decreasingly dependent on me as a creator and implementer. The more GRITLab inspired experiences

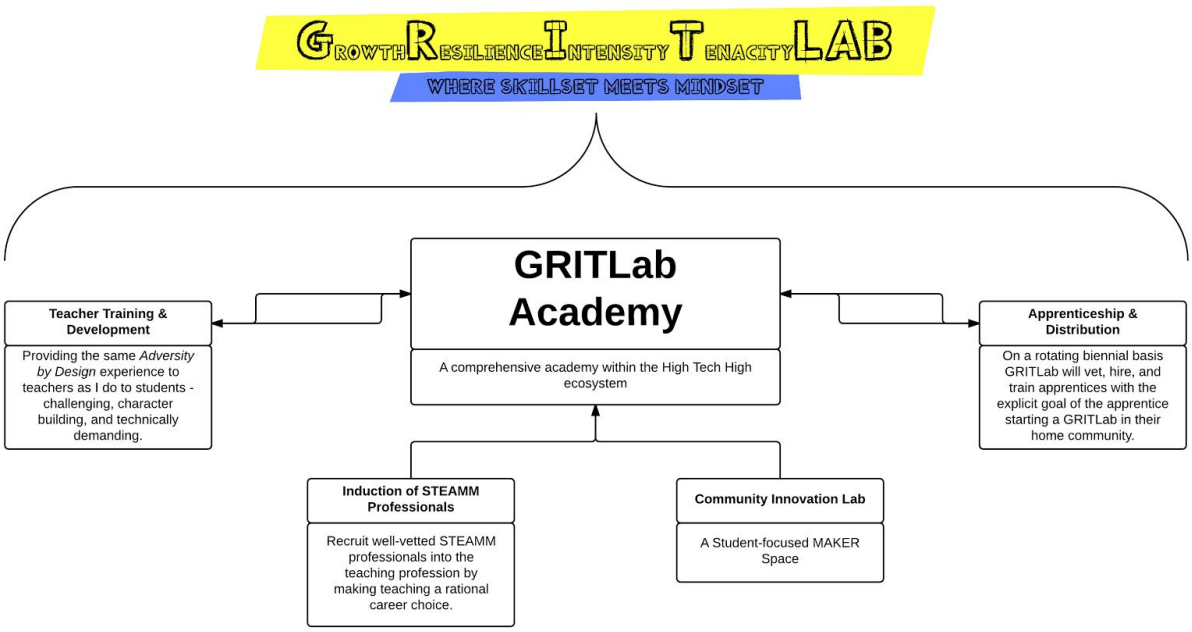
teachers accumulate, the more distributed the dependency, and the less reliant on me the program becomes.

Furthermore, this program is housed within High Tech High - an existing foci of global education and a hotbed for progressive research and education. Not only does High Tech High provide an ideal incubation environment for GRITLab logistically and philosophically - its existing network of schools and cultural memory serve as a repository for the ideas that are developed through this program.

Project Plan

Abstract

This expansion plan focuses on leveraging my personal entrepreneurial, engineering, and teaching experience to transform my existing Physics and Engineering course into a more comprehensive educational facility called GRITLab. GRITLab focuses on propagating STEAMM literacy, building professional skillsets, and also improving the global education space. With the GRITLab Academy as the foundation of a broader program, GRITLab will impact students around the globe through immersive teacher development experiences, apprenticeships, a pipeline of STEAMM professionals entering into education, and a community innovation laboratory.



Target Population

The proposed expansion has exponentially greater reach than the status quo and targets the following populations:

- **Students of the GRITLab Academy -** By expanding my classroom into a more comprehensive GRITLab Academy, the direct student influence will grow from a single classroom to as many as twelve classrooms. Leveraging High Tech High's existing lottery-by-zip code admissions system, the Academy will be populated with students

already enrolled in the HTH ecosystem which will help to guarantee both socioeconomic and academic diversity[2].

- **Educators across the globe -** HTH employs over three hundred teachers and hosts over two thousand visiting educators, administrators, and policy makers per year from around the globe. As such, there is an existing infrastructure for professional development and an existing brand that already attracts educators. Through the *Adversity by Design* Teacher Development Experience, GRITLab can leverage the existing systems and throughput of the greater organization to expand its reach.
- **Students across the globe -** Through the *Adversity by Design* Teacher Development Experience described above, GRITLab can very quickly reach countless students around the world. Reaching a single teacher can translate to reaching hundreds of their students. Reaching a single administrator can translate into reaching thousands of students. Reaching hundreds of educators a year can translate into reaching tens of thousands of students per year.
- **Local community members -** Through the community innovation lab, GRITLab can reach out to, and support, its local community. This expands the reach of GRITLab beyond the limitations of grade level and has the potential to connect innovators of all ages to tangible skillsets and developing mindsets.

The Academy

The foundation of GRITLab will be a comprehensive and independent academy that will grow into an independent charter school within the High Tech High ecosystem. The expansion of the academy is divided into two phases.

Phase 1 of the academy will be two years in duration and allocates five 9th grade teachers (two Humanities, two Science & Engineering, and one Math) and one hundred and twelve students per year from the existing High Tech High student body into a cohesive collaboration space where we can begin to demonstrate, measure the success of, and refine the *Adversity by Design* Curriculum. While the five teacher team structure (detailed in Appendix D) is meant to encourage interdisciplinary projects (humanities - STEAMM), it also allows for cross-collaboration between teaching teams and authentic integration of a Common Core Math program into a project-based learning setting. This structural fluidity allows faculty to balance their teaching workload as well as additional responsibilities resulting from the greater GRITLab facility.

During Phase 2, the refined Academy will be relocated in totality into a new space as part of a newly acquired HTH campus. Once in the new space, the Academy will introduce the second five-teacher team, thus bringing the Academy up to full capacity. While smaller than the other schools, it will operate as an independent entity within the HTH ecosystem and be dedicated to the continual refinement of the Adversity by Design Curriculum and progressive education as a whole. The loss of economies of scale, a result of the smaller population of students, will be

[2] …..explain why ...

balanced by a flat administrative structure with responsibilities spread throughout the faculty. It will also serve as the foundation on which the other facets of GRITLab are based.

The Space

This Academy will compliment the already rich Adversity by Design curriculum with access to a purpose-built MakerSpace which will include professional tools, equipment, and materials. Building off of the best practices and ideal equipment lists formed by existing MakerSpaces throughout the country, students will be trained to use everything from hand tools to computer-controlled routers, laser cutters, and 3D printers. This equipment will not only provide technical skill and confidence-building experiences but also provide legitimacy and quality to finished student projects. The space currently being considered for phase 1 is a wing of the existing Gary and Jerri‑Ann Jacobs High Tech High (detailed in Appendix D).

The space currently being considered to house phase 2 is a dedicated building within High Tech High's new Clairemont, California campus.

Staffing

The initial staff for the pilot will be drawn from existing faculty at High Tech High and selected in coordination with existing High Tech High administration. Staffing for the subsequent expansion will be opened more generally to internal and external applicants.

Program Refinement, Measurement & Verification

Leveraging residents of the High Tech High Graduate School of Education, we will benchmark the program using quantitative measures, including assessments such as the Adversity Quotient Profile®, GRIT Gauge®, and state mandated measures. We will also regularly perform qualitative checks using established inquiry-based reflection protocols. All of this information will be used to inform our practice throughout the pilot phase and into implementation and also to serve as validation for the approach as a whole.

My Role

During the pilot phase, I would serve as a part-time science & engineering teacher as well as the overall curriculum coordinator of the GRITLab Academy. Though isolated within the existing Gary and Jerri-Ann High Tech High during Phase 1, we will remain under the administrative umbrella of the host school.

Following phase 1, I will remain in the classroom as fifty-percent teacher and allocate the rest of my time to the position of GRITLab Director where I can continue to coordinate the broader GRITLab efforts. Administration of the academy will also shift into a separate fifty-percent position to be filled by one of the inaugural members of Phase 1.

Teacher Development Re-Defined

While many of us detest the phrase "those who can't do, teach", we are often less resistant to the phrase "those who can't teach, teach teachers." In fact, teacher development programs,

conferences, and in-services are widely known for being disconnected from reality, inauthentic, and most of all, extremely boring. I want to provide something different for teachers.

GRITLab will provide the same *Adversity by Design* experience to teachers it does for students - challenging, character building, and technically demanding. Teachers would complete an entire GRITLab project, from beginning to end, as a student - the only difference being an additional 15% of time devoted to daily debriefs of pedagogy and course structure. While being infinitely more interesting than a traditional in-service, teachers would leave this experience with exactly that - experience. They would leave with experience as a student so they can begin to redefine their existing understanding of what school is like. They would also leave with technical experience and confidence - something traditional teacher training does not provide. In addition, they will have acquired a skill - whether it be basic carpentry, introductory computer programming, or graphic design. With this combination of skills and experience - as well as some supplied support materials - these teachers can now replicate the exact same experience for their own students while beginning to develop their own projects.

Since the *Adversity by Design* Teacher Development Program is wrapped inside the completion of an actual project - it can be repeated with different themes and projects allowing for repeatability and repeat-attendance. With existing High Tech High residencies grossing up to $800 per participant for a three day event, the *Adversity by Design* teacher development program could be a significant source of revenue for this and other facets of GRITLab.

Just as the *Adversity by Design* Curriculum builds upon the constructivist foundation of project based learning and the High Tech High Design Principles, GRITLab's *Adversity by Design* Teacher Development Experience will build off of (and compliment) the existing High Tech High Teacher Development process. Once teachers have begun to experiment with project base learning in their own schools, GRITLab will offer the second phase of teacher development and help to refine their practise. During the pilot phase, which will begin in year one of the grant cycle, the *Adveristy by Design* Teacher Development Experience will be offered as part of the existing residency structure at High Tech High. Once refined through a year of pilot implementation, this experience will become a standalone program offered by High Tech High but remain rooted in the experience and development of the GRITLab Academy.

Structure

The *Adversity by Design* Teacher Development Experience will begin as a two-week web-based and skill-building course before culminating into a five to nine day in-person experience. As the program develops, we will analyze the efficacy of that approach and refine as needed to balance the purpose and goals of the experience with the requisite resource and time from participants.

My Role

I will guide and coordinate the efforts to develop curriculum for teacher training. I will also personally facilitate the teacher trainings until such time that other GRITLab faculty members are trained with the *Adversity by Design* curriculum and can also begin to facilitate these trainings.

Apprenticeship & Distribution

Beginning the third year of this grant cycle, on a rotating biennial basis, the GRITLab Academy will vet, hire, and train apprentices with the explicit goal of the apprentice becoming a local lightening rod for GRITLab methodologies in their home community. Apprentices will be chosen based not only on their abilities as educators, but also on community support, entrepreneurial capacities, and other reasonable evidence and assurance that they could make a meaningful impact on their local community.

Structure

Apprentices will work hand-in-hand with an existing GRITLab Academy Educator for the summer and fall while also being part of the greater GRITLab community. During the spring semester, the apprentice will take a more dominant role in the classroom and, as a result, their master educator will be more free to work on their own professional development as well as able to generally support the other facets of GRITLab. GRITLab can support up to apprentices per five-teacher teaching team.

Apprentice Selection

The first cycle of apprentices will be chosen from another campus within the HTH ecosystem with the goal of them returning to their home campus for implementation. Subsequent apprentice positions will be open to the public but will give more consideration to educators that have already participated in, and begun to implement, the *Adversity by Design* Teacher Development Experience.

Community Innovation Lab

Children spend a great deal of time thinking about their role models and if they can, they'll naturally gravitate towards arenas in which they can best emulate them. But what about the students that aspire to be great scientists or engineers? It's very difficult for them to emulate their role models at home - Legos can only get them so far.

That's why at GRITLab, the local community will have after-hours access to structured skill building activities, competitive STEAMM teams, and supervised lab time. While Tony Wagner may focus on Creating Innovators[3], I am of the belief that we already have a huge untapped resource of innovative youth - we just need to legitimize their play in such a way that it allows them to express it. Additionally, a wonderful byproduct of the GRITLab Academy is a staffed technical laboratory. With many of the teacher development and academic programs taking place during normal business hours, it creates a great opportunity to open up the space for additional community-based and fee-based programs in the evenings.

[3] Tony Wagner currently serves as an Expert In Residence at Harvard University's new Innovation Lab and is a frequent speaker and consultant in national education scene as well as the author of *Creating Innovators: The Making of Young People Who Will Change The World.*

The space can also serve as a space for local teachers, who are unable to commit to the greater *Adversity by Design* Teacher Development Experience, to develop projects and develop their own skills.

Timeline

Once the GRITLab Academy, Teacher Development, and Apprentice Programs are operational, GRITLab will begin to recruit local volunteers to help staff the Community Innovation Lab. Modeling off of the related-success of for-profit and operational MakerSpaces such as *MakerWorks, MakerSpace, Artisan's Asylum, and Vocademy,* GRITLab will staff the Community Innovation Lab almost entirely with volunteers from the HTH, GRITLab, and local community.

Induction of STEAMM Professionals

One of the greatest challenges faced by education is one of human capital. In order to facilitate a new style of learning for students, we will need teachers that possess certain mindsets and professional skills. The goal of the *Adversity by Design* Teacher Development Experience is to help bridge this gap with existing teachers. At scale though, these requirements can begin to seem unreasonable, if not unfair, when compared against our current teacher pool.

There is, however, an easier way. In addition to trying to instill these additional skills and characteristics into our current teaching pool, we can identify and recruit individuals that already possess those additional characteristics and skillsets and just train them how to teach. As such, our challenge, and my mission, is to recruit well-vetted STEAMM professionals into the teaching profession by making teaching a rational career choice. The first and most visible obstacle is credentialing - convincing a $100k / year professional to spend $30k on a teaching credential to receive a 50% pay cut; definitely not a rational move. However, a little-known program in California called the "California Alternative Route to Certification" and often referred to as "Intern Programs", allows technically competent professionals to enter the teacher profession in a more streamlined way. They can concurrently teach - for a full salary - and work on their credential, often for free. This financially superior alternative also lends for a more authentic and fulfilling credential curriculum - as the content can be immediately applied in the classroom.

It just so happens that High Tech High already has a teacher credentialing program and GRITLab could work to develop the recruitment pipeline feeding it. In summary, I would like to use GRITLab as a way to (a) help entice would-be educators with what teaching can look like, (b) collaborate with existing induction pathway supporters like Encorps to recruit teachers directly from STEAMM-related industries, (c) help existing intern programs find and vet candidates, and (d) help train this next generation of teachers with GRITLab and *Adversity by Design* methodologies.

Structure

This aspect of GRITLab is more one of influence than of brick and mortar. With the teacher credentialing program already in place, these additional efforts would be in the form of an outreach campaign to stakeholders throughout the teacher recruitment and hiring infrastructure. While these efforts will be continuous throughout the three year grant cycle, the goal is to formulate formal partnerships and pipelines by the end of year 3.

Measurement & Accountability

Many of GRITLab's outcomes are measurable and, with the collaboration of HTH's graduate school of education, can serve as metrics for the success of the program. For example:

- Assessments like GRIT GAUGE® and the Adversity Quotient Profile® can be used to measure the development of GRIT® in students[4].
- The most valuable metrics can be measured on a broader time scale and include: college graduation rates, starting salary after college, and number of patents earned.

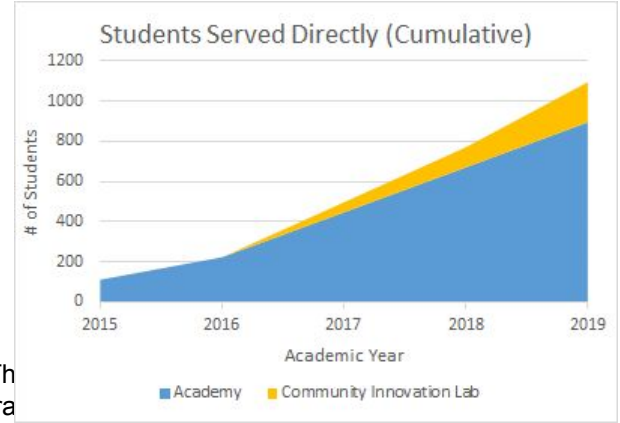
Explanation of Impact Estimates

Impact estimates assume that the 2015 - 2020 date range covers a total of five complete academic years.

If I were to continue in my current capacity I would reach approximately 56 students per year in my class and an additional 15 per year through other extracurricular activities. Total Students Served: (56 students / year + 15 students / year) * 5 years = 355 students

Estimated # of student served directly by 2020 with expansion:	Students (Academy): 896 Students (Community Innovation Lab): 900 Total: 1,796

The pilot phase of the GRITLab Academy lasts two years and directly serves 112 students per year. In subsequent years, GRITLab Academy expands to 224 students per year. Starting in the third year, the Community Innovation Lab is conservatively expected to bring in one hundred, two hundred, and three hundred students per year, respectively.

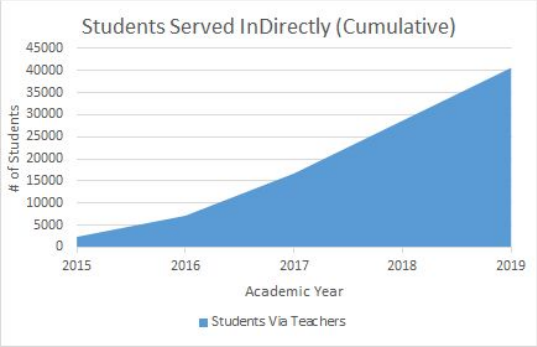


[4] These assessments are products of Peak Learning. Th
for decades and has a large pool of data on which to dra
(http://www.peaklearning.com/).

Estimated # of students served indirectly by 2020 with expansion:	Via Trained Educators: 40,000

This estimate assumes:

- Applicants of the immersion experience are pre-screened to ensure existing knowledge of basic project based learning pedagogy and process.
- 80% of attendee classrooms are influenced by the training.
- Teachers teach an average of 29 students per classroom with an average of 2.5 different student groups (or sections).
- The estimate of teachers trained (listed below).

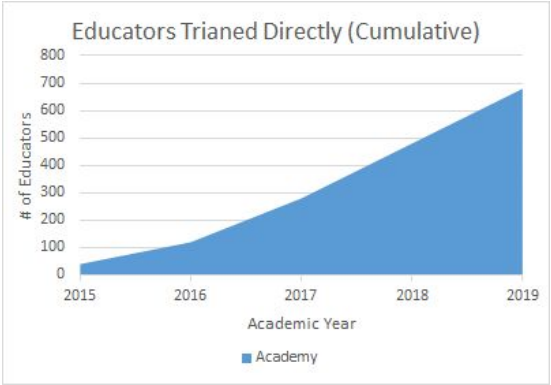


This estimate <u>does not</u> include the significant effect of:

- The influence on teacher classrooms who are listed under "hits" below, resulting from either documentary viewings, conference workshops, or website curriculum.

Estimated # of teachers trained in or out of school by 2020 with expansion:	680

This estimate includes only those teachers who participate in the full immersion experience. It assumes that GRITLab trains forty, eighty, and one hundred teachers per year for the first three years, respectively, before reaching capacity at two hundred teachers per year.



Estimated # of "hits" for any publications, videos, or manuals promoting the program or demonstrating some aspect of the program (if applicable; this will mostly likely be stated as a goal; be realistic)	Current Pre-Release Documentary Trailer Views (One Potato Productions): 11,000 Estimated Documentary Views (Reel Link Films Documentary): 150,000 Estimated Documentary Views (One Potato Productions): 150,000 In-person visitors per year: 9,000 (10) Website/Curriculum hits: 60,000 (11) Speaking/Workshops: 900 (12) Print: 10,000 **Total: 390,900**

The assumptions are as follows:

- Current pre-release trailer for One Potato Productions documentary: 11,000 views recorded on Vimeo.
- Estimated viewing for Reel Link Films documentary is based on their previous screenings of their first education documentary 'Race to Nowhere' which screened at over 6,000 schools and institutions with an (assumed) average attendance of 25 people.
- Estimated viewing for One Potato Productions documentary are assumed to be equal to the other documentary.
- In-person visits are based on the existing amount of annual visitors that visit High Tech High annually (1,500), with a 10% escalation each year.
- Website/Curriculum "hits" are based on current annual unique visitors (7,500) to my website with a twenty-five percent escalation per year.
- It is assumed that I will facilitate four presentations or workshops per year with an average attendance of 45 educators.
- Print media 'hits' are assumed to be on the order of 5,000 due to readership of currently mentioned print media, including NewsWeek.

Budget Narrative

Direct Support

One enormous advantage of the proposed GRITLab structure is that is is contained within the High Tech High ecosystem. As such, many of the startup costs and administrative overhead of running a school and other ancillary programs has already developed and has been pledged in support of this program. Features that will be directly supported within existing High Tech High budgets appear on the included budget as "HTH-Pledged".

Income

GRITLab will rely on three primary sources of income:

- Support from the Paul Allen Foundation - For the first three years of development, the grant funds will be used to refine and expand the program.
- Individual & Business Contributions - With a history of support from organizations including The San Diego Foundation and McGraw Hill, I have made some modest estimates of annual support
- GRITLab Generated Income - As the program develops, GRITLab will be increasingly capable of supporting itself with revenue from the *Adversity by Design* Teacher Development Experience. With current High Tech High residency programs as a benchmark ($800 per individual for a 3 day residency), it is assumed that the experience can be sold as an additional service for visitors. The Community Innovation Lab can also offer a fee-based subscription to adults to help support the greater program.

Expenses

Expenses include:

- GRITLab Director/Coordinator - To compensate me for my role as the director of the overall GRITLab program, I have allocated a stipend for the first two years of development. Once the Academy reaches phase 2, that compensation will shift to a 50% FTE salary.
- Makerspace - True fulfillment of the GRITLab Academy's mission relies on a well equipped makerspace. While there will be considerable outreach for donations of equipment, the grant funds will be used to begin the process of tool and material acquisition. Initial purchases will include a laser cutter, CNC router, and electronics fabrication equipment.
- Teacher Stipends - Phase 1 and phase 2 of the GRITLab Academy will require time and effort well beyond the scope of a normal teacher's duties. In order to compensate teachers for their efforts, and as an incentive to encourage the full scope of activities, inaugural faculty of the GRITLab Academy will be provided with annual stipends.
- Support Staff - As discussed under *Risks and Mitigation*, directing GRITLab while being a full-time faculty member of Academy has the potential to exceed my personal bandwidth. As a result, I will hire part-time support staff to assist in these efforts.
- Internal PD allocation - All inaugural faculty of the GRITLab Academy will have a discretionary professional development budget to ensure that they are able to hone and practice their individual professional skills as well as their pedagogy.
- Instructor Stipends (*Adversity by Design* Teacher Development Experience) - As we balance the workload of the Academy throughout phase 1, the instructors of the teacher development experience may or may not be current faculty at the Academy. As a result, instructors are paid a stipend to encourage high quality work on the curriculum and also in the actual facilitation of the experience.

Volunteers

Modeling off of my current collaborations with the University of California San Diego and the related success of for-profit and operational MakerSpaces such as *MakerWorks, MakerSpace,*

Artisan's Asylum, and Vocademy - GRITLab will leverage local and university student volunteers to staff the Community Innovation Lab and the GRITLab makerspace.

Sustainability

Innovation can be a risky endeavor when starting from the ground up. But if we look to history on how to encourage and support innovation, we find examples like Bell Labs. Bell Labs was a twentieth century powerhouse of innovation and in its day produced transformative innovations including the transistor, laser, and CCD imagery and earned the laboratory eight Nobel prizes. However, Bell Laboratories was not an entirely independent organization. Bell Labs was grown out of, incubated by, and continues to be supported by parent companies including Western Electric and AT&T.

I hope one day to draw a parallel between Bell Labs and GRITLab. GRITLab will be a hub of progressive education and do a great deal to inform global education. GRITLab is also part of a much larger parent organization called High Tech High. High Tech High's existing ecosystem consists of twelve elementary, middle, and high schools spread over three campuses with a fourth campus and four additional schools currently under development or construction. In addition to the schools, High Tech High houses a teacher credentialing program, a nearly-accredited graduate school, and a robust tour and residency program that serves as an introduction to project based learning.

This ecosystem is an ideal incubation space for GRITLab as it affords many much needed program supports for no cost, including: certification and accreditation, brand recognition, existing customer base, and facilities.

The Academy is the most easily sustained aspect of the program as it is a near cost-free long-term proposition. It's curriculum development, refinement, and equipment acquisition is the most costly aspect of the program. Once at full capacity, the GRITLab Academy will operate as a high school under the same per-student operating budget as other schools within the ecosystem.

The *Adversity by Design* Teacher Development Experience is designed to be very low cost. The cost of program advertisement and logistics falls under the existing teacher development umbrella at High Tech High and is thus perpetually sustained. The additional stipends provided to facilitators is supported by the revenue brought-in by the experience. With High Tech High residencies currently grossing over $800 per attendee for a three day event, this additional revenue could grow into a fund basis that would help to support the broader GRITLab efforts.

Risks and Mitigation

Personal Bandwidth

This program marks a deviation from my current role. In addition to my role as a Science & Engineering teacher within the phase 1 Academy, I will be responsible for every facet of the

GRITLab program. Given the magnitude of that task, I have explicitly structured support personnel into the inaugural years to help balance the day-to-day workload. The support infrastructure is two-fold. First, the inaugural five teacher team will share some responsibilities for program refinement and documentation of program activities. Second, a part-time administrative support person would be brought-on for the inaugural years.

Human Capital

As an investment in human capital, a great deal depends on the ability to identify, recruit, and manage talented professionals to the organization. As a not-for-profit social organization, GRITLab will not have the financial lure of a typical startup and must depend more explicitly on other motivating factors - even though the workload will be considerable. In order to identify great candidates for GRITLab positions - we will leverage High Tech High's broad and diverse world-wide network of educators. We will also develop a comprehensive hiring process that includes: sample lessons, student interviews, and a project portfolio review.

Once operational there is a risk of divergence within the GRITLab Academy. While the Academy exists to test the bounds of progressive education, it must do so in some semblance of a unified effort. Leveraging Improvement Science and an explicit culture around reflection and communication, we will meet regularly to discuss our goals, progress towards meeting those goals, and next steps. In addition to our internal efforts, we will work with a resident from the High Tech High graduate school of education to provide an external perspective on each of the aforementioned aspects of our progress.

Choosing Grade Levels

The GRITLab Academy starts phase 1 as a solely 9th grade experience. As it transitions to phase 2 and adds additional classes, there exists both a philosophical and structural tension between keeping it 9th grade or building a 10th grade class. There are currently ongoing discussions about how best to make the biggest impact on students. There are multiple potential solutions for this year 3 dilemma, including:

- Maintain the GRITLab Academy as a strictly 9th grade program and use it as a feeder-school for other high schools throughout High Tech High and/or the County.
- Bridge GRITLab into a two-year experience which will include both 9th and 10th grades before feeding into other High Schools.
- Grow GRITLab one year at a time with the full capacity Academy harboring one teaching team from each grade with intentional collaboration between grades.

These decisions involve multiple stakeholders, including: the college admissions board, other high schools, and parents. As such, this structuring will be part of the intentional refinement process during year one of the grant cycle.

Timeline

GRITLab will not achieve overnight access to millions of viewers. It is not a curriculum that is meant, necessarily, to be packaged and sold in a vacuum. It is not a Khan Academy model. In contrast, it is explicitly designed as a medium term investment in human capital and experience. During the course of that investment, there may be turbulence. As a progressive test-bed, we may find that there are parts of the methodologies that do not work as planned and need to be refined. As we tell our students though - if there is no risk of failure, then you're not innovating anything. Furthermore, any struggles we experience throughout the growth of the program will be documented and used to inform future efforts and development.

Alternative Revenue Streams

The long term sustainability of this program does rely on a modest revenue stream to compliment the direct support it receives from High Tech High. While the program is bound to receive additional external funding from time to time, this additional revenue on which the program depends will be generated by the Adversity by Design Teacher Development Experience. Additionally, we would like to explore more traditional means, including: local school ADA funds[5], state programs like those for Career Technical Education[6], and long-term business partners.

Standards, Expectations, & Synchronicity

GRITLab methodologies are uncommon and are very different than what people are used to. For some students and parents, the first experiences in an Adversity by Design influenced program can be offputting. When the effects of the program are best seen and measured over a longer exposure, often 6-18 months, there is a significant risk of the program isolating itself. Thus considerable attention must be paid to managing the community perception and expectations of the program as well developing an infrastructure that encourages students and families to persevere through the initial shock. This is why growing GRITLab in an innovation friendly incubation space like High Tech High is key to its development.

The modern education debate has recently been compounded by a new set of standards. The Common Core standards, covering English Language Arts and Mathematics are being rolled out with a residual debate about their effectiveness. The Next Generation Science Standards, covering Science and Engineering, are also in the adoption and implementation phase. While these standards tend to support GRITLab Methodologies, it would be a great benefit to pre-emptively map both standards onto our own methodologies.

[5] Schools are funded by the state based, in part, on their Average Daily Attendance (ADA).
[6] State funding for schools is now allocated locally through the Local Control Funding Formula which improves the plausibility of state funding for this program.

Bright Spots

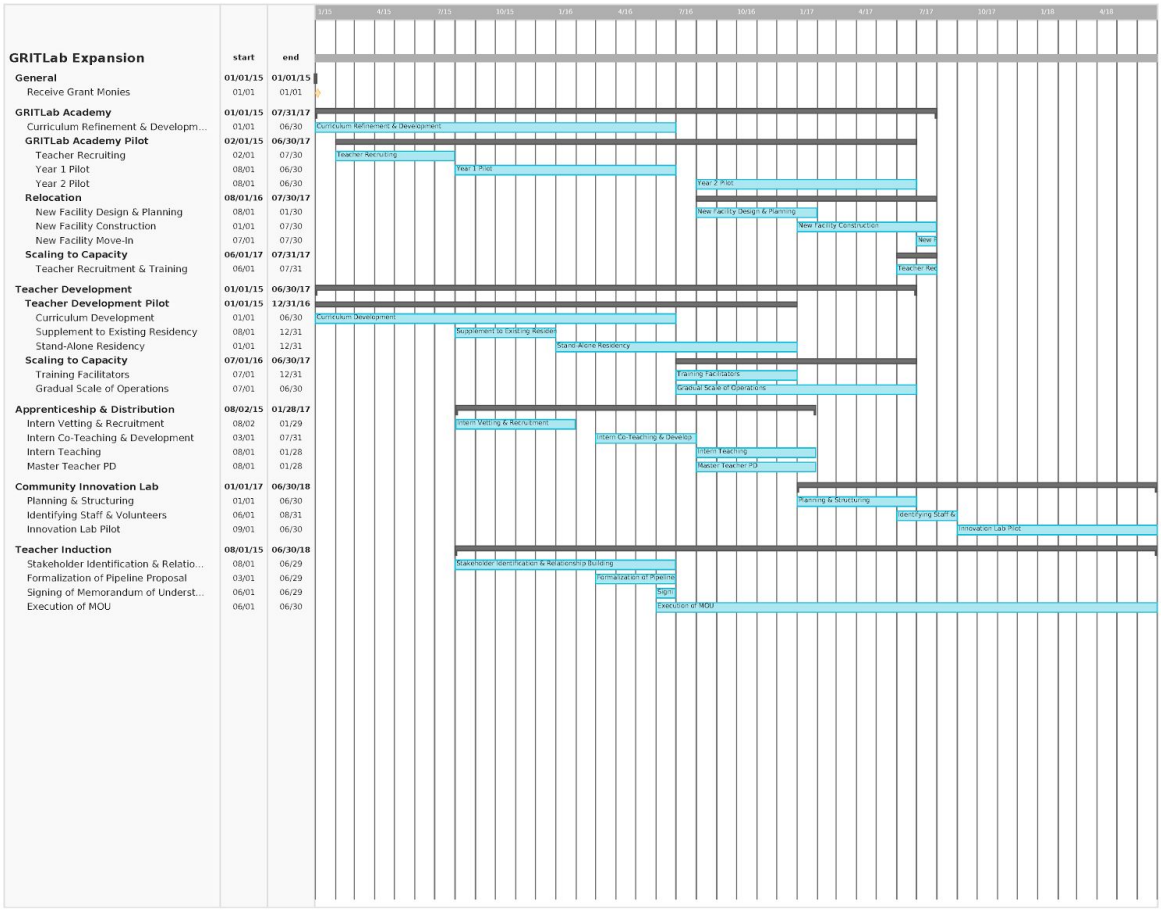
Dan Heath, co-author of the bestseller “Switch: How to Change Things When Change Is Hard”, talks a great deal about “Bright Spots” - or examples of where something is working. In contrast to our brain’s natural ability and inclination to solve problems, he instead lays out the benefit of modeling after successes. Let’s apply this to education.

We cannot force or push public education, as a whole, into a new way of thinking. It’s just too massive of an object - a culturally rooted, risk-averse, and controversially massive object. We can, however, create a Bright Spot that leads public education to a better place. A Bright Spot so bright - with such undeniably positive outcomes - that parents and educators are naturally drawn to it. I want that Bright Spot to be GRITLab. And when public education and parents come asking for support - we will be ready to welcome them with a functional Academy model, an *Adversity by Design* curriculum, the *Adversity By Design* Teacher Development Experience, and a developing pipeline of STEAMM professionals.

Appendix A: Project Budget

			Y1	Y2	Y3	Typical Year Thereafter
Inputs & Assumptions						
	GRITLab Teacher Development Experience	# of attendees	40	80	160	200
	GRITLab Teacher Development Experience	Net Income (/ attendee)	$250.00	$250.00	$350.00	$400.00
	GRITLab Academy	# of FTE Teachers	5	5	10	10
	GRITLab Academy	Professional Development Allocation (/ teacher)	$750.00	$750.00	$750.00	$500.00
	GRITLab Academy	Pilot Program Teacher Stipend (/ teacher)	$5,000.00	$5,000.00	$2,500.00	$0.00
	Community Innovation Lab	# of paying members	-	-	25	50
	Community Innovation Lab	Cost of membership (/ year)	-	-	$400.00	$500.00
Income						
	External Income	ADE Grant via PGAFF	$125,000.00	$80,000.00	$80,000.00	-
	External Income	Individual & Business Contributions	$0.00	$2,000.00	$4,000.00	$6,000.00
	External Income	Misc. Grants	$0.00	$3,000.00	$5,000.00	$5,000.00
	GRITLab Generated Income	Membership Dues (Community Innov. Lab)	-	-	$10,000.00	$25,000.00
	GRITLab Generated Income	Teacher Development Fees	$10,000.00	$20,000.00	$56,000.00	$80,000.00
		Total Income:	**$135,000.00**	**$105,000.00**	**$155,000.00**	**$116,000.00**
Expenses						
	General	Contract Services (Legal, Accounting, Financial)	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**
	General	Rent, Utilities, Overhead	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**
	General	GRITLab Director/Coordinator Stipend	$20,000.00	$20,000.00	-	-
	General	GRITLab Director/Coordinator Salary (50% FTE)	-	-	$35,000.00	$35,000.00
	General	General Expenses & Supplies	$4,000.00	$4,000.00	$4,000.00	$4,000.00
	GRITLab Academy - Maker Space	Tools & Equipment - Acquisition/Improvements	$50,000.00	$10,000.00	$25,000.00	**HTH - Pledged**
	GRITLab Academy - Maker Space	Lab Technician	**Volunteer**	**Volunteer**	**Volunteer**	**Volunteer**
	GRITLab Academy - Maker Space	Tools & Equipment - Maintenance	$1,500.00	$3,000.00	$3,000.00	**HTH - Pledged**
	GRITLab Academy	Teacher Salaries/Benefits	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**
	GRITLab Academy	Teacher Stipends	$25,000.00	$25,000.00	$25,000.00	$0.00
	GRITLab Academy	Support Staff	$20,000.00	$20,000.00	$20,000.00	$20,000.00
	GRITLab Academy	Relocation & Facilities Renovation	-	-	**HTH - Pledged**	-
	GRITLab Academy	Uncovered relocation expenses	-	-	$5,000.00	$0.00
	GRITLab Academy	Internal PD allocation - fees, travel, food	$3,750.00	$3,750.00	$7,500.00	$5,000.00
	GRITLab Teacher Development Experience	Instructors (Stipends)	$2,500.00	$2,500.00	$2,500.00	$2,500.00
	GRITLab Teacher Development Experience	Materials	$2,500.00	$2,500.00	$2,500.00	$2,500.00
	GRITLab Teacher Development Experience	Administration, Marketing, & Support Services	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**	**HTH - Pledged**
	Apprenticeship & Distribution	Administration, Marketing, & Support Services	-	-	$15,000.00	$20,000.00
	Apprenticeship & Distribution	Apprentice Compensation	-	Self-Raised	Self-Raised	Self-Raised
	Community Innovation Lab	Instructors & Mentors	-	-	**Volunteer**	**Volunteer**
	Community Innovation Lab	Program & Curriculum Development	-	$5,000.00	$1,000.00	$1,000.00
		Total Expenses:	**$129,250.00**	**$95,750.00**	**$145,500.00**	**$90,000.00**
		Net (Margin for Error):	**$5,750.00**	**$9,250.00**	**$9,500.00**	**$26,000.00**

Appendix B: Project Gantt Chart



[Link to live Gantt Chart]

Appendix C: Bio and resume of ADE

Having multiple educators in my family, I have always considered teaching a potential career path. In the fall of 2009, I took a sabbatical from my engineering career and began to explore that possibility. After a nationwide search for an educational idea or program I could embrace, my journey led me to High Tech High. I applied within days of my first visit. Since then, I have developed a unique engineering and fabrication program that pushes students to their limits, builds their perseverance, and develops their resourcefulness in preparation for a demanding future in today's STEM world[i].

Before my transition into teaching, my engineering career was focused on innovating within the industry as well as building a broad foundation of personal experiences and expertise. My engineering career began with the founding and operating of D-Sea Marine Electric, a marine design and construction company. I was then invited by a college professor and mentor to a Radio Frequency Identification (RFID) laboratory where I developed, fabricated, and marketed a mobile RFID enabled asset tracking device for the civil engineering division of Vandenberg Air-Force Base. I then relocated to San Francisco for an engineering position at Mazzetti Nash Lipsey Burch where I was instrumental in starting their energy services division. Within that division I managed energy contracts for Kaiser Permanente, oversaw a design and construction team for Fuel Cell startup Bloom Energy[ii], and petitioned the National Fire Protection Agency to modify their guidelines for isolated power systems. The division was also awarded a one million dollar federal grant to jointly develop energy monitoring hardware with Israel-based Panoramic Power. These experiences in the world of engineering not only developed my skills as an engineer, they have afforded me insight into how the professional world might serve as the ultimate outcome, and source of inspiration for, our current education system.

Prior to my arrival at High Tech High, I worked for Johns Hopkins Center for Talented Youth (CTY). The mission of the Johns Hopkins CTY is "To recognize and develop the world's brightest minds." Between the testing requirements (students must test in excess of the 95th percentile to enroll) and the cost of the program, CTY is exclusionary by design. In contrast, High Tech High employs a full inclusion model and "maintains a student body that mirrors the ethnic and socioeconomic diversity of the local community." As a result, students of all ability levels, demographics, and socioeconomic groups attend class together. While both CTY and High Tech High have their strengths, my experiences in both environments has broadened my perspectives and helped me define my priorities as an educator. Now, working at High Tech High with 9th graders, I am part of a multi-disciplinary team composed of Physics, Engineering, English, and Math that currently hosts a group of 64 students.

3754 ½ Curtis Street
San Diego, CA 92106

Scott Swaaley

805.878.1808
scott.j.swaaley@gmail.com

EDUCATION & LICENSING

B.S., Electrical Engineering: *California Polytechnic University, San Luis Obispo*

Licensed Professional Engineer, Electrical Engineering: *License: E 19326*

LEED Accredited Professional

Single Subject Teaching Credential: *Physics & Foundational Mathematics*

TEACHING EXPERIENCE

12th Grade & 9th Grade Physics Teacher — October 2011 to Present
High Tech High - Point Loma, CA

- Managed and operated manufacturing equipment including a woodshop and CO_2 Laser Cutter.

Academic Coach — February 2011 to September 2011
High Tech Middle Media Arts & High Tech High - Point Loma, CA

Instructor of Science and Engineering — Summer 2011 & Summer 2012
Johns Hopkins University, Center for Talented Youth - La Jolla, CA & Thousand Oaks, CA

- Developed curriculum for a project based science and engineering course, especially tailored for gifted students grade 6-7.
- Taught (2) 3 week summer courses.

ENGINEERING EXPERIENCE

Project Manager, Engineer, and Renewable Energy Consultant — June 2007 to February 2011
Mazzetti Nash Lipsey Burch – San Francisco, CA

- Designed electrical systems for the following environments: Healthcare, Data Centers, Institutional, Renewable Energy, and Commercial.
- Provided technical consulting, economic analysis, and contract management for Kaiser Permanente's Solar Initiative - totaling over $100 Million in contracts.
- Developed partnership with Silicon Valley fuel cell manufacturer (Bloom Energy, featured on 60 minutes). Managed electrical, mechanical, plumbing, architectural, and structural design teams for 7 installations.
- Researched and documented case studies including: an analysis of flywheel UPS systems in hospital data centers, a survey of existing operating room practices in relation to isolated power systems (as a lobby to the National Fire Protection Agency's annual code revision), and renewable energy feasibility studies.
- Developed partnership with Israeli-based energy firm leading to the acquisition of a $1 Million grant from the federal government for joint product development.
- Developed and managed a suite of renewable energy services within the company.
- Managed all proposals, contract administration, billings, client management, and two people.

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San Diego, CA 92106

Scott Swaaley

805.878.1808
scott.j.swaaley@gmail.com

Project Manager and Lead Engineer June 2006
L-3 Communications, EIS - Santa Maria, CA (contract position) to June 2007

- Researched, designed, and fabricated a mobile RFID enabled asset tracking device for the civil engineering division of Vandenberg Air-Force Base.
- Developed an active RFID based system to track I.T. assets in Okaloosa County School District, Florida.

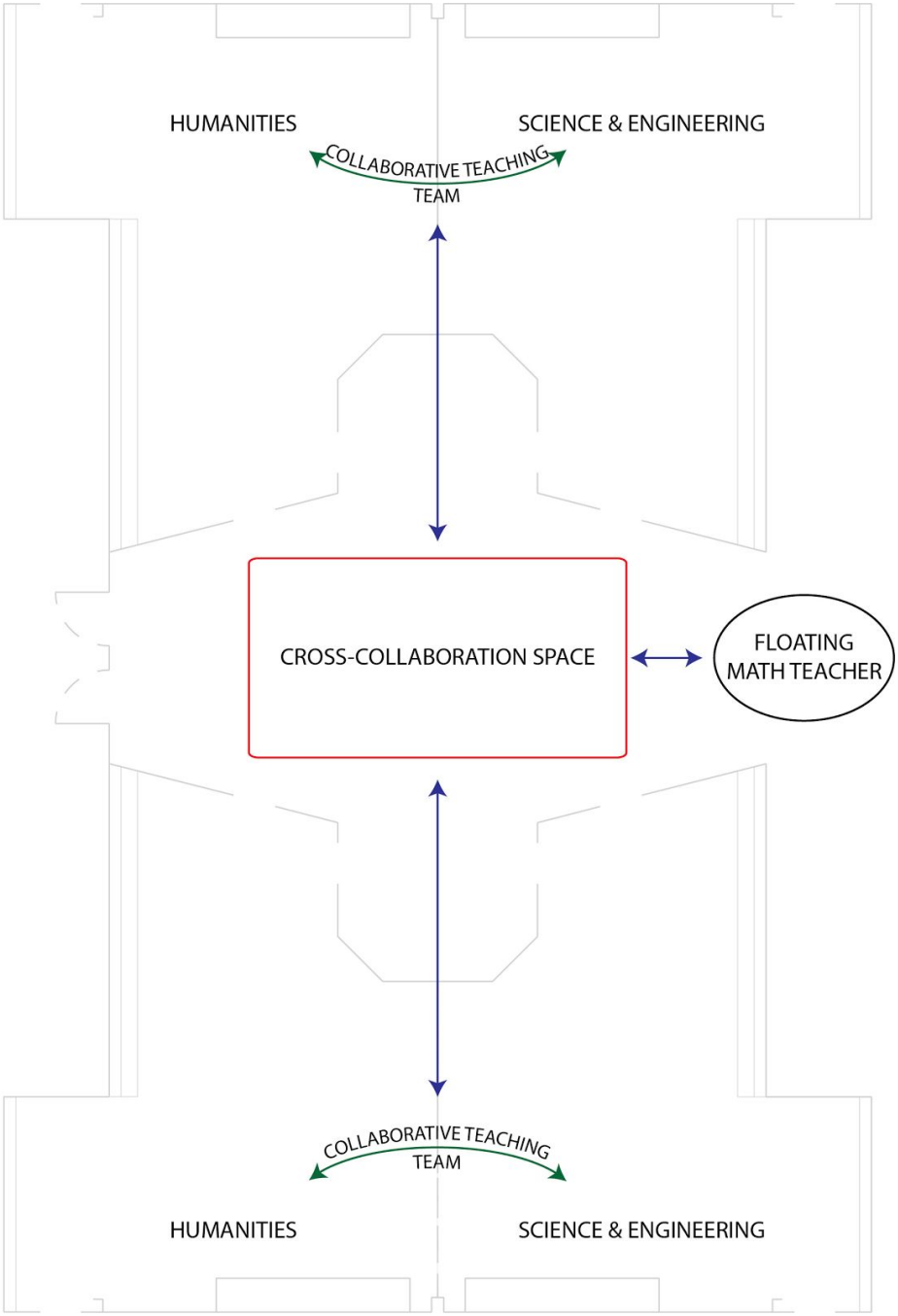
Owner & Operator March 2005
D-Sea Marine Electric - Morro Bay, CA to June 2007

- Designed, installed, and maintained high-end mobile power systems – specializing in yachts.
- Integrated different systems: Radar, GPS, DC & AC Systems, plumbing systems, & engine systems.

OTHER SKILLS & EXPERIENCE

- Received over $3,000 in education grants from McGraw Hill, The San Diego Foundation, and Donors Choose.
- Published in EC&M magazine (Electrical Construction and Maintenance – May 2012 - *The Truth Behind Energy Project Economics*)
- Organized and co-moderated a two-day international forum of energy experts (The Kaiser Energy Think Tank).
- Professional speaking engagements: EUEC 2009 - Phoenix, AZ; AIA 2009 - San Francisco, CA; EUEC 2010 - Phoenix, AZ; CleanMed 2010 - Baltimore, MD.
- Created and implemented approval processes and templates for economic analysis, contract review, site lease review, and business plan review for Kaiser Permanente's renewable energy procurement program.
- Developed an industry leading *avoided cost model* to aid in the analysis of energy projects. Presented to a peer group at the following professional conferences: EUEC 2010 - Phoenix, AZ
- Extremely proficient in MS Office: Excel, PowerPoint, Word.

Appendix D: GRITLab Academy Pilot - Physical Layout



Appendix E: Documentation of Involvement in Documentary Films



October 19, 2014

To Whom It May Concern:

I am a documentary filmmaker completing production on a feature-length film about education in the 21st Century. The film is due for release in January 2015. When we started shooting two years ago, education expert Tony Wagner recommended a number of schools for us to explore. Based on his recommendation, we travelled to High Tech High and consequently spent extensive amounts of time in Scott Swaaley's remarkable classroom.

We were lucky enough to film Scott's Wheel Project, which attempted to combine studies of physics, humanities and aspects of world civilization. We were especially struck by a number of unique features:

1) Students worked in groups of four.
2) Strong emphasis on depth of learning over breadth of content.
3) The goal of creating a physical representation of student work.

This last aspect was our main point of focus. Freshmen grew from being scared speechless at the beginning of the year to completing, in a semester, a stunning interactive gear that seamlessly demonstrated the combined efforts of each group of four. Under Scott's instruction, these new ninth graders produced what I can only describe as a piece of museum quality art. The project was an outcropping of a semester's worth of rigorous study that accurately documented not only what students learned about civilization, but how much they grew as learners and people.

We created a short clip of the wheel project for a handful of educators to view at a conference, and it has already been viewed approximately 11,000 times online. As we complete our film about Scott's classroom, we hope millions more will see it. Given our past success and the potency of Scott's story, we don't believe this is an unrealistic expectation. Further, the film which includes Scott's story is launching an accompanying education series and building an entire movement that we hope will change the conversation about education in this country.

Please feel free to contact me with any further questions.

Sincerely,

Greg Whiteley
Director: *Mitt, Resolved, NY Doll*
One Potato Productions
greg@onepotatoproductions.com

RACE TO NOWHERE
Reel Link Films
3527 Mt. Diablo Blvd. • Lafayette, CA 94549 • p 925.310.4242 • f 925.310.4239 • e info@racetonowhere.com
www.RaceToNowhere.com

The Paul G. Allen Family Foundation
505 5th Avenue South, Suite 900
Seattle, WA 98104

To Whom It May Concern:

It's my distinct pleasure to write in support of Scott Swaaley's grant application.

Over the last two years, I have followed Mr. Swaaley and the inspiring educators at High Tech High for my new documentary, *Think Again*. The film, which chronicles the stories of public schools at the forefront of educational change, features Mr. Swaaley prominently. It will undoubtedly showcase—in a richly visual manner—the innovative, hands-on learning practices he brings to the classroom. And I am also certain the film will convey not only Mr. Swaaley's commitment to his craft, but the deeply caring relationships he builds with his students.

Building on my past distribution success, I believe *Think Again* has the potential to reach a considerable audience and influence our national education conversation. My first education documentary, *Race to Nowhere,* reached an audience of millions with an unprecedented 7,000 public, community-hosted screenings in all fifty states and more than thirty countries. This fall, it also premiered on public television reaching 70% of U.S. households. The success of this film has established our brand as a trusted name among families, educators and youth experts.

Now *Think Again* is poised to reach an even broader audience. Beginning with a high profile festival premiere in 2015, we plan to distribute the film through theatrical screenings, town hall forums, professional conferences and television broadcasts, as well as future digital sales. To promote the film, we are tapping into our extensive network, which includes a database of hundreds of thousands of individuals, school districts, universities and other community organizations, as well as a robust following on our social media channels. Our hybrid distribution approach is part of a deliberate strategy to enhance real time, community engagement with the film and jump-start grassroots action.

We are excited to share the work of educators like Mr. Swaaley with communities across the country. By highlighting pioneering educators, we hope to paint a picture of what's possible in American education and inspire educational change from the ground up.

Please feel free to contact me for more information or sample scenes from the film.

Sincerely,

Vicki Abeles

vicki@reellinkfilms.com
(925) 310-4242