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Innovation within Education: Teaching and Scaling Engineering Design

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STUDIO: TESLA



YOUTHBRIDGE SEIC 2016 BUSINESS PLAN



EMPOWERING
YOUTH TO
CONNECT
LOCAL
RESOURCES
TO IMMEDIATE
PROBLEMS;
ONE DESIGN
CHALLENGE
AT A TIME



EXECUTIVE SUMMARY

ONE LINE PITCH:

"Empowering youth to solve the world's problems, one design challenge at a time."

SOCIAL ENTERPRISE SUMMARY:

In order to address the achievement gap that afflicts women and youth of color in America, Studio: TESLA counters this imbalance. Studio: TESLA mobilizes and cultivates a community of college students that establish after-school clubs for underserved youth that build STEAM literacies (Science, Technology, Engineering, Arts, and Mathematics) and critical thinking capacity through hands-on design challenges. Contrary to pre-set experiments, our curricula reinforces self-efficacy and guides our kids through ambiguity as they discover their own solution. We leverage the arts as a window to human expression, integrating cultural capital into our technical framework. Maximizing the creativity within urban youth, we enable them to become agents of change, with the sessions acting as catalysts for continued educational success. Studio: TESLA currently functions as a student group at Washington University in St. Louis, with over 50 WU student mentors, and we facilitate four after-school sites.

We are also developing an additional component to the organization for off-site learning. While Studio: TESLA clubs run once a week at each site, we acknowledge that youth can benefit from increased engagement. We will pair the design-thinking curricula with specialized kits, and rent them to customers at a certain rate. The kits we plan to utilize currently are only on the market for a full purchase, and we have seen that with our age range for youth, families and school may only desire to work with a certain product for a limited amount of time before they desire to move on. While our clubs give access to these products for a limited time, the rental kits offer the opportunity for continued connection and learning.

UNMET NEED:

Only 1 out of every 10 students in STEM is an underrepresented. Women make up 50% of the population, but less than 25% of the STEM workforce. Currently, there exists a school-to-prison pipeline, where minorities are often forced into lower educational opportunities from the start, often leading to increased likelihood in prison. These youth are rarely exposed to a possibility in a career pursuing STEM. The Missouri unemployment is 5.6%, despite the increase in technical jobs that lay vacant. Studio: TESLA provides a solution, a creation of a new pipeline, a pipeline toward innovation.

PRODUCT/SERVICES:

Through Studio: TESLA's engagement, our students become more knowledgeable about STEM principles, gain hands-on experience in problem solving, boost confidence in working in a team, surround themselves in a safe after-school environment off the streets, and receive collegiate mentors to help guide them in their pursuits. We produce our own curricula, building off the



experiences and education of our college students translated to interactive projects at the youth's learning level. This curricula and rental kits would then be offered through a subscription-based plan to organizations, school districts, and customers that seek to implement our program independently. With existing curricula and sources of funds for projects, Studio: TESLA provides the resources for branches to be created at colleges throughout Missouri, eventually becoming a national student group promoting equitable access to education.

CUSTOMER AND TARGET MARKET:

Our main form of revenue will be through donations from sponsors for each site, along with grants, with a wide availability for grants investing in STEM educational programs to engage youth in innovative learning environments. We seek donations from firms desiring to fulfill corporate responsibility requirements. These firms would better their reputation, enhance the education of their employees' children, and enter a network of high-achieving college students.

For sponsorship, we plan on reaching out to local STEM firms and organizations to find a sponsor for every site facilitated. Our target price is \$4000, with varying levels of sponsorships. A portion of this money would go directly into investing in funds to go to the site, but the rest would be allocated to overhead costs. In leveraging these firms to donate \$4000 toward the creation and sustainability of a site, we allow for an inflow of funds to come in. We have already identified and worked with two groups that would want to sponsor two sites for the 2015-2016 school year.

SUSTAINABILITY MODEL:

Each university has funds allocated for student groups, becoming a revenue source for each chapter. Engineering/STEM offices and schools seek programs that help build community. We have minimized internal costs by utilizing young college students seeking an opportunity to gain experience in communicating STEM material, classroom management, curricula production, and grant writing. We would connect TESLA workers with local engineering firms interested in new grads, incentivizing these firms to donate toward TESLA's efforts.

IMPACT VALUE:

Afterschool programs that engage students in strong STEM learning excite youth to enter these fields, develop STEM skills and proficiencies, and begin to see themselves as potential contributors to the STEM enterprise. Studies show that students participating in quality afterschool programs show gains in the school-day academic performance and increase likelihood of graduating from high school, especially for students that have fallen behind and need extra support and mentoring. The math achievement gap between low and high income students narrows when low-income students attend afterschool programs with greater frequency. There are 3.6 unemployed workers for every job in the United States. This compares to the one unemployed STEM worker for two unfilled STEM jobs throughout the country. Studio: TESLA fights generational poverty by equipping youth with opportunities for success.

COMPETITION:



Competitors in the field that are alternatives to Studio: TESLA don't match our ability to scale:

- STEMS for Youth: a student organization at Washington University in St. Louis that focuses on robotics
- Youth Learning Center: this program targets similar student populations in the St. Louis area revolving around an after school program offered at their site; curriculum focuses primarily on robotics and video game development
- Expensive STEM Programs: including programs such as Science Gone Mad (YMCA) and Youth Exploring Science (Science Center), these require students to undergo application processes and can be financially burdensome on families

With a focus on accessibility, scalability, and training, Studio: TESLA provides what many other organizations in the St. Louis area lack by providing free services to students and working with school districts to ensure success for students.

COMPETITIVE AND PROPRIETARY ADVANTAGES:

We will have copyright infringement policies on the curricula we create. We also make use of access to college students seeking to bolster their resume through experiences, while also being able to give back. By using college students, we severely reduce the overhead costs of administration.

Studio: TESLA's main proprietary assets come in the form of trademarking the intellectual property of our course curriculum. We will use some funds from this award to invest in the purpose of seeking out a trademark, paying lawyer fees and setting up the database. Additional projects will be continuously developed through our college student involvement, incorporating an organic flow of incoming curricula and an effective refinement process.

CONCEPT VALIDATION:

Studio: TESLA proved conception through our past year's execution. Studio: TESLA currently facilitates four after-school clubs, reaching 80+ youth on a weekly basis. Donors have invested \$8500 into TESLA for its continued success. Our model embraces scalability, enlisting college students to facilitate the clubs. We will expand through branches at St. Louis area colleges and universities that seek to bolster their STEAM outreach programs.

SALES/MARKETING STRATEGY:

Through evaluations and assessment, we will prove the impact we are having on students and will offer the same to neighboring schools. Social media/Facebook ads will be utilized to bring in more college students. Studio: TESLA will showcase success stories and experiences of students in order to bring in more students from the region and parents seeking similar experiences for their children. We currently have a relationship with Teach for America, and we hope to utilize this to push our efforts forward. They value what we bring, as we work towards cultivating a college student body around mentoring and teaching, gaining skills and a passion that could be transferred for TFA post-graduation.



APPROACH

MINORITIES AND WOMEN IN STEM

Microsoft reports that one in every five STEM majors decided to pursue their field of study in middle school while 4 out of 5 decided in high school or earlier. Minority and female youth often create internal biases due to external forces setting their own confidence in attaining success in these fields. Increasing the success rate of these populations in STEM has become a critical issue. Eighty percent of the jobs in the next decade will require technical skills, yet STEM jobs continue to go unfilled. By linking a population that faces educational inequity with the resources for higher economic achievement, Studio: TESLA inspires students to be the leaders and thinkers of tomorrow.

LACK OF TANGIBILITY IN APPLICATION THROUGH CURRENT MODEL

Studio: TESLA establishes the real-world applicability of STEM or STEAM. Students learn in the classrooms in order to narrow the achievement gap within disadvantaged students across the US. We aim to inspire youth at the age where many embrace or discard STEM as a potential career choice. Our hands-on model creates an environment where the youth engage in the material as an engineer would, utilizing the resources available to solve an immediate problem.

STEAM-BASED EDUCATION

Art and design serves a practical function, establishing a core around STEAM (STEM + Arts) principles. During the course of the design challenge, students engage in visualizing their concepts and expressing them to others. They think about the appearance, design, and usability of the solutions they create, sparking innovative ideas. This process promotes creative planning, as students brainstorm the engineering problems to create an artistic approach. STEM lessons naturally involve art; TESLA embraces this concept by putting design at the forefront. STEAM-based curricula allow our students to be motivated throughout the development of their solution, from reworking their blueprints to effectively communicating their concept.

PROFESSIONAL DEVELOPMENT TO INCENTIVE VOLUNTEER BASE

In mobilizing college students to run the execution of after-school clubs, we acknowledge the need in incentivizing this opportunity past a simple community service opportunity. We are developing a training module to provide our volunteers with clear skills, making TESLA a marketable experience in which college student desire to invest. With professional speakers tied with committee-based workshops (classroom management, diversity training, curricula design, budgeting process, etc.), TESLA presents an opportunity to gain real-world skills before they enter the workforce.



Studio: TESLA mobilizes college students to establish **dynamic after-school clubs** for underserved youth to build **STEAM** literacies and **critical thinking capacity** through hands-on design challenges.



Get in touch

email
wustl@studio-tesla.org

website
www.studio-tesla.org



Visit our website or ask for a form at school to enroll in Studio: TESLA. See you there!

STUDIO: TESLA



think. design. create.

How does

Studio: TESLA work?

Studio: TESLA is a free weekly after-school club that encourages creative thinking through STEAM-based projects. All of the scholars benefit from consistent attendance and active participation.



Boost creativity

Hands-on design challenges



Work in teams

Learn about STEAM
(Science Technology Engineering Arts Math)

Innovate

Join competitions

Improve problem solving skills

Why is Studio: TESLA valuable?

Minorities in STEM
Only 1 out of 10 students in STEM fields are from minority populations



Female Representation
Less than 1/4 of professionals in STEM fields are women



Mentorship
Role models from similar social situations boost confidence



Design Thinking
80% of students prefer learning that emphasizes creativity and innovation





STUDIO: TESLA

Applications due
September 9th!

Studio: TESLA mobilizes college students to establish after-school clubs for underserved youth to build STEAM literacies and critical thinking capacity through design-thinking challenges.

WHY should you get involved?

MINORITY REPRESENTATION
Only 1 of 10 professionals in STEM fields are from minority populations

DESIGN THINKING
80% of students prefer learning that emphasizes creativity and innovation

MENTORSHIP
Role models from similar social situations boost confidence

HOW can you be involved?

JOIN A COMMITTEE!
Operations - facilitate fun weekly projects at area schools

Enrichment - plan design-thinking curriculum to implement

Communications - recruitment and outreach

Resources - treasury

More information

APPLY & FIND OUT MORE:
studio-tesla.org

GET IN TOUCH:
wustl@studio-tesla.org

INFO SESSION
Thursday, Sept. 3rd @ 6 pm
Seigle Hall, 104



EXECUTIVE TEAM AND SUPPORT

NAME: NICK OKAFOR [CLASS OF 2016]
HOMETOWN: DALLAS, TX

POSITION: FOUNDER, CEO, PRESIDENT
MAJOR: MECHANICAL ENGINEERING & SUSTAINABLE DEVELOPMENT



BORN TO AN ENGINEER AND A TEACHER, BOTH IMMIGRANTS COMING FROM NIGERIA, NICK GREW UP UNDERSTANDING THE POWER OF A STEM EDUCATION. AS A PARTICIPANT OF SEVERAL YOUTH ENRICHMENT PROGRAMS, NICK VALUED THE SKILLS GAINED AND LESSONS LEARNED, BUT MOST IMPOTANTLY THE CONFIDENCE ACQUIRED. WHEN HE REALIZED THERE WAS A GAP IN STEM OUTREACH ON CAMPUS THAT FOCUSES ON BOOSTING PROBLEM-SOLVING SKILLS, NICK SOUGHT TO CREATE TESLA AS A MODE TO GIVE COLLEGE STUDENTS THE CHANCE TO GIVE BACK TO THE COMMUNITY AND GAIN MARKETABLE EXPERIENCES. HAVING HOSTED A FESTIVAL IN 2012 ABOUT THE POWER OF A STEAM [STEM + ARTS] EDUCATION, NICK ENSURED THAT DESIGN AND AMBIGUITY WOULD BE CORE TO TESLA'S CURRICULA. AMAZED AT WHAT HE ACCOMPLISHED IN JUST ONE YEAR, HE ASPIRES TO HAVE A TESLA CLUB IN EVERY MIDDLE SCHOOL IN THE NATION.

EXECUTIVE PARTNERSHIPS

The following groups and organizations have established formal and informal relationships with TESLA, providing resources, guidance, and support, as we maximize our potential to transform after-school education in the nation.

SAINT LOUIS PUBLIC SCHOOLS SYSTEM

BEZOS FAMILY FOUNDATION

GEPHARDT INSTITUTE FOR PUBLIC SERVICE, WASHINGTON UNIVERSITY IN ST. LOUIS

TEACH FOR AMERICA

JACKIE-JOYNER KERSEE FOUNDATION



NAME: ELISEE BIAYI [WU CLASS OF 2018]

**HOMETOWN: KINSHASA, DEMOCRATIC
REPUBLIC OF CONGO**

POSITION: VP OF COMMUNICATION

**MAJOR: UNDECLARED MAJOR //
ENTREPRENEURSHIP**

Born in the heart of Kinshasa and raised in St. Louis, Elisee is certain that technology is at the heart of innovation today. As Vice President of Communications, Elisee works alongside the Studio: TESLA Communications Committee in outreach and support to the Executive Board, Washington University in St. Louis communities, the St. Louis metropolitan area, and most importantly, Studio: TESLA Scholars and families. Success stories that result from TESLA is similar to Elisee's personal story and she believes organizations like this are paving the way for underprivileged youth to discover, love, and be transformed by what they learn; equipping them to be future leaders of companies and nations.



**NAME: MADISON WILSON
[WU CLASS OF 2018]**

HOMETOWN: BALTIMORE, MD

POSITION: VP OF OPERATIONS

**MAJOR: URBAN STUDIES // BIOLOGY AND
ART**



As Vice President of Operations for TESLA, Madison works to support and oversee the group's Site Directors and operations volunteers in their direct efforts at the schools and the various organizations in which TESLA has been implemented. Her operations team is dedicated to ensuring that TESLA volunteering is as effective as possible, maintaining close communication with community contacts within each site and troubleshooting any issues that Site Directors have in implementing TESLA curricula. Before joining TESLA, Madison spent two years as an executive board member for the organization City Faces, a non-profit dedicated to tutoring and mentoring kids living in the Clinton-Peabody public housing development of downtown St. Louis.

NAME: LEMOINE JOSEPH [CLASS OF 2018]**POSITION: VICE PRESIDENT OF RESOURCES****HOMETOWN: WILLIAMSVILLE, NY****MAJOR: MATHEMATICS // CHEMISTRY**

As the Vice President of Resources for TESLA, Lemoine works to facilitate the internal development of organization by implementing and analyzing evaluation procedures for participants and volunteers. He is also responsible for reaching out to various community partners to provide participants with alternative summer mentoring and educational resources during the summer and to address the needs of the several committees within TESLA. Before joining TESLA, Lemoine served in several leadership positions within his university including being a member of Lock and Chain Sophomore Honorary - Washington University's unique sophomore honorary and as the Producer for Black Anthology - Washington University's oldest cultural production.

**NAME: SADE ODUMUYE [CLASS OF 2016]****POSITION: VP OF ENRICHMENT****HOMETOWN: MINNEAPOLIS, MN****MAJOR: MECHANICAL ENGINEERING // ENERGY**

As leader of Studio: TESLA's Enrichment Committee, Sade works to support the committee's development of project based curricula that will be utilized at the various school sites. By placing an emphasis on exploratory hands on learning, she hopes to support the inquisitive and fun loving nature of kids while simultaneously developing their problem solving skills and critical thinking. As a young adult, Sade participated in summer programs geared towards developing interests in math and science in girls. Opportunities such as these were crucial in her decision to pursue Engineering, and she believes that it is necessary to provide a similar foundation for all young students.



NAME: HANNAH RAMSAYWAK
[CLASS OF 2018]

HOMETOWN: HOUSTON, TX

POSITION: VP OF TREASURY

MAJOR: CHEMICAL ENGINEERING
[PRE-MED]

Hannah has been involved in programs promoting STEM fields to underrepresented groups for the last few years. She is one of the founders of Alpha Omega Epsilon Beta Xi chapter, an engineering and technical science sorority on the campus of Washington University. This group promotes women in engineering and science fields. She has in depth experience with start up organizations and allocating funds to the betterment of new groups. She works with her Treasury committee to develop a budget that allows TESLA to grow and impact the students in the most efficient manner. She also works to improve the structural integrity of TESLA by funding team events such as member workshops. She and her committee are dedicated to finding funds to further expand Studio: TESLA.



ADVISORY BOARD

The following people have actively voiced support for TESLA and stand on our Advisory Board as we continue to scale this initiative to empower youth and build critical thinking capacity.

BOB FOX, MBA: FOUNDER OF NEWSPACE INC., CASA DE SALUD

ROBYN HADLEY: ASSOCIATE VICE-CHANCELLOR, WASHINGTON UNIVERSITY

JEDIDAH ISLER*, PH. D: SYRACUSE CHANCELLOR FELLOW; NASA-SPONSORED

DANIELLE N. LEE*, PH. D: URBAN SCIENTIST; WRITER FOR SCIENTIFIC AMERICAN

JENNI HARPRING, MSW: PROGRAM MANAGER, GEPHARDT INSTITUTE FOR PUBLIC SERVICE

AOMAWA SHIELDS*, PH. D: NSF ASTRONOMY FELLOW; FOUNDER OF RISING STAR GIRLS

*denotes being a 2015 TED Fellow, part of global network of 300 innovators from a variety of disciplines



OPERATIONS PLAN

PRODUCT

From a business standpoint, TESLA thrives by creating two products: project based curricula and volunteer teaching services. While an integration of these two facets is ultimately provided for the customer, it is important to note the differences in their development internally. Within each Studio: TESLA chapter exists an Enrichment Committee and an Operations Committee. The Enrichment Committee is primarily responsible for the research and development of curricula, whereas the Operations Committee deals with the training of the volunteers and logistics of each school site. The production of formatted projects by the Enrichment Committee can be viewed as internal products, which are then implemented by the Operations Committee to create TESLA's overall external product.

Based on the current model set forth by the Washington University Enrichment a four-week cycle is used to supply the project-based curricula. Working in small 2-3 person groups, college students use past experiences, external resources and creativity to construct design challenges and fun learning projects. Weekly committee meetings are held to facilitate peer editing between the small groups, and at the end of the month materials are provided to practice the projects. During this time, members of the Operations Committee are encouraged to join in order to provide additional feedback. After collaborating with the volunteers, the projects are typed into an easily understandable format and added to the TESLA database where they are saved for future access. As new TESLA chapters are created, this database will continue to grow as projects are continuously added.

Each respective chapter will be responsible for acquiring the funds necessary and taking inventory of the materials used for the basic projects. Through our experience over the last two semesters, these materials often include items such as wooden dowels, batteries, string, paper plates, etc. Currently, Washington University's Institute for School Partnership (ISP) has been generous in providing TESLA access to materials from the MySci resource center. This in conjunction with the use of fundraised money has allowed for the purchases of necessary materials. As new TESLA chapters are initiated, similar acquisition of materials and funds will be followed at their respective locations.

In addition to the general projects created and produced by the chapters, the growth of TESLA will lead towards the implementation of additional premium enrichment supplies. These supplies would include more expensive project kits such as littlebits, and would be kept in inventory at the national level, with each individual chapter having the opportunity to borrow out these higher quality materials for specified amounts of time to use at their local sites.

Quality control of TESLA's products consists of survey questionnaires from the volunteers, students and the school's instructors. These surveys provide helpful feedback and constructive criticism to ensure that the curricula are easy to understand and implement from the volunteer's position, interesting to the students, and educationally beneficial from the school's perspective.



This information is analyzed by the VP of Resources and will be used to continuously improve upon TESLA's products and performance.

ORGANIZATIONAL CAPACITY

Volunteers: TESLA currently consists of a network of approximately 50 undergraduate and graduate Washington University student volunteers who are passionate about investing in the youths living in their communities. In the future, each TESLA chapter will need at least 36 students to be successful. The necessary network of volunteer positions is outlined below:

Each TESLA chapter is led by an executive board consisting of the Chapter President and CORE Team, which is made up of Vice Presidents of Communications, Operations, Resources, Enrichment and Treasury. Each member of the executive board works to ensure that all facets of TESLA, within that chapter, are coordinated and in close communication with each other to ensure smooth operation.

Each Vice President, excluding the Vice President of Resources, is in charge of a committee or sub-group of volunteers within the chapter.

CHAPTER PRESIDENT

The Chapter President provides directional lead for all operations within their respective Studio: TESLA chapter. They communicate with various organizational leads, manage external partnerships and seek future connections with the community. They manage and support the Vice Presidents in their duties as well lead weekly meetings with the Vice Presidents to discuss the progress made. The Chapter President is also in charge of providing insight on the progress of Studio: TESLA, and handling internal conflicts.

VP OF COMMUNICATIONS

The Vice President of Communications leads a committee of 2 volunteers to increase university awareness of Studio: TESLA by distributing promotional materials, advertising fundraising events, and advertising during periods of new volunteer recruitment at the beginning of each semester. The committee focuses on both web and media development (increasing the chapter's online presence through social media networks like Facebook and Twitter) as well as TESLA relations (all communication between Studio: TESLA and chapter university).

VP OF OPERATIONS

The Vice President of Operations leads both Site Directors and Direct Volunteers in their volunteering efforts. Operations volunteers are directly in charge of implementing TESLA curriculum to participants and guiding them through projects. Operations volunteers consist of 3 Site Directors, one for each site, and 12 Direct Volunteers, 4 for each site.

VP OF ENRICHMENT



The Vice President of Enrichment guides the Enrichment Committee of 10 volunteers in their efforts to develop TESLA curricula. They work to ensure that TESLA develops a database of curricula to be implemented in the various sites and works with the operations volunteers to ensure that curricula in this database are effective when implemented.

VP OF TREASURY

The Vice President of Treasury leads a Treasury Committee of four volunteers to oversee the chapter's financing. This committee is in charge of securing any necessary grants, in kind donations, or other sources of funding necessary for a chapter's operation.

VP OF RESOURCES

The Vice President of Resources works to create and implement evaluation procedures to continuously assess and improve TESLA operations. They also work to bring any necessary trainings to TESLA committees and volunteer groups, including classroom management training for volunteers in the Operations Committee and Adobe Creative Suite training for the Communications Committee.

VOLUNTEER TEAM

Below is an example of a training session that an Operations Volunteer would experience, an application of Teach for America's "Teaching as Leadership Framework" to TESLA programming. The majority of middle school TESLA participants attend under-resourced public schools, especially when compared to public schools in wealthier school districts just a few miles away. Teach for America stresses this set of principles, outlined in their "Teaching as Leadership Framework" when working with kids in under-resourced schools who are often fairly behind grade level in many aspects of their educations.

"SET BIG GOALS FOR STUDENT ACHIEVEMENT"

Have high expectations for participants. Having big goals for participants can inspire participants to form greater goals for themselves.

"INVEST IN STUDENTS AND FAMILIES"

In the context of TESLA, this means that Direct Volunteers and Site Directors should have direct communication with participants' teachers and other community members at the various sites. Attend parent/teacher association meetings to ensure that families are aware of TESLA programming in their child's school and to get parents interested in the TESLA mission.

"PLAN PURPOSELY TO ACHIEVE STUDENTS' GOALS"

Plan backwards from where you want TESLA participants to be after a year or a semester. If you want participants to be able to design and build robot arms at the end of the semester, work towards that goal with projects that allow participants to cultivate the scientific knowledge and problem solving skills necessary to build an arm.



"EXECUTE EFFECTIVELY AND ADJUST WHEN NEEDED"

Be willing to alter the plan should an issue come up. Be reactive to the progress of students and be aware of participants' needs during projects.

"IMPROVE TO ACCELERATE STUDENT LEARNING"

Constantly review how things went during your sessions with participants and look for ways to improve the way that you implement TESLA curriculum or the curriculum itself.

"WORK CONTINUOUSLY TO OVERCOME CHALLENGES"

If you have a problem with a particular participant's participation, work with that child to find a solution to whatever issue they might be having. If you are struggling to keep high attendance numbers at sites, make sure that you work to address that by speaking with teachers and parents to employ their aid in fixing the problem.

PROJECTED PAID POSITIONS

After year one of our business plan, TESLA will add several paid positions to oversee TESLA's development as a national organization. These positions will facilitate TESLA's growth and expansion to other universities and sites around the country. Many of these positions are part time and will be marketed to post-graduates and graduate students interested in public service, education, and non-profit management.

CEO:

In year two of our business plan, TESLA will have a full-time paid CEO in charge of new chapter acquisition beyond the St. Louis metropolitan area, coordinating activities at various chapters and establishing TESLA as a non-profit organization. Following year two, the CEO will work part-time to direct TESLA programs occurring at the various chapters in which TESLA has been established.

NEW CHAPTER ACQUISITION ASSOCIATE:

In year three of our business plan, TESLA will bring on a part-time New Chapter Acquisition Associate who will work to establish new TESLA chapters at universities across the country. They will also work with newly established chapters to help keep them on track financially and in their establishment as student groups to help ensure their success.

PUBLIC RELATIONS AND DESIGN ASSOCIATE:

The part-time Public Relations and Design Associate will also be established in year three to head national communications campaigns and manage TESLA's national social media presence.

SUMMER ASSOCIATE:

Part-time national positions will not be active during the summer, so this intern works to aid the CEO in TESLA operations during summer months while public schools and universities are not in session. This intern will also work to facilitate the transition between the summer and the school year, as public elementary, middle and high schools often begin classes several weeks before colleges and universities are in session.

FUNDRAISING ASSOCIATE:

This position will be established in year five of our business plan, as TESLA requires more operational funds. This associate helps to secure grants, donations and other funds to help sustain national expenses as TESLA continues to grow.

LEGAL ENVIRONMENT

As Studio: TESLA continues to expand and contract its services to high-income school districts and private schools, we will secure trademark protection and copyright enrichment materials.

In addition, we plan on setting aside funds to execute background checks for Studio: TESLA volunteers and employees in future years to ensure that we are enlisting the best possible people in our mission. We also distribute liability waivers, permission slips and photo-releases to both school and parents to ensure TESLA's legal safety in its operations within sites.

MARKETING PLAN

ADVERTISING

Best forms of advertising include word of mouth, school district direct contacts, newsletters to science and math teachers, and brochure mailings to families. For TESLA Scholars, advertising once a new site has been confirmed includes flyers in the schools, classroom visits, announcements on the overhead during the school's daily announcement times and media sites where students can follow or like the TESLA organization.

MARKET SEGMENTATION

Subsets of market include school districts, parents, scholars, donors, and TESLA teams. Each subset is distinguishable and has specific needs so it is the responsibility of the TESLA Core Team to establish a method of reaching each target group. School districts, parents, and donors require a formal approach while scholars and TESLA teams (direct volunteering, enrichment, treasury, communications, resources) require a friendly approach during crucial targeting times such as the beginning of the academic school year.

SOCIAL MEDIA

TESLA should have pages on every major networking site including Facebook, Twitter, and Instagram. Facebook and Twitter should have links to current articles about STEM in the global economy as well as facts, statistics, and further information on minority and underrepresented



individuals in the STEM fields. Instagram will serve a similar role (in a visually pleasing manner) as well as featuring pictures live from TESLA sites of projects and scholars. Announcements about application deadlines, donors, and more can be found on any of the social media pages.

OPPORTUNITIES FOR MEDIA

Creation of a website is essential to helping TESLA expand outside of its first city of location and to keeping people informed in general. Website content should include an overview of TESLA, testimonials, contact information, current events, pictures, and bios. As the website gains traction through website traffic, selling advertising on the website for STEAM related materials will become an opportunity to make additional funds for the organization.



MARKET ANALYSIS

Studio: TESLA empowers disadvantaged youth, minority students and women to foster creativity, innovation, and critical thinking skills, enabling them to succeed in STEM fields.

Studio: TESLA's immediate target market is at risk students in grades 6-8 in St. Louis, Missouri. As TESLA continues to grow, the vision that the founder and CORE Team have developed will ensure that at risk youth across the country have exposure to STEM principles that will help them be college and career ready.

With less than 60% of black boys graduating high school and Hispanic boys at slightly higher rate of 65%, there is an apparent discrepancy when these values are compared to the 80% of white boys who graduate from high school in the USA (<http://blackboysreport.org/>). Additionally, 5 in 10 Native American females, 4 in 10 African American females, and 3 in 10 Hispanic females all drop out of high school (<http://dayofthegirl.org/girls-issues/u-s-girl-dropout-crisis/>) according to the national toll.

Across the nation, school districts see drops in student achievement during the 6-8 grades, making this period the most critical for disadvantaged students. TESLA believes that by targeting this age group and helping students find appreciation in STEM fields during this period, students will be more likely to pursue STEM related in high school and beyond.

TESLA is currently tackling the problem of achievement gaps by approaching it through the non-profit educational sector. TESLA creates curriculum that is implemented as a tool in after school programs at targeted middle schools in St. Louis City. The three current sites are Brittany Woods Middle School, Fanning Middle School, and City Faces. With 50 members, TESLA is rapidly growing and investments will enable TESLA to extend resources to more middle schools in St. Louis, Missouri, and the U.S.

MISSION COMPETITORS

TESLA has two major mission competitors in the St. Louis area. Although similar in mission statement, TESLA differs from its competitors in that we offer services on site, curriculum made, led, and distributed by students, and a space where middle-school college mentoring matches can be cultivated.

YOUTH LEARNING CENTER

Alternatively, Youth Learning Center: "provides unique academic and enrichment experiences for youth from underserved communities to inspire lifelong learning, social responsibility, and moral leadership. Their goal and YLC's continued goal is to have each child achieve his or her God-given potential, and to facilitate that, the center provides a rigorous after-school program and an engaging summer camp program" (<http://www.ylc-stl.org/about.cfm>). This program targets similar student populations in the St. Louis area revolving around an after school program offered at their site; curriculum focuses primarily on robotics and video game development.



YOUTH EXPLORING SCIENCE

Additionally, Youth Exploring Science (Science Center) serves "to ignite and sustain interest in and understanding of science, technology, engineering, and mathematics learning throughout the community." YES strives to increase participants' interest in science, math, engineering and technology and to build process skills through innovative programming that includes a rich variety of opportunities and experiences (<http://www.youthexploringscience.com/mgo>). This program require students to undergo an application processes and can be financially burdensome on families and their target group is high school students and not middle school students.

CAMPUS COMPETITORS

- STEMS for Youth: a student organization at Washington University in St. Louis that focuses on robotics education for St. Louis youth; also previous SEIC winners
- Science Olympiad: works with middle school students to help them master various sciences so they can have the opportunity to participate in Science Olympiad tournaments
- National Society of Black Engineers Pre-College Initiative: aims to increase the number of black engineers who succeed academically, excel professionally, and positively impact the community; reaches youth in community through one week outreach event per year
- City Faces: a program that works with children, teenagers, and young adults living in public housing in the city of St. Louis by hosting an after-school studio

INDUSTRY COMPETITORS

With a focus on accessibility, scalability, and training, TESLA provides what many other organizations in the St. Louis area lack by providing free services to students and working with school districts to insure success for students. Two industry competitors on TESLA's radar are Science Gone Mad sponsored by the YMCA and STEMs for Youth.

GROWTH POTENTIAL

Current demands for organizations like Studio: TESLA can be seen across the nation. With the growths in urban populations and the increase in poverty and unemployment rates, underrepresented families across the U.S. are hurting. Many minority groups do not have free access to fun educational clubs like TESLA. In St. Louis alone, corporate headquarters of companies like Boeing and Monsanto are willing to hire STEM focused people; however, local, minority individuals are not filling as many of those seats as they could. TESLA builds confidence



in St. Louis' youth by teaches students they are capable of success. The problem solving tools that students acquire from Studio: TESLA prepare them for STEM futures and futures in other fields as well. TESLA Scholars learn things that they can apply to any aspect of their lives.

For a venture of TESLA's current size, growth potential can be expected to quadruple over the next 3 years. As TESLA begins to reach into other cities similar to St. Louis, the impact will be huge. As TESLA continues to serve underrepresented areas in the United States, exposing the youth in these areas to science, technology, engineering, and mathematics, it serves as a benchmark to a national force of promoting educational access. At the current pilot hub at Washington University in St. Louis, there are 50 members who have joined TESLA since its creation in September 2014. The CORE Team expects to see that number increase by at least 15 new members next school year. Additionally, TESLA is currently exploring ways in which other organizations will be able to partner with us in the future. This includes the use of TESLA curriculum without the need of a TESLA site. In the future, selling curriculum will play a major role in TESLA's growth, as well as the establishment of sister sites across the U.S.



FINANCIAL PROJECTIONS

DIVERSE REVENUE TYPES

TESLA has several diverse revenue streams including tuition and curricula donations (earned revenue), grants and other donations. To clarify our model for generating revenue, we offer two different types of after-school programs: the ones offered free-of-charge at underprivileged, lower-income schools and those where schools pay tuition in order to incorporate the TESLA program. We are also in the process obtaining a trademark and copyright for our organization in order to package and sell our program curricula to various school districts. Other sources of revenue can be generated from non-profit afterschool programs that are willing to contract our organization's services.

FINANCIAL SUSTAINABILITY

The goal for TESLA is to become financially sustainable in year five. By this point in time, our organization plans to have 8 revenue-generating sites both inside and outside of the St. Louis metropolitan area. Based on prior experience from the past year of executing TESLA and models from organizations that provide comparable services, a reasonable rate that we would charge at each revenue-generating site would surmount to \$6000 in revenue per site per year. We determined this price by charging \$150 per student with an average of 20 students per site for 10 one-hour sessions per semester with semesters occurring each year. The revenue generated from these sites would be used to help fund staff salaries following year 3 and handle the operational costs for expanding into new chapters (e.g. new chapter acquisitions budget, chapter startup matching funds, insurance and liability costs, etc.)

POTENTIAL TO GROW AND SCALE

Once TESLA receives a 501c(3) and a centralized base, our executive team has the experience and determination necessary to expand our model outside of the St. Louis metropolitan area. We have found our model to be very applicable to various schools regardless of socioeconomic status because many of the materials required for our curriculum can be found in common crafts stores or even a typical household (e.g. plastic kitchenware, cardboard paper, clothes hangers, PCP pipes, etc.), which minimizes the overall cost on equipment expenditures. We have become increasingly more established in St. Louis by establishing four non-revenue producing sites and a fifth the following year. Internally, we started six months ago as merely an idea and have grown into an organization of 5 committees with more than 50 members involved.

As Henry Ford once said, "Thinking is the hardest work there is, which is probably the reason so few engage in it." One of TESLA's major goals is to advance the critical thinking skills of underprivileged populations through the means of fun and exciting projects related to the STEM field. While we also want to increase representation of these communities in related career fields, we also understand the success of the TESLA program extends far beyond measuring



career trends. If students are able to take the skills that they learn through our program and apply them to various other aspects for their lives to make an impact, we have achieved our goal.



APPENDIX

FINANCIALS

Use of Funds (Current + Future):

Use of Funds	Specific Activity	Funds Req.	Deliverable	By
Technology/ Equipment	We hope to bring in new sets of technology every year, with our sites able to develop new curricula based in these and adapt to them. This will also increase the base of the kits we will be able to rent	\$30,000	The deliverable is the purchase and maintenance of the technology that we use for the clubs to engage youth.	Year 2
Equipment Maintenance	Since these kits will be going out to our sites and others who will pay to rent, we assume we will need a fund to assist in replacing certain parts that break or go missing.	\$9000	The deliverable is the maintenance of the technology that we use for the clubs to engage youth and rental kits.	Year 5
Marketing and Publicity	In order to spread the word about Studio: TESLA and inform populations of our rental kit service, we should invest money into our website, social media, and printed materials.	\$5000	The deliverable is the website, online media presence, and availability of printed materials for our own advocacy.	All Years
Intellectual Property Plan	Seeking out a trademark and paying lawyers to protect the curricula that we would create and lease out	\$2000	The deliverable is the protection of our projects.	Year 2
Chapter Start- up Fund	This is a fund set to help start up new chapters once one has been settled. A \$500 fund will be available once \$500 has been raised by the new chapter, and this total \$1000 will be enough to purchase a set inventory for their projects.	\$2500		All Years
Physical Site	Leasing a physical sites to hold supplies, act as central working point when we branch out, host training sessions, and bring in donors. Based on TechArtista prices.	\$7500	The deliverable is the physical site for TESLA, acting as an official nonprofit that	All Years



		manages school chapters.
Total Initial Capital Needs	56,000	

Financials	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Sponsorship	\$6000	\$8000	\$10000	\$12000	\$14000
Rental Kits		\$1200	\$2400	\$4800	\$5000
Expenses					
Chapter Start-up Fund	\$500	\$500	\$500	\$500	\$500
Technology/Equipment	\$10,000	\$5000	\$5000	\$5000	\$5000
Equipment Maintenance		\$1500	\$2000	\$2500	\$3000
Marketing and Publicity	\$1000	\$1000	\$1000	\$1000	\$1000
Physical Site	\$1500	\$1500	\$1500	\$1500	\$1500
Staff/Overhead	-	-	-	-	-



Sample Chapter Budget for General Inventory for One Semester

Project	Description of item	Quantity	Individual Cost	Projected Cost
Advertisement	flyers	100	-	36.99
	Web promotion			
Roller coasters	foam tubing	6	\$13.25	\$79.50
	marbles	1	\$6.52	\$6.52
	tape	3	\$2.70	\$8.10
	scissors	20	\$2.08	\$41.60
	plastic cups	1	\$2.28	\$2.28
Paper Glider	copy paper	1	\$5.00	\$5.00
	scissors	-	-	-
	pencils	1	\$5.93	\$5.93
	rulers	5	\$0.42	\$2.10
	paper clips	1	\$6.00	\$6.00
	stop watch	4	\$8.59	\$34.36
Racing Boats		-	-	-
	heavy cardboard	2	\$5.35	\$10.70
	pebbles/metal washers	1	\$4.50	\$4.50
	plastic tubs	1	\$16.62	\$16.62
Mechanical Grabber	clothes hangers	1	\$15.99	\$15.99
	string	4	\$3.49	\$13.96
	rubber bands	1	\$15.20	\$15.20
	duct tape	4	\$3.49	\$13.96
	PVC pipe	20	\$4.25	\$85.00
	wooden dowel	20	\$1.23	\$24.60
PaddlePower	wide container			\$0.00
	copy paper			\$0.00
	duct tape			\$0.00
	washers			\$0.00
	straws	1	\$5.02	\$5.02
	wooden skewers	1	\$1.54	\$1.54
	paper towels	1	\$9.59	\$9.59
	paper cups			\$0.00
	rubber bands			\$0.00
Miscellaneous items	candy	4	\$5.00	\$20.00
Annual Workshop for TESLA memb	food and beverages			\$217.00
	supplies for demonstrations			\$40.00
TOTAL OPERATIONAL COST			\$722.06	

**Items may be repeated so they are not double counted for pricing reasons if already bought and can be reused



EXAMPLE OF PRE-ASSESSMENT QUESTIONS

1A. I want a career with work that makes me think.

Strongly disagree Disagree Agree Strongly agree

1B. I will seek work that allows me to help my community and/or society.

Strongly disagree Disagree Agree Strongly agree

1C. I appreciate working in a team.

Strongly disagree Disagree Agree Strongly agree

1D. I feel confident presenting work i have done in front of others.

Strongly disagree Disagree Agree Strongly agree

1E. I enjoy solving problems and creating solutions.

Strongly disagree Disagree Agree Strongly agree

1F. I want a career where I work with my hands.

Strongly disagree Disagree Agree Strongly agree

1G. I understand the importance of design.

Strongly disagree Disagree Agree Strongly agree

1H. I think engineers and scientists need to be creative.

Strongly disagree Disagree Agree Strongly agree

2. RATE THE FOLLOWING ON AN INCREASING SCALE FROM 1 - 10, WITH THE RANKING OF 10 BEING THE BEST.

2a. I want to become an engineer.

1 2 3 4 5 6 7 8 9 10

2b. I have heard a lot about different types of engineering, and I know what engineers do.

1 2 3 4 5 6 7 8 9 10



2c. I know of someone or have a role model who is an engineer.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2d. I like to learn how to use new technology.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2e. I plan to use technology in my future career.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2f. If I do well in my mathematics classes, it will help me in my future career.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2g. I know someone in my family or community who uses mathematics in their career.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2h. I will work hard in my science classes.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2i. I would feel comfortable talking to people who work in science careers.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2j. I think engineering and design can be fun.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2k. I want to learn more about subjects in science, technology, engineering, and mathematics.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----



EXAMPLE OF CURRICULA

STUDIO: TESLA



think. design. create.





Think **EMPATHETICALLY**

Connecting the needs of the **User** to the expertise of the **Producer**



Design **BOLDLY**

Brainstorming **Ideas** that will solve the user's **Problem**



Prompts
How can we redesign the user's experience?
What ideas have worked in the past?
How can we improve these ideas?

Strategies
Brainstorming
Sketching
Group Discussion



Create **EXPRESSIVELY**

Taking **Ideas** and turning them into **Solutions**





STUDIO: TESLA

Why Did The Marble Cross The River?

Duration: 2 sessions

Difficulty

Simple Standard Challenge

Objective: To get Lucky across the a river (see story on next page.

Materials:

Glue

Popsicle sticks

Marbles

Small container

Straw models of: triangle, square, pentagon

A Can-do Attitude

Vocabulary:

Force - an action that can cause movement

Mass - amount of "stuff" inside an object

Weight - the force gravity puts on an object





STUDIO: TESLA

Project Description: Think

Discuss the definitions presented in this activity. Be sure to explain the difference between mass and weight. Using the straw models, explain how triangles are able to handle a greater amount of force than shapes with more sides. Then have one of them read the scenario below to the group.

Story: Lucky the marble is afraid of water, but she wants to get to the other side of a river. She can't use a boat because she's afraid of getting seasick. Using only 50 toothpicks and glue, what can you create to help lucky with her problem?

Project Description: Design

As a group, discuss ideas with the scholars be sure to not give them assistance here; allow them to come up with their own ideas. After coming to an agreement, have everyone sketch their group's plan in their journals.





Project Description: Create

Day 1: Limited to only 50 toothpicks and glue, have groups build their structures with the time that is left.

Day 2: Test structures using “Luckys” (marbles) and “rivers” (small bowls)

Concluding questions

1. Did Lucky make it across? If you could try again, what would you do differently?
2. How did being restricted to only toothpicks and glue affect how your group tried to solve Lucky’s problem?
3. What other supplies would you have liked to have?
4. What would you have done if you had just toothpicks? just glue?

