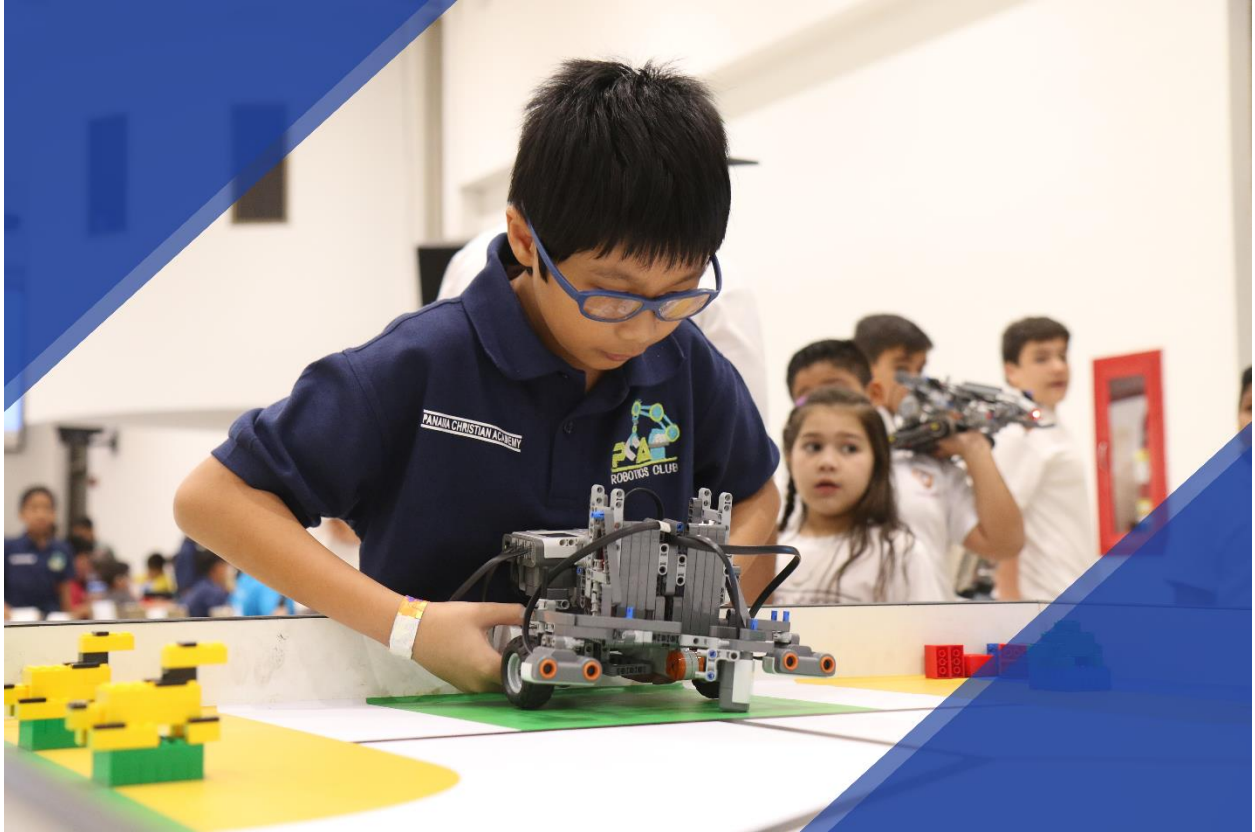


Funding STEAM Curriculum Development



by

Jagruthi Maroju (Biology and Biotechnology)

Orlando Pinel (Computer Science)

Christian M. Schrader (Aerospace Engineering)

Simone Williams (Civil Engineering)



WPI



Funding STEAM Curriculum Development

An Interactive Qualifying Project
submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfilment of the requirements for the
degree of Bachelor of Science

by
Jagruthi Maraju (Biology and Biotechnology)
Orlando Pinel (Computer Science)
Christian M. Schrader (Aerospace Engineering)
Simone Williams (Civil Engineering)

Date:
10 October 2019

Report Submitted to:

Professor James Chiarelli
Worcester Polytechnic Institute

Marvin Castillo
Fundesteam

This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its web site without editorial or peer review. For more information about the projects program at WPI, see <http://www.wpi.edu/Academics/Projects>

ABSTRACT

Panama's economic success is endangered by economic disparity and an outdated education system. The goal of this project was to improve accessibility to funding opportunities for Fundesteam as well as help the organization increase its marketability so that it can continue to expand their efforts of combating poverty with STEAM education. In order help Fundesteam better report to stakeholders and grantors in order to receive funding, our team created a funding database and updated its website.

ACKNOWLEDGEMENTS

Our team would like to thank our sponsor, Marvin Castillo of Fundesteam. Marvin Castillo and his colleagues at Fundesteam helped guide and formulate our project. Throughout our time working with Fundesteam, Marvin Castillo provided us with vital information for the upgraded website and guidance in analyzing the 3M study. Mr. Castillo was also our initial point of contact in Fundesteam and further, facilitated primary introductions to the rest of his employees. He has played a crucial role in formulating the applicability of our project as well as defining the scope and growth of it throughout our time in Panama. We would also like to thank Mr. Castillo for inviting and allowing us to judge the annual national robotics olympiad that Fundesteam sponsors.

We extend our gratitude to the staff and teachers at Fundesteam who were extremely helpful in guiding our work. Our thanks Pedro Pascual for his help in working with our team to update the website. We would also like to acknowledge the support of Fundesteam's teachers in their welcoming nature and their help in connecting us to their students; our team appreciates their willingness to distribute the student surveys, which further guided us in obtaining student testimonials. We thank the entire staff at Fundesteam in their hospitality and help in training us to be judges for the national robotics olympiad. Our team thoroughly enjoyed our time working with the members of Fundesteam as they have greatly enhanced our project and appreciation for STEAM education in other countries.

Lastly, we would like to thank our on-site advisor, James Chiarelli, for his continued support and feedback throughout our project. Professor Chiarelli has played a crucial role in connecting us with our sponsors and communicating with Mr. Castillo, while at Worcester Polytechnic Institute and in Panama. Our advisor spent countless hours providing us with

comments and feedback for revisions in both our final paper and presentation. Without Professor Chiarelli's continuous support and devotion to our project, we would not have achieved the same depth nor structure presented in our final product. We extend our greatest gratitude for his efforts.

EXECUTIVE SUMMARY

Panama has an excellent economy thanks to the Panama Canal. The country's economic prosperity was brought in by the inflow of wealthy immigrants, the trading power from the canal, and from a strong, banking economy. Although there is much economic success within Panama, its economic growth is endangered by economic disparity and an outdated education system.

Most of the money that enters Panama is condensed in the capital, Panama City, perpetuating a cycle in which those who live in outer cities and provinces are often marginalized and remain in less favorable economic conditions, while those in the capital live more prosperously. This financial divide contributes to the unbalanced distribution of wealth.

In the past few decades, technology has advanced rapidly, creating many new opportunities in STEAM. With its many international businesses, Panama needs professionals within STEAM in order to sustain and grow its economic success. However, Panamanian students are not being prepared for the future of STEAM. This is primarily due to Panama's public and private school system being very divided. Private schools have extreme prestige and offer a better level of education and facilities in comparison to public schools, which experience high dropout rates and teach an outdated education curriculum that places a heavy emphasis on humanities. The absence of STEAM education in modern day curricula creates an obstacle for Panamanians who cannot afford private school as they are faced with a barrier in any attempt to enter new STEAM careers. Aside from the sheer disparity with resources, the physical distance from outer provinces to Panama City provides further difficulty in accessing STEAM education.

The issues of economic disparity and a lackluster education system have led to the creation of Fundesteam, our sponsor, who seeks to improve STEAM education across Panama and spread opportunities to children from lower income backgrounds. Fundesteam is a non-governmental, non-profit organization based in Panama City whose main mission is to combat poverty in Panama through STEAM education. Unfortunately, one of Fundesteam's major obstacles is obtaining funding to expand and continue operating these programs. In order to reach their project goal of 800,000 children, our main project goal was to improve accessibility to funding opportunities for Fundesteam as well as help the organization market itself better.

We achieved this goal through three main objectives: creating a funding database, conducting a general survey, and upgrading the current website. Prior to the team's arrival to Panama City, 3M conducted a two weeklong organizational analysis of Fundesteam. At the end of the two weeks, 3M provided Fundesteam with a study and presentation of their observations of the organization as well as recommendations for further success. Our team used 3M's study to structure our work and guide us in accomplishing the project goal and objectives.

For the funding database, Fundesteam gave us a clear idea of the type of database they required and the information they wanted to include within it. We created the most informative and concise one for their purpose. All potential opportunities were compiled in an Excel sheet. With 3M's analysis, they provided Fundesteam with an excel sheet that contained a list of 66 potential donors for the organization. Our team utilized this existing sheet by creating sub sheets within the document listing "Donors", "Grants", and "Possible Partnerships". Each sheet was

enhanced with more opportunities that were found on Pivot and Foundation Directory Online. Each sheet contains columns that lists the grantor, donor or partner, a link to the grantor's, donor's, or partner's website with more information, a synopsis of each entry, and all necessary contact information. All grant opportunities have an additional column that lists any special requirements Fundesteam must meet or do before applying for the opportunity. The final database contained information for 42 donors, 28 grant opportunities, and 14 possible partnerships.

In order to understand and present the work Fundesteam has done and its importance, our team administered written surveys to current Fundesteam students to understand the work Fundesteam has done so far and the impact they have made. These survey responses were incorporated into their website to further improve their marketability through emphasizing their mission. The initial plan to survey World Robotics Olympiad (WRO) participants and trained Fundesteam teachers in addition to the students who attend programs at Fundesteam proved not to be possible. Since Fundesteam has trained teachers at over 50 schools all over Panama, contacting and communicating each school would have been extremely difficult. We could not survey WRO participants because Fundesteam did not have any contact information for the teams.

Our final survey was given to students between ages 10 and 17 who attended day and after school programs at Fundesteam. We received 13 responses from the survey and all respondents were between the ages of 10 and 15. Of the 13 responses, only two provided any meaningful responses that could be potentially used on the website.

For quantitative student data, the team received access to results from a past survey conducted by the Pan American Development Fund (PADF), which was taken by 1616 students in 6th through 12th grade who attend schools that Fundesteam worked with. The survey was developed by a team of researchers at North Carolina State University to act as a tool for measuring student attitudes towards STEM. The survey contained four sections: Mathematics, Science, Technology, and 21st century skills. Students marked whether they were in total agreement, agreement, neither disagreement nor agreement, disagreement, or total disagreement of the statement provided. The team quantitatively analyzed this data by computing mean composite scores for the math, science, and technology sections. Fundesteam students displayed the most confidence on the statements in the technology section, which could be attributed to their focus on robotics and engineering.

Fundesteam's website required various improvements in order to portray Fundesteam in a desirable manner to potential donors as well as attract many new visitors that can expand their outreach and further enhance the importance of their message. Their website could contain more written content in addition to better graphics that illustrate the organization's mission and vision of changing the poverty equation in Panama with STEAM education. Although the website contained some information about their work and who they are, there was little information about the impact they have and are trying to make, which is only communicated in their mission statement and vision.

Fundesteam's website had issues with proper display of their organization's methods, scale and overall success of the robotics curriculums they were implementing. The website also

had an overuse of generic content, the color scheme didn't match the organization's logo, the font used on the website was inconsistent, and the CSS (Cascading Style Sheet) was unnecessarily long and caused loading issues for the website.

To address these issues, our team made many basic fixes to the CSS by removing unnecessary code, changing colors, and making the styling consistent. To solve the content issues, any content that did not address anything meaningful was removed or replaced with information specific to Fundesteam, which was given by the sponsor. This included swapping out most of the stock images with photos taken at events or partner schools participating in STEAM activities organized by Fundesteam. Sections detailing quantitative data from the PADF survey and testimonials from the team's survey were also added to provide evidence for the effectiveness of the program. Additionally, links to media about Fundesteam, such as journal articles and videos were placed in the website as well. Each of these components contributed to improving the appearance of Fundesteam to donors as having a clear goal and record of success are vital.

Lastly, our sponsor asked our team to produce a contact list of websites in Panama with the heaviest web traffic, some websites of interest our sponsor, and a few online blogs related to tech and education. This was with the purpose of launching a small-scale marketing campaign aiming to spread and increase awareness of Fundesteam, as well as STEAM, among their target audience.

Final Recommendations

Based on the recommendations provided to Fundesteam by 3M and our team's observations while working with Fundesteam, mainly Marvin Castillo, the organization's CEO, we generated some recommendations that would help Fundesteam beyond the work we were able to accomplish during our time in Panama. Funding STEAM curriculum development goes beyond updating a website and applying to funding opportunities.

First, we recommend that Fundesteam clearly define roles within the organization. Defined, structured roles would mainstream Fundesteam operations, improve the organization and improve interactions between employees. Work distribution could be evenly distributed and Fundesteam's reach would increase significantly.

Second, we recommend that Fundesteam have better reporting to stakeholders. In order to find and maintain a pool of regular donors, Fundesteam would be required to report to them regularly and update the donors on their actions and results. This recommendation ties into our previous recommendation since this would mean a staff member should be tasked with record keeping, and delivery and presentation of data.

Third, Fundesteam should align the organization with the Ministry of Education in Panama. Both organizations share similar missions and passion to achieve their visions, which should be enough to encourage cooperation. Alignment to the Ministry of Education would give Fundesteam a bigger and better platform to find support of any kind.

Fourth, Fundesteam needs to increase and improve their social media presence.

Producing content highlighting the effects of STEAM around the world and showcasing similar successful projects around the world could allow Fundesteam to establish its relevance both with average users as well as stakeholders. It would allow them to maintain their relevance in the focus of its intended audience while also making it easier for them to gain attention, which could result in a momentum that could introduce them to more investors and supporters.

Fifth, Fundesteam should clarify their relationship to PanamaSTEM. Fundesteam has a dependent relationship between PanamaSTEM. The informal relationship between the two organizations is hurting Fundesteam by encouraging their lack of clear structure, making the organization fully dependent on PanamaSTEM, keeping Fundesteam from developing a clear identity.

Lastly, we recommend that Fundesteam offer connections to after school or internship programs to their high school participants. If Fundesteam wants to make sure that children have the necessary resources to achieve their goals within STEAM, then they should provide counselling and aid to children that want to attend college. Connecting them to internships, summer camps and proper guidance can be a definitive factor that ensures their attendance to college.

Ultimately, all objectives of the project were met and thus the goal of the project was achieved. The general survey, while proving to not be as helpful as we initially hoped, provided two quotes that Fundesteam could use on their website. The funding database proved to be much easier to tackle than anticipated because 3M provided Fundesteam with a starting ground, an Excel sheet of 66 potential donors, where they could further build and add funding opportunities easily. Although updating the website proved to be the most difficult task of the entire project, an improved website was developed. The main deliverables our team formulated for Fundesteam at the end of our time in Panama were a funding database and an upgraded website, as well as a secondary deliverable being the list of high trafficking websites in Panama and online blogs related to STEAM.

AUTHORSHIP PAGE

Abstract: Simone Williams

Acknowledgements: Jagruthi Maraju

Executive Summary: Simone Williams

Introduction: All

Background

Importance of STEAM Education: Simone Williams

STEAM Education in the United States: Simone Williams

STEAM Education in Panama: Simone Williams

Mission Statement and Vision: Orlando Pinel

What Have They Done So Far: Orlando Pinel

Grant Types and Availability: Christian M. Schrader

Funding Opportunities in Panama: Christian M. Schrader

Fundesteam's Current Funding: Christian M. Schrader

Website Design: Jagruthi Maraju

Fundesteam's Website: Jagruthi Maraju

Methodology

Research Existing Funding Databases: Christian M. Schrader

Conduct a General Survey: Jagruthi Maraju and Simone Williams

Create an Upgraded Website: Simone Williams

Findings and Analysis

3M Study of Fundesteam: Simone Williams

Creating the Funding Database: Simone Williams

Collecting Survey Data: Christian M. Schrader and Simone Williams

Reworking Fundesteam's Website: Christian M. Schrader

Judging the National Robotics Olympiad: Christian M. Schrader

Finding Marketing Outlets: Orlando Pinel

Recommendations: Orlando Pinel

Conclusion: Simone Williams

References: All

Primary Document Editing: Simone Williams

Secondary Document Editing: Jagruthi Maraju

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS	ii
EXECUTIVE SUMMARY	iv
Final Recommendations	vi
AUTHORSHIP PAGE	viii
TABLE OF CONTENTS	ix
TABLE OF FIGURES	xii
TABLE OF TABLES	xii
CHAPTER 1: INTRODUCTION	1
CHAPTER 2: BACKGROUND	5
STEAM Education	5
Importance of STEAM Education	5
STEAM Education in the United States	6
STEAM Education in Panama	7
Fundesteam	8
Mission Statement and Vision	8
What They Have Done So Far	8
Funding for Nonprofits	9
Grant Types and Availability	9
Funding Opportunities in Panama	9
Fundesteam's Current Funding	10
Presenting to Stakeholders	11
Website Design	11
Fundesteam's Website	11
CHAPTER 3: METHODS	13
Research Existing Funding Databases	13
Conduct a General Survey	14
Create an Upgraded Website	15
CHAPTER 4: FINDINGS AND ANALYSIS	17

3M Study of Fundesteam	17
Creating the Funding Database	19
Collecting Survey Data	20
Reworking Fundesteam's Website	24
Judging the National Robotics Olympiad	26
Finding Marketing Outlets	27
CHAPTER 5: CONCLUSION AND RECOMMENDATIONS	28
Recommendations	28
Recommendation 1: Clearly define organizational structure and roles.	28
Recommendation 2: Better reporting to stakeholders.	29
Recommendation 3: Align Fundesteam with MEDUCA.	30
Recommendation 4: Increase social media presence.	30
Recommendation 5: Clarify Fundesteam's relationship with PanamaSTEM.	31
Recommendation 6: Connect students to internships/summer/after school opportunities.	32
Final Conclusions	33
REFERENCES	35
APPENDIX A: WRITTEN STUDENT SURVEY	37
Written Student Survey in Spanish	37
Written Student Survey in English	37
APPENDIX B: WRITTEN SURVEY RESPONSES	38
Oliver la Cayo	38
Santiago Swarckopf	38
APPENDIX C: SNIPPETS OF SURVEY CONDUCTED BY THE PADF ON FUNDESTEAM SCHOOLS	39
Survey Questions about Mathematics	39
Survey Questions about Science	40
Survey Questions about Technology	41
Survey Questions about 21st Century Skills	42
APPENDIX D: SWOT ANALYSIS GENERATED BY 3M	43
APPENDIX E: FUNDING DATABASE	44
Main Excel Sheet	44

Grant Opportunities Sheet	44
APPENDIX F: FUNDESTEAM’S WEBSITE	45
Before Improvements	45
After Improvements	47
APPENDIX G: FUNDESTEAM TEACHER AND STAFF TESTIMONIALS	55
Alexander Caceres	55
Lutfi Garzon	55
Victor Rodriguez	55

TABLE OF FIGURES

Figure 1.1: Population density within Panama per km ² .	2
Figure 1.2: Percent of lessons administered to improve memorization, understanding of procedures, ability to formulate connections, and mathematics in Panamanian and Costa Rican schools for 3rd and 7th grades.	3
Figure 2.1: Projected growth of STEM careers in relation to all other occupations from 2010-2020.	6
Figure 4.1: Percentage of students who agree that they can be successful in an engineering career.	23
Figure 4.2: Percentage of students who agree that they can make changes when things do not go as planned.	23
Figure 4.3: Percentage of students who plan to attend college or university.	24

TABLE OF TABLES

Table 4.1: Composite Scores for Math, Science, and Technology Sections of Survey	22
--	----

CHAPTER 1: INTRODUCTION

Panama has a thriving economy thanks to the Panama Canal, its busy port, and international companies and their shipping activities. The country's economic prosperity was brought, in part, by the inflow of wealthy immigrants from Venezuela, the trading power from the canal, and from a growing financial services sector. However, this economic success is endangered by economic inequality and an outdated education system.

Nearly half of Panama's population resides in the country's capital, Panama City. Figure 1.1 below shows Panama's population distribution, which contains the highest density within the capital at 203.9 people per km², while the next most populated province only contains 71.1 people per km² (Erazo, et. al, 2015). This dispersion of the population produces great economic disparity between those who live in the capital and individuals who live in outer cities and provinces. Majority of the wealth that enters Panama is condensed in the capital, thus perpetuating a cycle in which Panamanians within the capital become more prosperous while people outside the city are often marginalized, remaining in less favorable economic conditions. This financial divide results in more people moving into the capital, which further exacerbates the unbalanced distribution of wealth.

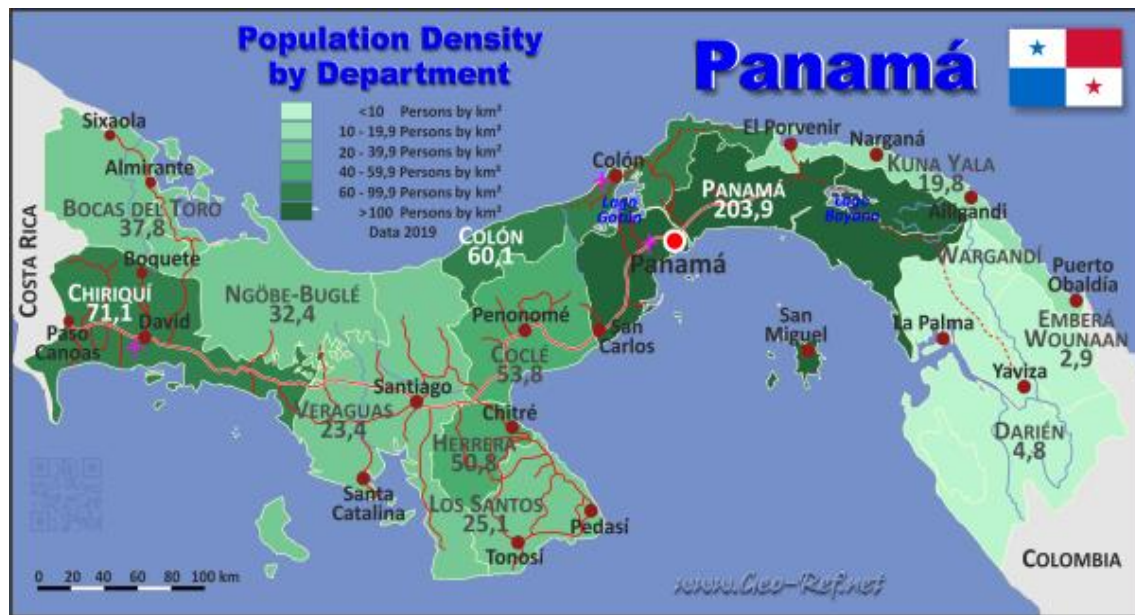


Figure 1.1: Population density within Panama per km² (Erazo, Rodriguez & Sousa, 2015).

Although Panama is home to many excellent private schools, its public-school system does not share the same prestige. Public schools experience high dropout rates and contain poor facilities due to a lack of resources. Moreover, they have remained unchanged, despite needing reform, due to complex disputes between the teachers' union and the Ministry of Education. (Lee, 2016; Scholaro, 2018).

In the past few decades, technology has advanced rapidly, creating many new opportunities in STEAM (education in the areas of Science, Technology, Engineering, Arts, and Mathematics). Especially with its many international businesses, Panama needs engineers, computer scientists, actuarial mathematicians, and many other professionals in STEAM fields in order to sustain its economic success. Panamanian students, however, are not being prepared for these opportunities. This is because Panama has yet to embrace STEAM, the curriculum, and benefits of a STEAM education. One of the issues with Panama's public schools is their outdated

curricula, which traditionally places a heavy emphasis on the humanities. 60% of students have not been effectively taught the mathematics skills they need in 3rd, 6th and 9th grade (Fundesteam, 2019, slide 2). Figure 1.2 below shows the distribution of course material in various areas of cognitive thinking with mathematics containing the least percentage of lessons. Leaving out STEAM education makes it very difficult for Panamanians who cannot afford private school to pursue new STEAM careers. Moreover, it is even more difficult for those outside of Panama City to reach the economic success of those within the city.

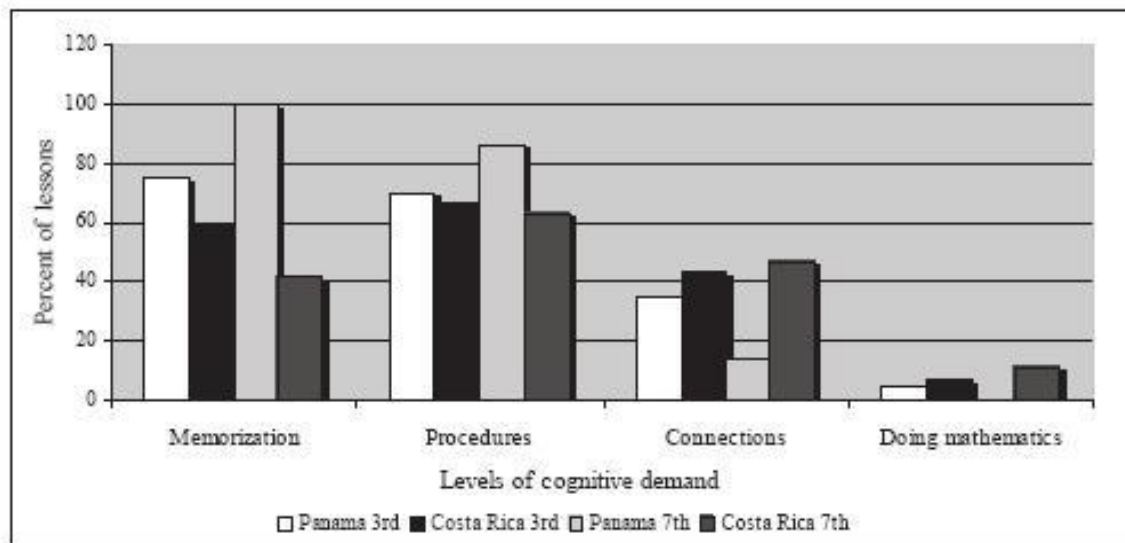


Figure 1.2: Percent of lessons administered to improve memorization, understanding of procedures, ability to formulate connections, and mathematics in Panamanian and Costa Rican schools for 3rd and 7th grades (Carnoy, Luschei, Marshall & Sorto, 2009).

Technologies, such as computer labs, are only just starting to be introduced into the classroom. The issues of economic disparity and a lackluster education system have led to the creation of organizations, such as Fundesteam, our sponsor, which seek to improve STEAM education and to spread opportunities to children from lower income backgrounds. Fundesteam is a non-governmental, non-profit organization based in Panama City. Its primary mission is to

combat poverty in Panama through the promotion of STEAM education. However, one of Fundesteam's major obstacles is obtaining funding to expand and continue operating these programs.

This project was intended to improve accessibility to funding opportunities for Fundesteam as well as market the organization better, in order to achieve its current goal of reaching 800,000 children. The first component of the project concerned finding prospective funding opportunities. A database was created, containing various STEAM and educational grants, donors and partnerships available within the Americas as well as globally. The second component was to make Fundesteam more marketable to potential funders through updating their website to house all aspects of what the organization does daily, and to show the quantitative and qualitative impact they have made throughout the country. Both components will improve the overall marketability and accessibility of Fundesteam to stakeholders.

CHAPTER 2: BACKGROUND

Improving Panama's education system can lead to an improvement in the entire country's economic development. Fundesteam's mission to increase their awareness nationwide will be an important stepping-stone toward improving Panama's education system. Providing access to STEAM education for disadvantaged children in Panama will significantly improve their ability to exploit opportunities in growing STEAM fields. In this chapter we will discuss the STEAM education and the work Fundesteam is doing to improve it, as well as funding opportunities and website design.

STEAM Education

Importance of STEAM Education

STEAM is an acronym for Science, Technology, Engineering, Art and Mathematics. SMET (Science, Mathematics, Engineering and Technology) was an initiative originally designed by the National Science Foundation as a way to provide students with "critical thinking skills that would make them creative problem solvers and ultimately more marketable in the workforce" (White, 2014). The overall idea was that students who possess a SMET education would be able to lead lives of greater opportunity if they continued their studies in their field and well into post-secondary education (White, 2014). It was eventually renamed to STEM and, more recently, STEAM as art and design were added.

As society progresses, technology follows. With each generation, new products and services are created that not only improve livelihoods but also build economies. Due to this continually evolving future of technology, it is imperative that STEAM education begins at a young age because "innovation [...] depends on a solid knowledge base in the STEM areas"

(Eberle, 2010). STEM fields are among the fastest growing in the workforce and this trend is likely to carry on into the future; most jobs will likely require a basic understanding of STEM concepts (Eberle, 2010). Figure 2.1 below displays the immense growth STEM fields have experienced in the past ten years, further emphasizing the need for cultivating STEM ideas early in younger generations.

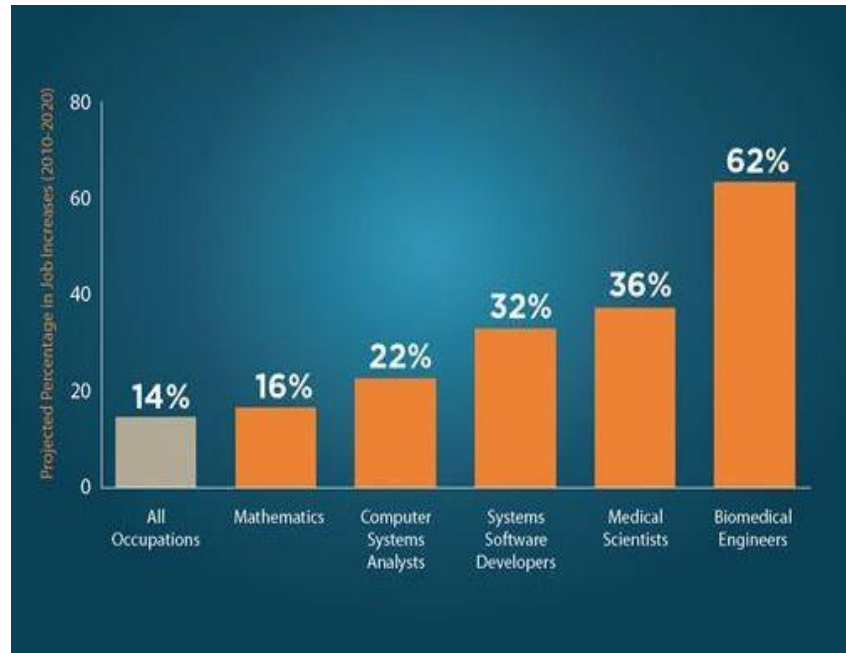


Figure 2.1: Projected growth of STEM careers in relation to all other occupations from 2010-2020 (Fayer, Lacey & Watson, 2017).

STEAM Education in the United States

The current president of the United States, as well as his former, have made sure that a great emphasis is put on the vitality of STEAM Education. Most importantly, they have put great emphasis on educating our youth with a STEAM model from an early age because of where the future is headed (The White House, 2017). More than \$200 million has been invested in “high quality” STEAM education (U.S. Department of Education, 2018). Moreover, the country hopes

to improve equality within the STEM field by promoting it to more females as well as to minorities (The White House, 2017). There are a variety of STEM-based programs nationwide that try to do so such as Girls Who Code, STEM for Kids, and ID Tech summer camps.

Additionally, the past and current administration are trying to increase the number of well-educated STEAM teachers and professors in schools nationwide, so children can receive an adequate STEAM education. In 2013, the Obama administration created a five-year plan for STEAM education that laid out his administration's goals for improving STEAM education. A few of those goals were to make STEAM a higher priority in education through the Department of Education and have the National Science Foundation increase their programs in order to increase the retention rate of STEAM undergraduates (Obama White House Archives, 2013).

STEAM Education in Panama

The Panamanian education system has been described as one of the most poorly performing in the world because it has remained unchanged for over 30 years (Scholaro, 2018). As education level increases, the curriculum mainly focuses on humanities (Scholaro, 2018). This static curriculum can be attributed to structural issues within the education system. Any attempts to modify the curriculum have caused a dispute between the teachers' union and the federal government creating deadlock. This issue has prevented the necessary improvements to the currently outdated general education. Further, the conflict creates a divide in Panama's education system between public and private schools as private schools have no problem updating curricula. Moreover, those who attend private schools receive "a head-start in life" (Scholaro, 2018). STEAM education is practically non-existent within Panamanian schools. Introducing a STEAM education curriculum, through the teachers, into Panama's education

system would not only improve the quality of education students would have, it would prepare them for the technologically driven future.

Fundesteam

Mission Statement and Vision

Fundesteam is a non-governmental, non-profit organization founded and based in Panama with the goal of fighting poverty through improved education. The organization focuses on enabling children of low-income families to receive STEAM education to eventually work in better and higher paid jobs, thereby changing the poverty equation in Panama. Currently, Fundesteam promotes STEAM by creating robotics labs and curricula, as well as training teachers in schools so they can introduce children to these fields to further present it as an option they can pursue in their successive education. This combined with exercising the children's problem solving and leadership skills allows them to empower future generations.

What They Have Done So Far

Through collaboration with Panama STEM, which is the representative of Lego education in Panama, Cable Onda, a private internet provider company, and EXPLORA, a center of Arts and Sciences, Fundesteam has provided 50 schools, some private and some public, with robotics labs and a robotics education program. With the addition of these labs, Fundesteam also trains the schools' teachers by showing them how to properly use the equipment and how to teach the education program to the students. In addition to creating these school programs, Fundesteam also hosts day and after school programs for children, starting as young as three years old, which teaches them the fundamentals of mechanics to general robotics concepts.

Fundesteam has also assembled and prepared the group that has represented the delegation of Panama in the World Robotics Olympiad (WRO) since 2014. In addition, they organize more regular and local robotics Olympiads in order to reach more students that do not get the opportunity to go to the WRO.

Funding for Nonprofits

Grant Types and Availability

There are multiple types of grants for a variety of purposes and organizations. The most flexible type available for nonprofits are General Operating grants, which are not allocated to specific projects, enabling nonprofits to cover the price of salaries, ongoing projects, and other operational expenses (IDC, 2017). These grants usually range from \$50,000 to \$100,000 (IDC, 2017). Operational grants are the most flexible, however, are difficult to get as the foundations that provide them require intense investigations to prevent abuse of the spending freedom. It is much more common to receive grants for specific programs. These grants are offered more frequently and cover the expenses of a given project, but not the operating costs of the organization (IDC, 2017). This can be an issue if a nonprofit does not already have money to cover operational costs. For a nonprofit that already has its operational costs covered, these grants are a much more effective way to create and expand projects.

Funding Opportunities in Panama

For an organization like Fundesteam, the most prevalent funding sources are the various world organizations with goals aligning with Fundesteam's mission, such as UNESCO and ISEA. Within Panama, there is also La Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT). SENACYT is the government organization responsible for the promotion of

science and technology. Its mission statement, while not targeted at youth, is very similar to Fundesteam's (SENACYT, n.d.). These organizations offer a variety of large grants for nonprofits running educational programs.

There are also more specific grants such as those offered by the Society of Photo-Optical Instrumentation Engineers (SPIE). This organization provides funding to projects seeking to increase awareness of photonics and optics (SPIE, 2019). Provided that Fundesteam is willing to create new programs with specific curriculum such as optics education, grants such as these are effective for expanding or creating specific projects. Additionally, many large companies sponsor STEAM activities. Partnering with tech companies allows for some additional funding in exchange for marketing. There are many options such as Dell, Uber, and Samsung to reach out to.

Fundesteam's Current Funding

Fundesteam currently receives funding from the private sector, local governments, and donations. According to its website, Fundesteam has raised \$380,000 out of \$1,800,000 (Fundesteam, 2019). In addition, Fundesteam has a partnership with the Pan American Development Foundation (PADF) to train teachers to lead STEAM activities for their students (PADF, n.d.). These funds allow the organization to operate its current programs. Taking advantage of more funding options available to Panamanian STEAM organizations would allow Fundesteam to expand to reach more children. They have also worked with well-known international companies such as 3M, Ford, and Boeing as well as with those in Panama such as Fundacion Eleta and Banesco Contigo (Fundesteam, 2019, slide 13).

Presenting to Stakeholders

Website Design

Due to the fast paced nature of our world as well as our increased usage of the internet, website design is an imperative part of running a successful nonprofit. As of 2014, 87% of American adults aged 18 or older are Internet users (Chiu, 2016).

As for Fundesteam's current website design, it contains all the relevant components of their organization, such as a mission statement, some projects, and the overall importance of STEAM education. However, there are some discrepancies within the format of certain portions within the website. For example, the general aura of the website conveys a more dismal image as there are many pictures of impoverished children who seem to have little hope. Although this is an important aspect of their organization as they do indeed target lower income areas, Fundesteam ultimately surrounds around bettering STEM education; rather than appearing more as a non-profit, Fundesteam's website contains more components geared towards a charity's platform. Concise, simplistic, and clear content is necessary in any successful nonprofit organization as these components strengthen the website's presence as well as message.

Fundesteam's Website

One of the issues with Fundesteam's website is the mission statement versus the organization's vision, which are slightly varied, proving somewhat difficult to understand for potential stakeholders. Through an improved website design that contains a more cohesive design and flow between connecting parts of the organization, Fundesteam will be further marketable and user friendly. Moreover, their website lists several of their projects, mostly WRO teams, but does not include some of their other initiatives, such as their work with teachers and schools. It is important to not only discuss projects, but also how they demonstrate the

organization's effort to fulfil their mission. Robotics competitions and the WRO are great achievements that should be highlighted, but they are the results of their main actions and thus should not be the website's main focus. Additionally, a stronger message regarding the importance of STEAM education is necessary to connect the mission to its vision, and further strengthen the presence of Fundesteam. Each of these components will ultimately enhance the organization's appeal and marketability to potential stakeholders and donors.

CHAPTER 3: METHODS

The main goal Fundesteam tasked us with is to help the organization market itself better in order to receive funding as well as help them find more funding opportunities in order to develop and expand. In order to achieve this goal, we developed three main project objectives:

1. **Create a funding database.** Fundesteam gave us a clear idea of the type of database they want and what information they want included within it. Our task was to create the most informative and concise database for their purpose.
2. **Conduct a general survey to understand the impact of Fundesteam.** In order to understand and present the work Fundesteam has done and its importance, we intended to conduct surveys with current Fundesteam students as well as trained teachers to gain a general idea of Fundesteam's work along with the impact they have made, and incorporate it into their website.
3. **Upgrading their website.** Giving their website a makeover that portrays Fundesteam in the image they desire as well as attract many new visitors that could hopefully spread the word on the importance of their organization.

Research Existing Funding Databases

The primary source for funding opportunities is funding databases. Through the Gordon Library at WPI, our team had access to Pivot and Foundation Directory Online, two research databases for this purpose. The databases use advanced searches to look through various grant opportunities from a variety of grantors. This can be narrowed to international STEM grants. Both databases provide all the information necessary to apply for grants, including the grantor's contact information, deadlines, application requirements, and all necessary components for

applying. The main disadvantage of using such databases is that they are targeted at American non-profits. There are many grants listed that are offered internationally, however there are not many Panamanian grantors or grants offered to Panamanian organizations.

In order to effectively track funding opportunities discovered by the team through research, the options were compiled in an Excel sheet. Each entry contained the name of the grant and the contact information of the person in charge of managing the grant or whomever oversees accepting applications. This included phone numbers, emails, and websites. Relevant information to the grant was included such as the application deadline, eligibility requirements, and other general information.

Conduct a General Survey

In order to gain a greater understanding of Fundesteam's work and impact, our team conducted a written survey in Spanish to students aged 10 to 17 who regularly attend Fundesteam for educational programs. Additionally, we want to interview trained teachers who teach programs at Fundesteam.

Surveying these groups generated pertinent data pertaining to the effect of Fundesteam on individuals. The data were further statistically analyzed as well as formulated into graphs, which can be added to the website and increase marketability to potential stakeholders. In addition, specific quotes from survey informants will be added to the website to add a sense of Fundesteam's message.

A few elements that may present challenges within the surveys is the amount of reach and accessibility our team will have in contacting our target groups. Since the students are currently enrolled in the Fundesteam education programs, data regarding their population were easier to obtain.

In addition to the written survey we conducted, an online survey was conducted by PADF (The Pan American Development Foundation) on students attending Fundesteam schools. The survey was administered to two groups: students in grades 4th and 5th, and students in grades between 6th and 12th grade. It gauged the students' interests and feelings on Mathematics, Science, Engineering, Technology. It also asked students whether they feel they would use STEM outside of school, in their daily life, and if they would pursue a career in that field.

Create an Upgraded Website

As of now, Fundesteam's website appears better suited to a charity and reads very much like a brochure. We would like to add to and change some aspects of their website in order to portray Fundesteam more as the organization that it is, a non-profit STEAM organization aiming to make significant changes in Panamanian education and social structure. At present, their website could contain more information and better graphics to illustrate this. They have a generous amount of content informing readers about who they are and the work that they do, however, their site does not contain information regarding the impact that they have made and are trying to make, which is only written in their mission statement and vision.

The main issue with Fundesteam's website is they do not accurately show the visitor all that they do in Panama. Fundesteam employs programs at schools, educates and trains teachers on robotics, and provides the school with all the equipment and curriculum required to properly teach robotics and other STEM concepts. Additionally, Fundesteam hosts day and after school robotics classes and programs. Although this is not clearly shown on their website, such

programs are integral parts of the organization's efforts. Changes need to be made to the website to include the aspects of Fundesteam that show what it is about.

We would also add quotes from student and WRO participants, and the teachers who have been trained concerning the impact Fundesteam has made on them as individuals and/or to their quality of education. These quotes would come from the general survey we want to conduct with the aforementioned group of people. A third possible addition would be to add various data, graphs and statistics to visually show the viewer the change Fundesteam has made within Panama. Since Fundesteam has made a presentation showing some statistics that illustrate changes they have made and the number of students and schools they have reached, we would like these elements to be included. An example of a graph we would like to include is the number of students entering STEAM fields after joining Fundesteam's programs versus how many individuals would have gone into STEAM careers prior to participating in Fundesteam. Fundesteam also has thousands of survey responses from the survey conducted by the PADF in Fundesteam schools; these responses can yield further data and charts to show the positive change Fundesteam has made regarding STEAM education.

Lastly, we would be to improve the display of monetary donations. Presently, they have a section on their page where one can donate and it shows their goal, the amount they have earned thus far, and the percentage achieved of the overall goal. We would like to create a real-time way of displaying the flow of donations to viewers, as it would make the page more interactive and show visitors that donations are accepted on an ongoing basis.

The main limitation and challenge with proposing all these changes is that our sponsor may not want to make them. Some ideas are very idealistic, such as the idea of including charts

and graphs as our sponsor may not have quantitative data to construct these. Ultimately, we would like for Fundesteam's website to embody the passion that its founder has for the organization.

CHAPTER 4: FINDINGS AND ANALYSIS

Upon meeting with Marvin Castillo, the founder and CEO of our sponsor, Fundesteam, our team learned that our project would not be all like what we initially planned. Before our arrival to Panama City, 3M conducted a two-week-long organizational analysis of Fundesteam. At the end of the two weeks, 3M provided Fundesteam with a study and presentation of what they analyzed and their recommendations for organization for continued success. Our team used those recommendations as a guide to how we would accomplish our project goal and objectives.

3M Study of Fundesteam

3M provided Fundesteam with a SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis (3M, 2019, slide 11) (Appendix D). A SWOT analysis is a planning technique that is used to identify internal and external factors - strengths, weaknesses, opportunities, and threats - that affect the viability of a project, organization or company (Grant, 2019). 3M based their SWOT analysis of Fundesteam on interviews and materials provided to them by Fundesteam (3M, 2019, slide 9). Some of the strengths observed by 3M analysts was that Marvin Castillo, Fundesteam's CEO, was very well connected with educators and is passionate about the work he does for Fundesteam (3M, 2019, slide 12) Because of this passion, Fundesteam has a very clear vision for its future goals and objectives (3M, 2019, slide 12). Additionally, the

STEAM curriculum Fundesteam has implemented into schools has been well received by students (3M, 2019, slide 12).

Weaknesses observed by 3M were ones our team hoped to strengthen for the organization. A main weakness observed is that Fundesteam has a very clear lack of money and personnel resources (3M, 2019, slide 13). Because of this lack of resources, the organization has no clear strategy, target audience, social media presence, operational processes, nor strong board of directors (3M, 2019, slides 13-15). These issues exist as the entire organization is placed on Marvin's shoulders.

Some opportunities seen by 3M are Fundesteam's lack of competitors, and the organization's ability to be able to connect its participants and students to careers in Panama (3M, 2019, slides 16-17).

Lastly, a significant threat found within Fundesteam was the organization's lack of funds and dependency on Panama STEM, an organization with which Fundesteam currently shares its location and from which it receives 60% of its funds from (3M, 2019, slide 18). Another critical threat is that stakeholders are not interested in improving STEAM in Panama because Fundesteam has done a poor job in distributing financial reports and results to their stakeholders (3M, 2019, slide 19).

Based on all the great amount of information reported from 3M, Fundesteam gave our team much material to work with. The majority of what was observed by 3M aligned with the project our team planned to formulate for Fundesteam. The two main objectives of our project were to create a funding database and to update Fundesteam's website. Both objectives, as well as our third objective to conduct a survey amongst Fundesteam students, worked to help solve

Fundesteam's issue of lack of financial resources, social media presence, unclear strategy, and poor reporting to stakeholders.

Creating the Funding Database

For the funding database, all potential opportunities were compiled in an Excel sheet. With 3M's analysis, they provided Fundesteam with an Excel sheet that contained a list of 66 potential donors for the organization. Our team utilized this existing sheet by creating sub sheets with the document listing "Donors", "Grants", and "Possible Partnerships" (Appendix D). Each sheet has columns that list the grantor, a link to the grantor's website with more information, a synopsis of the grantor, and all the contact information for the grantor. All grant opportunities have an additional column that lists any special requirements Fundesteam must meet or do before applying for the opportunity (Appendix E). The 66 donors given to Fundesteam were organized into those categories. 19 of the donors in the list given to Fundesteam were those that are strictly US based or do not fund organizations in Latin America or Panama, or fund STEAM and robotics education. Consequently, Pivot and Foundation Directory Online were used to find more funding for Fundesteam to consider. Ultimately, the database contained information for 42 donors, 28 grant opportunities, and 14 possible partnerships. Our team also reached out to WPI's Office of Foundation and Corporate Philanthropy to give Fundesteam any advice that would be helpful in their grant application process.

Initially our team thought it would be helpful to reach out to Panamanian STEM organizations to ask and learn about Panamanian grants since the amount of grants offered within Panama were limited, and from those that existed, Fundesteam had already received support. However, we found it to be unnecessary for our project since 3M had provided us with a good

starting ground from which we could look for international and local grant opportunities. Additionally, the calendar we had hoped to create to go along with the database proved to be unnecessary as well, since almost all the grant opportunities found had year-round application dates. Of those that had specific application dates (8 out of 28 opportunities), there was no concrete date as to when the application would open or be due, only date ranges. So, making a calendar to track all upcoming grant opportunities was ultimately not necessary.

Collecting Survey Data

With the survey we conducted, we wanted to target students that would be most helpful in providing us with impactful statements on Fundesteam's impact from the children's perspectives. Our final survey (Appendix A) had less and different questions than our initial survey because we realized students would not want to give long, detailed, or meaningful responses to an open-ended survey as there would be less guidance to the questions. We administered our written survey to students from ages 10 to 17 who attended day and after school programs at Fundesteam. We learned from the teachers that there were only 8 students within that age range who attended programs there. However, we received 13 responses from the survey and all respondents were between the ages of 10 and 15. Of the 13 responses, only five gave our team permission to use their survey responses on the website. From those five, only two provided meaningful responses and quotes (i.e., not a yes or no answer) that could be potentially used on the website (Appendix B). The written survey proved to be less successful as we had initially hoped it would be.

The initial plan to survey WRO participants and trained Fundesteam teachers in addition to the students who attend programs at Fundesteam proved to be more difficult than we had

anticipated. Since Fundesteam has trained teachers at over 50 schools all over Panama, reaching out to each school would have been extremely difficult, especially since we would have to give the survey in person. Additionally, it was not easy to interview the teachers who worked at Fundesteam as they did not have the time to be interviewed or were too shy. However, we were able to receive some meaningful quotes from some staff on the impact Fundesteam has made on their life (Appendix G). We could not survey WRO participants because Fundesteam did not have any contact information for the teams, therefore limiting the number of students we could ultimately survey.

While the survey conducted by the team gathered testimonials, it did not generate any quantitative data. For this, the team received access to results from a past survey conducted by the Panamerican Development Fund which was taken by 1616 students in 6th through 12th grade at schools Fundesteam was working with. The survey was developed by a team of researchers at North Carolina State University to act as a tool for measuring student attitudes towards STEM and was found to have a Cronbach's alpha value of 0.83, a measure of internal consistency. It was also translated from English to Spanish (Farber et. al., 2013).

The survey had four sections: Mathematics, Science, Technology, and 21st century skills. Each question provided a statement, such as “Creo que puedo tener éxito en una carrera relacionada con la Ingeniería.”(Appendix C). (I believe that I can have success in a career related to engineering.). Students then marked whether they were in total agreement, agreement, neither disagreement nor agreement, disagreement, or total disagreement. One of the ways the team analyzed this data was by computing mean composite scores for the math, science, and technology sections. Table 4.1 shows the mean composite scores for these three sections.

Fundesteam students had the most confidence on the statements in the technology section which could be attributed to their focus on robotics and engineering.

Category	PADF Survey
Math	3.0
Science	3.5
Technology	3.7

Table 4.1: Composite Scores for Math, Science, and Technology Sections of Survey

The team also visualized this data by creating graphs using individual questions. These provide a concise way of showing Fundesteam's effect on students. Because the key takeaway from these graphs was intended to be the ratio of agreement to disagreement, it was determined that pie charts were the best graph type for this purpose. Figures 4.1, 4.2 and 4.3 show the results from some of the more relevant questions asked to students.

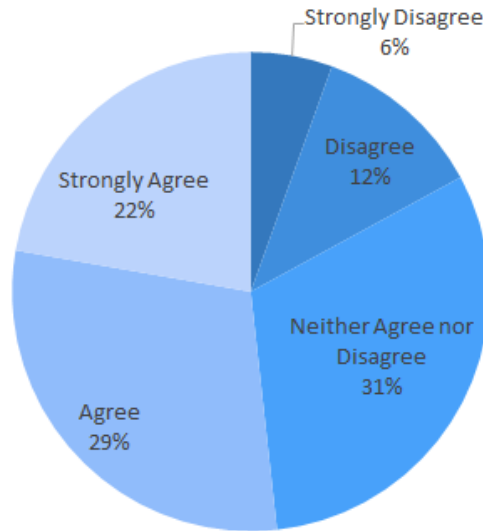


Figure 4.1: Percentage of students who agree that they can be successful in an engineering career.

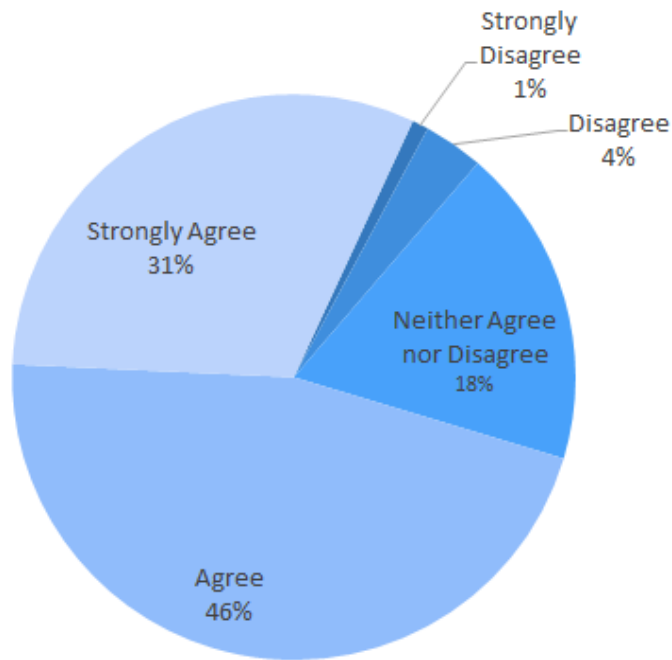


Figure 4.2: Percentage of students who agree that they can make changes when things do not go as planned.

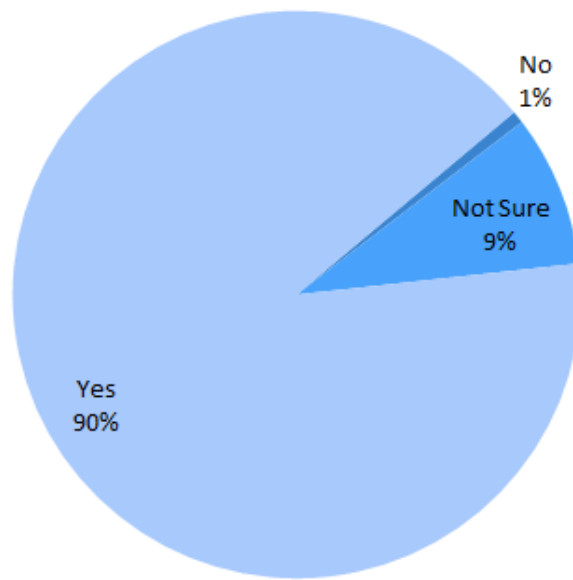


Figure 4.3: Percentage of students who plan to attend college or university.

Reworking Fundesteam's Website

For the website, there were various things that needed to be tackled in order to update it with the recommendations from 3M and other improvements the team thought was needed. The largest issue was a lack of specificity and clarity. After reading through the original website, the only information the team could gather was that Fundesteam was a nongovernmental organization that worked to improve STEAM education in Panama and had a robotics team that competed in WRO. Besides this, their methods, scale, and overall success was either missing or not communicated clearly. Their ongoing program to equip schools with STEAM labs - one of Fundesteam's primary goals - was included in a small area labeled "Organizing Donations", making it easy to miss.

Contributing to this lack of clarity was an overuse of generic content. The first thing that can be seen on the website is the text “Changing the Education, Changing the Life of Our Kids” overlaid on a photo of a rural classroom. Despite being the first thing a viewer sees on the website, there is no indication of a STEAM focus. This issue is repeated in other areas such as the mission and vision statements. Additionally, most of the photos are stock images. While they are high quality images on their own, they do not convey any significant message about the organization. None of the images on the site are of explicitly STEAM related activities, such as programming or building robots. Visual imagery is often far more powerful than text, but it can’t be used to its full effect without images specifically of Fundesteam and its activities.

Finally, the CSS (Cascading Style Sheet), the code used to change the look of the content on a website, has some issues. The website’s color scheme of red orange does not match Fundesteam’s official color scheme which uses primarily blue (Appendix F). The font in the website is not consistent either (Appendix F). There are some places with all capital letters, some in different colors, and others in different font styles (Appendix F). The main style sheet also causes loading problems as it is approximately 6800 lines long. This, combined with the use of in-line styles, make the website difficult to edit.

To address these issues, the team first made many basic fixes to the CSS by removing unnecessary code, changing the colors, and making the styling consistent. To solve the content issues, content that did not address anything meaningful was removed or replaced with something that told the viewer specific information about Fundesteam. This included swapping out most of the stock images with photos taken at events or partner schools of students participating in STEAM activities made possible by Fundesteam (Appendix F). Sections detailing quantitative data from the PADF survey and testimonials from the team’s survey were

also added to provide evidence for the effectiveness of the program (Appendix F). For this same reason, links to media about Fundesteam, such as journal articles and videos, are also provided (Appendix F). These all contribute to improving the appearance of Fundesteam to donors for which having a clear goal and record of success are vital.

Judging the National Robotics Olympiad

Close to the end of our project we assisted our sponsor with a robotics competition. Since Fundesteam has partnered with the Lego ambassador in Panama they organize and run the yearly WRO qualifying competition. Fundesteam organizes all aspects of the tournament from the venue and the date to the sponsors and the judges. Since they were short staffed the week of the competition, they trained us (the team) as judges and assigned us to one of the four categories available. This turned out to be a great insight into Fundesteam. We gained first-hand knowledge of how Fundesteam operates when it's met with a challenge and got a better idea of the role each staff member serves. The competition is also the final step of the process that Fundesteam has designed for the schools with which it collaborates, starting with selecting a school and donating the robotics lab, ending with showcasing what they learned in the competition, and finally, taking the best team to the World Robotics Olympiad (WRO). This was one of the few branches of Fundestem's operations where our sponsor delegated a great amount of the work. He was completely aware of his limits regarding his knowledge of WRO and World Educational Robot (WER) competitions and thus focused on the logistics of the event, while delegating the actual judging and competition side of it to his staff. This made clear that our sponsor is more than willing to delegate work as long as it doesn't involve an executive aspect of Fundesteam.

Judging for the robotics competition also allowed us to see how learning robotics affects children's lives and ignites passion for STEAM within them.

Finding Marketing Outlets

Lastly, our sponsor had a side task for us to pursue. One of them was to produce a contact list of potential online marketing outlets. This was with the purpose of launching a small-scale marketing campaign aiming to spread and increase awareness of Fundesteam among their target audience. Upon request we produced a short list containing a list of websites in Panama with the heaviest web traffic, some websites of interest Marvin suggested, and a few online blogs related to tech and education. A few of the sites had actual instructions on how to buy marketing space, however, most of them simply had a contact that could be reached. This task was also a confirmation that our sponsor sees equal value in marketing to potential investors and marketing to anyone interested in the subject. Fundesteam hopes to be within the focus of relevant conversation and to be able to attract potential investors by being present on related websites or by word of mouth.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

Based on the recommendations provided to Fundesteam by 3M and the structure of Fundesteam our team has observed while working with our sponsor, mainly Marvin Castillo, we have generated some recommendations that would help Fundesteam beyond what we were able to do during our time in Panama. Funding STEAM curriculum development goes far beyond updating a website and applying to funding opportunities.

Recommendations

Recommendation 1: Clearly define organizational structure and roles.

One of the main problems threatening Fundesteam's operations and survival is the unclear and disorganized internal structure. The organization was created more than two years ago, yet there are no clear and specific roles. There are staff members who help with odds and ends, but other than the teachers, everyone has broad and unspecified responsibilities which is a recipe for forgotten tasks and short term, unsuccessful projects. Marvin Castillo claimed that this is because of Fundesteam's financial situation; the organization operates on a month to month mentality, where they must find funding to avoid sinking. The organization does not have the time or resources to restructure itself, but defined, structured roles would mainstream Fundesteam operations, improve the organization and improve interactions between employees. Work distribution could be evenly distributed and Fundesteam's reach would increase significantly.

Recommendation 2: Better reporting to stakeholders.

Fundesteam's "paycheck to paycheck" style of operating is another problem that holds the organization back. NGO's (Non-Governmental Organizations) depend on grants and aid, but this doesn't mean that this is the only way to fund themselves. One of our main misunderstandings before arriving in Panama was why Fundesteam only focused on winning private grants and why the organization didn't align with the Ministry of Education (MEDUCA). Our team thought that Fundesteam would be better suited for regular donors rather than applying for constant grants. Most of their donors are one-time givers and do not provide regular donations and we see this as a missed opportunity.

Our team recommends finding a small pool of regular investors while at the same time finding grants to expand rather than solely relying on grants and big donations. This would allow Fundesteam to focus on their expansion and to follow up on their active projects. Concentrating their efforts on this would allow Fundesteam to ensure the effects of their projects are as desired and that those effects can be reported back to the investors. This would then put the spotlight on them and thus attract more support and money, ensuring their survival and capacity to fulfill their mission and vision statements.

In order to find and maintain a pool of regular donors, Fundesteam would be required to report to them regularly and update the donors on their actions and results. This would mean that Fundesteam would need to have regular and organized record keeping. This recommendation ties into the previous recommendation since this would mean a staff member should be tasked with record keeping, and delivery and presentation of data. This data should also be tailored to their

stakeholder's interests, which would most likely be individuals and groups who hold important positions in education in Panama.

Recommendation 3: Align Fundesteam with MEDUCA.

The government's shaky record regarding the management of education projects and the fear of making Fundesteam an organization dependent on politics or even the bureaucratic problems that would distract the organization are reasons why Fundesteam cannot secure funding from the Ministry of Education (MEDUCA). The reasons make perfect sense. However, an economic alliance isn't the only option that Fundesteam has when working with the Ministry of Education. The robotics competition we attended revealed that cooperation between the two entities is not only possible but also beneficial for both.

Both organizations share similar missions and even though the road through which they aim to achieve their mission might not be the same, the fact that they both share a main goal and passion to achieve their visions should be enough to encourage cooperation. Promoting STEAM education and opportunities within this field should be an easy pitch for Fundesteam to sell to the Ministry of Education, affording Fundesteam a bigger and better platform to find support of any kind.

Recommendation 4: Increase social media presence.

By now it is unnecessary to stress how important social media presence is for any type of entity seeking brand recognition and aiming to spread an important message or feeling. After a few days of observing Fundesteam's Instagram and Twitter accounts, it is clear that there is no one in charge of managing the accounts. Fundesteam's Twitter account consists of tweets

retweeted from Marvin's account, and none written by or from the organization itself. This has resulted in inconsistent content being shared. We understand an NGO dedicated to improving STEAM education in Panama won't be the next big influencer with widespread online reach. However, social media is extremely successful at creating communities of people and organizations with shared interests.

Producing content highlighting the effects of STEAM around the world and showcasing similar successful projects around the world could allow Fundesteam to establish its relevance with both average users as well as stakeholders. It would allow them to maintain their relevance in the focus of its intended audience while also making it easier for them to gain attention, which could result in a momentum that could introduce them to more investors and supporters.

Assigning one or various staff members to take care of social media, or even hiring a student to run the social media pages, would allow Fundesteam's accounts to produce better, and more consistent and relevant content that their followers would actually want to receive. This would also allow the staff member in charge of social media to apply marketing strategies that require follow up and not just one or a few posts.

Recommendation 5: Clarify Fundesteam's relationship with PanamaSTEM.

Fundesteam has a dependent relationship with PanamaSTEM, which is a separate organization that serves as the ambassador of Lego robotics in Panama. The organization shares a very similar goal with Fundesteam. They also want to ignite interest in STEM through robotics competitions and classes. However, because PanamaSTEM is a franchise, they are a separate entity, but they also team up with Fundesteam to organize Robotics competition and train the delegation that competes in the World Robotics Olympiad (WRO).

Fundesteam's lack of clear identity can be observed through its old website. The section of the website "Our Success Stories" has several entries of the WRO teams, but has no mention of donating robotics labs or training teachers. It's true that the process that Fundesteam uses with schools culminates with showing its progress in robotics competitions, but that isn't the organization's end goal. The robotics competitions are more like markers that are meant to show the effectiveness of Fundesteam's process. These competitions should not be seen as their main operation. By distancing themselves from PanamaSTEM, Fundesteam can create a clear identity that can be used to market themselves and improve their image towards stakeholders, providing the organization with the independence it needs without having to cut ties with PanamaSTEM, which is a valuable ally.

Recommendation 6: Connect students to internships/summer/after school opportunities.

Fundesteam's goal is to change the poverty cycle in Panama by giving low income family children the resources needed to pursue a career within STEAM. Right now, Fundesteam concentrates mainly on sparking interest by exposing children to education and activities within STEAM. However, their only action towards making sure they aren't discouraged to go to college after their exposure is asking them if they're attending college and making them consider their options. This is a problem because children can be discouraged as easily as they are encouraged. If Fundesteam wants to make sure that children have the necessary resources to achieve their goals within STEAM, then they should provide counseling and aid to children that want to attend college. Connecting them to internships, summer camps and proper guidance can be a definitive factor that instills a goal of college attendance.

The best way to achieve this would be to train teachers to fulfill these roles when considering Fundesteam's limited resources and staff. By training the teachers to guide and help children connect with educational institutions that can sponsor and help them reach higher education, Fundesteam can address half of the solution that they have proposed.

Final Conclusions

At the start of this project, our goal was to improve Fundesteam's accessibility to funding opportunities for Fundesteam as well as market the organization better so that they can be more accessible to potential donors in order to develop and expand. To meet that goal, our main project objectives were to create a funding database, conduct a general survey, and to update Fundesteam's current website. All objectives of the project were met and thus the goal of the project was achieved. The general survey, while proving to be not as helpful as we had hoped, provided two student quotes that Fundesteam could use on their website. These quotes provide an authentic show of Fundesteam's work and impact on children's STEAM education in Panama. The funding database proved much easier to tackle than initially thought; 3M provided Fundesteam with a starting ground, which was an Excel sheet containing 66 potential donors, where they could build and add funding opportunities with ease. Updating the website proved to be the most difficult task of the entire project. The source code for the website was much more complicated than expected as it was much more elaborate than it needed to be and lengthy with over 6000 lines of CSS. The content for the website was much harder to receive from our sponsor and the time constraints leading up to the completion of the website provided a few obstacles. In the end, our team produced a website that was indeed much better than the initial website, however, the changes were not to the extent as was initially hoped.

Ultimately, the two main deliverables we created for our sponsor Marvin Castillo and Fundesteam were a funding database, complete with potential donors, partnerships and grant opportunities, as well as an improved website that houses content that accurately portrays all of the impactful work Fundesteam does and has done throughout Panama. In addition to our two main project components, the secondary deliverable for Fundesteam is the list of bloggers and high trafficking websites, which Fundesteam can further use for advertising purposes and enhance their outreach. Each of these components will improve Fundesteam's growth on a long term scale and These two accomplishments, along with the recommendations from our team as well as from 3M and the list of bloggers and websites, will give Fundesteam the tools they need for long term success, and continued growth and development.

REFERENCES

- 3M. (2019). 2019-05-17 SUMMARY 3M Impact Fundesteam [Powerpoint Slides]. Retrieved via Email.
- Carnoy, M., Luschei, T., Marshall, J., & Sorto, M. (2009). Teacher knowledge and teaching in Panama and Costa Rica: A comparative study in Primary and Secondary education. Retrieved October 6, 2019, from http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-24362009000200005.
- Chui, J. (2016). A Literature Review: Website Design and User Engagement. Retrieved October 8, 2019, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4974011/>.
- Eberle, F. (2010). Why STEM education is important. Retrieved March 23, 2019, from <https://ww2.isa.org/standards-and-publications/isa-publications/intech-magazine/2010/september/why-stem-education-is-important/>.
- Erazo, B., Rodriguez, M., & Sousa, L. (2015). Panama: Locking in Success. Retrieved October 8, 2019, from <http://documents.worldbank.org/curated/en/180611468100727814/pdf/947060SCD0P1510IC0disclosed03030150.pdf>.
- Farber, M, Unfried, A, Dr. Wiebe, E. N., Corn, J, Collins, T. L. (2013). Student Attitudes toward STEM: The Development of Upper Elementary School and Middle/High School Student Surveys. Retrieved via email.
- Fayer, S., Lacey, A., & Watson, A. (2017). STEM Occupations: Past, Present, And Future. Retrieved October 6, 2019, from <https://www.bls.gov/spotlight/2017/science-technology-engineering-and-mathematics-stem-occupations-past-present-and-future/pdf/science-technology-engineering-and-mathematics-stem-occupations-past-present-and-future.pdf>.
- Fundesteam. (2019). Fundación Nacional Para El Desarrollo De Las Steam [Powerpoint Slides]. Retrieved via email.
- Fundesteam. (2019) Cambiando la Educación, Cambiando la Vida de Nuestros Niños. Retrieved March 25, 2019, from www.fundesteam.org.
- Grant, M. (2019). Strength, Weakness, Opportunity, and Threat (SWOT) Analysis. Retrieved October 6, 2019 from <https://www.investopedia.com/terms/s/swot.asp>.
- IDC Giving Group. (2017) Fundraising for Nonprofits – The Five Most Common Types of Grants. Retrieved March 25, 2019, from <http://www.idcgivinggroup.com/articles/fundraising-nonprofits-five-common-types-grants/>.

- Lee, R. (2016). Education in Panama: Still the Worst in the World?, Retrieved March 23, 2019 from <https://www.borgenmagazine.com/education-in-panama/>.
- Obama White House Archives (2013). Retrieved March 23, 2019, from https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf.
- Pan American Development Foundation, (n.d.) How STEM Fuels Growth and Opportunity for the Next Generation. Retrieved March 25, 2019, from www.padf.org/stem.
- Scholaro. (2018) Education System in Panama. Retrieved March 23, 2019, from <https://www.scholaro.com/pro/countries/Panama/Education-System>.
- La Secretaría Nacional de Ciencia, Tecnología e Innovación. (n.d.) Sobre Nosotros. Retrieved March 25, 2019, from <https://www.senacyt.gob.pa/sobre-nosotros/>.
- Society of Photo-Optical Instrumentation Engineers. (2019) Education Outreach Grants Program. Retrieved March 25, 2019, from <http://spie.org/education/education-outreach-resources/education-outreach-grants?SSO=1>
- U.S. Department of Education. (2018). Science, Technology, Engineering, and Math. Retrieved October 6, 2019 from <https://www.ed.gov/stem>
- White, D. W. (2014). What is STEM education and why is it important? *Florida Association of Teacher Educators Journal*, 1(14), 1-8. Retrieved March 23, 2019, from <http://www.fate1.org/journals/2014/white.pdf>
- The White House. (2017). Presidential Memorandum for the Secretary of Education. Retrieved October 6, 2019, from <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-secretary-education/>

APPENDIX A: WRITTEN STUDENT SURVEY

Opening Statement of Survey

This is a survey so that we can better understand the impact of Fundesteam on the lives of the students they serve. Please answer the questions by extending your answers. The more you write, the better for us. The answers are completely private but if you authorize, it we can use your response on the website.

Written Student Survey in Spanish

Nombre:

Edad:

1. ¿Nos da permiso de utilizar su respuesta en el sitio web? Si no las respuestas se mantienen completamente anónimas y su información es privada.
2. ¿Cuántos años has venido a Fundesteam?
3. ¿Ya estabas interesado en ciencia y tecnología antes de empezar a venir a Fundesteam?
4. ¿Cómo ha impactado tu vida venir a Fundesteam?
5. ¿Planeas estudiar estudiando ciencias y tecnología después de graduarse del colegio?
6. ¿Tus padres y o guardianes estudiaron ciencia y tecnología?

Written Student Survey in English

Name:

Age:

1. Do you give us permission to use your response on the website? If not, the answers remain completely anonymous and your information is private.
2. How many years have you attended Fundesteam?
3. Were you already interested in science and technology before you started coming to Fundesteam?
4. How has your life been impacted by coming to Fundesteam?
5. Do you plan to study science and technology after graduating from high school?
6. Did your parents and guardians study science and technology?

APPENDIX B: WRITTEN SURVEY RESPONSES

Question: How has your life been impacted by coming to Fundesteam?

Oliver la Cayo, 13

“E aprendido python y electrónica que me ayuda a ser más interesante.”
 (“I have learned python and electronics which help me to be more interesting.”)

Santiago Swarckopf, 15

“Me e sentido más relajado y con más ganas de seguir aprendiendo este mundo.”
 (“I’ve felt more relaxed and motivated to learn more of this [STEAM] fascinating world.”)

APPENDIX C: SNIPPETS OF SURVEY CONDUCTED BY THE PADF ON FUNDESTEAM SCHOOLS

Survey Questions about Mathematics

	Totalmente en desacuerdo	En desacuerdo	Ni de acuerdo ni en desacuerdo	De acuerdo	Totalmente De acuerdo
Matemática es mi peor materia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consideraría elegir una carrera en la que se use la matemática.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Matemática me resulta difícil.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Soy de los estudiantes que les va bien en Matemática.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
En la mayoría de las materias me va bien, pero Matemática me cuesta un poco.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sé que podría hacer ejercicios avanzados de Matemática.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suelo obtener buenas calificaciones en Matemática.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Soy bueno/buena en Matemática.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey Questions about Science

	Totalmente en desacuerdo	En desacuerdo	Ni de acuerdo ni en desacuerdo	De acuerdo	Totalmente De acuerdo
Me siento seguro/segura cuando estudio Ciencias.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consideraría estudiar una carrera relacionada con la ciencia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Espero usar la ciencia cuando me gradúe de la escuela.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tener conocimientos sobre Ciencias me ayudará a tener un trabajo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Necesitaré la ciencia para trabajar en el futuro.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sé que puedo tener un buen desempeño en Ciencias.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La ciencia será importante para mi vida profesional.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey Questions about Technology

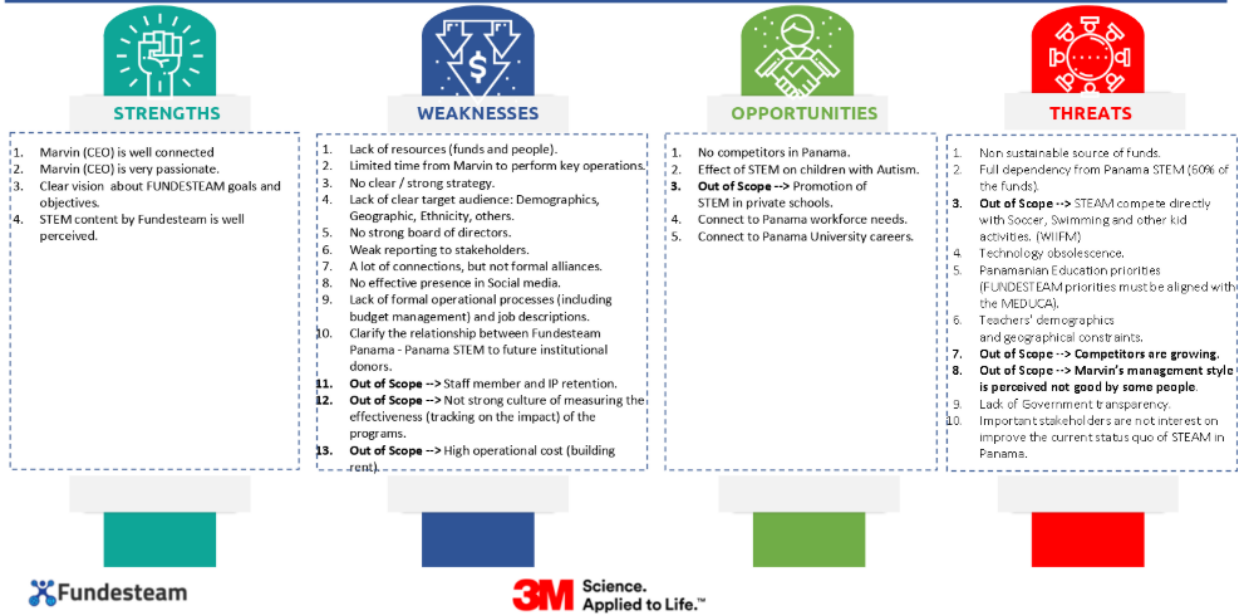
	Totalmente en desacuerdo	En desacuerdo	Ni de acuerdo ni en desacuerdo	De acuerdo	Totalmente De acuerdo
Me gusta imaginarme creando productos nuevos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Si aprendo sobre ingeniería, podré mejorar las cosas que la gente usa todos los días.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Soy bueno/buena para construir y arreglar cosas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Me interesa saber qué es lo que hace que las máquinas funcionen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
El diseño de productos o estructuras será importante para mi futuro trabajo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Me interesa saber cómo funciona la electrónica.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey Questions about 21st Century Skills

	Totalmente en desacuerdo	En desacuerdo	Ni de acuerdo ni en desacuerdo	De acuerdo	Totalmente De acuerdo
Estoy seguro/segura de que puedo guiar a otras personas para que logren un objetivo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estoy seguro/segura de que puedo motivar a otras personas para que saquen lo mejor de sí.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estoy seguro/segura de que puedo realizar un trabajo de alta calidad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estoy seguro/segura de que puedo respetar las diferencias que existen entre mis compañeros.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estoy seguro/segura de que puedo ayudar a mis compañeros.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX D: SWOT ANALYSIS GENERATED BY 3M

SWOT Analysis



APPENDIX E: FUNDING DATABASE

Main Excel Sheet

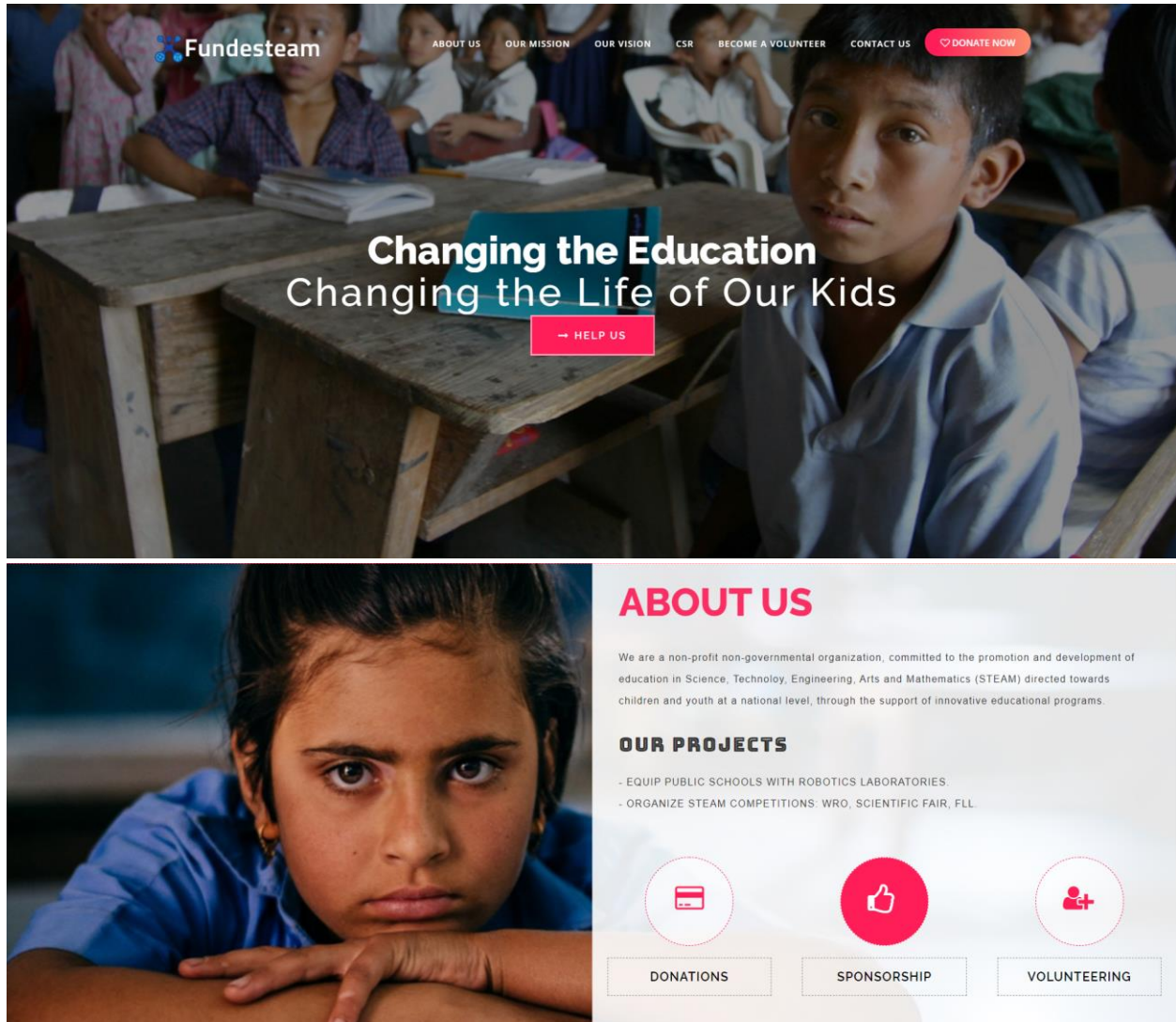
Donor	Fund Category	Donor Info	Focus Area	Profile	Based In	Notes	Contact Name	Phone	E-mail	Mail	Inserted by
The American Institute For Foreign Study Foundation	Institution	https://www.aifsfoundation.org/grants.asp	Education and Exchange Programs	The American Institute for Foreign Study Foundation helps students from many nations and cultures gain global competencies through firsthand, human interaction and opportunities to travel and study abroad. Aiston SA is a French multinational company operating worldwide in air transport markets, active in the fields of passenger transportation, signaling and locomotives, with entities including the Aéro, TGV, Eurostar, and Parisienne high-speed trains, in addition to suburban, regional and metro lines, and Châteaume.	USA	Partnership Possibilities: Offer grants, but for foreign study and exchange programs.	No direct contact		AIFSFoundation@aifs.org		Simone
Aiston Association for the Advancement of International Education	Corporate	https://www.aiston.com/submit-project	Transportation	Main focus is on promoting exemplary school leadership and research-based, effective and innovative educational practices.	France	"Support a Project" based. Possible alliance for partnership or could become a member.	No direct contact		aiston-foundation@aistongroup.com	AAIE PO Box 3496 Princeton NJ 08543-3496	Simone
AT&T	Institution	https://www.att.com/csr/innovation/education	Education and Research	AT&T is an American multinational conglomerate holding company headquartered at Whitacre Tower in Overland Park, Kansas. It is the world's largest telecommunications company, the second largest provider of mobile telephone services, and the largest provider of fixed telephone services in the United States through AT&T Communications. Since June 14, 2018, it is also the parent company of mass media conglomerate WarnerMedia, making it the world's largest media and entertainment company in terms of revenue. As of 2018, AT&T is ranked 4th on the Fortune 500 earnings of the largest United States corporations by total revenue.	USA	Supporting "innovation in education"	Norelle Garcia Seima Astudillo	1 609-716-7441	norelle.garcia@att.com sastudillo@att.com		Simone
AT&T	Corporate	http://about.att.com/csr/innovation/education	Communication	This is a public body created to encourage and support entrepreneurship as well as micro, small and medium enterprises.	Panama	Business focused		(+507) 500-5742	sarango@ampyme.gob.pa	Via Espeña, Ave. Manuel E. Batista	Simone
Empresas (AMPYME)	Institution	https://ampyme.gob.pa/2018/05/27567	Public Agency	It is the dominant entity of the State in order, coordinate, issue guidelines, supervise, collaborate, support and provide the editorial use of information and communication technologies in the government sector for the modernization of public management, as well as recommend the adoption of national strategic policies, plans and actions.	Panama	Technology focused	Irvin Halman	(+507) 520-7400/7500	ihalman@innovacion.gob.pa	Calle 61 y Av. Ricardo Arango, Edificio Sucre, Atlas y Reyes, Nivel 500 Urb. Obarrio, Corregimiento de Bella Vista	Simone
Autodad Nacional para la Innovación (AIG)	Institution	http://www.innovacion.gob.pa/innovacion	Public Agency-Technology	Entity regulated and supervised by the Superintendency of Banks of Panama	Panama	Strategic Donor for STEM Education	No direct contact	(+507) 210-4852	afteren@bancanacional.com.pa rseon@bancanacional.com.pa	Avanida Principal, Panamá	Simone
BAC CREDOMATIC	Corporate	https://www.baccredomat.com/es/informacion-corporativa	Finance	Banco Nacional de Panamá is the official banking entity of Panama that performs some central bank functions. Bancomer is the largest bank in Panama and Central America. It was founded in 1904 as Banco de la Amara before it became part of the HSBC Group following its former parent company. Since Bancomer's acquisition by HSBC in November 2008, it was the subsidiary of HSBC Bank (Panama) S.A. and merged into HSBC Bank (Panama) in 2009.	Panama	Official Bank of Panama. Possible entity of interest		(+507) 505-2000 (+507) 505-2812	afteren@bancanacional.com.pa rseon@bancanacional.com.pa	Calle 55 y Via España, Torre Bancomer	Simone
Banistmo	Corporate	https://www.banistmo.com/portal/banistmo/innovacion	Finance	Banistmo is a Panamanian bank. It is the largest bank in Panama and Central America. It was founded in 1904 as Banco de la Amara before it became part of the HSBC Group following its former parent company. Since Bancomer's acquisition by HSBC in November 2008, it was the subsidiary of HSBC Bank (Panama) S.A. and merged into HSBC Bank (Panama) in 2009.	Panama	Supporting Education	No direct contact		https://www.banistmo.com/portal/banistmo/innovacion		Simone

Grant Opportunities Sheet

Grantor	Fund Category	Grant Info	Focus Area	Profile	Based In	Notes	Special Requirements	Application Dates	Contact Name	Phone	E-mail
AT&T	Corporate	https://about.att.com/csr/innovation/education	Communication	AT&T Inc. is an American multinational conglomerate holding company headquartered at Whitacre Tower in Overland Park, Kansas. It is the world's largest telecommunications company, the second largest provider of mobile telephone services, and the largest provider of fixed telephone services in the United States through AT&T Communications. Since June 14, 2018, it is also the parent company of mass media conglomerate WarnerMedia, making it the world's largest media and entertainment company in terms of revenue. As of 2018, AT&T is ranked 4th on the Fortune 500 earnings of the largest United States corporations by total revenue.	USA	Supporting "innovation in education"	Applications are closed for 2019 and reopen January 2020	February 2020	Norelle Garcia Seima Astudillo		norelle.garcia@att.com sastudillo@att.com
Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT)	Institution	https://www.senacyt.gob.pa/innovacion	Science and Technology	All the activities, projects and programs of SENACYT aim to strengthen, support, include and promote the development of science, technology and innovation with the purpose of being the first of productivity, competitiveness and modernization in the private sector, government, the academic-research sector, and the population in general.	Panama	Priority for STEM. Date has expired, but should be considered for 2020	Application opens December 2019.	March 2020	No direct contact	507 517-0014	info@senacyt.gob.pa
Walmart	Corporate	https://walmart.com/how-we-give	Retail	Walmart Inc. is an American multinational retail corporation that operates a chain of hypermarkets, discount department stores, and grocery stores. Headquartered in Bentonville, Arkansas, the company was founded by Sam Walton in 1962 and incorporated on October 31, 1969. It also owns and operates Sam's Club retail warehouses. As of January 31, 2019, Walmart has 11,361 stores and clubs in 27 countries, operating under 55 different names.	USA	More focused on local grant giving within the US but does offer grants within Central America	Can apply here but applications are closed for 2019. Applications reopen February 2020.	April 2020	Mario Francisco González Islas	52830100 ext 18611	mario.gonzalez@walmart.com
Cargill	Corporate	https://www.cargill.com/about/community/education	Agriculture	Cargill, Incorporated is an American privately held global corporation based in Minneapolis, Minnesota, and incorporated in Wilmington, Delaware. Founded in 1869, it is the largest privately held corporation in the United States in terms of revenue. It is a public company, it would rank, as of 2018, number 15 on the Fortune 500, behind Walmart and ahead of AT&T.	USA	STEM Education priority; Application is sent based on invitation only in early August	Nonprofits that integrate programs that encourage interest in STEM for post-secondary education and potential careers in STEM fields.	September 2020	Stacey Smida, Grants Manager	800-227-4455	stacey_smida@cargill.com
John Templeton		https://www.templeton.org		The John Templeton Foundation (Templeton Foundation) is a philanthropic organization that reflects the ideas of its founder, John Templeton, who became wealthy after a career as a contractor (investor) and wanted to support		Partnership possibilities; Please email us at: fund@templeton.org	Must submit an Online Funding Proposal (PDF) before funding starts. See: https://www.templeton.org/funding				

APPENDIX F: FUNDESTEAM'S WEBSITE

Before Improvements



OUR MISSION TO CHANGE LIVES

Promote and develop educational programs that inculcate interest in the sciences, technology, engineering, arts and mathematics in the minds of children and youth through innovation, collaboration and problem solving, breaking the cycle of poverty and changing the lives of thousands of children as well as the future of our country.

OUR VISION TOGETHER WE CAN MAKE IT

With your help we can change the **equation of poverty in Panama**, eliminating the circle where limited access to 21st century education does not allow children from lower income families to prepare for well-paying jobs in the future.

HOW DO WE DO IT?



PROMOTING S.T.E.A.M.

The programs we support spark passion for innovation in STEAMs in the minds of children and youth.



EMPOWERING A GENERATION

Develop a structured thinking in problem solving as well as a spirit of leadership.



COMPETING INTERNATIONALLY

Organizing competitions so that children from all over the country celebrate their knowledge and can represent Panama internationally.



ORGANIZING DONATIONS

Equipping public schools with STEAM laboratories, which allow children to learn Programming, Robotics, Mathematics, etc.

OUR IMPACT



61

STUDENTS TAKEN TO
INTERNATIONAL COMPETITIONS



1000+


STUDENTS COMPETING AT
NATIONAL LEVEL SINCE 2014




\$208,500

IN DONATIONS

After Improvements

[ABOUT US](#)[OUR HISTORY](#)[MEDIA](#)[BECOME A VOLUNTEER](#)[CONTACT US](#)[DONATE NOW](#)



Changing Education

Changing the Life of Our Kids

[→ HELP US](#)


Goal \$1,800,000

Achieved \$12,000

0.67% of our Goal -- 10

[DONATE](#)


Donations




ABOUT US

We are a non-profit, non-governmental organization committed to the promotion and development of education of the Panamanian youth within the fields of Science, Technology, Engineering, Arts and Mathematics (STEAM) by employing innovative educational programs.

Our projects



SUPPLYING PUBLIC SCHOOLS WITH ROBOTICS LABORATORIES



ORGANIZING STEAM COMPETITIONS LIKE WRO, SCIENCE FAIRS, FLL

OUR MISSION

TO CHANGE THE POVERTY EQUATION IN PANAMA

Promote and develop educational programs that incite interest in the fields of science, technology, engineering, art and mathematics in the minds of children and youth through innovation, collaboration and problem solving. Thus, breaking the cycle of poverty and changing the lives of thousands of children as well as the future of our country.

We chose this mission because we see a deep-rooted problem in the Panamanian social structure. People that are born into poverty never get the chance to escape it because they lack the resources and knowhow to make something with their lives. We seek to flip this system, which we know as the poverty equation, on its head by giving low income children exposure to fields that lead to high paying careers and opportunities to practice and develop skills in these fields. We aim to flip the poverty equation by investing in technology and education and betting on developing Panama from within.

OUR VISION TOGETHER WE CAN MAKE IT

With your help we can change **the equation of poverty in Panama**, eliminating the circle where limited access to 21st century education does not allow children from lower income families to prepare for well-paying jobs in the future.

OUR PROCESS



FIRST CONTACT

Public schools make the first move by contacting Fundesteam either through their website, an email, a phone call or by attending one of the many events that Fundesteam hosts. The school is then required to provide some background information and is put inside Fundesteam's database.



CASE ASSESSMENT AND PLANNING

With the information given by the school Fundesteam's team analyzes the social reality that the school and the community around it faces to understand their needs. This process usually lasts around one day.

This step is one of the most complicated ones since Fundesteam is tasked with finding either public or private institution that can cover 50% of the costs needed to help this school. Fundesteam has several alliances and deals with institutions that help yearly and is constantly looking for new benefactors. Because of the bureaucratic, legal and administrative steps required to cover these expenses this step usually takes between 2-3 months.

During this last step actions such as presenting the project, visiting previously benefited schools to measure success and visiting the community applying take place.

After taking care of all these requirements Fundesteam then presents the contract and the calendar for the rest of the project to the school so the implementing process can begin.



DELIVERY OF RESOURCES NECESSARY FOR THE PROJECT

A protocolary act is held in the school with the benefactors, the local community and Fundesteam. The purpose of this event is to highlight the importance of the project that is about to be implemented and to motivate everyone from students to educators about the project.

These resources include the robotics lab and the new curriculum that must be incorporated, focused heavily on STEAM.



IMPARTATION OF APTITUDE TESTS TO STUDENTS

An aptitude test is held to record each student's strengths and use this information to guide them towards a concentration where their skills can be showcased and allow them to take full advantage of the new resources.





TRAINING EDUCATORS

A training program of three days is imparted for at least 25 educators, this course is meant to prepare educators to teach the new elements of the curriculum such as programming and robotics but also anything they hadn't covered before. A test is given both before and after the course to make sure that the educators have really absorbed the knowledge and are ready to teach the content.



FOLLOW UP

Three or more educators are selected to keep attending training sessions so they can acquire more in-depth knowledge of STEAM. The purpose of this is so that they can manage their local program and don't depend on Fundesteam whenever they find something a road block or something they haven't seen before.



ROBOTICS COMPETITIONS

This is the unofficial final step of the cycle, because of their relationship with Panama's IEM Fundesteam is co host of the qualifying competition for the World Robotics Olympiads (WRO) in Panama. Fundesteam uses this and other smaller robotics competitions through the years to measure the level of success of their projects in the schools. Through a school's turnout, passion and skills Fundesteam can observe the impact that the project has had on each situation and further investigate the ones with smaller impacts.

Fundesteam also adopts each qualified team and prepares them through close mentoring to ensure a good performance in the WRO so they can make a good name for Panama and also to motivate the teams to keep on working hard on their projects and realize that their projects are actually going somewhere.

WHY IS IT IMPORTANT TO DEVELOP CSR PROJECTS FOCUSED ON **STEAM**?

Investing in STEAMs as part of your Corporate Social Responsibility (CSR) program not only has a social impact, but in the medium term it allows you to increase your ROI by investing directly in the formation of the country's Human Resource.



BETTER STUDENTS

It helps us raise the level of knowledge and critical thinking of our students.

[DONATE NOW](#)



BETTER PROFESSIONALS

It provides an urgent need to increase the level of professionals in the sciences, including medicine and the health care sciences.

[DONATE NOW](#)



INCREASED COMPETITIVENESS

Improves the competitiveness of companies by increasing the level of mathematical knowledge and solving problems of students / future employees.

[DONATE NOW](#)

OUR IMPACT



61

STUDENTS TAKEN TO
INTERNATIONAL COMPETITIONS



1000+

STUDENTS COMPETING AT
NATIONAL LEVEL SINCE 2014



\$208,500

IN DONATIONS

SURVEY OF STUDENTS AT PARTNER SCHOOLS

Based on a survey of 1623 students conducted by the Panamerican Development Foundation



I BELIEVE THAT I CAN BE SUCCESSFUL IN A CAREER IN ENGINEERING.

Strongly Agree ☐ ☐ ☐ ☐ ☐ Strongly Disagree

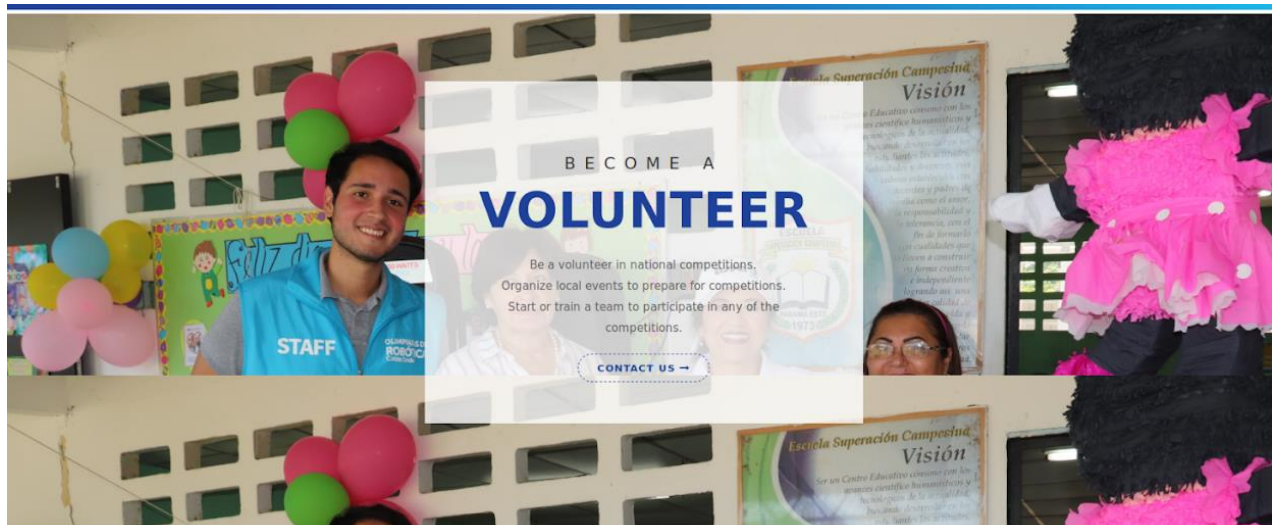
90%

Plan on going to college.



I AM SURE THAT I CAN MAKE CHANGES WHEN THINGS DO NOT GO ACCORDING TO PLAN.

Strongly Agree ☐ ☐ ☐ ☐ ☐ Strongly Disagree



CONTACT US



Calle Gonzalo Crance 175
Clayton, Panama City

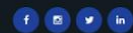


info@fundesteam.com



+507 317-0379 | +507 6674-7992

©2019 Fundación Nacional para el Desarrollo de las STEAM. All rights reserved.



OUR HISTORY



The National Foundation for the Development of STEAM was created after participating for the first time in the World Robotics Olympiad in Sochi, Russia in 2014. The Panamanian Delegation suffered a terrible defeat by ranking second to last in the standings table against more than 65 countries and 70.000 boys and girls. This experience caused FUNDESTEAM to be created in 2014 to structure projects focused on the implementation of STEM-STEAM Education (Science, Technology, Engineering, Arts and Mathematics). Using methods such as project-based learning (ABP), challenges (ABR), Problems (ABP), Engineering Design, Design Thinking, and Gamification as tools we help the kids develop skills that are in high demand 21st century. All FUNDESTEAM projects are focused on the development of an educational quality in students and educators of public schools located in communities with high rates of violence and/or social threats. Thus, seek to promote social and economic development that benefits a comprehensive development of the country.

OUR SUCCESS STORIES

2014



WRO RUSSIA 2014

In November 2014, we sent our first team to the World Robotics Olympiad held in Sochi, Russia. A group of parents became the first to believe in Panama and our children, supporting the first two teams representing Panama participating in the World Robot Olympiad.

2015



WRO QATAR 2015

In September of 2015, we held the first National Robot Olympiad WRO Panama 2015, achieving the participation of 120 national teams. In this edition, children and youngsters from 7 to 18 years old competed, achieving the classification of 6 teams that went to represent us in the World Olympiad celebrated in the month of November in Qatar.

2016



WRO INDIA 2016

Our second National Robotics Olympiad was held at the City of Knowledge with the participation of more than 450 children distributed in three categories and 145 teams. Five teams classified of which 4 could travel to represent us at the World Robot Olympiad in New Delhi, India. We achieved an excellent participation by staying at number 32 worldwide of a total of more than 20 thousand teams.

2017



WRO 2017 COSTA RICA

For the first time the International Final of the World Robot Olympiad was held in America! In November we traveled to San José, Costa Rica for the WRO 2017.

2018



WRO 2018 THAILAND & WER 2018 SHANGHAI

WHAT PEOPLE HAVE TO SAY ABOUT FUNDESTEAM

"I HAVE LEARNED PYTHON
AND ELECTRONICS
WHICH HELP ME BE MORE
INTERESTING."

- OLIVER LA CAYO, STUDENT, 13

"FUNDESTEAM HAS
CHANGED MY LIFE. SEE
THE FACE OF TEACHERS
AT THE TIME OF THE
TRAINING. SEE HOW THEY
CAN TRANSFORM THEIR
CLASSES."

- ALEXANDER CACERES, FUNDESTEAM TEACHER

"I'VE FELT MORE RELAXED
AND MOTIVATED TO
LEARN MORE OF THIS
FASCINATING WORLD."

- SANTIAGO SZWARCZKOPF, STUDENT, 15

IN THE NEWS

"LA ROBÓTICA LLEGÓ A
TRES ESCUELAS EMBERÁ
WOUNAAN"

- ZETA

"LLEVAN ROBÓTICA A
NIÑOS DE EL CHORRILLO"

- PANAMA INFORMA

"EQUIPO DE
COMUNICACIÓN
PARTICIPA EN SEMINARIO
SOBRE ROBÓTICA E
INFORMACIÓN"

- TRIBUNAL ELECTORAL

"DIVULGAN LAS REGLAS
PARA LAS OLIMPIADAS DE
ROBÓTICA"

- LA CRÍTICA

"NIÑOS DE SANTA ANA,
CHORRILLO Y CURUNDÚ
INCURSIONARÁN EN LA
ROBÓTICA"

- METRO LIBRE

"IMPLEMENTARÁN LA
ROBÓTICA EDUCATIVA EN
ESCUELAS PRIMARIAS
OFICIALES"

- DIA A DIA



- BANESCO

PHOTOS



CONTACT US



Calle Gonzalo Crance 175
Clayton, Panama City



info@fundesteam.com



+507 317-0379 | +507 6674-7992

APPENDIX G: FUNDESTEAM TEACHER AND STAFF TESTIMONIALS

Alexander Caceres

“FUNDESTEAM has changed my life, see the face of the teachers at the time of the training, see how they can transform their classes, how they can apply different learning strategies such as, project-based learning (ABP), challenges (ABR), problems (ABP), Engineering Design, Design Thinking, and Gamification, generates a happiness and a smile in the children, falling in love with the classes and eliminating comments like “teacher I want to leave” and changing them to “teacher we can stay”. That change in boys and girls who once were only in the street playing in violent or vulnerable communities now strives to want to continue in school and learn more and more about STEM-STEAM areas. It is pure motivation for students and it is something I had never witnessed.”

Lutfi Garzon

“FUNDESTEAM is one of the organizations that best executes its goals, and one of its main goals is to take STEAM to more and more schools nationwide, I think we have achieved it step by step regardless of the limited support we have received. The progress and development of the students and educators who have been participating in the projects is an experience that has changed their lives. Before the existence of this program there was no opportunity for these students and educators to learn and develop their knowledge. A generation with new challenges is coming and FUNDESTEAM is opening the way for future generations to come to the professional field.”

Victor Rodriguez

“I have been able to witness the change in the lives of thousands of boys, girls and teachers who, thanks to these STEM-STEAM Education implementation projects, have been able to benefit and take another step forward in the progress of their academic and professional development. I am impressed that boys and girls from communities where they hardly have the opportunities to emerge as professionals in STEM areas, nowadays they are doing it with the greatest ease thanks to these projects.”

* Above statements are included by permission of the respondents.