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INTRODUCTION

As of 2015, there were 3.2 million registered NGO’s in India, which translates to roughly four NGO’s for every 1,000 people in urban areas and 2.3 NGOs for every 1,000 people in rural areas (1). The emergence of India’s NGO sector began in the post-independence era and continues to rapidly expand, both in volume and diversification of target social issues. Despite a vast network of NGO’s, there are far less viable solutions emerging with sustainable impact on social issues like water scarcity, waste management, public health, housing, and education, among others. In order to understand why NGO programs, projects, and initiatives are failing or falling short, it is crucial to understand the nature of social issues. Social issues are inherently complex, grand challenges, and rarely mitigated by an individual solution-- instead they require an approach which factors in economic, cultural, political, and geographical factors. They are multi-dimensional and require multi-pronged solutions as a result. Although this approach is generally accepted by actors in the social development arena, the non-profit nature of NGO’s creates a significant barrier to developing intuitive and robust solutions to complex problems.

PROBLEM

More often than not, constraints like financial resources and time force NGO’s to focus on action-based solutions, which can deliver the most impact in the shortest amount of time. The biggest problem with this approach is most solutions fail to address the root cause of the problem and instead treat the symptoms, without examining all possible impacting factors like how human behavior may implicate project success. We see this vulnerability time and time again in Bangalore-- for example, in the rainwater harvesting systems which are implemented by Biome in government schools. After interviewing Biome, we discovered that the rainwater harvesting systems are effective in treating the immediate problem of water scarcity; however, a lack of education surrounding how to use the system and its benefits results in 50% of installed systems failing after just one year. Moreover, all of the remaining functional systems have various degrees of costly repairs. As a result, Biome is forced to continue to maintain and make costly repairs to existing systems-- funding and time which could otherwise be used to implement systems in new schools.

Other NGO’s working in different sectors face similar constraints, such as Hasiru Dala-- an innovative social impact organization working in waste management. Although Hasiru Dala has great success in their waste management collection services and in waste picker support programs, Hasiru Dala estimates that roughly 60% of Karnataka is unaware of available waste management services and waste segregation practices. This is another prime example of a solution which works to eliminate urban waste, but does not address the underlying gap in education surrounding waste segregation practices.

CUSTOMER
Echo Ed’s customers are primarily operational NGO’s, which focus on the design and implementation of development projects and are operating at the local level in Bangalore. NGOs are ideal customers as they are non-profit organizations which are largely funded by donations and, as a result, are constrained by a lack of financial resources and time. In Bangalore, Biome notes that financial support from donors is often contingent upon fulfilling varying levels of quantifiable project results, in order to promote the perception that donating parties or individuals are fostering real change. Hasiru Dala adds that NGOs have a responsibility to follow their donor’s ideas of success, which often involve wide reach and scalability, rather than a focus on long term change and impact. Additionally, NGO’s are funded by grants from large benefactors, which can support specific programs, projects, or can be provided on an ongoing basis for overall support. Most commonly, grants are project specific and require NGO’s to deliver specific outputs in line with funding and a timeline from the benefactor. As a result NGO’s, “undermine its attention to the needs of its intended beneficiaries… and they focus on short-term quantifiable outputs rather than systemic change in order to satisfy funders…” (2).

Biome and Hasiru Dala are not the only operational NGO’s in Bangalore which face these problems: other NGO’s including Hasiru Dala, The Gramantara Trust, FFEM, The Environment Association of Bangalore and IPH expressed similar concerns surrounding funding. As a result, these NGO’s report a lack of education in their respective fields, which translates to high rates of failing infrastructure in built projects, low retention and performance of existing projects, and an inability to scale and reach larger populations. Large amounts of already constrained resources are then put back into mitigating existing projects, leaving little money and time for NGO’s to incorporate education and supportive resources for an all-inclusive and robust solution.

Echo Ed’s clients include Biome, Hasiru Dala, The Gramantara Trust, and The Environment Association of Bangalore-- all of which expressed a desire for more education in their respective fields. Beneficiaries are the community members, schools, and individuals served by our clients, whom we engage with and are directly benefiting from our educational resources and tools. Additional beneficiaries are the communities connected to those we educate: families, villages, friends of those who receive education. Echo Ed is actively working with Biome and Hasiru Dala on tailored curriculums in rainwater harvesting systems and waste segregation, respectively, and has plans to further develop material for the other aforementioned clients (See Appendix IV. Documentation of Prototype).

**SOLUTION**

**Methodology**

Echo Ed recognizes that the action taken by NGO’s in Bangalore is valuable and that constraints like financial resources and time can make or break a project. That’s why Echo Ed provides educational tools to NGO’s in order to alleviate constraints and create cooperative and all-inclusive solutions. Echo Ed develops educational resources including but not limited to: curriculums, brochures, presentations, activities, and lectures. All of Echo Ed’s resources are custom tailored and co-developed with each client in order to ensure maximum impact. All of the resources can be purchased as stand-alone products online, or with the inclusion of one of our educators who will facilitate on-site learning for dynamic educational experiences (See Appendix IV. Documentation of Prototype). At Echo Ed, we are committed to supporting the success of NGO’s and provide services throughout all phases of project development--from providing beneficiaries with educational tools and resources before project implementation, to impact assessment on human behavior and follow-up.
Processes

Pre-Implementation & Planning

Echo Ed bridges the gap between project and practice, beginning with pre-implementation services. Potential clients can submit requests directly on the Echo Ed website and a representative will follow-up with them to establish a point of contact. From there, our team will meet with and work closely with each NGO to understand their values, needs, and project goals.

We take this one step further by planning site visits and/or setting up meetings with the NGO’s target beneficiary group(s) to assess the current knowledge landscape and where education gaps may exist as they relate to NGO’s project goals. Using learned knowledge from on-the-ground assessment and direction from each NGO, we map custom education trajectories by beneficiary group, and design educational tools, resources, and facilitation activities. We streamline the education process and allow NGO’s to focus on action.

Implementation & Execution Monitoring

Echo Ed is committed to maintaining an active role throughout each phase of our client’s project development. During project implementation Echo Ed maintains a supportive role, and at the direction of our client will provide additional educational resources and facilitators as needed.

Post-Implementation & Performance Analysis

At the end of implementation, Echo Ed ensures long-term project success and sustainability by providing follow-up assessment, which analyzes retained knowledge and behavioral change of target beneficiary groups, as it relates to each project’s goal (See Appendix XI. Job Postings). Learning takes time, and Echo Ed is committed to providing a learning experience which adapts and adjusts to the needs of the beneficiaries we serve, and in turn meets client goals.

Evidence

We believe wholeheartedly in the power of education as a key tool in the development of socially sustainable and inclusive solutions, and there is evidence to support its viability. In 2012, the Social Science and Medicine journal published a study on interventions in developing countries involving the use of bed nets, hand washing, face washing and complementary feeding, in which they identified behavioral change techniques and their effectiveness (3). In total, 86% of the 24 interventions showed significantly positive outcomes in terms of observed changes in behavior. For example, successful hand washing interventions included educational instruction and modelling, social support, and provided participants with soap. The use of multiple intervention techniques engaged participants at the behavioral, social, sensory, and cognitive level for increased likelihood of learning and sustaining the improved behavioral practice (3). Conclusively, behavioral change is best observed when intervention techniques provide participants with physical resources like bed nets and soap, as well as education on proper use and implementation. The results of this study further supports Echo Ed’s solution, by re-affirming the need to create all-inclusive approaches to solving social issues using both education and physical resource implementation.
Moreover, evidence which supports the use of a multi-pronged approach to solving water based issues in Karnataka exists. In 2006, The Government of Karnataka implemented 1,269 rainwater harvesting structures (RWH) across seven school districts, and in 2007, a study by Arghyam found that only 140 of the structures were still functional (4). The following problems were identified: underinvestment and lack of resources, use of a, “one size fits all,” technical design, and lack of protocols surrounding maintenance, water quality and treatment testing. Following this, Arghyam implemented a two-phase project in partnership with RWH experts and NGO’s, in which they revived and repaired 27 defunct RWH systems and implemented awareness activities and maintenance plans, including water conservation education, and RWH system skills training. A follow-up survey in 2009, found 16 of the 27 RWH structures were still functioning. They further analyzed the technical and social reasons for success/failure of systems and found that vandalism was the predominant reason for defunct systems (4). This study underscores the importance of multi-pronged solutions which include education in conjunction with infrastructure implementation. The success rate rose from barely 11% to over 59%, with the notable difference between the two implementations the addition of education. This is what Echo Ed hopes to add to all operational NGO implementations.

Additionally, Echo Ed conducted a preliminary assessment of our rainwater harvesting curriculum at Parikrmra by leading a water filter activity with pre and post assessment surveys. On average, our surveys found that the students performed better after our activity, during the post assessment survey-- with upwards of two thirds of students answering survey questions correctly, up from one third in the pre-assessment survey (See Appendix V. Prototype Feedback). We recognize that this is preliminary data, but also that it is indicative of early success in our curriculums and reflects positively on their future potential.

**MAKE IT REAL**

We developed a curriculum for Biome and Hasiru Dala, both of which are listed on our website and can be found below in Appendix IV. Documentation of Prototype. The curriculums and our website are our Minimum Viable Product. The website allows new users/clients to connect with us and submit requests for educational resources. We received feedback from Hasiru Dala in regards to updating the website and making it more targeted towards NGO’s, and also created a google survey surrounding usability. We plan to update the website to be more direct but also more user friendly.

In order to get our project up and running, we will need to hire a coordinator, systems analyst, research assistant, and educator (See Appendix XI. Job Postings). This is the team we need in order to fully get started. We hope to eventually grow and retain multiple educators, so that we can have multiple teams working on more than one project, and incorporate education into more services. However, for the sake of this report, because it is so difficult to predict growth, and because we do not think we will grow enough in five years to need to hire on a whole additional team, we will move forward with our four paid employees for now.

To make up any extra work, or facilitate and engage with communities more, we are also relying on volunteers who want to make an impact in their communities. Their role would primarily be to participate and lead activities, give presentations, and help with any building, and build relationships with the beneficiaries. Upon talks with eighteen SJC students, we found that 14 out of 16 were very interested and willing to be trained and learn new material, then lead activities and presentations to beneficiaries.

Additionally, we will need to find methods for funding our anticipated startup costs in the first year-- which totals 1.03 lakhs. This number includes the salaries of our needed positions, travel costs, and research and outreach costs. We have also calculated the cost of our first customer, who is Biome. This
breakdown of all of these costs can be found in Appendix IX: Cost Structure and Analysis; to save space here, we will state that to complete a curriculum for one school at which Biome implements a rainwater harvesting system, it will cost us 67,000 rupees. To finance this initial client and get us off the ground, we will take out a loan of 70,000 rupees. From our discussion with our potential clients we will charge 10% of their total implementation cost, and this will be one of our sources of income. We have confirmed clients of Biome and Hasiru Dala in our first year, but due to the nature of our work, we cannot accurately predict the costs and profit of our future years. As said before, this is all stated in Appendix IX.

We plan to expand upon Echo Ed’s customers to more NGOs or to any organizations which are interested in our services. Ideally, we want to have fewer projects, to be able to devote more time to these projects. This means targeting NGOs involved in larger projects and implementations, so that our costs are covered by one or two projects. We want to make sure that we are involved in about five projects a year, depending again on the size of the implementations we are involved in. Until we get another team, we want to cap the number of projects we get involved in to ten.

Our immediate next steps will be to obtain our loan, which we aim to pay off in four years, with an interest rate of about 10%. We have already uploaded job applications to our website, and will need to publish these on job finding sites such as WorkIndia and Just.jobs.
REFERENCES


I want to clarify my priorities by defining my goals and the path to reach them.
APPENDIX II. RANDOMIZED CONTROL TRIAL

Changing Behaviors Through Education

A randomized control trial to test the effectiveness of education in increasing continued success of NGO programs.

1. Our first RCT will be with Biome, as they are our first customer. In order to randomize this trial, we will first make a list of all schools which Biome has marked as being eligible for a rainwater harvesting system. The measure of success between the test group and control group will be the conditions of their systems after one year.

2. The second step will be to number these schools, 1-# of schools (to our last knowledge, this was 50 schools). Using a calculator, we will generate 20 random numbers. The schools with these associated numbers will be selected to participate in our RCT.

3. These 20 schools will be numbered again, 1-20. Again, we will use a calculator to generate ten random numbers. These ten schools will be our test group. The other ten schools will be our control group.

Randomization

There is a limit to how many schools Biome can install rainwater harvesting systems for in a year. Therefore, each year, two schools will be randomly selected from each group, using the randomization method from before.

These schools will have their rainwater harvesting systems installed at the same time, in the months of September-March (the dry season). The test group will receive our services during this time, while the control group will receive Biome’s typical installation process.

Test and Control Groups

For each school in both groups, arrange status check ins at three, six, nine, and twelve months after initial installation. Using prepared list of questions and observations, visit each school and record the state of the system, how many facilitator sessions have been requested, and how many times simple repairs have been done by the school. Additionally, question students and teachers about their involvement, whether or not student committees have been created, and about the uses for the systems. Finally, repeat this process for five years, until all twenty schools involved in the trial have rainwater harvesting systems and have been addressed. Evaluate the responses using statistical testing to decide if the difference in results between the two groups is statistically significant.

Measuring Success
APPENDIX III. EMPATHY MAPS

Empathy Map: Customers

Empathy Map Canvas

Empathy Map Canvas

Empathy Map Canvas

Empathy Map Canvas
APPENDIX IV. DOCUMENTATION OF PROTOTYPE

FOR CLARITY, WE WILL NUMBER EACH PART OF OUR PROTOTYPE. THIS NUMBER WILL CORRESPOND TO THE NUMBER IN THE PROTOTYPE FEEDBACK SECTION.

I. Teaching through physical activities prototype

In order to prototype our product, we decided to lead an activity which would demonstrate the amount of learning that could be accomplished. While our ultimate goal is to use education to change behavior and to incite beneficiaries of NGOs to take more ownership over what is given or implemented for them, this cannot be accomplished in a few weeks, because implementation of a system and behavioral change takes months. In the case of our first client, Biome, we would be measuring behavioral change over the course of a year, through measurement of the health of rainwater harvesting systems.

We went to Parikrama Center for Learning on Tuesday, March 3rd, to teach an eighth grade class about rainwater harvesting and filter maintenance. As we were preparing the material, we were told that we only had 30 minutes. This meant we couldn’t prototype a whole session, and had to condense into a shorter activity and presentation, while still being engaging. To meet these requirements, we prepared a physical model of a rainwater harvesting filter, shown to the left. We made this filter with common household items, easily recognizable so that students could create association between item and function easily. We also made it a size which was easy to hand around and play with, so that students could feel each component and physically hold the filter. To go along with this, we created a presentation, which we gave on a projector, which explained why we need rainwater harvesting, had a visual representation of the full rainwater harvesting system, and had a 3-D model of the filter systems that are actually used.

To demonstrate, we had a student come up and pour dirty water filled with leaves, dirt, and cement through the filter, so that the students physically saw the change in water and the success of the filter. This is important, because by seeing and touching and hearing, as well as the actions included in the demonstration, students will remember what they learned. We then had a physical model to show how to clean the filter, which we know from speaking with organizations is often a weak point. To measure success, we asked four questions before we began speaking and showing our prototype, and asked the same four questions after the presentation. The difference in the responses and the amount of correct answers will be how we measure learning. The benefit of having such a short period of time is that we were able to measure if any learning could be done in such a small window of time. Of course, to measure long term learning, we would have to go back and ask these questions again, in a week or a month.
II. Website

The other part of our prototype is our website. Here, our clients (NGOs) can contact us with specific requests, set up meeting times, and establish first contact with us. Additionally, we also have curriculums available to purchase, targeted for NGOs, but also available for anyone who wants to learn. We have options for entire curriculums to be purchased, or only certain parts. This way, NGOs can customize fully what they buy, as well as the programs that we build for them.

https://echoedindia.wixsite.com/bangalore

From the Home Page:

We are Echo Ed, and we know that education reverberates throughout the world. Whether it be through a business, service, or non-profit actions, adding education into a system guarantees results. Providing proper education, personalized to maximize success of implementations while focusing on the needs of the beneficiaries, is difficult - but we’re here to help.

At Echo Ed, we work closely with YOU. We develop education curriculums built to guarantee success of your actions and goals. We provide the research, follow up materials, and necessary knowledge to ensure that beneficiaries are aware of the services they will be benefitting from. Additionally, we work to meet your goals, whether it be in the form of data or ease of system maintenance.

To do this in the most efficient method, we begin with meeting with our customers (you!) to establish existing knowledge within the community they are trying to serve. This means taking advantage of your on the ground knowledge, expertise, and resources. For example, if you are trying to reach out to a ward to implement waste segregation, we would talk to you about the best way to do so. We would then make several visits based on this information, and talk to people across several demographics in these communities. Using our continued partnership with the NGOs, we would develop an education program which would include whatever you agree would be most effective. Of course, a huge part of our service is knowing
OUR GOALS

Our short and long term ambitions.

Echo Ed is committed to finding a way to make sure NGO’s returns on investment from their time in communities is 100% - we want your programs and implementations to be self maintained and always successful. We don’t want excess time to be spent on repairs, or spending precious resources on things that can be handled by the

We want to educate the target audience of your projects and programs so that they are prepared, eager, and willing to make sure that the service they are receiving from you works and continues on. Additionally, we want this education to be lasting and worthwhile, to develop skills which they will keep.

We want to revolutionize the way that NGOs and work is done in India, and educate communities while we’re at it. We want the education we provide to spread beyond those we tell it to, into their families and communities, to create societies that are well educated about the problems that exist.

TELL US WHAT YOU’RE LOOKING FOR

63, Miller’s road, Benson Town, Bengaluru, Karnataka 560046

echo.ed.india@gmail.com

+91 90190 22621

From the Personalized Curriculum Page:
III. Hasiru Dala Prototype

Hasiru Dala is one of our potential customers, and asked us to create for them something that concisely explains waste management, while being easy to interpret or read, and which wouldn’t take too long for someone to understand.

Again, please visit https://echoedindia.wixsite.com/bangalore to see the full site!
Waste Segregation
SECURING BANGALORE\'S FUTURE

Innovative services for waste pickers and the Karnataka Community.

Hasiru Dala
The Green Force

Contact Us
www.hasirudala.in
info@hasirudala.in
00-91-89-22355553

Why Segregate Waste?
Segregating your waste keeps Bangalore clean. By separating dry waste and wet waste, you are helping to ensure that waste is processed to the fullest extent.

How Do I Get Started?
Getting started is easy. Hasiru Dalais actively working with waste pickers and Dry Waste Collection Centers throughout Karnataka. You can do your part by segregating your mixed waste before it reaches the collection center.

Who are We?
Hasiru Dala (the "Green Force") is a social impact organization that focuses on justice for waste pickers through interventions co-created with the waste pickers, in the areas of identity rights, access to family education, healthcare, housing, skill development, market and employment access, and multi-tier policy advocacy. Above all, Hasiru Dala\'s aim is to provide its members with opportunities that will help them claim their much-deserved role in society – as 'green collar workers' who quietly labor towards keeping our cities clean and mitigating climate change by enhancing recycling.
IV. Biome Prototype

Biome was our first customer, and they asked us to create a full curriculum for rainwater harvesting which they could give to staff at the schools where they want to implement and use it as a screening method. They also wanted to include informational graphics that could be shown to the students which transcended language, so that these could be shown at multiple schools with several different languages. Below is a preview of each section of the curriculum (we also have a separate booklet created for them of just infographics, all of which are the style which you see in these previews).
India is one of several places around the world, which suffers from water scarcity. In Bangalore, overuse of water and lack of proper infrastructure has decreased availability of groundwater, contaminated rivers and lakes, and promoted lack of access to municipal water. Currently, the majority of Bangalore’s water comes from deep bore wells, tankers, and municipal water. The municipal water comes from the Cauvery River, which is far away but still supplies water to the inner city. Due to Bangalore’s massive population boom and expansion, much of the city was never connected to municipal water and is unable to receive it. This leaves wells and tankers, both of which have their disadvantages. Wells, which were once plentiful, have less and less groundwater available from overuse and must be dug deeper and have less water to produce water. Tankers...
ACTIVITY: Make Your Own
Filtration Systems

OBJECTIVES:
- Understand how and why rainwater is a feasible source
- Students comprehend what is happening in their own RWH filtration systems
- Students visually watch how dirty water is filtered and how we can reuse different sources of water

INSTRUCTIONS:

PART ONE:
Step 1: Using the larger, example filter, explain to teams the order of the aggregates and layers and why it is most efficient in this order. Reiterate the function of each layer as you demonstrate water moving through this filter.

Part Three: Report

Produce a report that includes the following information:

- Type of system desired and why
  - How big of a sump, overhead, and/or surface tank is needed?
  - Are more than one of these needed? Why?
    - Think multiple buildings, water demand
- How much water does the school consume daily (drinking and non-drinking)?
  - Where does your non-drinking water come from now?
    - How much of this water could be replaced with water from RWH systems?
- What will the water be used for?
  - Please outline all uses, major and minor
    - How different are the uses during the dry season vs the rainy season?
    - What uses do you feel like you could decrease your usage on? What can you do to conserve water?
APPENDIX V. PROTOTYPE FEEDBACK

FOR CLARITY, WE WILL NUMBER EACH PART OF OUR PROTOTYPE FEEDBACK. THIS NUMBER WILL CORRESPOND TO THE NUMBER IN THE PROTOTYPE SECTION.

I. Teaching through physical activities prototype

In order to see whether or not learning can be done and have an impact on behavior, we went to Parikrama Center for Learning and led a presentation and activity with a class of eighth standard students. We first had them fill out a survey to see the amount of base knowledge they had, then gave a visual presentation, led an activity involving the students, and measured how much they had learned. The results are displayed below:

For this question, we can see that learning stayed about the same. There was clearly good knowledge of rainwater harvesting systems to begin with, and follow up discussion with the students after also showed this. Therefore, there was little change before and after, although more people correctly identified that harvested water could be used for hand washing and toilets.

**What is the use of the charcoal in rainwater harvesting filters?**

Here, we saw clear learning, and identified a point of weakness in the education curriculum. While students knew what rainwater harvesting was, they were unsure of what actually constituted the filter they were using. After we showed them a physical model of the system, and explained what each layer did, there was a large increase in the amount of students who could identify what activated charcoal did correctly. The amount of wrong answers also decreased by one, but, more importantly, there was not a single student who did not have some idea of what it did, and students were able to give more specific responses.

**How often do filters need to be cleaned?**
Again, there is clear learning displayed here. Two thirds of the students correctly learned how often they needed to clean the filters (once a month), while before the presentation only a third knew. Additionally, the answers were narrowed down to two choices.

This activity also provided us with information on what we needed to do differently: in further prototypes and when we actually go into schools for clients, this would be considered a primary survey, before the actual education begins. Parikrama provides excellent facilities, clean water, and food for the students while they are at school. From the amount of education they already have, we would have developed a further curriculum to target the gaps in their education: focus on treatment techniques they could take home to the slums, focus on technical learning of rainwater harvesting rather than theoretical, and go more in depth. We would also want more time, and arrange for follow up sessions to actually measure learning. Additionally, we would want to also visit homes and see the difference in behavior that occurs in their homes, as this is one of the goals of Parikrama, to improve the home lives of these children. From our initial visit, we learned where the gap in Parikrama’s system lies, and would be able to tailor a much more beneficial system to see if education can improve the home lives of these children with the knowledge they bring home.

II. Website

We showed the website to one of our potential customers, Indha from Hasiru Dala. She gave a list of things that she would like to see as someone interested in our services. The most important ones are that she wanted more details as to what would actually happen: how are we going to make sure we get accurate preliminary data, how are we going to be reaching out to these communities in a way that will be effective to her and to the thousands of people she serves, etc. Her list of comments are shown below:

- Lot of outreach needs to be on the website, start with the common people but work up to do outreach through higher ups, because this is what will lead to more change
- Bangalore and people working here quite open to new changes
- Party representatives are the people on the ground, they already know some of our data, so make sure you work with NGO so they can help you determine best way to get primary data
- Need to have strategies in place, show them on website
- Emphasize collective responsibilities
- Need accountability, someone to question you all the time
- Awareness is a very important topic, stress this
- Convince people what you are trying to do
- Show pilot and long term goals on the website
  - Impact makes a lot of difference, must be on there to pull in more views
- Emphasize the partnership and that we are part of their representation

Hearing this feedback was very useful because we were able to add more details to our website, both on the home page and on the personalized curriculum page. We were able to take our website from being very general and vague to being detailed and forward thinking.
The same kind of feedback was reflected in the survey we conducted. However, the responses we got were from SJC students, so it was a good indication of what normal people would see if they went onto our website looking for our services. We got positive, but vague responses from this survey. On a scale of 1-5, the overall response was a 3. When we asked if it was clear what Echo Ed did based on the homepage, we got the common responses of: “it provided personalized educational curriculum” and a specific response of “Echo Ed closely works with NGOs and organisations to help them build their goals and give them a clear path to their vision by providing with necessary education about this project.” When we asked what the most important feature that we need to add is, we received the common response that we needed pictures and our vision more clearly stated.

While we got relatively good feedback on our website, it was not as in depth as we would have liked. Therefore, our website edits were made based on Indha’s guidance and recommendations.

We reached out to SJC students in the literature and commerce colleges, and asked them if they would be interested in being volunteers for this type of program. Of the sixteen we asked, fourteen said they would be interested. Furthermore, we outlined that they would need to be trained and showed them some of the subjects they would have to learn, and they were still as willing to learn. This means that a large part of our implementation team is solidified already.

III. Hasiru Dala Prototype

When we showed Indha from Hasiru Dala the brochure we had made for her, she liked the idea of how simple and easy a brochure was to hand out and to flip through and open. However, she wanted less words, since a lot of the people that she was trying to reach were lower income communities. She also wanted us to update the graphic at the end to reflect the three different waste categories, rather than just two, since hazardous waste contamination can result in things being sent to the landfill for nothing.

IV. Biome Prototype

Biome was very pleased with the prototype we created. They especially liked the infographics, and encouraged us to do more for drinking water treatment. They also liked the report section at the end, which they found would be very valuable as it would allow them to receive feedback of knowledge and a method to assess knowledge.
APPENDIX VI. BUSINESS MODEL CANVAS

The Business Model Canvas

Key Partners
Biome and other NGOs, such as Hasru Dal and the Environment Association of Bangalore, who are implementing their respective projects, but do not have the time or manpower to include an education aspect. NGOs will implement our product at various locations, including schools and community centers.

Any students interested in volunteering/working as presenters/instructors
Schools/organizations that want to learn more about some beneficial systems can purchase our pre-made curriculum packages.

Key Activities
Finding NGOs that want to implement education for schools or communities before, during, and after the implementation of their project.
Creating tailored curriculums
Providing employees and volunteers for presentation of the curriculum

Value Propositions
We provide NGOs with education materials and services throughout all phases of project development in order to bridge the gap between project and practice.

Through education we improve the overall success rate of implemented projects which allows NGOs to focus on scaling and growing their programs.

Customer Relationships
We work with NGOs to develop curriculums that are finely tailored to their needs.

Communication is through our website.
After the initial assessment we continue to work with NGOs and provide follow-up evaluations.

Customer Segments
NGOs and businesses that want to implement education in conjunction to their products are our primary customers.

We have beneficiaries such as the schools (teachers, students) and private homes, community centers that are receiving this product.
People/organizations that want pre-made general curriculum packages.

Key Resources
Human Resources
Volunteers, Social Media Coordinator educators, research assistants and a systems analyst.

Physical Resources
Educational resources and tools to facilitate presentations

Intellectual Resources
This includes our brand and partnerships with NGOs

Cost Structure
Hiring educators, systems analyst, Social Media Coordinator and research assistants
Marketing and outreach to potential clients

Cost in creating and maintaining the website.
Hiring educators, systems analyst, Social Media Coordinator and research assistants
Materials for curriculums and activities

Revenue Streams
Selling personalized curriculum development and teaching services to companies that are going to implement products at schools/communities.

Selling packages of pre-made general curriculums.
Seven Sentence Story - Team Biome

Once Upon a Time, there was a little girl Anika who lived in a rural village.

Every day, her and her younger brother, Ganesh, would pick up non-potable water from the local well and then walk 3 miles to purchase drinking water for their family.

One day, a lady from an NGO dropped off a silver tablet and told their family they could drop this device inside the well-water and it would eliminate all bacteria inside.

Ganesh and Anika were thrilled at the prospect of no longer needing to walk three miles every day, however, their parents were apprehensive to use this unfamiliar tablet and questioned whether they could trust it.

Ganesh and Anika’s parents were not alone-- the NGO noticed that many community members had this same concern.

The NGO decided to take action and hired Echo Ed, a company which provides personalized curriculums and services, to visit this community and teach an interactive lesson on how to use the silver tablet.

Ever since that day, community members began utilizing these silver devices, and Anika and Ganesh never had to walk 3 miles to obtain drinking water again.
In this year, we have the confirmed customers of Biome and Hasiru Dala, with the potential to work with Gramatara Trust and Environmental Association of Bangalore. Using the financial system that we have attached above, we know that we are expecting costs of 1.03 lakhs, or 103,000 rupees, and we are expecting this to be able to finance ten different projects. This number could vary, depending on the scope of education required from each NGO for their different projects.

In the beginning, we will need some kind of loan, for materials and to pay our team. We would take out a loan of 70,000 rupees, which would more than cover our cost for our first customer (seen in the financial spreadsheet). For work in the public sector, we are looking at interest rates of about 10%. Our other options for getting this initial startup cost would be to enter Villigro's iPitch, which is a startup competition which focuses on startups seeking to improve education in India (1). They provide 8 crores of total investment, which would more than cover any costs we need. However, this program is very competitive, and it would be unwise to rely on such a method, which is so unlikely and so uncertain. A
third option is angel investors, of which there are 254 in Bangalore, but again, this would be unwise to rely on (2). Other methods of revenue are discussed below.

Even with only Biome and Hasiru Dala as confirmed customers, we know that we would be able to meet our project goal. We will be charging per implementation, so for each school which Biome implements in, we will be charging 10% of the implementation fee. In looking at past proposals for rainwater harvesting systems in schools, we see that the average implementation cost is 100,000 rupees. Therefore, we would charge Biome 10,000 rupees for each rainwater harvesting system that they install. For Hasiru Dala, we know they are seeking to expand into more dry waste management centers, and that for each, they invest about 20 lakhs, so we would request 200,000 rupees (3).

Beyond our first school, which is our first project and the one we would need a loan for, we would be able to make a profit off of any future schools which Biome implements at. This gives us a certain amount of freedom, because we would be able to truly spend a lot of time and focus on each project to our full capabilities. With our small team, especially in our first year as a business, trying to be involved in too many projects would be against what we believe in.

Instead, we aim to implement at two to four schools a year, and at least at one dry waste management center or community a year. This way, we can finesse our skills and resources, and take the adequate time to work closely with Biome and Hasiru Dala on each project. However, given that Hasiru Dala would be providing all of our income and needed costs, if they do not continue to hire us, we would face a huge drop in income. This means that we will need additional funding to remain sustainable. While we could opt to remain in debt, we are instead choosing to add advertisements to our website. So, to find how much we will need from advertisements after our first year, we do the following:

\[10,000 \times 4 = 40,000 \rightarrow 147,200 - 40,000 = 107,200 \text{ rupees}\]

So, we will need 107,200 rupees in revenue from ads or other funding to remain sustainable after the first year, if Hasiru Dala does not continue to hire us. Most of this will be funneled back into paying off our loan, which we plan to pay off within four years from revenue from ads and our business. Ads cost between 37 and 3700 rupees per click, and so we will assume that within our first year we would be able to charge 100 rupees per click (4). This means that we would need 1072 website visits in one year in order to break even. This would decrease as the number of schools Biome implements increases, and if we continue to partner with NGOs like Hasiru Dala, whose implementations are much bigger. However, especially in the first few years, we will not be able to get this amount of traffic on our site.

With our loan, and the expenses we are accumulating, and without Hasiru Dala, it cannot be guaranteed that we would be making the same income as in our first year. Our ideal situation would be that we continue working on larger implementations, so that we can continue to keep the amount of projects we work on low, and can devote the maximum amount of hours to these. Our future years all predict expenses of about 1.5 lakhs, using a small overhead of 10%. Our total loan, including interest over four years, is 77,000 rupees. Assuming that we pay off ¼ of our loan in the first year, and that is the only debt we accrue, then we will have paid off our loan after four years. However, in order to maintain financial stability and become sustainable, we will need to grow our customer base in the coming years, in order to continue paying our team. We assume a customer growth of one NGOs a year, with a minimum fee from implementation of 1 lakh.

If we are unable to get bigger customers, we will need to rely on ads and more, smaller implementations. While this would not be ideal, we are confident that we could handle 10 different projects in a year, and make up the difference in ads. However, it would take us longer to become self
sustainable. Unfortunately, because we do not know the combinations of projects and NGOs we will be partnering with, we cannot fully predict what our finances will be like.

Sources:

One of our customers, Environmental Association of Bangalore, is also one of the companies whose values are most in line with ours. However, EAB does not offer curriculums for sale as we do, nor do they offer their services beyond water and the environment. Both of us look to partner with other organizations, however, EAB is highly government focused, while we target NGOs.

Perhaps the largest difference is that EAB focuses on single, larger events. They host seminars, talks, festivals, and create campaigns. At Echo Ed, we aim to personalize our curriculums to specific NGOs and THEIR specific beneficiaries. [http://www.eabindia.org/](http://www.eabindia.org/)

Another company in Bangalore which has a similar viewpoint on education is Klay. Clearly, the largest difference is that Klay is a school, while we are a company. They work with individual students and their parents within the boundaries of their schools, while we outsource and go to schools and communities with our information. While Klay does build personalized curriculums, their curriculums are targeted for individuals, while our curriculums are for communities, and are constantly changing. [https://www.klayschools.com/curriculum/](https://www.klayschools.com/curriculum/)

Atma is another company who partners directly with NGOs. However, they partner with them for the opposite reason that we do: they focus on helping NGOs scale up, while we focus on helping NGOs zone in and focus on where there are educational gaps in the systems or programs they are implementing. Atma also focuses on following through on results, through quarterly evaluations and skills training. They also rely on volunteers, but their customization is in the form annual strategy and goal setting, while our customization is in the type of education and maintenance goals that the NGO has. They focus specifically on education NGOs, while we work to provide educational services to implementation-based NGOs. [https://atma.org.in/](https://atma.org.in/)

This is the Agastya Mobile Science Labs. They center their focus on the educational gaps which exist throughout India. They focus on the educational gaps in India’s school system, while we focus on educational gaps in NGOs’ implementation processes. Like us, AMSL understands the importance of continuity, and focus schools multiple times a year. Our services will be more varied, reaching beneficiaries outside of schools, and visitation will depend on the goal of the NGO we are working with and the goals they have. ASML focuses on teaching students what their teachers cannot, while we aim to educate entire communities. [https://educationinnovations.org/program/agastya-mobile-science-labs](https://educationinnovations.org/program/agastya-mobile-science-labs)
APPENDIX X. JOB POSTINGS

The following are the necessary positions we need to fill in order to make our company real:

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**Coordinators**

**Job Description:**
Because we work with primarily NGOs and companies and add to their already existing systems, we need coordinators who are able to work with our system analyst and our clients to identify clear goals, set up multi-year plans, and ensure that we give our clients what we need. This includes finding volunteers, using university students or research assistants for field visits, and facilitating reporting back to us in the United States and to our clients in Bangalore and India. Our coordinators must be motivated, adaptable, and able to multitask and take on many responsibilities at once.

**Your Requirements:**
- Experience in management, administration and facilitating
- Experience working in multiple different fields for multiple demographics and ages
- Ability to sign on for at least one year contracts. Preference will be given to those who have the flexibility for two or three year contracts
- Fluent in writing, reading, and speaking at least two of these languages: Hindi, Tamil, Kannada and English, and able to facilitate and translate between the two.
- Must be a good representation of our values and what we stand for.

**Benefits:**
- Hourly wage of 250 rupees.
- Guaranteed full contract pay, even if something ON OUR END falls through.
- Varied work and excellent experience across multiple age groups, fields, and subjects.
- Network of people in different companies, NGOs, and organizations.
- Full benefits during time of employment.
- Educational benefits for any children you have.

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**Educator Job Application**

**Job Description:**
We need a trained teacher or educator who has taught in multiple fields. We are looking for someone who is engaging, flexible, and willing to learn and teach on new materials. The education we are providing is varied through demographics and age groups, and while we provide all of the necessary material and training, we need someone who is willing to take on the challenge of in-person teaching and engaging. A requirement is that when signed on to work with one of our clients, you remain dedicated to finishing out the curriculum with them. We therefore require a one-year minimum contract.

**Your Requirements:**
- Be able to read, write, and fluently speak English and at least one of: Tamil, Hindi, or Kannada
- Be able to commit to at least one year contracts. Preference will be given to those who have the flexibility to commit to two or three year contracts
- Have at least two year’s experience teaching. No subject is preferable, but we are looking for people who have experience in multiple fields.
- Experience with multiple age groups and demographics required.
- Ability to learn new systems, products, and methods of teaching as our clients require. Need to become the expert in order to be able to teach and measure success of learning.
- Driven, leadership oriented, and want to make a difference in ways NGOs and companies implement.

**Benefits:**
- Guaranteed full contract pay, even if something ON OUR END falls through.
- Hourly pay of 250 rupees.
- Varied work and excellent experience across multiple age groups, fields, and subjects.
- Network of people in different companies, NGOs, and organizations.
- Full benefits during time of employment.
- Educational benefits for any children you have.
At the bottom of each google form, applicants are asked to upload files. These files are deposited directly into predetermined folders on the team drive so that we can all view them and evaluate them.
Post-Lesson Plan Questionnaire
This survey is to be distributed to community members 2 months after a seminar by educators

1. Did you feel that the information taught was useful to you?
   Yes, it was relevant and I learned something new
   No, I didn’t learn anything new/this was not relevant

2. How likely were you to use this product before this seminar?
   Very likely- I definitely wanted to try it
   Pretty likely- If it is easy I would have tried it out
   Unsure- I don’t know if I had the time to learn the new system
   Not likely- I did not want to change my current ways

3. How did your opinion of the product and interest in using it change after this seminar?
   It increased
   I feel the same way I did before
   I was less interested

4. Would you like to have another learning session?
   yes( ) no( )

5. What would you like to be different about this session?
   Fill in the blank

Post-Lesson Questionnaire Specifically on Water Filtration Systems
1. If you could pick any rainwater harvesting system, which would you choose and why?
   Short Answer

2. Which of the following filtration systems only provides non-potable water?
   A) Silver Ion Tablet
   B) Solar UV Radiation
   C) Reverse Osmosis
   D) Rainwater Harvesting System

3. True or False: If you filter your water but leave it in an open container it is no longer safe to be consumed
   True  |  False

4. Silver Tablets have side effects
   True  |  False

5. Solar UV Disinfection only works on 20 L of water at a time
   True  |  False

6. Reverse Osmosis pumps water through a partially permeable membrane
   True  |  False

ACTIVITY: Compare & Contrast
**Scenario:** Right outside of sunny Bangalore, there is a rural community located in Devanahalli village. Village members have non-potable water already available, but find that it is too expensive and unreliable to continue to buy water from a tanker. This village wants an affordable, simple alternative to their tanker water and are interested in water filtration devices.

Choose two water filtration systems you know of, compare them, and decide which would be better for this situation.

<table>
<thead>
<tr>
<th>Water filtration device:</th>
<th>#1:</th>
<th>#2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does it work?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How does it fit this community?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In your opinion, reflect on which system would be more ideal for this community and include reasons why.
Echo Ed Workers should view sheet below to use for return visits:

The sheet should be printed and filled out while in the field talking to the communities. The bottom portion should be printed and completed five times with five different interviews.

System Analysis

Analyzing Behavioral Change

1. Compared to the potential use, how much use is the product or system actually getting? *

Mark only one box:

1 2 3 4 5

Way less ☐ ☐ ☐ ☐ ☐ Way more

2. Please select all that you observe: *

- There is an existing process for maintenance of system. This can be a committee, a type of "chore" chart, a weekly schedule, or dedicated members.
- People in different demographics are aware of the product and system (i.e. knowledge has gone beyond the direct beneficiaries)
- People in different demographics are interested in the product and system (i.e. they are interested in learning more and have expressed interest in one of their own)
- The direct beneficiaries have directly told or taught other demographics about the product or system, and they have implemented this in some way in their lines.
- The use of the system is alone what was predicted.
- Beneficiaries and other groups have expressed interest in updating or improving their existing system (for example, adding drinking water solutions to rainwater harvesting).

3. Please add details about the options you selected above, and add any other aspects of impact you have noticed in the community: *

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

4. FOR REPEAT VISITS: has the use of the system or product increased since your last visit? Please detail the date of your visit: *

Example: January 7, 2019

________________________________________________________________________

5. FOR REPEAT VISITS: has the use of the system or product increased since your last visit? Please detail the current output of the system, and whether or not it is less than, greater than, or equal to the amount in your last visit: *

How much does the overall community know about the product or system? Interview at least five members of the community and ask them the following questions:

6. What is the name of the product or system in your community? *

________________________________________________________________________

7. Who is involved with this product or service? Who do you see using it or around it most often? *

________________________________________________________________________

8. What is the system or product used for? What do you use it for specifically? *

________________________________________________________________________

9. How well is the system working? Is there anything you want to change about it? *

________________________________________________________________________