IPRO 335: Developing Technology to Transform Education in Haiti

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Team Members:

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- Zach Crane
- Jacob Ernst
- Bryan Fujiwara
- Sarah Guan
- Erik Harpstead
- Annika Heilig
- Anastasia Mendimenos
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I. <u>Team Purpose and Objectives</u>

- To enable and empower Haitian children's education through the use of sustainable energy and collaborative technology, as well as expanding our practical and professional experience through obtaining funding and grants. To create a reproducible model, intended to be applied to other similar projects around the world.

- In order to achieve these objectives we intend to

  1. Design and propose a means for charging the laptops using solar energy.

  2. Establish a method for technological collaboration between countries using the XO's laptops, such as Wiki, PBworks, iGroups.

  3. Find a way to fund the purchase of equipment to test, such as solar panels, as well as funding a trip to Haiti to install our prototype.

  4. Propose updates/suggestions to existing XO software.

II. **Background**

Formed in 2005, the non-profit organization One Laptop Per Child (OLPC) intended to develop and implement an affordable laptop computer to be used to enrich education in developing nations. These laptops, called XO's, enable children to learn through constructionism, or experiential learning. Throughout OLPC's early years of existence, their focus was on hardware development. Their product needed to be low-cost, low power, durable, and mass producible. Faced with these criteria, it took OLPC nearly eighteen months to develop a working prototype. Thirty-five months after their formation, OLPC began mass production of the XO-1. Today, OLPC has changed their focus from hardware development to actually placing the systems in the hands of children around the world. As the organization likes to put it, "It's not a laptop project. It's an education project." Through the work of OLPC, their affiliate organizations, and supporters, children in remote areas of the globe are being given a new, previously unimaginable, method of learning and exposure to information.

OLPC has developed a solid piece of hardware and, while it has its shortcomings, the system does address the goals of the organization. However, a huge oversight has been the power source for the XO laptops. In developed nations, a stable electrical source is often taken for granted, but this situation is not the same in the developing world. In the case of Haiti, electricity is only available for an average of two hours each day. This means that once a child's XO has discharged its battery, they must wait until electricity is available again, and then wait for the system to charge. With a target audience spanning the entire globe, OLPC is also struggling with various aspects of content development. For example, the TamTam application allows users to generate music using various icons and mouse gestures. However, the sounds that TamTam offers are not natively understood as music in many undeveloped areas of the world. International collaboration is also an issue through the OLPC project. As different nations receive

laptops, they often have to start from the ground up and 'learn as they go'. If a system of collaboration were put in place, one nation's project could learn from others' mistakes - eventually leading to an ideal project template.

To solve OLPC's problem with sustainable energy, various electrical components would be utilized. These may include, but are not limited to, solar panels, charge controllers, ammeters, deep-cycle batteries, and power inverters. These components form the basis for a solar power and energy storage solution. As outlined in this document, one of our tasks is to further our own knowledge of solar technology. When speaking of content development and collaboration, various open-source and commercially available developer applications may be utilized. XO systems would be used for testing purposes.

Since its founding, OLPC has expanded its reach to underprivileged children in developing and developed countries across the globe. OLPC's mission is to advance the education of children through the use technology, more specifically, laptops. It has been debated both in countries where OLPC is currently operating and in countries that rejected OLPC whether technology or reform of the educational system should come first. Most countries that have this debate have limited resources and can only afford one or the other. Other countries only have the resources to provide laptops to a small percentage of it children. In these cases, governments often give laptops to a select few schools, in hope that program is such a success, they will be able to expand the program to other schools. However, most often, this creates rivalries among schools and communities. The logistics involved in providing XO's to every child in any country are daunting, and OLPC has yet to offer a clear solution to this.

Throughout OLPC's history, there have been successes and failures, both on a technological level and a social level. There have been several iterations of the popular green XO laptop, as well as other machines that OLPC has distributed to various countries. Certain countries, like Brazil, Uganda and Australia, where the response to

OLPC's XO's has been overwhelmingly positive, this project's intentions were achieved in broadening the material that children in those countries were exposed to. It raised school attendance, participation, and enjoyment of the students. When OLPC executives approached the Peruvian government with their vision of supplying every child with an XO laptop, the government took it upon themselves to see that this became a reality, as well as applying it not only to region of the country, but to all of Peru.

Where the OLPC project runs into difficulties is in extremely remote and undeveloped countries, such as the Pacific Islands, where internet access is not available in schools, let alone anywhere in the country. This makes it very difficult for the students to use the laptops to their full potential. The XO's content is also in English, which becomes difficult in certain countries, like Haiti where the native language is Creole. This poses another problem because not only is it difficult for the students to learn how to use the software, but the teachers cannot be trained to know how to teach with them and incorporate them into their curriculum in an effective way. The social repercussions and backlash to OLPC's project to provide a laptop for every child, targeting developing countries specifically, cannot be ignored. Many of these schools do not have the financial stability to provide their students with books, desks, or even classrooms. The families of these children do not have the money to provide clothes and shoes for them. Most of the criticism about the project is the economical priorities of the more under-developed countries. While the intention to enable the students in these countries to be allowed a better education, the finances are not always there, and the money needed to buy the XO laptops for the students could be used on other things.

III. Team Values Statement

All members will be expected to attend class and arrive at a reasonable time. If members should be consistently unable to manage this task such that it disrupts the class flow or results in unfair distribution of work, then the group should submit a complaint with the group advisor and/or moderator to discuss a course of action. All group members are expected to participate in the brainstorming of ideas as well as helping other group members where help is needed. If there are any concerns, it shall be addressed with the advisor or fellow group members. Any interpersonal issues between group members should be settled between them, unless this as well disrupts the class flow or results in an unfair distribution of tasks, wherein it should be moderated by the group instructor in order to resolve the issue or find a reasonable compromise to resume class activities. All group members will be responsible to upload any finished information or presentation materials to PBworks for the easy access of all group members.

In regards to providing laptops and even internet access, the group will need to consider many things. Firstly, the correct procedures to use when dealing with communities in developing countries to assure both parties are fully aware of the obligations entailed in initiating and completing projects. Group members will take into account the cultural aspect of working in a developing community. With any review of content group, members will aim to be as conscious of the possible threats posed by internet connectivity available to young children. This would involve any possible threats posed to others by the student's access to open source information, possibly abuse and exploitation by use of the technology, and most commonly the access to inappropriate information that students might gain by unmonitored internet use. All funds allocated to the project stays within the project for the proposed reasons and shall be discussed with the group before use.

During class time, the group members as a whole will meet, with facilitation assistance of the group instructor to have an open discussion and review of group direction, and delegation of individual tasks. Questions or concerns shall be addressed one at a time with fellow group members or private matters with the facilitators. Group members shall accommodate the question and concern. When deemed necessary, members of the three sub-groups will meet separately both inside and/or outside of class to discuss in greater detail the sub-group topics and again assign any individual tasks.

The group as a whole will strive to establish and maintain not only open communication within the group but as well with contacts from other OLPC related projects, or communities that may be impacted by our project.

IV. Work Breakdown Structure

We will solve the problems of providing an alternative source for powering the XO laptops to the Haitian children. We will do this by first learning about photovoltaic cells and how they work and then by designing an accurate design for stationing the cells on top of the houses in Haiti. After learning and designing the cells, we will then need to actually get funds to produce and ship them to Haiti. Some of the major setbacks for these tasks would be funding because it is hard to get enough funds for any new type of energy.

As we are nine students working on this project and as we have, set three main goals we decided to split our team in 3 smaller teams; 1) Solar 2) Collaboration and 3) Grants.

First of all every team should find out as much as it can about its task. For example: What possibilities do we have? Has there been something similar in the past we can use to solve our problem? Who do we have to contact/work together?

1) Solar team

- What different possibilities do we have?

- Could we use an existing solar panel to charge the laptops? (Like the ones you can use for an iPod?

- Which companies are producing such solar panels and who could we work together with?

- What will be the costs?

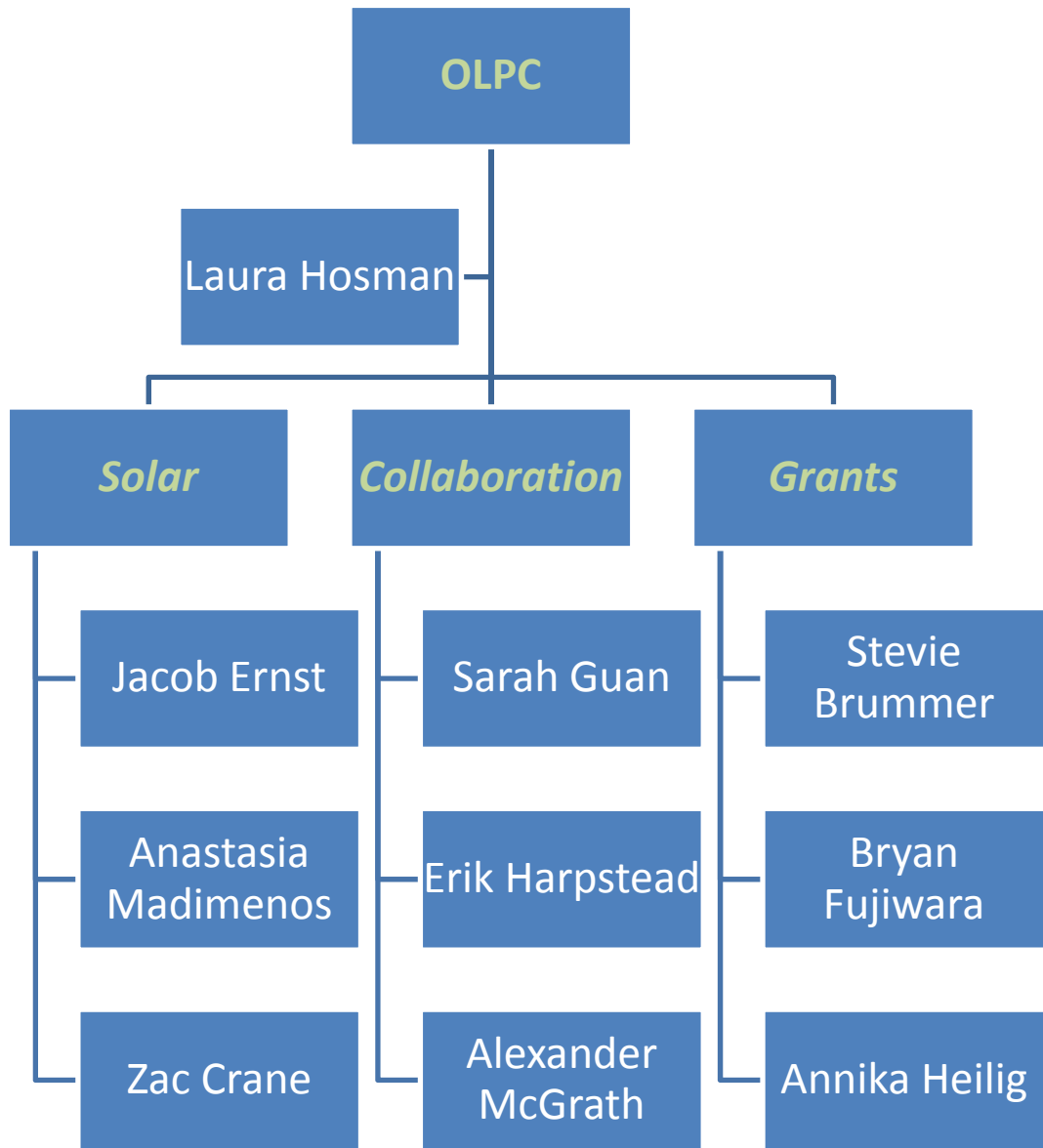- When do we plan to propose a solution to the school in Haiti?

2) Collaboration team:

- Who should be able to communicate together?

- What different problems will we have to face when trying to build a

    system? (Electricity, languages, time zones, etc.)

- Is there any similar collaboration that we can take as an example?

- What will be the costs?

- When do we plan to propose a solution to the school in Haiti?

3) Grants team:

- What different possibilities do we have?

- What do we need for an application?

- When is the due date?

After every team is well informed about its target, it should define sub objectives and a timetable. The teams should also think about alternatives in case that something is not realizable. During the whole project, the teams must check if they are still on time and if the plan still is working like this. Additionally every team should inform the others what is going on.

OLPC

Laura Hosman

Solar

- Jacob Ernst
- Anastasia Madimenos
- Zac Crane

Collaboration

- Sarah Guan
- Erik Harpstead
- Alexander McGrath

Grants

- Stevie Brummer
- Bryan Fujiwara
- Annika Heilig

V. Expected Results

Throughout the course of this project, we expect to learn how to fundraise for our trip to Haiti, as well as for sample solar panels in order to learn more about the technology that we propose to use to solve the charging station problem that schools with the XO laptops are facing. We intend to stay in close and active communication with our contacts in Haiti, to make sure that their needs are being met through our project, as well as use the information and knowledge they are willing to impart to us as a way of learning about the conditions in developing countries. Generally, the overall expected results for the team as a whole is building a successful and productive team dynamic, and understand the ethics that go into it.

In order to make these expected results realistic, we will collect knowledge about solar panels and specifically how they apply to our project in Haiti. For example, how many will be needed, how big they need to be, and how they need to be positioned are all-crucial factors that will require research. In relation to the solar panels, the existing conditions of the school will need to be clarified and taken into consideration when designing our charging station. The cost of the panels, the resources needed to make this project successful, and our trip to Haiti is also data that we will collect, through grant applications and fundraisers. Once all this data is collected and organized, we expect to have a functional solar panel charging station, a collaborative means of communication between students in Haiti and in other countries. Grant applications and

proposals will be an important part of funding our project, as well as deliverables produced by the project. Documentation of our proposal for a solar panel charging station is also an expected product.

The challenges that our project is expected to face is the lack of resources from OLPC in Haiti, as well as the lack of funding. Keeping our project goals realistic and manageable will be our biggest challenge. The way we intend to solve these challenges is by doing the best we can with the resources that we do have, and becoming creative with what we do not have, and making sure to stay on task and work as a team to achieve our goal of allowing these children to expand their education.

VI. Project Budget

Activity	Amount	Description
Grants	$250	Application submission fees
Equipment	$400	Purchase of equipment to test (ex. solar panels, XO laptops)
Transportation	$200	Trips to lectures regarding the technology we propose to use/Buildings that already implement it
Total	*$850*	

Team Information

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Fujiwara, Bryan : bfujiwar@iit.edu

Guan, Sarah : sguan@iit.edu --- Minute Taker

Harpstead, Erik : eharpste@iit.edu --- iGroups Moderator

Heilig, Annika : aheilig@iit.edu --- Time Keeper

Madimenos, Anastasia : amadimen@iit.edu --- Agenda Maker

McGrath, Alexander : AMcGrat2@iit.edu

VI. Team's Strengths and Weaknesses

Team Member	Strengths	Weaknesses	Knowledge/ skills to develop	Expectations for project
Stephanie Brummer	Presentations, creative/aesthetics, ability to solve analytical problems	Leadership, Computer programming	Develop leadership skills as well as become familiar with technology	International connections/exposure, Strengthen comradery
Zach Crane	Analytical problem solving, MS Office, some web development experience, IT/Business intelligence, light project management.	Public speaking, programming	Improved project management skills, to learn how to implement solar technology	Exposure to IT in developing nations, Strengthened teamwork and project management skills
Jacob Ernst	Presentation drawings, team building.	Programming	New technology to be implemented.	Exposure to new technologies and team building skills.
Bryan Fujiwara	Working as a group, Taking some leadership, Adobe Photoshop & Illustrator & Architectural Drawings	Public Speaking & Presentations	Public Speaking	More Knowledge in OLPC
Sarah Guan	MS Office, Experience with Autocad and SAP2000, Analytical Problem solving and math, Chinese	Computer Programming/Coding and public speaking	Research and Public Speaking skills	Further knowledge of Electrical Systems

Team Member	Strengths	Weaknesses	Knowledge/ skills to develop	Expectations for project
Erik Harpstead	Computer Programming (Java, C++, Flash Action Script, Ruby, Python), Analytical Problem Solving, IT knowledge, Team organization and collaborative methods	Public Speaking, mildly insubordinate	Logistical considerations for global/long distance projects, infrastructural considerations for developing countries	Application of collaborative methods, experience applying new technologies in developing countries
Annika Heilig	reliable, teamwork, persistent, MS Office, speak some French	Leadership, Presentations/public speaking, English, no understanding of engineering	Leadership skills, not getting nervous before public speaking, English	to achieve our goals and find a good solution for haiti, get experience in working in an international team
Anastasia Madimenos	Working in a team, Presentation drawing/aesthetics	Computer Programming	Knowledge regarding new technologies	Understanding developing countries' needs and learning new methods of implementing sustainable energy technologies
Alexander McGrath	Writing, Minor Translation, Presentation Organization	Programming, Time Schedule Conflicts	Organization of a Technical Project without Background	A better understanding of project in coordination with developing countries' governmental entities.

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