IPRO 335: Developing Technology to Transform Education in Haiti

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I. Team Purpose and Objectives

A. Team Purpose

To enable, empower, and enrich Haitian children's education through the use of sustainable energy and educational technology, as well as expanding our practical and professional experience through obtaining sponsorship within the energy industry. To implement a reproducible model of sustainable energy that an informed user base can maintain without external assistance.

B. Team Objectives

- Finalize a photovoltaic design in order to charge the XO laptops in two schools in Lascahobas, Haiti.
- Collaborate with locals in order to reproduce this solar design in every secondary school in Haiti.
- Provide an educational component that will transfer knowledge of solar solutions and sustainable energy sources in the two secondary schools of Haiti.

In order to achieve these objectives we intend to

1. Utilize the information collected on the assessment trip to alter the current calculations.

2. Establish lasting ties with the solar industry and the people in Haiti via weekly communication.

3. Raise enough money to fund travel and construction of our pilot implementation.

4. Provide educational materials for students and teachers the better understand solar power and other issues depending on the best form of communication.

5. Execute everything with continuity in mind to allow for the project to go on.

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 lowcost, 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 rose 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.

Last semester, our main focus was the design a solar solution to provide power for the laptops, schools and Internet connectivity. We created a prototype-model of our solution and finalized the calculations that can be used to design larger solutions in Haiti. We then sent a team to Haiti in January 2011 to perform a site-assessment trip to gather more information about the schools where we intend to deploy our solar solution, to develop a stronger partnership with the schools officials and also to gather more information on the availability of

solar materials locally in Haiti. In our second semester, we intend to use the information gathered on the trip to fulfill our objectives and design a photovoltaic system for two schools in Lascahobas, Haiti.

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 four 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

Team Goals

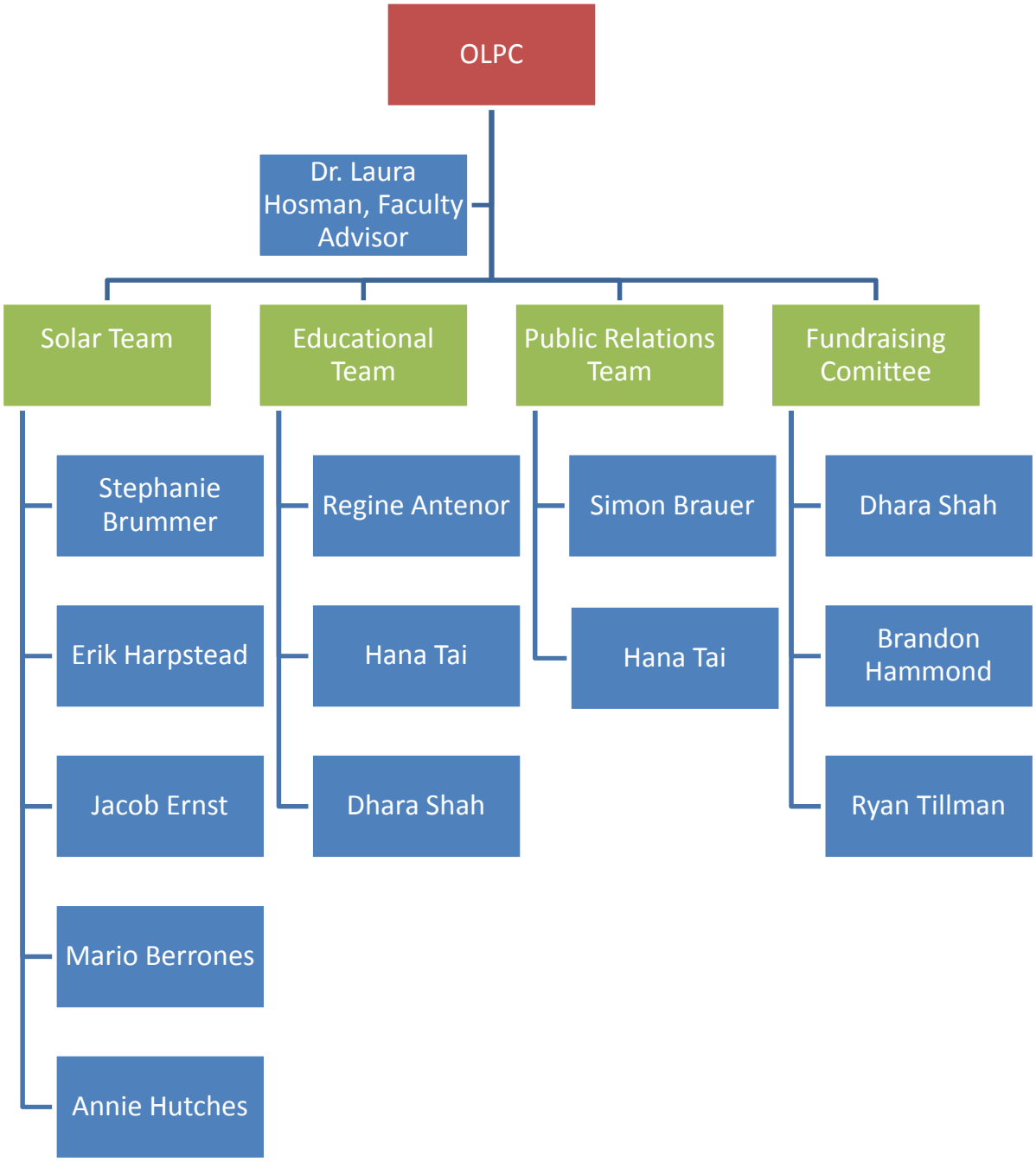
In order to fulfill the main objectives of our organization, we have decided to organize ourselves into four groups. Last semester, we were able to gain an extensive knowledge and appreciation for solar energy. This semester we are planning to utilize that information to finalize a photovoltaic design for two schools in Lascahobas. This goal will be completed by the Solar sub-group. While working in developing communities, the biggest challenge is fully developing that country and promoting a partnership. In order to profit the schools we are working in the most, we are also emphasizing on an educational component that will be deployed during the implementation trip in May 2011. The Educational sub-group will primarily be concerned with the educational sustainability and transfer of information to the teachers and students in Lacahobas. In order to fulfill both goals, we intend to reach out to a variety of networks and media sources through the Public Relations sub-group as well as increase the funds for our projects through the Fundraising sub-group.

Each sub-group has been organized with main goals to fulfill in the next four months.

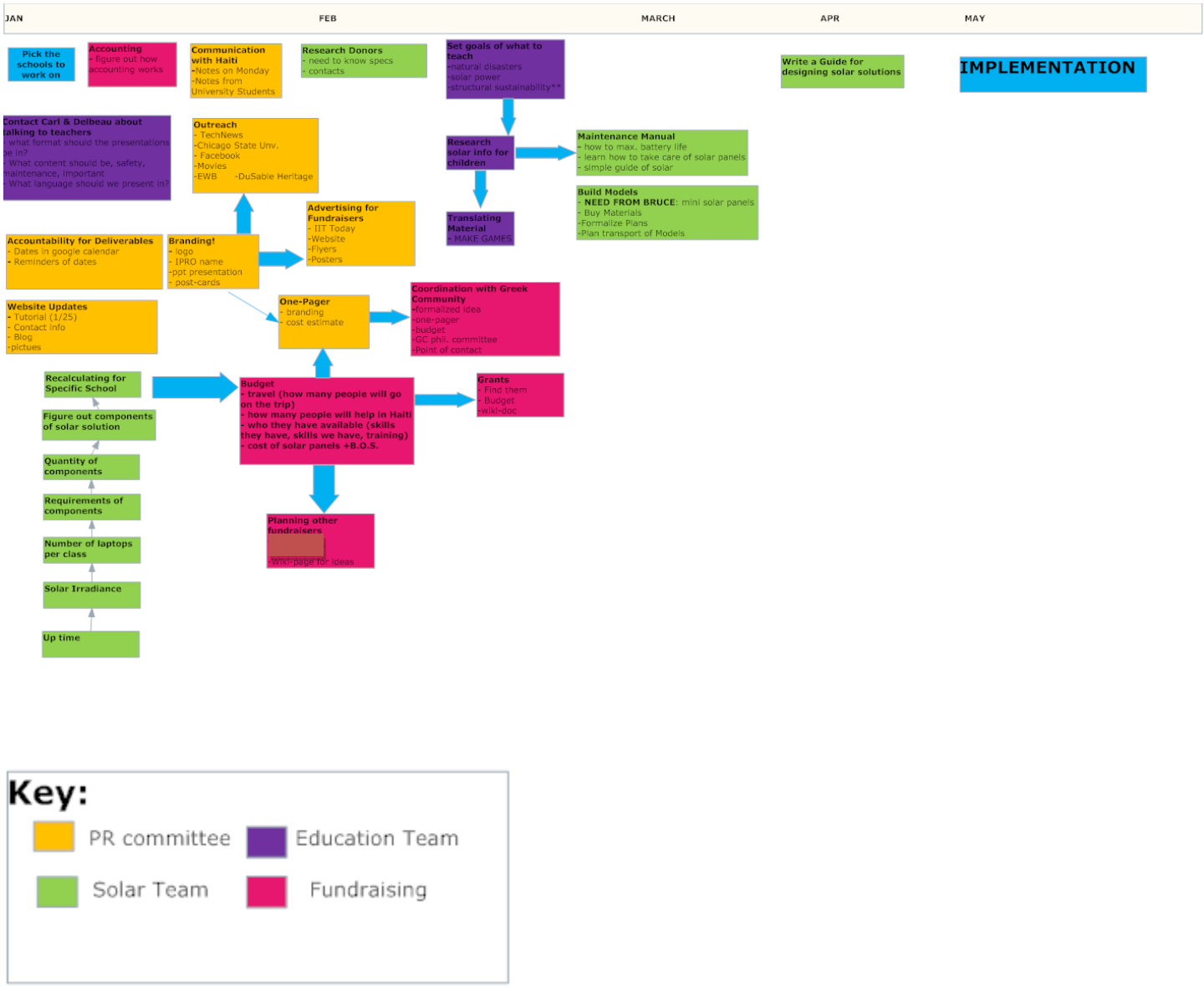
1. Solar Sub-Group Goals
    - **a.** Recalculate and complete design for two schools.
    - **b.** Create a how-to-guide on calculations for solar systems.
    - **c.** Build four models, two of each school.
    - **d.** Research solar panel donors/sponsors
    - **e.** Consider connectivity and servers in the design

2. Educational Sub-Group Goals
    a. Organize presentations on solar systems during final implementation trip.
    b. Communicate with Haitian State University students to develop content to transfer.
    c. Organize a deliverable for the schools.
    d. Organize a plan to sustainably replicate this project through out Haiti.
3. Fundraising Sub-Group Goals
    a. Coordinate with Greek Community to sponsor a school in Haiti.
    b. Plan other fundraisers for travel.
    c. Manage budget by determining an overall budget for design and travel and other expenses.
4. Public Relations Sub-Group Goals
    a. Hold the group accountable for deliverables
    b. Project media through updates via current media sources (IIT Today, TechNEWS, Website)
    c. Appropriately brand our organization.
    d. Advertise for all events.

Team Structure

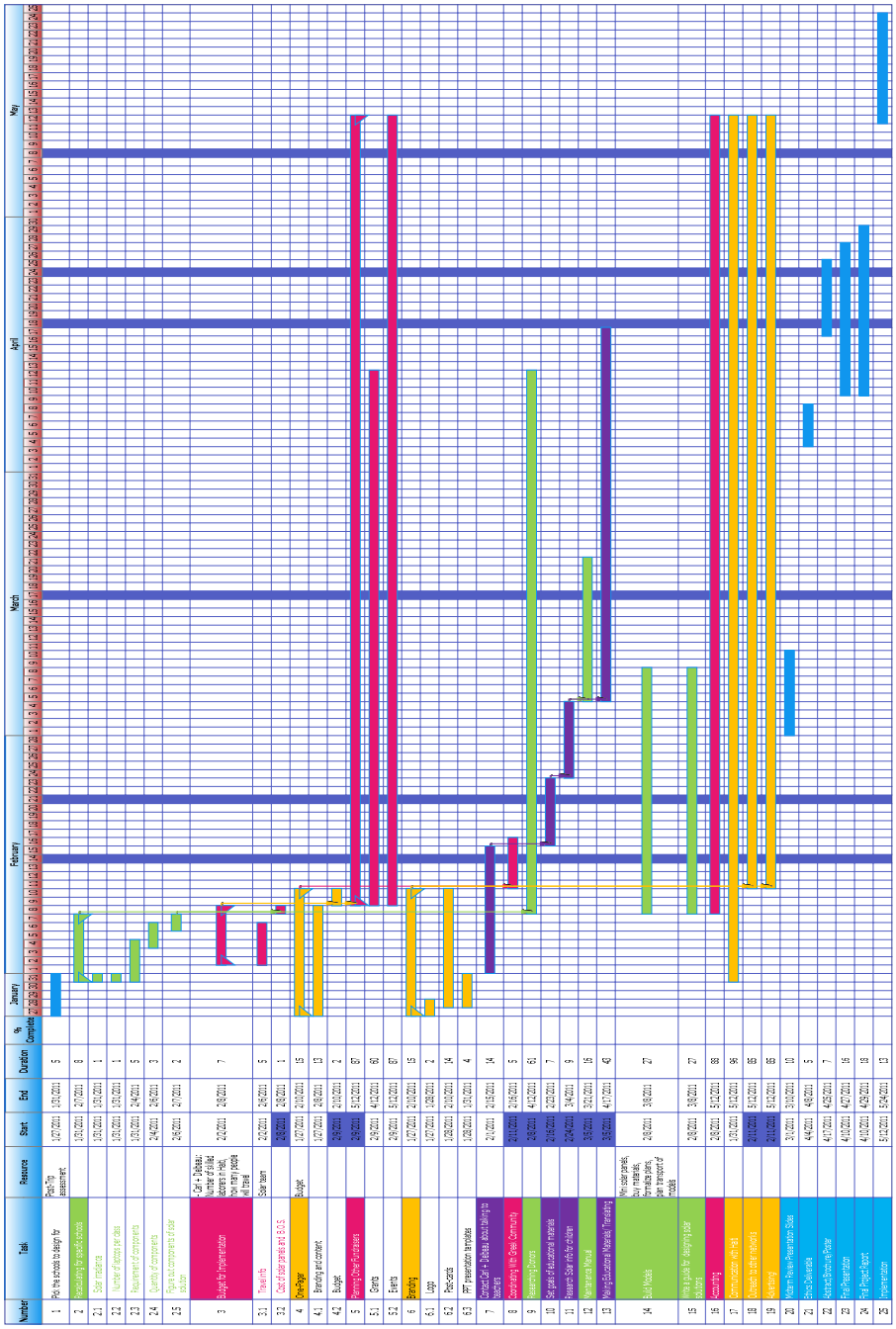


Program Evaluation and Review Technique Chart



GANNT Chart

A. Overview



B. Goals List from GANNT Chart

Number	Task	Resource	Start	End
1	Pick the schools to design for	Post-Trip assessment	1/27/2011	1/31/2011
2	Recalculating for specific schools		1/31/2011	2/7/2011
2.1	Solar irradiance		1/31/2011	1/31/2011
2.2	Number of laptops per class		1/31/2011	1/31/2011
2.3	Requirement of components		1/31/2011	2/4/2011
2.4	Quantity of components		2/4/2011	2/6/2011
2.5	Figure out components of solar solution		2/6/2011	2/7/2011
3	Budget for Implementation	- Carl + Delbeau: Number of skilled laborers in Haiti, how many people will travel	2/2/2011	2/8/2011
3.1	Travel info	Solar team	2/2/2011	2/6/2011
3.2	Cost of solar panels and B.O.S.		2/8/2011	2/8/2011
4	One-Pager	Budget	1/27/2011	2/10/2011
4.1	Branding and content		1/27/2011	2/8/2011
4.2	Budget		2/9/2011	2/10/2011
5	Planning Other Fundraisers		2/9/2011	5/12/2011
5.1	Grants		2/9/2011	4/12/2011
5.2	Events		2/9/2011	5/12/2011
6	Branding		1/27/2011	2/10/2011
6.1	Logo		1/27/2011	1/28/2011
6.2	Post-cards		1/28/2011	2/10/2011
6.3	PPT presentation templates		1/28/2011	1/31/2011
7	Contact Carl + Delbeau about talking to teachers		2/1/2011	2/15/2011
8	Coordinating With Greek Community		2/11/2011	2/16/2011
9	Researching Donors		2/8/2011	4/12/2011
10	Set goals of educational materials		2/16/2011	2/23/2011
11	Research Solar info for children		2/24/2011	3/4/2011
12	Maintenance Manual		3/5/2011	3/21/2011
13	Making Educational Materials/ Translating		3/5/2011	4/17/2011
14	Build Models	Mini solar panels, buy materials, formalize plans, plan transport of models	2/8/2011	3/8/2011
15	Write a guide for designing solar solutions		2/8/2011	3/8/2011
16	Accounting		2/8/2011	5/12/2011
17	Communication with Haiti		1/31/2011	5/12/2011
18	Outreach to other networks		2/11/2011	5/12/2011
19	Advertising!		2/11/2011	5/12/2011
20	Midterm Review Presentation Slides		3/1/2011	3/10/2011
21	Ethics Deliverable		4/4/2011	4/8/2011
22	Abstract/Brochure/Poster		4/17/2011	4/25/2011
23	Final Presentation		4/10/2011	4/27/2011
24	Final Project Report		4/10/2011	4/29/2011
25	Implementation		5/12/2011	5/24/2011

V. Expected Results

Through the course of this semester, our team's main goal is to be able to have an implementation trip to Haiti in May. In order to accomplish this goal there are many other goals that we must achieve. In order to raise funding for the materials and travel expenses, we expect to spend a lot of time fundraising this semester. We have also formed a partnership with the IIT Greek Community in order to help fundraising efforts. We expect to be able to raise enough money to help one or two schools as a prototype for a solar solution in Haiti. We are expecting to finish all design requirements for the specific school or schools chosen for the project. Once we know the specifications for our project we will begin investigating the possibilities of having the materials needed donated. We will also be creating a "How To" manual on the steps for designing a solar solution for any school by generalizing the steps we take in order to calculate the specifications of our prototype.

In addition to creating the the design for the solar system, we feel that it is important to develop an educational component for our project. It will be important for the students to understand what the solar panels are for and that they are very important. In another location where the One Laptop Per Child (OLPC) program installed a solar solution, the students thought it was exciting to throw rocks at the panels, and the panels were damaged. If the students understand their importance and are included in the care and maintenance of the panels, the project is much more likely to succeed. In addition to education on our solar solution, we would like to include information about natural disasters such as earthquakes, hurricanes, and typhoons. The lack of information and understanding of the earthquake that happened a little over a year ago was one of the biggest problems that caused many deaths. By making this information available, we are hoping to save lives. One of the challenges that we will face in the educational component of our project is figuring out how to communicate these ideas. The way students are taught in Haiti is very different from the way that they are taught in the United

States. We expect to be in contact with the teachers at the school about what type of presentation will be most effective, and what information is most important to teach.

Another challenge that our group is facing is that we would like for the solar solution to be spread to other schools all over Haiti. In order for this to happen, the solution needs to be simple, easy to reproduce, and inexpensive. We are expecting to be in constant contact with the OLPC office in Haiti to make sure that this project will not end with our prototype. Overall, our group is expecting a very busy semester in order to get everything ready for the trip in May. We know that this is quite a challenge, but we think that as a team, we will be able to accomplish all of our goals.

VI. Project Budget

Activity	Amount	Description
Materials and Supplies	$ 150	2 posters ($60 each), 30 brochures ($1 each), Total = $ 150
Travel Expenses	$ 1,150	$1,000 for Guest Speaker / Guy Serge Pompilus visit or Solar Expert visit, $150 other misc. transport
Prototyping	$ 1,600	Will build 4 models of schools with solar panels. $400 per school, 4 schools = $1600
Other Expenses	$ 1,100	Advertising Fund = $600. Fundraiser Expenditures = $300. Grant Application Expenses or Fees = $200
		3 Plaques for Sponsor Recognition = $150
Total	**$ 4,000**	

V. Appendix

A. Team Logo and Motto

B. Contact List and Roles

C. Team Strengths, Weaknesses and Expectations

Appendix A:

Name: IIT Empowering Haiti

Logo:

Motto: Developing Technology to Transform Education in Haiti through One-Laptop-Per-Child

Appendix B:

Name	e-mail	Role
Stephanie Brummer	stevie.brummer@gmail.com	
Jacob Ernst	jernst3@iit.edu	Co- Team Leader
Erik Harpstead	whitill29@gmail.com	
Laura Hosman	lhosman1@iit.edu	Faculty Advisor
Annie Hutches	ahutches@iit.edu	Minute Taker
Brandon Hammond	brandon.c.hammond@gmail.com	
Dhara Shah	dharshah67@gmail.com	Co- Team Leader
Hana Tai	hanalian@yahoo.com	
Mario Berrones	mberrones@gmail.com	
Regine Antenor	rantenor@iit.edu	
Ryan Tillman	tillmanrj89@gmail.com	
Simon Brauer	sbrauer@iit.edu	Time Keeper

Appendix C:

Name	Strengths	Needs	Expectations
Stephanie Brummer	- Experience with fundraising events and projects - Graphic designs - Involvement in project from last semester - Speaking	- Leadership skills - More knowledge of solar technology and installation - Re-evaluate our new goals and prospects that need to be finished by the end of the semester	Cohesive team working together to produce results and learning experiences.
Jacob Ernst	- experience from last semester and with other related projects - keeping focus on the big picture	- organization - time to think - clear tasks	- to do more than just learn from this experience, but to grow from it - to build a cohesive team that is driven to provide a service that will have real, lasting results
Erik Harpstead	-Computer Programming (Java and Python being most relevant) - Analytical Problem Solving -IT Knowledge -Collaborative Methods -Public Speaking/Selling the Project -Experience from last semester	-More experience with fundraising for NPO projects -Working as a continuing member of a new team of people from different disciplines	Continuity will be built into the organization of the project, which will allow it to successfully outlast any of the current team members.
Annie Hutches	organization skills understanding computer programs quickly being logical	help with writing documentation help in understanding verbal instruction (not an auditory learner)	i am expecting that working as a team means that i will be offering help and receiving help as it is needed.

Brandon Hammond	- Public Speaking - Writing - Coming up with radical, almost ludicrous ideas - Very anal retentive - MS Office & Apple iWork - Many Mac-based applications (iPhoto, iMovie) - Salesmanship	- Leadership Skills - Streamline, clear and concise direction - Engineering and Computer Science knowledge	- To have a great learning experience. Not only as class, as far as content, but with hands-on experience. - To build relationship skills through great team building. - To give it my all as if I was back on my high school football or track team. - "Leaving it all on the 'field' with no regrets."
Dhara Shah	Organizational skills, Project management skills, Java programing, Grant writing, Public Speaking, Event programming, Communication	- Technical experience with solar - Experience in engineering design	To successfully work in a team and provide input as well as take feedback as the team continues to face challenges when working in Haiti while trying to design a product that will be implemented nation wide.
Hana Tai	- Researching, writing, collaborating - Can design training programs - Can work on Mac & PC - Graphic Design (Photoshop) - Experience selling on ebay	- Public speaking - Fundraising - Event Planning	- To engage myself in challenging work - To brainstorm creative solutions and ideas - To work together as a team in order to accomplish all of our goals
Mario Berrones	Ambitious, Curious, Methodical, and Fair Minded.	Challenge, Contribution, and Discovery	To positively contribute to an inspiring cause while continuing to grow personally and mentally.

Regine Antenor	Organizational Skills, Event Planning, Graphic Design	Public speaking, experience with solar power, writing skills.	To find ways helping education in Haiti. Have a better understanding of solar power systems implementation.
Ryan Tillman	Event Planning, Past Work with similar organizations with similar goals, Organizational Skills, Communication Skills	Not familiar with Solar Power, not having a first hand understanding of the environment, Grant Writing	To have an implementation trip in May, meet all of our deadlines set by ourselves and the IPRO office, work closely as a team and have a great time accomplishing our goals.
Simon Brauer	- Writing - Organizational Skills - Public Speaking	- Solar Understanding - Initiative	- Become closer acquainted with the workings of a specialized team - Feel like something is actually achieved (practical vs. theoretical) - Develop stronger personal initiative in group work