



Final Report

IPRO 332: Our Energy Future

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Illinois Institute of Technology

May 1, 2008

1.0 Introduction

Over the course of the Spring 2008 Semester, the students enrolled in IPRO 332 have taken Energy Sustainability Education to a new level. With an Outreach, Marketing, and Website sub-teams, IPRO 332 was successfully able to continue another semester of energy education. The original plan for this IPRO was to educate high school students on their energy consumption using the Ecological Footprint module. This module consisted of a “footprint calculator” to show how much energy each student was consuming on a day-to-day basis. The IPRO team also administered pre-tests and post-tests to measure the effectiveness of our presentation.

Different from past semesters, IPRO 332 has decided to reach a broader audience, beyond Chicago high school students. In order to reach students across the United States, the outreach sub-team has created a kit that includes everything high school teachers need to administer the Ecological Footprint presentation, as well as answer any questions their students may have about energy consumption. It allows the IPRO to push their message beyond Chicago and will also allow for teachers to incorporate energy consumption into their curriculum.

Marketing was a key factor in IPRO 332’s overall success. Along with the Web-team’s creation of HowManyEarths.com, public events were coordinated, sponsors were found, and information was distributed in order to promote education about energy consumption.

2.0 Background

Energy can neither be created nor destroyed. That is one of the only two things that are known for certain about energy. The other is that energy has become increasingly scarce. Recently, with the help of popular cultural and rising oil prices, “green” has become the buzzword that screams for attention in every media outlet around the world. “Green” has often been paired with automobiles, houses, appliances and even airplanes to advocate energy conservation and the noble act of saving our planet. IPRO 332 continues to undertake the goal to educate high school students about their energy consumption and raise awareness of the environmental impact of their energy choices.

Last semester’s IPRO team was able to administer the first module, the Ecological Footprint, in Chicago high school classrooms. The Ecological Footprint is a measurement, in terms of acres of biologically productive land, which a given person needs to support him or herself. This conceptual footprint allowed students to understand how much energy they use through the size of their footprint and compare it to their peers. The Ecological Footprint quiz evaluates a person’s energy usage based on such things as water use, food, transportation, shelter, and general energy/electricity use. This allows a person to see where they use energy in their everyday life. From there a person could make a decision about their energy choices as they better understand the ways they consume energy and how much they consume as compared to others. There was also a second module created, cradle-to-cradle, which dealt with the timeline of products as they are created and destroyed.

Ethics are still a topic that the team must be conscious about during this project. This is particularly difficult with the topic of energy. People learning about energy will need to make their own decisions. Energy choices made today have future societal consequences, and if people make smarter decisions today then they will have a better tomorrow. The previous team accomplished this successfully with the use of feedback from the students and teachers. The current team built on this and continued to remain unbiased as new materials and methodologies were added to the project.

3.0 Purpose

IPRO 332 is a continuing, and evolving project with a foundation of the past two semesters beneath it. This team picked-up on day one right where last-semester's team left off with the creation of a teaching module for educating high school students about the ecological footprint, and beginning to conduct classes in Chicago area high schools pertaining to this module. Having such a solid foundation, IPRO 332 began this semester with a specific set of objectives in order to continue in its evolution. These set objectives were:

1. Develop a teaching kit containing a curriculum to present the Ecological Footprint module, and instructional materials designed to help teachers implement the module.
2. Develop a website to enrich the experience of the module; provide a professional contact interface and deliver our educational message to a broader audience.
3. Promote the project, renamed How Many Earths, and education on resource consumption by developing a marketing plan, publishing stories in local media outlets and capitalizing on opportunities for publicity.
4. Continue to reach out to high school students by visiting more Chicago-land high schools, continuing to present the Ecological Footprint module and beginning to present the Cradle-to-Cradle module.
5. Refine the Cradle-to-Cradle presentation by analyzing feedback and response of pupils
6. Continue to collect and analyze feedback from students and teachers concerning both of the modules, our presentation style and the teaching kit. Use this information to continually enhance the learning experience.

With the exception of objectives number five and six in the above list, IPRO 332 has met each of the other objectives to one degree or another, building onto the foundation provided to them for the continued evolution of the project by future students. Over the course of the semester a teachers kit, a website, and a cradle-to-cradle educational module have all been created. As well, IPRO 332 has had the opportunity to visit three different Chicago-land high schools this semester, and at one of these institutions had the opportunity to present the newly created cradle-to-cradle module. IPRO332 was also able to create some positive publicity for itself this semester with its participation in three different public events during earth week, which were the Green Apple Music Festival, Earth Day at the Illinois Institute of Technology and the Media

Fair at Columbia College in Chicago. It should also be noted that in its push for marketing itself, IPRO 332 had an article published about itself in the Illinois Institute of Technology's Tech News, and was able to gain a corporate supporter in Carlson Environmental, inc..

In its push for meeting other objectives and desire for participation in unforeseen opportunities, though, some original objectives were put to the side. The cradle-to-cradle presentation has been created, and implemented, but, unfortunately, the team was not able to schedule enough presentations of this module to collect and analyze this information at this time. Also, the desire to create an objective system of measures for analyzing the effectiveness of the educational modules had to be put aside in order to accomplish and part take in unforeseen opportunities to expand the reach of the project.

4.0 Research Methodology

A. Problem

With the growing need to raise awareness with respect to the ever-changing climatic conditions that we face on this planet, the challenge to harvest such awareness amongst high school aged individuals has been placed in front of us. A base for solving this problem has been established for this IPRO over past semesters with the establishment of a two class period presentation for high school students concerning the topic of the ecological footprint (how much does one consume), which was presented to several high schools in the Chicago metropolitan area. It is now the problem of the current IPRO to investigate and implement tactics in order to harvest awareness among individuals on a much greater scale than those select individuals whom we may give a physical presentation. The questions in front of us now are: (1) How can this information be delivered without team members physically having to deliver the presentation; (2) How can awareness of the work that has been done and its availability be harvested among individuals outside of those who have participated in a physical presentation; and (3) How can this information be tailored to the individuals intellectual and interest levels? (4) How can a community of such people seeking benefit from this information be developed in order to promote further discourse and the development of these ideas?

B. Problem Solution

IPRO 332 addressed the problem of expanding the organization in three key ways. Last semester, the team focused on creating new modules including building on the Ecological Footprint. Along with expanding and improving the presentations, the team made it a goal to reach more schools. This semester's team found it important to continue with what previous teams were working on, but expanding it further by finding a way for other organizations to spread the cause without the teams' physical presence. The first way to accomplish this was to develop a starter kit that will be distributed to teachers. This kit basically consists of the original presentations developed by the team as well as instructions on how to teach them, the Ecological Footprint module and tests, along with other games, worksheets, and projects to aid the teacher. The second way that IPRO 332 expanded the organization was creating a website

that was advertised to the general public through our marketing material, focusing on both students and adults who are interested in furthering their knowledge of the issue of energy. The third important step was to create a marketing plan and implement it to spread our cause to the general public by creating a name and slogan (How Many Earths) for the organization and advertising it through posters, newspapers, and making appearances at Chicago area events including IIT Earth Day, Green Apple Music Festival, and Raw Voices Youth Media Festival at Columbia College. By doing so we reached far more people than just presenting to high schools would have accomplished, therefore increasing the number of people becoming aware of the issue and hopefully wanting to learn more.

The steps that were taken to materialize these three goals was to break up into three different sub teams which each took on one goal, the outreach team, the website team, and the marketing team. Each sub team then performed separate steps in completing the assigned tasks by going through the following:

1. Researching possible ideas
2. Create a system of research filters and evaluation criteria for application to these ideas.
3. Analyze how the ideas fair when set against the filters and criteria.
4. Determine which of the ideas will be most realistic, efficient, and successful
5. Execute the chosen ideas

Although this was an involved process, it was quite reasonable for our team to complete these tasks. We had a great deal of manpower, and with proficient project management, we were able to achieve our goals.

C. Testing

Analyzing our audiences' interest and reaction to our project is essential to the improvement of the product and services we aim to provide. This year our audience has expanded outside of the classroom -- seeking partnerships and sponsors with organizations and companies engaging in similar outreach interests. At the same time, more testing is done in classrooms to promote awareness, and the all the information is supplemented by an interactive and informative website that is catered to the general publics' curiosity and involvement pursuits. Three corresponding sub teams; the marketing team, the outreach team, and the web team delivered our message to these audiences. These teams also measured and analyzed our effort's effect with the activity or feedback we received from people at the events we attended, student and teacher surveys and engagement, and web interaction and exploration activity. By sub-dividing our objectives within the sub-teams we had a strong concentration with the objective goals and efficiency with our deliveries.

D. Documentation

The same process of documenting and testing the presentation that was created by last semester's team was used this semester also, which included a pre-test, post-test, survey and Ecological Footprint calculator. However, this process was expanded by creating a follow up worksheet for each student to complete which examines the individuals' energy use in their home and whether or not it has improved after going through the presentation. Including documenting the results of the presentation, feedback from teachers on the starter kit was also accumulated. The data from these documents was archived according to school and date. After studying the feedback and the tests, the outreach team had a summary of the good and bad aspects of the presentation and kit. This summary allowed the team to brainstorm ideas on how to improve the project. Using these ideas and results Ipro 332 can continue to develop and improve presentations.

E. Analysis

Part of the objective of this IPRO was to analyze the effectiveness of our ecological footprint curriculum and general subject matter on individuals whom experience the material presented. This analysis falls under two categories: immediate impact and lasting impact.

The immediate impact of the material can be analyzed in terms of the clarity of the material presented as well as interest in the material. The way that this was measured was through the use of a pre and post-test regarding the presented material, which is an aspect of the IPRO that is a continuation from the previous semester's work. The fact that this is a continuing aspect allowed us to have a base set of results to compare with results gathered from presentations given this semester.

The lasting impact of the material is a new aspect, which this IPRO wishes to measure and analyze. This concept of analysis hopes to understand what the actual interest level is regarding this topic among individuals who have experienced the presentation. We hope that the website can be used to measure this impact in the future. This would be measured in terms of the number of people coming to the website as well as the ones becoming actively involved with our cause.

F. IPRO deliverables

Previous IPRO deliverables were used as a guide to expanding our deliverables and as the high initial bar of improving our outcomes in conjunction with creating new target objectives. We built upon and fine-tuned old modules and carefully examined past pursuits and incorporated new pursuits. Our notebook documented our process and incorporated ideas that future IPRO's may build upon. Our project plan and schedule guided our objectives and the timeliness of their delivery. Our presentations helped us to prepare us for formal interactions with our partner organizations as well as our sponsors. We all worked as a team expecting equal and grand individual efforts with no one member becoming overwhelmed. Our communication and teamwork stayed strong and facilitated the achievement of our goals.

5.0 Assignments

Our IPRO consisted of 13 members, so we broke into smaller sub –teams. These smaller teams worked well and allowed us to complete a variety of different work and keep everyone involved. There have been no changes made to the sub-teams or tasks since they were created at the beginning of the semester.

The outreach sub-team used the Ecological Footprint module in Chicago area high schools. They were also able to set up multiple other events in the Chicago area. The marketing sub-team used both promotional materials and newspaper articles to promote our message. The website sub-team created the HowManyEarths.com website. All the sub-teams communicated with each other to achieve the goals of our project.

Individual Team Member Assignments:

Name	Skills	Interests
Carmen Aguilar-Wedge Civil Engineering 3 rd Year	Bilingual (English/Spanish) Microsoft Office, CAD, Adobe Illustrator, Cost Works, Primavera, C++, MathCAD	Art, Architecture, Traveling, Shoes, Volleyball, Dance, Music
Dariusz Bunda Electrical Engineering 4 th Year	Bi-lingual English and Polish, Leadership, Team work, Organization, Project Management, MS Office, and Auto CAD	Automotive Technology, Working Out, Friends, Family
Kaitlyn Conley Civil Engineering 3 rd Year	Skyscrapers, Design & Imagination, Reading, Writing, Photography, Politics, Arts, Music & Sciences, Environment, Holistic Medicine, Cooking	Sky Scrapers Computer Applications & Basic Computer Programming, Mathematics, Foreign Languages (French), Photography, Conceptual Design, Musician
Alex DiSciullo-Jones Materials and Aerospace 3 rd Year	Proficient in Microsoft Office, computer programming (MATLAB and C++), finding contacts for sponsors and media, marketing, efficient worker	Alternative energy, transportation safety, cinema, literature, music, travel
Audrey Galo Architecture 4 th Year	MS Office, AutoCAD, 3d Studio Max, Photoshop, Illustrator, Dreamweaver, Bilingual (Spanish), Research ability	Interests: International music, traveling, design, art, drawing, baking, cooking
Alfredo Garcia Electrical Engineering 4 th Year	Bi-lingual English/Spanish Excellent communication /public speaking and leadership skills	Music, Dancing, Working out, Family
Rohan Mehta Computer Engineering 4 th Year	Programming (Java, C++), Adobe Flash	Computer games, traveling, working out, soccer, new technology, photography
Andrew Mey Civil Engineering 3 rd Year	Microsoft Office, Adobe InDesign, Carpentry	Friends, Family, Camping, Hiking, Construction
Minh Nguyen Electrical Engineering 4 th Year	Matlabs, AutoCAD	Energy-efficient power electronic applications, power system operation

Maile Rennard

Electrical Engineering
3rd Year

Excel in typing skills, use of Microsoft word, excel, PowerPoint

Hanging out with friends, taking pictures, dancing, experiencing new places and things, tennis

Samantha Staley

Professional & Technical Communications
4th Year

Technical editing, proficient in Microsoft Project, project management experience, Communication, Leadership and teamwork training

Swimming, Alpha Sigma Alpha sorority, running, singing

Sarah Stone

Political Science
4th Year

Adobe InDesign, AutoCAD, Microsoft Office, previous public speaking experience, marketing experience

Marathon training, swimming, playing violin & steel drum

Matthew Walczuk

Architecture
5th Year

Digital Media (web technology + graphic arts)

Design Theory, Social Sciences, Ecology, Philosophy, Building Technology

IPRO 332 Team Leader: Dariusz Bunda

Outreach sub-team is responsible for going to schools and giving the “How Many Earths Presentation” & implementing the cradle-cradle module to the classrooms. Outreach will try to reach 12-14 Schools, speaking directly to a minimum of 400 Students. The group will also be responsible for getting the “kit” together to pass on to teachers/other student organizations so they can do the presentations at their local high schools.

Leader: Alfredo Garcia

Carmen Aguilar-Wedge, Minh Nguyen, Maile Rennard, Dariusz Bunda, Samantha Staley

Web Development sub-team will be entering the web contest, creating a website that is functional and gives contact, the downloadable kit, feedback, a blog, online resources, and an online community.

Leader: Audrey Galo

Matt Walczuk, Rohan Mehta

Marketing sub-team is responsible for coming up with ideas for: Branding, Name, Logo, & Slogans; Marketing through Flyers, T-shirts, Posters, IIT Today, IIT newspaper, Patches, Pencils, Calculators, and Sponsors. The Marketing group will also be responsible for the budget.

Leader: Sarah Stone

Kaitlyn Connley, Andrew Mey, Alex Di Sciullo Jones

6.0 Obstacles

Throughout the semester, the team came across numerous obstacles in attempting to complete its objectives, the biggest of these being to find a way to spread energy awareness to a larger

audience without overusing the same tried and tested module from past semesters while also increasing public knowledge of our organization. This was a large challenge and each sub-team did their part in attempting to accomplish the team's goals using untried methods.

Outreach Team

It had been proven in past semesters that the ecological footprint module was an effective method for spreading energy awareness to high school students by giving them presentations in person, but the team did not want to rely solely on this method to reach its audience. One obstacle is that with this method, the team is limited to students that can be reached in person within reasonable traveling distances. To be able to reach students that could not normally be reached in person, the outreach team has worked to produce a kit to be distributed to teachers so that they can teach the module without us actually being there. For this to work, a way had to be found to make sure the teachers presented the module properly. To do this, the team produced a script and instructions for each slide and activity to be included. The next obstacle was that our past teams had already presented at some schools and these schools were hoping that we would present something new to their students. The team from the previous semester had produced but never put into action a second module, referred to as the cradle-to-cradle module, but when the team looked at it, the members realized that there were many flaws with it, namely that the presentation had little relevance to the activities that were to be used with it. To get past this, the team had to revamp the entire presentation slide-by-slide to make sure all the pertinent knowledge they wanted to get across was included.

Marketing Team

In trying to spread awareness about the existence of our organization to as many people as we could, a major obstacle was deciding how to go about doing so while also trying to obtain funds to push the team in the direction of self-sustainment. Some ideas were on items to sell but the main problem with these ideas was that we doubted whether there was a real market for them, that people would not be willing to spend a reasonable amount on them that we could make a real profit. Instead, we turned to items we could easily give away, though an obstacle in this is that we were limited in the items we could give by the team's budget garnered from the IPRO office. We were able to produce stickers with the team's logo on it, but the rest of the giveaways were mainly standard IIT items without a logo to attract attention to us directly. In the attempt to attain further funds, the marketing team attempted to gain sponsors via emails sent to a broad range of possible financiers, ranging from other universities to car companies. In the end, it was a team member's contact through her workplace, Carlson Environmental Incorporated, that we gained a small amount of funds and gained a sponsor. The fact that we actually have had a sponsor has the ability to attract further investing in our organization. Our initial objective was to spread energy awareness to as many high school students as possible but it was soon realized that by increasing public exposure of our organization would make this more successful in the future. To do so, the team sought to contact various meeting to garner exposure. Members contacted newspapers and magazines with an article describing our organization, finally getting it into IIT TechNews. But since this was the only success we had in getting published and only campus students were likely to see it, other methods needed to be

devised. To overcome the difficulty in reaching the public through printed media, we decided to expose the group by attending events where we would be able to communicate our goals and garner interest in as many people as possible. This did mean that less time could be spent giving presentations to high school students but the team saw this as just another way to spread energy awareness, only there would be no age restrictions. This led to us attending Engineers Week, the Green Apple Festival at the Lincoln Park Zoo, and Raw Voices Media Fair at Columbia College.

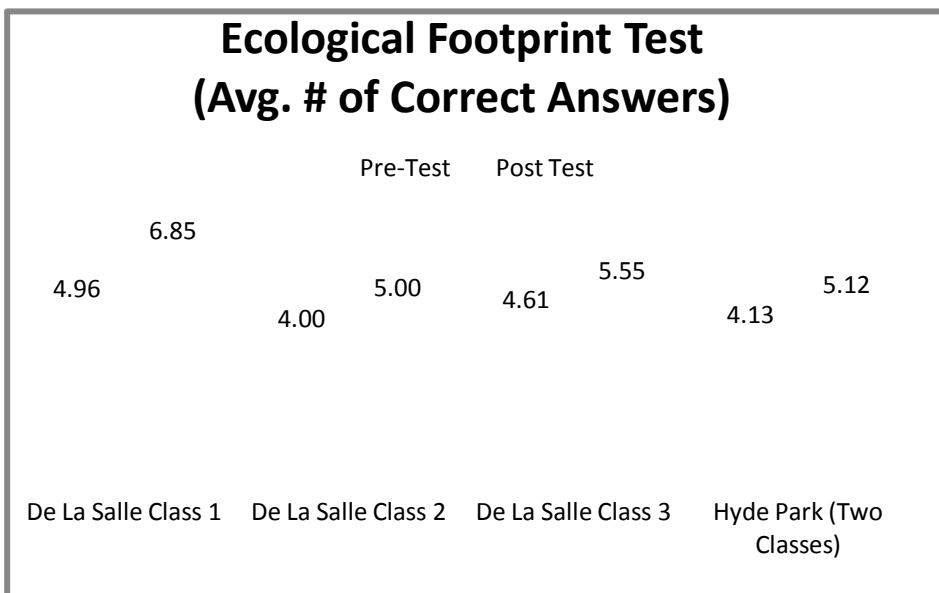
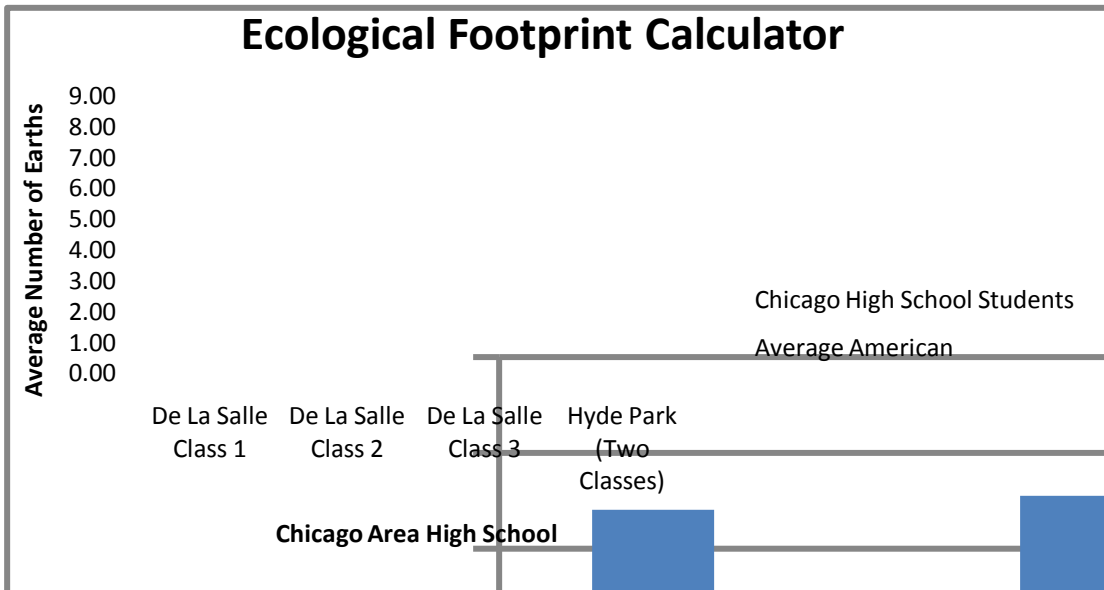
Website Team

The team also believed that a working website for the group would also make exposure much more effective by having a place for students and the public to visit to gain more information about our group, express opinions and ideas, and have a way to contact us. In producing the website, a major obstacle was figuring out the coding. Proper coding was needed to use flash in the website and convert various parts of the presentation and its activities into flash to be used on the website. The sub-team had decided to use ActionScript 3.0 because it was the newest version so they figured it would be easier to use, this turned out to be a mistake. The coding was actually more difficult and they had trouble finding help online since little was available for such a new product. Eventually a draft was completed in this form but the team decided that if they left this code in this form, but it was then decided to switch to a better understood coding, ActionScript 2.0, to avoid problems that might arise in the future.

7.0 Results

The team was pleasantly surprised with the results this semester. Although the team decided to focus its attention in a different direction than the previous semester, the results were better than anyone in the IPRO expected. We will break down the results by sub-team.

The outreach team ended up visiting 3 different schools which consisted of 7 classes. The following charts indicate the scores (pre-tests, post-tests, and footprint calculators) of each class that attended the presentation:



Pretest

Post Test

Pass

Fail

From these charts, it can be seen that there is a distinct improvement from pre-test to post-test scores, indicating that the teaching method was effective and knowledge was retained, which can also be seen in the overall results. Also by observing the average number of earths for the students calculated from the footprint calculator compared with that of an average American, one can see that the high school age group makes less energy conscious decisions and is in need of further energy awareness.

Although the number is below the number that was proposed in the Project Plan, the team made up for it by seizing great opportunities that presented themselves. The team participated in the Engineer's Week Expo at the IIT Rice Campus, the Green Apple Festival at the Lincoln Park Zoo, the Service and Green Fair at IIT, and the Raw Voices Teens in the Media Arts Festival at Columbia College. In total, around 640 Ecological Footprint Calculators were completed this semester.

Also, the outreach team set out to develop an Ecological Footprint teaching kit. The purpose of this kit was to give teachers the ability to teach the ecological footprint module on their own. A script was created which thoroughly explained each aspect of the presentation giving guidelines for the teachers to follow. Hard copies along with digital copies of all the materials are included. To further enhance the topic of energy consumption awareness, project ideas and

activities were also included in the kit. The purpose of these projects is to allow the teacher to incorporate more information into their curricula as well as to have an impact that continues beyond the presentation.

The website team created the HowManyEarths.com website. This serves as a resource tool for anyone who shows special interest in our project. While browsing through the site, users have access to both of the module presentations, the Ecological Footprint Calculator, an Ecological Footprint Quiz, the Footprint Calculator results from both the Green Apple Festival and the Service and Green Fair, the “Consumption in Everyday Life” short film, and an online library.

The marketing team was able to further extend our goal of spreading energy awareness by expanding our reach beyond the students in the classrooms we present to. The sub-team put together a marketing plan on which to base its actions. To reach the public, the marketing team came up with a logo and slogan to use as a brand to associate with our organization. This branding was then used on all promotional items, on our shirts, stickers, business cards, posters, and website. The marketing team contacted the media via newspapers and magazines, eventually having an article published in our local paper, TechNews, referring to our organization and its activities. The team also contacted financiers with an official sponsor letter leading to eventual sponsorship from Carlson Environmental Incorporated. Items were considered for production to give or sell. It was finally decided that an audience did not exist to purchase items thus attention was turned solely to items that could be given away under our budget. The marketing team then focused on producing stickers and business cards that could be produced and distributed at an acceptable cost. Posters were generated to promote our public events and displayed around campus to garner student attendance and notice. Events were booked for the team to promote our organization, spread awareness, and gain more data through footprint calculators from a large audience by attending Green Apple Day at the Lincoln Park Zoo, the Service and Green Fair at IIT, and the Raw Voices Teens in the Media Arts Festival at Columbia College. To further fund our organization, a book drive was started on campus with Better World Books to recycle books while also gaining further exposure and making a profit.

8.0 Recommendations

The recommendations of the Spring 2008 Team of IPRO 332 are as follows. The main focus should be to further expand the audience that is presented to, including more students as well as a greater public audience. This semester, 7 classrooms were reached with a total of about 150 students as well as a public audience of about 750 people. This totals to almost 900 individuals who were reached. The 750 people who were publicly reached consisted of college students as well as individuals who have an interest in green issues. The next team should continue to find events and organizations in order to reach a larger diversity of people. To do so, the team should immediately start researching opportunities for public event appearances, contacting high schools for classroom presentations of the curriculum, and communicating with mailing list participants.

As for the content of the presentations, it is recommended that the “Ecological Footprint” module continue to be used as well continuing the implementation of the “Cradle to Cradle” module. This second module was recently updated in Spring 2008 but should be further presented, tested, and modified in a classroom environment. This module should be brought first to schools that are aware of our cause because they have been very receptive and supportive of our first module. With these schools, feedback should be collected from the teachers and students to help further improve our second module. For both modules, a way to follow up with the school should be created to gain a better perspective of the impact of our cause.

This semester, a website entitled HowManyEarths.com was created to support the audience’s interest and to promote the organization. The website includes all forms of media and content created throughout the term. We recommend continuous updates of information and events as a quick and effective marketing tool. Most importantly, the development of a blog would allow our audience to post comments and media relating to environmental topics/issues.

The ecological footprint teaching kit, now in the beta testing stage, was made containing all the necessary tools, information, handouts, and instructions for any person to examine and implement in the classroom. We recommend that the beta kit be expanded and tested by willing teachers around the state and ultimately around the nation. Using their feedback, improvements of the kit should be made to perfect it for mass distribution to pre-selected organizations, schools and individuals.

The final recommendation for the future of IPRO 332 is to rethink and revise our marketing plan to fit with a new set of objectives. Following the achievement of attaining a financial sponsor, Carlson Environmental, the next step is to reach out to more companies and organizations that are willing to sponsor our organization. Any funds collected through such a venture should be put back into the project to help finance the production of the ecological footprint teaching kit, website expansion, promotional materials, and event fees. We recommend also getting the name of our organization known publicly throughout the city and nation through different media options including the Internet, newspapers, radio, and the television.

These recommendations are made based on the success and positive feedback of this semester’s efforts. Next semester, an aggressive effort to maximize these new methods and opportunities for spreading awareness will allow us to reach new heights.

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10.0 Acknowledgements

IPRO 332 would like to thank the following for participating in our project and helping to make this semester a success.

Chicago Public Schools

Kevin Hall, Science Coach for Area 23

De La Salle Institute Girls' Campus

Mr. Bob Chrupka, Teacher
Biology

Perspective Charter School

Ms. Mary Anne Loafman, Teacher
Social Science and Biology

Hyde Park Academy

Ms. Betty Holcomb, Teacher
Biology

Lincoln Park Zoo

Rachel Lowen, Chicago NPO/Green Business
Coordinator
Green Apple Festival

Columbia College

Paul Teruel, Director of Community
Partnerships
Youth Media Fair

Illinois Institute of Technology

Fabio Buffa, Coordinator of Student Activities
Service and Green Fair

Thank you to Tech News for printing our article, which helped us publicize and legitimize our efforts. Also, we would like acknowledge all the staff of the I PRO Office for all of their help in every endeavor, from writing the Code of Ethics to printing the abstract. Without their help this project would not have been able to succeed.

And last, but not least, I PRO 332 would like to thank our advisor, Professor Braband, for the interest, enthusiasm, and skills that he has brought to us. Without his guidance this I PRO would not be what it is.