Exploratory Grants provide an opportunity and funds for students to further develop a public service research project. Awards are up to $750, and funds are awarded based on the quality of the proposal.

Eligibility: The application process is open to first- or second-year students. Third-year students may be considered in some cases. Group or individual applications are welcome.

Grant requirements: Recipients will be expected to write a short report about their exploratory work within one year of the award date.

Deadline: Students may submit an exploratory grant proposal any time. Proposals will be reviewed on a rolling basis.

For more information visit: http://www.virginia.edu/jpc
Letter from the Editor

Dear Reader,

I’m delighted to introduce the third edition of the Jefferson Public Citizens (JPC) journal. The articles in this journal reflect the culmination of projects that originated in the fall of 2010. This year’s cohort of 81 students and 18 graduate student mentors, have spent nearly two academic years engaged with their faculty advisors and community partners pursuing shared research-service objectives.

Soon after returning from winter break, the students exchanged papers for peer editing. They then submitted their manuscripts to previous JPC participants, community members, and faculty members for a rigorous review process. The reviewers’ comments serve to challenge assumptions, clarify outcomes, and sharpen prose. I am grateful for their thoughtful and instructive comments to our students. The overall writing and review process provide a structured opportunity for students to reflect on and gain a deeper understanding of their JPC experiences.

In the following articles JPC students discuss a wide range of community-based academic inquiry from sustainable building designs to rural education and effective models of youth mentoring. As one faculty advisor remarked, the projects give students “the opportunity to extend their classroom analysis and critical thinking to implementation in the real world.”

These articles demonstrate the passion, effort and commitment of our JPC students, graduate mentors, faculty advisors, and community partners. I hope that you will enjoy learning about their exciting and inspiring work.

Sincerely,

Brian Cullaty
Associate Director, Jefferson Public Citizens Program
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“Who are my Sisters?” The YWLP Global Connections Project

Lauren Mims, Janelle S. Peifer, Jessica Foster, Jennie Williams, Roxanne Campbell, Erika Lee, and Edith C. Lawrence

Abstract
Using artifacts, Facebook-styled informational packets, and other written communication, the Young Women Leaders Program (YWLP) Sister-to-Sister Project expanded the global connection components of YWLP’s mentoring curriculum with the goal of enhancing middle school girls’ sense of themselves as global citizens. The project had three stages. First, focus group and interview feedback on existing global connection components of the mentoring curriculum was obtained from 80 mentors and 20 group facilitators participating in YWLP at the University of Virginia (YWLP/UVa) during 2010–11. Next, themes were derived from these data and served as the basis for revising the global connections components of the mentoring curriculum. Finally, the revised curriculum was implemented with a new cohort of YWLP mentors and mentees. Results revealed a significant increase for YWLP facilitators’ sense of global competence but not for mentees and mentors. Program implications as well as study limitations and future directions are discussed.

Introduction
For girls, middle school is often a time of low self-esteem and increased concerns about who they are in relation to others (Underwood, 2003). Early adolescent girls struggling with their sense of self are more likely to feel hopeless and engage in self-destructive behaviors if they lack a positive female role model during their middle school years (Ornstein, 1994).

In particular, as they are developing their own sense of self, it may be useful for middle school girls in the United States to explore the ways in which their issues are similar and different from girls and women in other communities around the world. Research findings suggest that those students involved in global awareness programs are more motivated for and competent in adapting to multiple perspectives, developing multilingualism, and facilitating mutual respect post participation than students not in these programs (Ashford, 2010). Little is known about the potential benefit of engaging middle school girls in an exploration of self by providing them opportunities to also learn about the issues facing girls and women around the world.

The Young Women Leaders Program at the University of Virginia (YWLP/UVa) is an after-school mentoring program that pairs college women with at-risk seventh grade girls for an academic year (Lawrence, Levy, Martin, & Strother-Taylor, 2008).
The curriculum teaches middle school girls academic and interpersonal skills that are useful for their development (e.g., organizing homework, problem solving, creating support teams) and includes opportunities for them to develop and participate in leadership service projects in their school and community (e.g., appreciation dinner, school leadership project). In 2010, YWLP piloted the addition of a global connections curriculum to the existing curriculum. Called the YWLP Sister-to-Sister Project, it focuses on enhancing middle school girls’ sense of their global citizenship by pairing YWLP groups with a group of girls and women from Africa for a year of cultural and informational exchange activities.

The current research has three goals: 1) assess the effectiveness of the pilot YWLP Sister-to-Sister Project curriculum in enhancing the global competence of 7th and 8th grade girls participating in YWLP/UVa during 2010–11, 2) use this feedback to revise the curriculum to increase its level of engagement and effectiveness, and 3) assess the degree to which following the new curriculum enhances the global competence of a new cohort of mentees, mentors, and facilitators participating in YWLP/UVa during 2011–12.

**Methods**

*Phase 1: Curriculum Feedback*

The first phase of the project was to gather feedback about the pilot global connections components of the YWLP curriculum from 2010–11 YWLP/UVa mentors (n = 80) and group facilitators (n = 20) during the last two months of the program year through focus groups, group observations, and one-on-one interviews.

*Phase 2: Curriculum Revision*

Following analysis of the feedback data, members of the project team researched alternative structures for and ways of delivering the global connections material through the YWLP group mentoring meetings. Decisions about changes to the curriculum were based on the degree to which they addressed one of the three themes identified in the feedback, and had the potential to increase mentee engagement with the curriculum. In addition, the amount of time that could be devoted to a global connection focus over the course of the year was considered since YWLP also commits to addressing other issues facing adolescent girls (e.g., problem solving, academics, dating). Therefore, efforts were made to build the global connections curriculum on issues already covered in YWLP (e.g., school, family, and friends).


The final phase of the project involved surveying 2011–12 participants in YWLP/UVa who were following the revised global connections curriculum for a semester. This
included the middle school girl mentees (n = 73), undergraduate and graduate student women mentors (n = 68), and group facilitators (n = 17). For middle school girls, the survey distribution took place during YWLP group meetings. For facilitators and mentors, surveys were distributed and taken online at the beginning of the second semester.

**Measures**

**YWLP Curriculum Evaluation Questions.** To assess the original pilot global connections curriculum, 15 questions were asked in focus groups and interviews with mentors and group facilitators. The questions focused on the utility of the global connections materials in the curriculum (e.g. letters, fabrics, pictures, etc.), the importance of the global connections curriculum as part of YWLP, and the degree to which the structure and implementation of the global connections curriculum was appropriate and effective. These questions were asked to mentors and group facilitators in the 2010–11 cohort at the end of the academic year.

**Global Competence.** The 14-item Global Competence Measure (GCM) was developed and used to evaluate participants’ global competence before participating in the global connections curriculum (Fall 2011) and after a semester of activities (Winter 2011). Items assess respondents’ opportunities for learning about other cultures, desire to travel abroad, and desire to make global change.

**Results**

**Objective 1 & 2: Revise the 2010–2011 original global connections curriculum to address weaknesses.**

Members of the project team analyzed qualitative data from focus groups and interviews with mentors and group facilitators participating in YWLP/UVa during 2010–11 and derived three themes.

**Theme 1: Time for Activities:** One theme that emerged was that participants did not feel there was enough time set aside each week to adequately cover the global connections material. The revised global connections curriculum was divided into 15–20 minute, bi-weekly sessions as opposed to the original curriculum’s weekly 5–10 minute sessions.

**Theme 2: Greater Relevant Background Knowledge:** Another theme that emerged was that the mentors and facilitators did not feel they had sufficient knowledge about their global connections site or the issues girls and women there faced. The curriculum was revised to include the development of the Global Connections “Facebook” and the Global Connections website. The Global Connections “Facebook” pages contain “profiles” outlining information about various aspects of girls’ lives in Cameroon. At least one “profile page” and one “note” was created for the curriculum each week that included a global connections focus.
Setting Goals in Cameroon

Basic Information
Just like we've been doing here, the little sisters of YWLP in Cameroon set goals that they would like to achieve, both short-term and long-term. Think about the goals you've been discussing in group lately; do you think the little sisters in Cameroon have similar goals?

Activities and Interests
Short-term goals: Here are some examples of the goals the little sisters in Cameroon set for the near future:

- To finish all of their chores at home before leaving for school in the morning
- To help take care of younger siblings
- To practice speaking and reading English
- To study the Bible everyday
- To earn better grades in science at school
- To learn how to prepare a favorite meal

Long-term goals: What kinds of goals do the little sisters of Cameroon set for their future?

Education – some girls in Cameroon hope to go to college when they get older. Emelinda, a little sister in Kumbo, wants to go to law school.

Talk about it: What challenges do Cameroonian girls face in going to college? Reference previous Global Connections Facebook pages for more information.

Family – Like in the United States, family is very important in Cameroonian society. Most of the little sisters hope to marry one day and raise their own family.

Talk about it! Are any of these goals similar to the goals you've set for yourself? Do you think your plans for achieving these goals are similar?

Contact Information
Email Questions about Global Connections or Cameroon? Ask your group's facilitators, or contact Jennie Williams (jk-w5a@virginia.edu).
Website Don't forget to check out the YWLP-Cameroon website! https://sites.google.com/site/ywlpandcameroon/
The Global Connections website (http://ywlp.virginia.edu/category/projects/global-connections/) was created as an online resource for mentees, mentors and facilitators to obtain additional information about the girls and women in Cameroon and the issues facing them.

Theme 3: Visuals and Hands-on Activities: The third theme that emerged was the need for more engaging materials so the curriculum was revised to include significantly more pictures of the girls participating in YWLP in Cameroon, their families, friends, and communities. Additionally, the revised curriculum included hands-on activities.

Objective 3: Assess changes in YWLP/UVa mentees, mentors, group facilitators’ global competence pre and post-participation in one semester of the revised global connections curriculum.

A one-way ANOVA was performed to assess changes in participants’ overall competence as measured by the Global Competence Measure. Facilitators had significantly higher overall global competence after participating in the revised global connections curriculum for a semester than they did prior to participating in the program \[F(1,31) = 4.793, p = .036\]. There was no significant change for either the mentees or the mentors after one semester.

Discussion

There has been little research on the utility of using a global connections focus in afterschool programming for adolescent girls, especially as a vehicle for supporting the development of their own sense of self. As a first step, this project revised the pilot global connections curriculum of YWLP. The results from our project indicate that developing a global connections curriculum that can be embedded in an existing mentoring curriculum and effectively change all participants’ sense of their global competence is difficult. While the changes made to the YWLP curriculum lead to significant changes in the group facilitators’ global competence after a semester, there was no significant change for either the mentors or mentees. It is promising that the new curriculum was successful in enhancing the facilitators’ global competence, but important to note that further revisions are needed to the curriculum if it is to become an effective mechanism for advancing mentees and mentors’ sense of global competence.

Related, the project team found that the greatest challenge was creating and designing exercises that captivated a diverse group of girls and women. Participants in the sample not only varied in age (i.e., college women and adolescent girls) but also by level of global experience. The current participants included international students, recently immigrated students, as well as students who had never travelled
outside of the Charlottesville area. It may be that the program will need to develop a variety of global issues activities for girls and women and then let mentoring pairs pick the ones they want to engage in based on their prior history with and interest in global issues for girls.

Limitations of the study included utilization of only one measure of global competence and relied on self-reported data, thus limiting the degree to which the results can be generalized to other after-school programming. Additionally, YWLP is designed to be a yearlong program, but because of project restraints, the global connections curriculum was evaluated after only a semester. It may be that significant changes in mentees and mentors’ global competence will only occur after increased involvement with the curriculum. Another evaluation of the curriculum is planned for the end of the academic 2011–12 year.

Although engaging middle school girls in an exploration of self by providing them opportunities to also learn about the issues facing girls and women around the world has theoretical support, findings from this study suggest that further research and development of the YWLP Sister-to-Sister curriculum is needed. It currently has positive effects on the group facilitators. With additional revisions, it may be that this global connections curriculum can become an effective avenue for participating girls and women to enhance their sense of globally competence as well.

References


Biographies

Roxanne Campbell is a third year student at the University of Virginia and interested in digital media.
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Jennie Williams is fourth year in the University of Virginia’s Distinguished Majors in History Program. This is her third year participating in YWLP.

Edith C. Lawrence, Ph.D., is a Professor in the Curry School of Education at the University of Virginia and Director of the Young Women Leaders Program. She is co-author of Competence, Courage, and Change: An Approach to Family Therapy and teaches and conducts research on adolescent development and family therapy.
Photovoice Research, GIS Mapping, and Water Testing in Siuna, Nicaragua

David Griggs, Katie Hempenius, LeeAnn Li, Tyler Slack, and Shreya Soni

Abstract
In July 2011 a team of University of Virginia students traveled to Siuna, Nicaragua to conduct research in the rural Siunan suburb of Fonseca. With the support of their community partner, Bridges to Community (BTC), which already had established connections there, the researchers were able to use photovoice methodology, water testing, and GIS mapping to pinpoint issues of significance in this former mining area. Photovoice enabled community members to identify, categorize, and prioritize community problems while also providing the team with a window into the workings of the community. The research team also integrated water testing data, photos, and site plans into an interactive GIS map of Fonseca. This tool is now being used by BTC to guide the construction of a water distribution system in Fonseca.

Introduction
The research team's overarching goal was to develop a long-term, sustainable project with Bridges to Community (BTC) that could be built upon by future University of Virginia (U.Va.) students. BTC's two decades of experience in Nicaragua and their engineering projects in education, shelter, and health care made them an ideal community partner. In addition, their pre-existing presence and established relationships with individual communities would enable the team to begin work with community members immediately and begin building the relationships and trust necessary for a long-term project in the region.

The research team, led by the desire to understand fully and empathetically the desires and goals of the local people, searched for a method that would allow them to work with the local citizens, rather than simply working for them. The photovoice research methodology accomplishes this by identifying a community's needs through photographs taken by the locals themselves. These photos are then used to stimulate discussion and collaboration between community members to address these needs and consider sustainable solutions.

Water testing was incorporated into the project after preliminary talks with BTC revealed that water and sanitation were problems in this former mining region. Water samples from Fonsecan households as well as locations around Siuna were tested for iron, copper, pH, turbidity and the presence of coliforms.

Geographic information systems (GIS) mapping was another component of the
project, useful in future infrastructure development initiatives in Fonseca. Global positioning system (GPS) coordinates, when cross-referenced with elevation data, images, water quality, and other information, allow engineers to understand terrain they may have never seen or visited. After consulting the experts at the U.Va.’s Library’s Scholars’ Lab the team decided to use Garmin GPS units and Google Earth software.

**Methods**

*Photovoice*

BTC identified the small village of Fonseca as an exceptional worksite because of its history as a well-organized community under the leadership of a community member, Don Juan. The team met with Don Juan and other community leaders after arrival to form a plan for the photovoice project and affirm community support. Don Juan thereafter introduced the research team at another village meeting, announced the project to the villagers, and then asked for volunteers. Eleven people were selected, with attention given to demographics; the volunteers ranged in age, gender, and family representation. Volunteers were given cameras, taught how to use them, and then asked to photograph perceived problems or issues in the community. After two days, during which team members made themselves available for any questions/discussion at nightly “office hours,” volunteers regrouped in the school building for discussion and sharing.

One hundred and forty-six photographs were collected from the 11 volunteers, each of whom explained how their photographs depicted needs in the community. Afterwards, the photos were grouped according to subject (e.g. sanitation, access to medicine, etc.) and discussed amongst the team members. Representative photos from each of five subjects were printed, captioned in Spanish, and displayed at the farewell ceremony which was attended by approximately forty community members. There, community members observed the photographs and discussed them with friends and family, then participated in a group-wide discussion led by the research team.

*GIS Mapping and Water Testing*

GIS mapping was executed in conjunction with BTC. BTC was in the process of building a water system for the community and stood to benefit greatly from accurate GIS measurements. Three teams, each with students, a GPS unit, a guide, and a translator, covered different sections of the proposed water system. At each of the 33 households within the system GPS data, photos, and water samples were collected. Water was tested for iron, copper, pH, turbidity and the presence of coliforms. Using a netbook, the locations of the households were overlaid on top of a satellite image.
of the region, along with data such as homeowner surname, the number of residents, the parameters of the existing water supply, and a photo of the location. Because the team traveled along the existing network of paths and roads in Fonseca they were also able to create a basic roadmap of the community—the first to ever exist. These results were summarized in a short report that was given to BTC along with a set of instructions (all in Spanish) for their engineering staff to use in the construction of the water system.

**Results**

*Photovoice*

In addition to traditional service and labor, the novelty of the Photovoice methodology provided a way to connect with the community of Fonseca and work together as one team. Many residents were intrigued by the cameras and were thereby more attentive to possible solutions to problems in their community. The team noted a high level of engagement from the eleven participants, likely due to the project being presented not as a chore but as an activity with direct personal benefit (i.e., community improvement), and internal peer pressure among participants to attend meetings and bring thoughtful responses.

Results revealed the people of Fonseca were most concerned with sanitation and health issues. Additionally, subjects usually focused not on themselves, but rather on the welfare of the less fortunate or able-bodied residents of the community—particularly children and the elderly. Photographs were grouped into the following categories:

- Latrine sanitation
- Pollution from unconfined waste dumping, resulting in water contamination
- Unsafe river crossings
- Inaccessibility to medicine
- Lack of safe play space for children

The photos displayed clear examples of potential improvements and were explained by locals through small group interviews and conversation, as community members were extremely hesitant to discuss these topics in front of all their friends and neighbors.

*Water Testing*

Presence/absence tests for coliform bacteria were conducted on water samples from key water sources. Coliforms themselves do not normally cause serious illness,
however their presence is used to indicate whether other fecal pathogens may be present. All samples were found positive for coliforms. This may indicate that the presence/absence of coliform is not a parameter of consequence for evaluating water in the region, or, it may simply indicate the presence of wildlife upstream from every testing location. The control test was run in a more controlled environment in the U.S. and came out negative. The change in environment of the control test may have affected the result.

The team also tested water for copper and iron since Siuna used to be a mining town. Exposure to elevated levels of copper for even short periods of time can result in stomach and intestinal distress, liver and kidney damage, and anemia. No significant traces of copper were found in any of the samples, indicating that copper pollution may not be a significant contaminant of the water supply. However, significant concentrations of iron were found in eight water samples, including the government-supplied tap water in Siuna and the water sources of homes Fonseca. Unlike copper, iron has no direct effects on health, but it can indicate larger water contamination problems.

Turbidity refers to the cloudiness or haziness of a fluid caused by individual suspended particles and is a key test of water quality. In drinking water, high turbidity is associated with gastrointestinal diseases because contaminants like viruses or bacteria can attach to suspended solids. Community members stated gastrointestinal diseases to be a problem experienced from the water used for drinking, which often came from a concrete basin during the wet season, and from creeks during the dry season.

High turbidity levels also interfere during chlorine disinfection, a technique used by some community members, because the suspended particles can act as shields for the virus and bacteria. Suspended solids can also create chlorine disinfection by-products, which are dangerous and carcinogenic. While water tested in Fonseca exceeded the World Health Organization standard for turbidity, it did have relatively low turbidity compared to that measured from tap water in the neighboring city, Siuna. The BTC well in Fonseca had a turbidity level that was relatively high (6.8NTU) compared to that of water from other sources in Fonseca. Water from filters used by some community members had the lowest turbidity measured.

River water was not significantly acidic, which may indicate that acid rain is not a problem, despite the region’s mining history. Community members sometimes drink the river water, especially during the dry season when the wells run dry. Collecting data during the rainy season could have influenced pH measurements. In general, all water tested was not significantly acidic, which is good. Some drinking water had a higher pH at 9, however this water would still be safe to drink, although its taste may be compromised.
Discussion

Limitations

Research was conducted in Nicaragua during the rainy season, a period of relative affluence in resources, which may have influenced the needs identified and water testing data collected. Due to scheduling constraints of community members, the final photovoice presentation was held the day of the community’s farewell ceremony for us, which took attention away from the presentation discussion. While the small focus groups that the team formed earlier were conducive to understanding needs, people were less likely to speak up during the larger group format of the final photovoice presentation.

Outcomes

A. Documentation of Community Needs

The photographs collected through the photovoice exercise have provided local leaders in Fonseca with documentation of issues facing their community. These photos can now be used to help solicit funding from the regional and national governments.

B. Introduction of GIS Mapping

The GIS mapping element of this project created a valuable tool for the BTC staff and Fonseca’s community leaders. The last map of Fonseca, having inaccuracies even at the time of its creation, had since become outdated. The designers of the new water system can now easily calculate distances and elevation changes between the households included in the system. In addition, for the first time, community leaders can view satellite images of Fonseca with points of interest (households, paths, roads, etc.) clearly indicated. This capability will assist with property disputes and may furthermore help leaders provide evidence to support funding proposals to the local government.

C. Establishment of a Sustainable Relationship for Future Research

Key in establishing lasting relationships in Fonseca was the research team’s ability to immerse itself in the community. BTC arranged for living space in one of the central homes of Fonseca. Because of this the team members were able to speak and play with local children and villagers every evening. Also, a BTC staff member - a local who had been involved in politics for years - gave the team a history lesson specific to that area of Nicaragua. These experiences aided in understanding the cultural context of the work and helped keep the channels of communication between the team and the Fonseca community clear.
A strong foundation for future work with BTC was an important goal of this project. In addition to conducting research, the team spent considerable time and effort aiding BTC with their existing projects in Fonseca. This allowed the team simultaneously to build rapport with BTC and the community. As a result, BTC was very receptive to the idea of partnering with future groups of U.Va. students to assess and resolve needs in other Nicaraguan communities.

**Biographies**

**David Griggs** is a second year Mechanical Engineering major from St. Louis, Missouri.

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**Tyler Slack** is a third year Systems Engineering major, also studying economics. He hopes to continue travelling, learning, and working in Central America after graduation.

**Shreya Soni** is a fourth year Biomedical Engineering major with a minor in studio art. She aspires to use her undergraduate research experiences in a career influencing public health policy in the United States and around the world.
The Art of Recapturing Lost Voices: Helping an NGO Find a Sustainable Way Forward

Maria Colopy, Lauren Kanipe, Allie Malis, Molly Osborne, and Atlee Webber

Abstract
Research has shown that street children suffer from a number of serious psychological, developmental, and physical risks. This project aims to support and enhance Fundación ProNiño’s existing efforts at rehabilitating the former street children whom the organization houses and cares for. The team chose to evaluate, reinstate, and improve the organization’s former art therapy program as an outlet for the children to express themselves, develop motor skills, and gain a sense of agency from the creative process. The team’s approach for the project was to meet an expressed need by providing a framework for a sustainable art therapy program on site at ProNiño in El Progreso, Honduras with the intention that the development of the new program would be a co-participatory collaboration between the various stakeholders within the organization. The team focused on the imperative of sustainability and incorporated selling the boys’ creations as a means of fundraising to ensure that the project would be self-sustaining.

Introduction
The past forty to fifty years have seen an unprecedented expansion in the numbers of children living and working on the street, especially in Latin America (Rizzini & Lusk, 1995). The term “street children” refers to both children “of the street,” who live on the street day and night, and children “on the street,” who work on the street during the day but return to their homes at night, with the majority of the population being classified as the latter (Lalor, 1999, p. 760; Rizzini & Lusk, 1995, p. 392–3). Due to a negative association of street children with crime, many suffer from abuse and violence by police and groups of community vigilantes (Rizzini & Lusk, 1995, p. 395–396). Economic insecurity causes a vast majority of children to work on the streets which often results in their inability to obtain an education (Rizzini & Lusk, 1995; Lalor, 1999). Additionally, they often live in a culture of drugs; many of the children at ProNiño reported sniffing glue while living on the streets because it helped stave off hunger.

In response to the increased number of street children living in El Progreso after Hurricane Mitch, Fundación ProNiño was established as a grassroots organization founded in northern Honduras in 1998. The organization grew from a porch-style soup kitchen to a multi-site home, rehabilitation and education center for about
ninety boys ranging in age from six to nineteen. In 2008, a long-term volunteer studying art therapy at the Virginia Commonwealth University started a jewelry-making workshop for a select group of boys as an extracurricular opportunity after school. Unfortunately, the 2008 program fizzled shortly after the volunteer’s departure. The team researched the former project’s lack of sustainability by holding extensive interviews with the founding volunteer and ProNiño staff with the objective of evaluating the reasons for past failures and collaboratively brainstorming a new framework for the program we would implement in the summer.

First, we researched how art therapy has been used worldwide to help children overcome trauma and to verify that an art program would be a valuable addition to ProNiño. Therapist Helen Landgarten (1981), who worked with children traumatized by public acts of violence, writes “art…aids the individual in productively ventilating crisis-related affects of anger, guilt, and loss” (p. 136). The teachers at ProNiño described how the boys living at the foundation often verbally and physically abused each other, emulating the treatment they had received at home and on the streets. Author Cathy Malchiodi (1997) emphasizes art as a “preventative measure” and a “neutralizing agent for aggression and violence” (p. 9). While the program plan did not include a clinical psychotherapy component, the team hoped that the reintroduction of an art therapy program at ProNiño would contribute to the boys’ ability to overcome their aggressive feelings and provide a respectful environment for them to peacefully express themselves. Additionally, art therapy aids in “fostering self-expression, enhancing coping skills, managing stress, and strengthening a sense of self,” all of which we hoped to reinforce at ProNiño (Malchiodi, 2009, p. 1).

The ProNiño board and staff expressed interest in reinstating the art therapy program but lacked the resources and human capital after a reduction in funding and the organization’s volunteer base in 2009. Many of the boys already had impressive creative talents in weaving and jewelry making but rarely encountered the opportunity to work with the materials needed for these activities. The team focused on addressing ProNiño’s stated need for a revival and renewal of the previous art therapy program. The project goal was twofold: first, to examine why the previous program failed, and second, to collaborate with the staff to design and implement an art program that would continue after the team’s departure.

**Methods and Approach**

The team’s plan was first to observe and research local and international art therapy programs and gain exposure to diverse applications of art therapy and to identify best practices. Talking extensively with the VCU student who initiated the organization’s original art therapy program, the team developed a basic and flexible structure of what would be the ideal art program for ProNiño. They decided to focus
on weaving and beading as the project’s main media because ProNiño still had a substantial supply of jewelry-making materials left over from the previous program. A UVA faculty member volunteered to teach the team the basics of the art of beadwork.

The team then conducted both formal and informal interviews with the presidents of Fundación ProNiño and ProNiño USA as well as current staff to assess the successes and failures of the program in 2008. Elizabeth Williams, the president of ProNiño USA gave the team a thorough background on the organizations’ partnership and shared her knowledge of the previous art therapy program. Once the team arrived in El Progreso, they had several group and one-on-one meetings with the staff members at ProNiño, including the director, the volunteer coordinator, the fundraising coordinator, administrator, and head professors, to understand what they desired from the program and how the program could best be integrated into the boys’ daily schedules.

The team used an observational, participatory approach to evaluate the success of the program and art therapy as a whole. First, the team employed the preexisting institutional memory in a retrospective analysis. By synthesizing our research and the findings from our collaboration with our partner organization, the team formulated a co-participatory blueprint for the new art therapy program, which resulted in four different groupings of boys based on their skill level as determined by the
ProNiño staff. Each group consisted of around seven to ten boys and met for an hour to an hour and a half every day with a total of about thirty boys participating in the program.

Over the course of six-weeks, the team observed the program’s impact on their daily lives through journaling and discussions with the boys. In the beginning, the boys had trouble focusing and sharing art materials, and much of class time would be spent gaining their commitment to the goals and rules of the room while keeping them on task. By the end, however, the boys concentrated on their work almost the entire class period and acted respectful towards the teachers and their peers. They also invested a great deal of energy into developing their jewelry making skills, learning new techniques, and gaining the confidence to take creative liberties throughout the process.

**Results and Outcomes**

Based on our observations and interactions, the outcomes related to this phase of the project closely match the expressed need from ProNiño for an art program that was congruent with the foundation’s overall mission and could serve as a sustainable outlet for creativity for the boys. What was once a large, disheveled storage room became a functional and welcoming space through the team’s extensive renovation efforts. The project initially focused on jewelry making, but the mediums used have since then expanded to involve painting, sewing, and various other artisanal crafts. With grant money ProNiño was able to hire an art teacher for three days a week, and the program continues to serve as an outlet for the ProNiño boys to express themselves and learn new skills. The “joyería” has now been incorporated into many of the boys’ daily routines as part of their “manualidades,” or “handicraft workshops.”

Furthermore, the boys’ creations continue to serve as an important fundraising mechanism for the organization. ProNiño has sold the jewelry at local artisan markets as well as outside of Honduras by ProNiño donors and those connected with the foundation. In the months since the project began, additional outside donors from Holland have also expressed interest in donating funds to pay the art teacher and restock the art supplies.

The main limitation is the program’s continued reliance on outside funding to ensure sustainability. While ProNiño has successfully sold much of the work made in the art room, the majority of the program is currently funded by an external grant from a Dutch donor. It is unclear what will happen when the grant runs out. For the project to be truly sustainable it will need to find a better way to fundraise and sell the artwork.

In January 2012, three team members returned to El Progreso to complete a follow-up evaluation. They were pleased to learn that the art teacher hired in August had
maintained the integrity of the room’s original purpose. They expressed satisfaction with the new teacher and gratitude that the program continued after their departure.

Discussion

Living in Honduras for six weeks and working with an organization that aims to improve the circumstances of Central American youths was an enlightening experience for the group. We gained a valuable self-awareness when engaging in both their research and service learning. The project would not have been nearly as successful if they had not been previously connected to the organization through one of the group members. Additionally, the team’s academic background in the Global Development Studies program and proficiency in Spanish facilitated more effective community engagement.

In addition to establishing the art room, the team was able to make valuable observations of volunteer interactions with nonprofit organizations such as ProNiño. Throughout their six-week stay, they saw many weeklong volunteer groups come and go, and through this experience they recognized the importance of building relationships with the community partners, concluding that preparation is key to success. Though short-term groups do not get to spend much time on-site, thorough preparation can maximize a group’s positive impact and minimize a group’s burden. The disadvantage to being a short-term volunteer is that it prevents them from having the time to forge deeper relationships with the partner. The team is currently in the process of writing an academic paper addressing these issues, with the hope of publishing it later this year.

Overall, the project was successful in that the group addressed a stated need of the partner organization, which is evident by the art room’s continued use. Their recent trip to ProNiño in January confirmed that the art room is still being used and that the children are enjoying their time during their art lessons. Further work with ProNiño will be necessary to find a sustainable future for the art room separate

Bracelets made by the boys of ProNiño out of recyclable magazines
from outside donations. The team has discussed selling the jewelry and artwork from the art room online with ProNiño as a fundraising mechanism but decided that this would need to wait until the art room is more firmly established. They are hopeful that continued collaboration with ProNiño on this issue will ensure the sustainability of the art room.

References


Biographies

Maria Colopy is a fourth year Global Development Studies major and Bioethics minor from Fredericksburg, Virginia. She will be attending graduate school for Public Health next year.

Lauren Kanipe is a fourth year Global Development Studies major and Global Public Health minor from Richmond, VA. She will be travelling back to work with ProNiño for her eighth time this coming March and hopes to continue her involvement with the organization.

Allie Malis is a fourth year Global Development Studies major interested in nutrition and agricultural policy. She is from Arlington, Virginia and next year plans to work in the international development field in either the public or nonprofit sector.

Molly Osborne is a fourth year Global Development Studies and Economics double major from Essex, Massachusetts. Next year she will be a Teach for America corps member in New Orleans, Louisiana.

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Abstract

Through research of various energy efficiency solutions available to homeowners including insulation, HVAC (Heating Ventilation and Air Conditioning), and solar technologies, the JPC team provided information, demonstrations, and performance data to consumers and contractors in the Charlottesville community. These solutions fall into three specific ones: a monitoring system, a computer energy consumption model, and an automated drape. A monitoring system has been designed and part-way installed along with an interactive system that displays its information. A computer model of an ecoMOD house has been improved to much more closely model the house’s HVAC system. An algorithm developed for an automated drape will take advantage of the monitoring system and is in the process of prototyping. The effort focused on the design of educational materials for the ecoREMOD house, a showcase for energy-efficient renovation and the home of the Local Energy Alliance Program (LEAP).

Introduction

According to a report by McKinsey and Company (2009), the residential building sector will consume 29 percent, or 11.4 quadrillion BTUs, of the all energy consumed in the United States by the year 2020. The majority of the demand is met by non-renewable energy sources, such as coal, natural gas, and petroleum, which are damaging to the Earth’s environment and costly as energy prices continue to increase (US Energy Information Administration, 2010). As the demand for energy around the world continues to rise, efficiency improvements will become necessary, and the residential sector is an area of enormous potential. The Local Energy Alliance Program (LEAP) is a non-profit organization in Charlottesville whose mission is to “lead the effort in our local community to conserve water and energy in buildings” (LEAP, 2011). The purpose of our project was to assist LEAP in developing three tools: modeling and simulation, energy monitoring and data representation, and home automation. These tools will help verify and increase energy savings for the homeowners that LEAP works with.

The students working on this project are members of the ecoMOD program, a multidisciplinary group that designs, builds, and analyses energy efficient homes in Charlottesville. The ecoREMOD home is an energy efficient renovation project and is currently the headquarters of LEAP.
Energy Monitoring and Data Representation

Research suggests that providing real-time monitoring information about energy expenditures is highly effective at enabling residents to conserve energy (Wood and Newborough, 2002). One method of raising awareness about energy use in homes is through the use of a computer monitoring system. Owners with energy monitoring displays appear to reduce their energy use and increase savings (Darby, 2006). Energy monitoring helps homeowners understand energy use and may prompt them to invest in energy efficient renovation and/or retrofitting, which increases a home’s energy efficiency and savings. The data can also prompt future architects to reevaluate their designs to improve on energy efficient building practices, materials and heavy use appliances such as heating and ventilation systems. LEAP wanted to make this case for their headquarters at ecoREMOD.

Method

LEAP proposed that their office be used as a learning center for the public, providing data on the energy use of the building to enhance public education on energy efficiency. Our sensors and data loggers had to be small, inconspicuous and preferably wireless. The key areas of measurements for public understanding are the heating, ventilation and air conditioning (HVAC) system, full house electric loads, temperature and humidity. HVAC is the largest user of electricity in homes and buildings and accounts for about 49 percent of the home’s total electricity usage (EIA, 2005). By monitoring the electricity used by the HVAC system, one can determine when the HVAC is being used the most and why, by combining that data with the temperature and humidity data. Furthermore, measuring the full electric load of a home can determine when peak times are when they should use less energy. We combined custom and proprietary software to store collected data in a University of Virginia (U.Va.) database. Next, we built a public display to demonstrate the office’s energy usage.

Accomplishments

Wireless HOBO® brand sensors were installed to log temperature, humidity, and carbon dioxide data. Temperature sensors were installed on every floor to measure indoor temperatures. We also installed temperature sensors in the insulation of the attic, the main floor study, and the basement to see how well the insulation is preventing heat transfer. A temperature sensor is located on the porch for outdoor temperatures. We are measuring humidity on the main floor as a means of seeing how well the HVAC system is working and carbon dioxide to estimate how many people are in the room. The Brultech® data logger sensors are installed in the circuit breaker of the home, but the data logger is not yet configured in software. Future students in the affiliate course “Sustainable Housing” will carry on this installation. We also
designed software that collects data for the class to analyze and a data display for the general public. The display has four major components: the slide show, an announcements pane, a useful links section, and a real time monitoring data.

**Modeling and Simulation**

With the ability to collect data from ecoREMOD, we wanted to use software to simulate and predict the energy usage of the house and determine home attributes whose influence on energy usage could be greatly reduced through energy efficiency upgrades. We used EnergyPlus, a building modeling and simulation program provided by the U.S. Department of Energy. This software allows for the modeling of buildings that the ecoMOD team has fitted with sensors monitoring the energy consumption in the house, including the HVAC, refrigerator, and various groupings of receptacles and lights. This unique scenario allows for the verification of values generated from EnergyPlus and the discovery of inconsistencies between the model and reality. EnergyPlus is central to research concerning the effects of environmental settings and the building’s characteristics on its energy consumption; this makes it ideal for ecoMOD and LEAP in determining potential energy savings for buildings and what energy saving measures would be most effective for a given house.

**Method**

EnergyPlus has been used to simulate houses that have been constructed and monitored by the ecoMOD team, including ecoMOD1, ecoREMOD – the headquarters of LEAP – and other ecoMOD buildings. The simulations help verify whether energy consumption is as expected and what factors significantly affect the consumption. LEAP will use the simulation results and method to recommend renovations and predict further energy savings for other houses.

**Accomplishments**

EnergyPlus inputs include home geometry, material properties, HVAC properties, inhabitants, schedules, installed lighting, and “other electric loads”. Outputs include energy consumption, indoor temperature, and outdoor temperature. A geometric model of ecoMOD1 has been developed to model yearly HVAC energy consumption. The model now contains the HVAC system and a thermostat following the general setting in the house. The model HVAC energy consumption varies from the monitored consumption on a monthly basis possibly because of differences in the thermostat setting, weather, and/or occupant actions. The picture below shows the difference between simulated and actual HVAC energy consumption in 2009.

The indoor temperature was compared between the simulation and that which was monitored in the house. As expected, there were greater variations in temperature monitored that were not seen in the simulation. Some months, it is obvious that the
home’s thermostat is set to maintain a particular temperature, and this temperature value can be used in the energy simulation with confidence, yielding a more accurate model of the home’s energy usage.

**Discussion**

EnergyPlus is a very detailed and technical program with many fields defining the HVAC system and loads and flow rates whose required input is unlikely to be known by the average homeowner wishing to model their home energy usage. These fields can detract from the broader application of the program. The program and monitoring system generate large amounts of data that make data analysis and iteration a lengthy process and has prevented the completion of the model as of yet. The components include the previously mentioned “other electric loads” and the schedules for energy use. Future simulations will improve and provide a more accurate model of the energy usage as the data in the more technical fields of the software are calibrated to be more accurate based on the house’s actual condition.

**Home Automation**

Home automation technology is another tool available for LEAP to use to accomplish their goals. Chetty (2008, p. 1) found that homeowners are unaware of “in-the-moment” resource consumption because it is invisible to them. This results in a situation where even if the costs of using energy are known, the ways to limit those costs are not. To fill this information void, home automation can be used. According to Kosny (2004, p.1), over 50% of home energy loss is associated with heat transfer and air leakage through the building envelope. An area where this heat loss is accen-
uated is through uncovered windows due to their high thermal conductivity compared to wall materials. The team addressed this problem by developing an automated drape, which is a continuation of a previous JPC project, “Automated Drapes Lessen Financial Burden,” whose focus was the energy savings attributed to an automated drape system in ecoREMOD.

*Method*

Before developing the prototype, the specific goals of this technology were established. The drape needs to provide a thermal barrier when external conditions require one and display real-time information about the heat flow and decision making process. The final product will be priced such that low-income homeowner can afford it and therefore will require minimal upfront capital and have a high return on investment. Over the long term, success will be measured by a reduction in annual energy costs and an improvement in the knowledge of the homeowners regarding this issue.

With these goals established, development began. In order for this to be automated, a mechatronic system was necessary. According to Garner (2011, p. 23), a quintessential mechatronic system consists of data flow between the external environment, sensors, a micro-controller, and an actuator. Our system depends on the temperature inside and outside, the thermostat temperature, and the solar radiation incident on the window. By using sensors to translate this from environmental information to electrical signals, a micro-controller will be able to interpret the information and tell the motor what to do.

The above schematic shows a cross-sectional view of the chosen drape and highlights some of its important thermodynamic properties. The honeycombed nature of the material allows for air to be trapped and used as insulation.

The next step was to develop the circuitry to read information from the environment and move the drape up or down accordingly. The microcontroller used is the Parallax Propeller Chip, which allows for multiple inputs and outputs and parallel processing. To read the temperature and solar radiation, a simple temperature sensor and photoresistor were used. These work by changing resistance in response to external conditions.
The final component of the design is an LCD screen that displays the information being processed by the microcontroller. The following picture shows this display.

**Accomplishments**

After the prototype was developed, we had a working system that moved the drape up or down depending on the environmental conditions. For example, when the system was set to heating mode, and the solar energy entering through the window did not exceed the heat lost due to conduction, the drape would lower. This increased the thermal barrier of the home and decreased energy loss.

**Future Work and Impact**

For monitoring and data representation, we hope for future iterations of this team to add on to the current system. We would like to expand on the types of circuits we are measuring and to add sensors directly to the HVAC system to monitor its performance. In response to the growing number of measurements, a future team would have to make the necessary changes to our database and display. The display will continuously change in response to the educational message LEAP hopes to convey.

Models of more ecoMOD houses with monitoring systems will be developed to demonstrate how variations in the building envelope and HVAC equipment can significantly change the total energy consumed. Models will be used to prioritize what improvements would save the most money given a house’s characteristics and the specific behavior of its occupant(s). While every house will have different priorities with regard to energy efficiency improvements, these models will serve as a universal demonstration of how specific home improvements can reduce homeowners’ annual energy costs.

After the automated drape prototype is further developed and tested, it will be installed in the ecoREM0D home. We will integrate it with the existing monitoring system in that home, as the necessary monitors are largely in place. This data will help determine how much energy the automated drape system is saving the home.
LEAP will be able to use this data to show homeowners the effectiveness of home automation technologies.

These three projects serve to make homeowners aware of their energy usage and the cost of that usage. They strive to show homeowners the benefits of retrofits and more efficient technologies. LEAP will use these and future results to argue for home improvements that help save money and the environment.

References

http://www.bruiltech.com
http://www.onsetcomp.com

Biographies

**Ryan Hughes** is a second-year electrical engineering student whose fields of interest include residential and commercial HVAC design and building automation systems.

**Quinn Weber** is a fourth-year mechanical engineering and economics student from Doylestown, PA.

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Using Context and Perspective to Improve the Lives of Those with Disabilities in Rural South Africa

Colleen Farrell, Madeline Tolmie, Dagney Pruner

Graduate Student Mentor: James Ngundi
Faculty Advisor: Robert Swap

Abstract

This article offers a comprehensive overview of a community engagement project conducted by a group of three students in the Mpumalanga Province of South Africa, assessing the needs of children with mental and physical disabilities in this rural community. Working with the Amass Centre, a previously established community-based organization aimed to aid youth with disabilities, our project evolved to become a combination of technical research, abstract questioning, and engagement. We recount from interviews of a variety of sources interpretations of what it means to have a disability in this region and the limited resources available for persons with disabilities. Upon further reflection, we acquired a new meaning for the complex concept of development: investing time and energy in people.

Making a Change in Acornhoek

The primary goal for our JPC Project was to investigate the specific needs of individuals with disabilities and their caretakers in rural South Africa. The site of our project was Acornhoek, a small town in Northern South Africa. This town has unemployment as high as 60 percent (Writers, 2008). While dire circumstances abound, conditions of the economically and socially marginalized, especially those with mental and physical disabilities, are cause for further study. Our main goal was to assess these conditions using the Amass Centre as a starting observation point, with the end goal of helping the Centre build connections with the community. We hypothesized that building a strong relationship with the community would entail promoting healthy conversations about disability.

The Amass Centre crèche1 hosts about 50 children and young adults between the ages of eight and 25 (Swap, 2008). At Amass, three caretakers feed, attend to and teach the children daily. In addition to the financial and educational limitations of those with disabilities in Acornhoek, they are often severely stigmatized because of

1. A crèche refers to any nature of care center—most often places that provide primary care for young children.
the prevailing cultural notion of disability as communicable. The stigma makes attaining adequate care for children with disabilities an even greater challenge. While our primary goal for the project was to investigate the specific needs of those with disabilities and their caretakers in this rural area, our role in the community evolved from observing the children at Amass to having a proactive English teaching role at the Centre and as catalysts for relationship building in the area, between the Centre and local schools, hospitals, and other local care facilities.

The Importance of Advocacy

Poverty and unemployment are rampant in the area of Acornhoek. Local businesses rely heavily on tourism due to nearby Kruger National Park. Most businesses in the area are family-owned, and often compete with one another for provision of the same services. Due to the close proximity that community members work and live, knowledge of families with children with disabilities is fairly common and can fuel disdain based on beliefs about the negative implications of disability (Writers, 2012).

Ironically, while South Africa has pioneered legislation supporting persons with disabilities through federal aid, rehabilitation, inclusive education and job training programs, tangible, practical and material support is often hard to obtain. People with disabilities are often shunned and labeled unproductive members of society. Social stigma and superstition are somewhat responsible, as having a child with disabilities can be viewed as a family curse (Seibert, 2011). What limited resources exist are spread among the “normal” student population in schools. We heard accounts of children being bullied and taken advantage of by their peers because of their disability. For these children, there is little to no opportunity to get a quality education and later find work, given their denigrated place in society and difficulties obtaining financial support as adults. Promoting awareness and advocating for alternate treatment and acceptance of the disabled within the community, which already seems to be occurring in South Africa, is critical and multifaceted because it requires an intimate understanding of the complex social, educational, financial and cultural standing of persons with disabilities in society. Therefore, we attempted to understand the unique situations of community members with disabilities and build relationships both with the children at the Amass Centre and the community at large, in the hopes of promoting positive discourse about disability.

Key Project Logistics and Interview Methodology

One of the first major challenges we encountered was establishing rapport in the community. We attempted to structure our learning after Stephen Covey, who

2 “Amass Empowerment Project for the Disabled in Bushbuckridge” Business Plan. P. 2
believes in the importance of seeking to understand by actively listening (Covey, 1998). We utilized a method similar to that of Robert Chambers, who teaches overcoming of cultural and personal biases through active listening and rejection of any preconceived notions of community needs and collective feelings (Chambers, 1983). Consequently, we interviewed the caretakers at the Centre and the children’s families to discuss the children’s experiences with disability. We conducted our interviews with the parents in focus groups, as several of them worked at the Centre, helping to construct a newer, bigger facility. The managers of the construction site acted as translators between us and the parents. Using a tape recorder, we recorded interviews for later transcription. We kept our questions open-ended so as to invite the most candid answers and easy translation: “In your experience as a parent of a child with disabilities, how do you feel you and your child are treated?” We also found that the more specific our questions were, the more challenging it was to convey our ideas to the interviewees and evoke in-depth responses: “Do you think that, outside of the Centre, the children still experience some hardship or misunderstanding from those who don’t have disabilities?” We attempted to create a welcome environment by making the interviews open and offering refreshments to participants. The relaxed, communal nature of the interviews seemed to build a sense of trust, and encourage parents to speak more freely of their experiences. In addition to interviewing parents, we also spoke with local community members and leaders about their perceptions of disability. It was difficult to enter the project with a clear interview methodology, as we did not know what the language capabilities of the parents and caretakers would be, as well as their willingness to discuss such a taboo topic with strangers. On the ground, simple, open-ended questions seemed most effective.

Further methodology developed through informal encounters at the crèche. When not conducting interviews, we interacted with and taught English to the children. We started most days with a simple song or movement activity in English, eventually progressing to teaching elementary writing. Working side-by-side with the caretakers, we familiarized ourselves with the children. Keeping in form with Chambers (1983), this methodology was evolutionary, based on the community’s needs—we initially planned to solely take on an observational role at the crèche. However, we found that taking a proactive teaching role helped us gain the respect of the parents when we interviewed them and helped them open up, giving us a better perspective on the daily struggles of individuals with disabilities.

Findings

Our interviews revealed that there are many negative communal preconceptions of disability. Reasons ranged from religious speculation to resentment of the financial “burden” the community assumes in caring for a child with disabilities. When we
asked the caretakers how they believe the children are treated, they replied, almost shamefully, that:

“Some community people, when they see these children, they do not like. Others they ignore and others they fear.” (caretaker)

“People [explain] that some children are products of witchcraft or cursed—that the family has done something wrong.” (caretaker)

“The children need housing because they mostly come from very poor families and don’t have great home situations. They don’t like to go home.” (caretaker)

The caretakers professed that their work at the Centre has changed their views of those with disabilities for the better, transforming feelings of fear and apprehension into a deep caring. One caretaker said that many of her friends do not understand why she chooses to work with persons with disabilities, which encourages her to try to spread positive messages and promote understanding about disability even more.

Amass serves as a sanctuary of sorts, an escape from what these children experience most of the time—neglect or negative attention. In similar company, they can finally be their true selves, without consequence. In an interview, one mother described her child’s transformation:

“Before [my child] came to Amass, the community treated him differently. After he came here, he is being treated equally. Even now he’s coming home clean and fed. In the morning, he does not need to be woken up because he wants to come to school.”

The children’s parents expressed great concern that the system is constantly failing these children. Many children attended traditional school before Amass, where they were shunned, or even expelled for their difference. Illiteracy prevents children from continuing their studies at home, and they are often seen as a burden to their family members. The parents also expressed that, while they are frustrated with the system, most of their wishes for their children are seemingly simple. They want acceptance from the community. They also want to dispel the stigma that families are to blame for their children’s disability. We invited a local community member who knew nothing about Amass to witness the children and their daily lives firsthand. He later relayed that he now understood the hardships of getting an education with a disability, and freely interacted with his neighbors with disabilities. He pledged to take it upon himself to raise awareness about the conditions of children with disabilities in his community, in an effort to alter common attitudes and treatment.

After establishing the existence of negative perceptions of disability of varying kinds and with varying justifications, we wondered what could be done specifically to improve their way of life. Most of the parents said their primary concern was their lack of education. They expressed frustration at the difficulties of obtaining disability support from the government and the lack of special provisions (such as specific
classes and programs) for students with disabilities in mainstream education. Many parents also said that their children wished to have training because many of them had professional ambitions, such as to work for the police or become a pastor. But these children could not find the training to help them succeed. The parents were hopeful about places like Amass that promise further growth, and were encouraged by the recent increased presence of such centres. They hope that the caretakers will continue to receive training (they have no formal educational training relating to disability) so that they can educate their children, as well as provide the basic necessities for them.

**Discussion**

Throughout our time in Acornhoek, we observed how pervasive an issue disability is, greatly impacting not just children with disabilities, but those that care for them: stigmas are placed on the entire family, and even caretakers like the ones at Amass. The greatest tangible need seems to be financial, both in the education system and for families in general. Parents would also like the government to take an active role in educating the general public on disability, in the hopes of reducing stigmatization. Language barriers and the complicated local politics between the Amass Centre and the community allowed us to see only one side of the story. The motives of those we spoke to were not always clear, which may have affected how they spoke to us.

Our project is not a finished product, but it has allowed us to define ourselves in new ways and has given us insight into life experiences that are drastically different from our own, yet still united under the same umbrella of humanity. It was a combination of technical research, abstract questioning, and engagement, yet its value was realized only through our actual presence. We left with a better understanding of what development means. It is about human interaction, spending time and energy together to make change possible.

**References**

“Amass Empowerment Project for the Disabled in Bushbuckridge” Business Plan. P. 2
Biographies

Madeline Tolmie is a fourth year studying Global Development Studies.

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An Assessment of the Availability of Locally-Sourced Aggregate for Use in HydrAid Biosand Filters around Lake Atitlán, Guatemala

Jennifer Bergner, Colby Cashen, Michael Jordan, Carolyn Pelnik, Lacey Williams

Abstract
This project sought to find a suitable in-country source of aggregate for use in a HydrAid biosand water filter and to assess the feasibility of constructing a small-scale aggregate production facility. This built on the work of a group of UVA students who introduced these filters in Tzununá in the Lake Atitlán region of Guatemala in 2010. By reducing the cost of the filter and enabling local participation in its manufacture, a local aggregate source would increase the sustainability of the filter in the region. Through interviews with existing aggregate producers and vendors, the project team ultimately determined that the establishment of an aggregate manufacturing facility specific for this purpose would be inappropriate due to a number of legal, ethical, and logistical concerns. In lieu of attempting to introduce such a facility, investigations were conducted regarding preexisting sources of aggregate as provided through local quarries. Results showed that the large-scale, Guatemalan-run operation Agreca would offer the most consistent, high-quality option for use in HydrAid filters.

Introduction
Access to potable drinking water is problematic in Guatemala, where over 40% of the poorest rural population lacks a household water connection (Inter-American Development Bank, 2009). This is especially pertinent in the Lake Atitlán region, where frequent mudslides and hurricanes regularly destroy potable and wastewater infrastructure. The lack of wastewater treatment centers and widespread use of fertilizer around the lake resulted in an excess nutrient load led to an enormous cyanobacteria algae bloom in 2009 and a series of smaller blooms since (Global Nature Fund, 2009). This rampant contamination has led to the spread of water-related illnesses throughout the lakeside communities, with some even pumping their drinking water directly from the lake.

In the summer of 2010, a group of UVA students traveled to Tzununá in the Lake Atitlán basin (location depicted in Figure 1) to educate families in basic hygiene and install 13 domestic HydrAid biosand water filters (Allam, Hashimi & Houle, 2010). Both the filter bodies and sand aggregate were shipped to Guatemala from a manufacturing facility in Michigan (J. Boeddner, personal communication, May 14, 2011).
The filter installation team felt that the most glaring shortcoming of the project was its dependency on imported materials.

In an assessment of sanitation projects in developing countries, researchers Garfi and Ferrer-Marti note that using local natural resources is an essential factor in designing filtration projects (2011). This decreases the cost of technology implementation and increases sustainability by allowing repairs and material replenishment to take place on-site (Murphy et al, 2009). The next step in making HydrAid filters more sustainable would thus be to find a local source of aggregate that met the same rigorous standards set by Cascade Engineering (the manufacturers of HydrAid) and which could be easily transported to Lake Atitlán, or perhaps even quarried in a small-scale operation near the lake. Our team’s project aimed to assess the feasibility of using locally sourced aggregate in HydrAid filters around Lake Atitlán.

Methods

Before arriving in Guatemala, we spoke with a representative from Cascade Engineering to determine their aggregate production standards in existing facilities. Once in-country, we investigated the different sources of aggregate already available through local operations. We first visited several hardware stores in the Quetzaltenango region and inquired about the availability of aggregate that would satisfy HydrAid parameters. In these interviews, we asked a series of questions to determine the origins of the aggregate, available sizes and prices of aggregate, the rigor of testing performed, and transportation methods from the quarries. Next we visited two large-scale rock quarry operations and one private operation. We spoke with the managers of these quarries to determine the method of rock extraction, the sizes of aggregate offered, the types of tests performed, the price of aggregate, and methods of transportation. Finally, we visited a hardware store in Panajachel on Lake Atitlán to determine what aggregate was offered, as we had with the hardware stores in Quetzaltenango. All in-country interviews were performed in person, in Spanish.

Results

HydrAid Stipulations

For use in their water filters, HydrAid maintains the following requirements regarding aggregate. To minimize contamination, aggregate should come from crushed rock harvested by dynamite from mountains, not from rivers. The three-layer system of the filter requires three distinct aggregate sizes: 1/2–1/4”, 1/4–1/8”, and 1/8”-sand. Tests should be performed for organic contamination, durability, and heavy metal contamination (arsenic, cadmium, chromium, mercury, and lead).
Hardware Stores

From our initial interviews with hardware stores in Quetzaltenango, we developed a basic understanding of the types of aggregate already available in Guatemala. The different stores visited, as well as the relevant information from each interview, are summarized in Table 1. Generally, we learned that there are two types of aggregate available: the softer, more porous red aggregate and harder and more durable, though more expensive, blue aggregate. For use in water filters, blue aggregate was recommended since it would degrade less and provide more consistent, long-lasting filtration.

Table 1: Hardware Store Interview Results

<table>
<thead>
<tr>
<th>Store Name</th>
<th>Location</th>
<th>Source of Aggregate</th>
<th>Sizes of Aggregate</th>
<th>Cost of Aggregate (Guatemalan Quetzales (GTQ)*/cubic meter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candelario</td>
<td>Quetzaltenango</td>
<td>Unknown vendor</td>
<td>½&quot;</td>
<td>285</td>
</tr>
<tr>
<td>May Conci</td>
<td>Quetzaltenango</td>
<td>Agreca (Xecaracoj)</td>
<td>n/a</td>
<td>120–160</td>
</tr>
<tr>
<td>Serviblock</td>
<td>Quetzaltenango</td>
<td>Agreca (Xecaracoj)</td>
<td>½&quot;, ¼&quot;</td>
<td>170</td>
</tr>
<tr>
<td>Mayasersa</td>
<td>Panajachel</td>
<td>Agreca (Amatitlan)</td>
<td>3/8&quot;, ½&quot;, 1&quot;</td>
<td>375</td>
</tr>
</tbody>
</table>

*1.00 USD = 7.83 GTQ

Quarries

(1) Private Operation

First we interviewed a private aggregate operation in Zone 9 of Quetzaltenango. This family-run establishment used pickaxes on a nearby mountain to harvest aggregate for construction purposes. There was no standardization of size or quality of aggregate.

(2) Ffacsa

Ffacsa is one of the major distributors of aggregate in Guatemala, with several locations throughout the country. They use explosives to harvest blue rock from mountains, which is then crushed and sifted into ½", ¾", 3/8", and 1" sizes and sold for Q160/m3. Durability tests are performed regularly on their aggregate, but no chemical tests. However, the manager of this mine cautioned the use of their aggregate for water filtration due to concerns about the chemicals used in the explosion and the potential contamination of the filtered water.

(3) Agreca

The largest aggregate manufacturer in Guatemala, Agreca has 13 branches across the country and 3 in other Central American countries. We visited the Xecaracoj branch, located in the outskirts of Quetzaltenango. Aggregate is harvested through
explosions and then crushed to 1.5”, 1”, 3/8”, 5/32”, and ¼”. Aggregate costs between Q120 and Q160/m3. They perform a variety of different tests on their aggregate: a granulometric test, a test for organic contamination, an absorption test, a durability test, an erosion test, and a sulfate-resistance test. The only unmet Cascade requirement was a test for heavy metal contamination. Furthermore, the manager informed us that in order to operate legally, they had obtained licenses from the Mining and Energy Industry, the National Institute of Forestry, and the Ministry of the Environment and Natural Resources; likewise, they had a license to sell their aggregate from the Ministry of Commerce. When questioned about potential contamination of aggregate by the explosive chemicals, the manager said that the explosives are gaseous and therefore dissipate without contaminating the rock.

**Mines**

Observation of a quarry explosion at Agreca’s mine in Xecaracoj informed us of the logistics involved in a successful mining operation. First, by law the quarry must take a seismograph before the explosion, and limit the decibel level of the explosion. The military must conduct the explosion, and only two explosions per month are performed to avoid interruption to the neighboring community. However, despite these efforts, many Guatemalans resist the presence of mining in their communities. The sound of the rock-crushing machines, the harm that the transportation vehicles cause to the roads, and the use of explosives are all highly disruptive, and community members hold the belief that quarries influence their health and weather patterns. Despite many philanthropic efforts on the part of the mine, including an extensive reforestation initiative and donation of building materials to community members, there still exists a widespread perception of the mining industry as “evil.”

**Discussion**

We began our investigation with the intention of providing locally-sourced aggregate for HydrAid water filters. In our interviews with existing vendors, we learned about the various sources, types, and costs of aggregate currently available for purchase in Guatemala; this information led us to the two large-scale quarries, which informed us of the methods and procedures required to mine aggregate directly. Under the assumption that cutting out the middleman would reduce cost, we had initially planned to establish our own aggregate-production facility based off of these models. However, after witnessing a successful quarry explosion at Agreca—the only rigorously tested, high quality aggregate provider that we found consistent with HydrAid’s stipulations—we were convinced that such an operation was beyond the scope of our ability. The production of consistently high-quality aggregate seems unlikely on the small scale operation that we envisioned, due in large part to the
Locally-Sourced Aggregate for HydrAid Biosand Filters in Guatemala

fact that the highest quality blue rock must be extracted with military-coordinated explosions. Furthermore, we were concerned with many of the ethical implications of operating a rock quarry. Although the quarry has engaged in philanthropic activities, community perception of its work remains negative. To come in as a foreigner and disrupt a community in such a profound way would be intrusive, especially when well-established, Guatemalan-run operations still experience substantial ill will. Furthermore, the environmental implications of rock quarrying can be viewed as harmful, especially when lacking the resources to enact a rigorous reforestation program. For these reasons, we determined it infeasible to establish our own aggregate mining facility in Guatemala.

Instead, we satisfied our original search for local aggregate by evaluating the aggregate offered already in the region. Of the different sources, we felt that a private operation would be too inconsistent and unreliable for use purifying drinking water. Ffacsa did not recommend their aggregate for use in filters and only performed one of the necessary tests required by HydrAid. We determined Agreca to be the best source of aggregate, since it satisfied the rigorous requirements set for use in HydrAid filters; furthermore, since it is such a large-scale operation, it is available throughout the country. Indeed, upon arriving at Lake Atitlán we were able to find a hardware store that carries Agreca aggregate of the same high quality as that which we saw in Xecaracoj. Thus, we were satisfied with the aggregate provided by Agreca, and would recommend it as a local, high-quality source of aggregate in HydrAid water filters.

Our team began this project after an initial installation of 13 filters by a previous group. In pursuing our goal of providing locally sourced aggregate, we hoped to allow more filters to be introduced in a cheap and community-oriented manner. We were attempting to foster a sustained relationship within this community. However, our project operated under the implicit assumption that the HydrAid filter was the most appropriate option for providing clean water to the people of Lake Atitlán. Upon arriving in Guatemala, we began to have doubts about the appropriateness of this specific filter as a method of water purification. By virtue of being in-country, we were exposed to a number of alternative filter types, each with different benefits and drawbacks. Furthermore, we encountered a complex network of NGO- and government-based water initiatives around the lake, none of which were effectively communicating with each other. Instead of continuing in the pursuit of our initial goal of introducing more HydrAid filters, we felt that a preliminary diagnostic investigation into the overall potable and wastewater situations in the lake communities would be a more appropriate next step.

In his book *Whose Reality Counts? Putting the First Last*, Robert Chambers (2003) discusses the recurring theme in development whereby the developing party executes a project without proper consideration of the local conditions: “Professionalism, dis-
tance and power can combine with vested interests to offer spirited resistance to new insights”. Essentially, the combination of these factors prevents developers from being sensitive to changes in a situation, thereby leading to projects which are out of touch with the issues at hand. Such tunnel vision is what he calls a “normal error” in development due to the consistency with which it occurs. If HydrAid filters are in fact the best option, we felt satisfied that Agreca would be an ideal source of local aggregate; however, we did not feel comfortable moving forward without knowing the reception of the community members to both HydrAid filters and other purification options. Instead of strictly following our initial plan, we reevaluated the appropriateness of our goal, the further introduction of HydrAid filters into the region, based on our observations on the ground. We felt that such a reassessment was critical to the health of a long-term, sustained relationship between UVA and the Lake Atitlán region, hopefully avoiding the pitfall of over-committal to an initial proposal.

References


Biographies

Jennifer Bergner is a chemistry major and environmental engineering minor.

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Locally-Sourced Aggregate for HydrAid Biosand Filters in Guatemala

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Community Water Assessment Based on Best Practices Models in San Lucas Tolimán, Guatemala

Amanda Below, Andrea Maddox, Ashley Samay, Denson Staples

Abstract
In order to best address the needs of the communities they work in, it is imperative that researchers and “global developers” perform comprehensive community assessments before introducing novel initiatives or projects with the hope of effecting long-lasting, sustainable change. We devised a community assessment of water access, quality, and resources in San Lucas Tolimán (SLT), Guatemala, with the intention that this assessment would directly inform future projects in the region relating to water health. Qualitative data were collected through in-depth interviews with community members in fields related to water health; and, by conducting community surveys that focused on daily water usage and beliefs about water in three rural villages that are considered part of the greater SLT area. Quantitative data were collected by testing water samples taken from multiple sources throughout the SLT urban area and the three rural communities where surveys were conducted; these water samples were tested for the presence of coliform bacteria and chlorine. Each community expressed differing desires to improve water quality and access in their locale, including the need to find new springs, achieve equal water access within communities, and increase use of filters. Water tests showed that all water sources were contaminated with coliform, and no chlorine was found in water supplies that were purported to contain chlorine for purification purposes. Our research underscores the importance of partnership and collaboration with community members when performing a community assessment.

Introduction
The rhetoric of global development and the implementation of development projects often focus on introducing interventions into communities to achieve some designated goal. Under this model, researchers and other “global developers” seek to integrate the prevailing realities of a community into the project after its initiation at best, or subordinate those realities to the aims of their research at worst. These realities include collective community history, perceived community identity, cultural perceptions about the research topic, extant community resources, the political power dynamic between community entities, and expressed-felt needs of the community.

In recognizing that community realities should drive a research or development
project—rather than merely contribute to project considerations—a thorough and ongoing community assessment should and must be performed prior to introducing a project into a community in the name of “development.” To this end, we performed a comprehensive community assessment of water quality, access, and resources in San Lucas Tolimán (SLT), Guatemala, to determine what, if any, future projects aimed at improving water quality and access would be most feasible and appropriate for this community. The assessment was comprehensive insofar that it collected as much information as possible relating to water health in SLT with the goal of ultimately providing a broad, holistic, big picture understanding of water in the community, more so than a complete and final summary of water health. A community assessment of SLT seemed especially pertinent and necessary before implementing a set of development goals due to the community’s long history of exposure to foreign aid in the form of international volunteer groups, engineers, and humanitarian relief. As recommended by newer models and analyses of global development, we found it vitally important to adopt a partnership model that was inclusive of community members, and endorsed work and collaboration alongside local community partners and representatives to produce an assessment that adequately reflected the dynamic, complex nature of the SLT community and its members (Carter Center, 2002; Buse & Harmer, 2007).

Thus, our research aimed to provide a clear picture of the state of water access, quality, and resources in SLT. This assessment was performed with the intention that it would directly inform development efforts in the immediate future related to water health in the area. More generally, the research carries implications for current models of global development, and suggests that there is an imperative need to place greater resources on more fully understanding the communities, and the realities of the community members, that are impacted by development projects.

Methods

The project methods were based primarily on qualitative designs for community public health assessments. The research focused both on the water quality in the communities around SLT and other factors that impinged upon water-related health concerns: access to water (or lack thereof), community perceptions of water, previous projects (and why those did not help improve water health), and existing community resources that could be incorporated into a potential future project.

A set of interview questions and surveys were created during the semester leading up to the project. The interviews were designed to collect data on the community, primarily relating to water. Once in country, the team collaborated with a Guatemalan student to improve the survey and interview questions. Finally, upon arrival to SLT, a health promoter offered final revisions. Thus, all qualitative components of
the project were crafted with ongoing revision and constant feedback and contributions from local Guatemalans who have a well-developed understanding of the communities studied.

The team also included water tests to evaluate the presence of coliform and chlorine in the water. These water tests provided quantitative data to complement the interview and survey qualitative responses. The tests examined the presence of coliform bacteria and chlorine in the water supplies.

The surveys were directed at residents of the rural communities; they were used to determine what projects would be most appropriate in the future by evaluating the expressed-felt needs of the community members (represented by their spoken desires). The surveys collected information on past water projects, possible future projects, and suggestions to improve water access, quality, and resources. The interviews were conducted with local authorities who had access to privileged information related to water health in SLT and collected information and opinions regarding water access, quality, and resources.

Results

Our team identified three local communities: San Gregorio, Nueva Providencia, and San Martin, as well as the SLT urban area, as suitable areas for assessment. The SLT urban area receives its water from the close proximity of Lake Atitlan. Water is pumped directly from the lake upwards to one of two large tanks and then is gravity-fed to most all of the individual houses in the city.

San Gregorio uses a nacimiento (natural spring) located in the community as its main source of water. According to community members, this nacimiento originates in Nueva Providencia. While community members believe the nacimiento water to be clean, they regard the river that flows in close proximity to San Gregorio to be very dirty. Community leaders claim to chlorinate the tank with three to five tablets of chlorine every five months in order to keep the tanks clean.

Similarly, Nueva Providencia has a permanent nacimiento that residents believe to be clean. The upper portion of the community (where almost half of the members of the community reside) is without continuous in-home access to water, and must use tanks or public chorros (faucets) regularly. Many of the upper homes have chorros but these do not regularly receive water.

San Martin does not have a nacimiento. Rather, each household pays 10 quetzals monthly for water to be pumped upward all the way from Lake Atitlan. The cost of pumping (as well as an electricity fee) is the reported reason for the monthly service fees. There is one large, central tank at the top of the community where this water is stored, but it is neither filtered nor sufficiently chlorinated.

Each community differed in their opinions when asked how to improve their wa-
Water quality or access. In San Gregorio, the largest expressed concern by community leaders was the need for more access to water for fear of soon reaching the carrying capacity of their current infrastructure. Local community leaders also expressed concern about old and dirty pipes contaminating the water on its way to the homes. Nueva Providencia expressed similar concerns and voiced the need for equal access to water throughout all of the community, referring to the barren upper sector. San Martin had two main concerns: locating a new *nacimiento* instead of having to rely on the lake, and achieving greater filter use. Community members felt that the discovery of a *nacimiento* would help address issues of water access and water quality because more water would be available. This hope is supported by the common belief that the lake is dirty whereas *nacimientos* are clean.

Water testing strongly supported that the lake, tanks, *nacimientos*, and public *chorros* are all contaminated by coliform in each of the four areas. We have reason to believe our coliform tests are accurate because our *agua pura* (pure water) control tested negative. Chlorine testing did not indicate a detectable level of chlorine in any of the samples, including the two urban tanks that are claimed to be chlorinated regularly. Please see the appendix an example of coliform and chlorine testing analysis.

**Discussion**

Our project underscored the necessity of community involvement throughout the entire assessment process. Community members must not only be incorporated during the planning of the project, but also during the daily execution of the project. This project benefited from constant involvement and critical engagement with residents of SLT who had knowledge of local resources and culture of which we were unaware. It is also important to recognize that even with this constant contribution from community members, there are gaps in knowledge: rather than having all questions answered resolutely, our collaboration with community members raised novel questions that could not be answered during the course of the project.

However, the knowledge produced by this assessment provides sufficient basis for us to develop future water projects in the area. Potential future outcomes of the research include water health education seminars in collaboration with local health promoters, the introduction of water filters in some communities, the initiation of community-wide conversations about the status of water health in the area, and perhaps civil engineering projects. Even with ongoing collaboration with the community, we recognize that our knowledge may never be complete due to the dynamic, ever-evolving nature of the communities and the broad area of inquiry that is “water health.”

This research supports the assertion of current popular models of development that promote acquiring a full understanding of communities, and the realities of
community members, that are impacted by development projects, rather than entering communities with preconceived notions and previously developed projects. In this way, the community water assessment allowed us to gain both a more detailed perspective and to include the community’s voice in the design and development of projects for the future. One of the most positive implications for our findings is the ability for community members to use that information to direct change themselves.

The survey and interview questions, while covering a broad base of water-related information, did not truly cover the breadth of what could or perhaps should be covered for a truly holistic community wide assessment. The survey may have proved more helpful if it had been expanded to include various aspects of health beyond water health. For example, in response to some of our questions to both health providers and community members, we were sometimes told that diseases from water were not an issue; instead they mentioned chest infections (attributed to smoke from stoves) and tuberculosis. In this way, the potential projects suggested were limited, leaving some community members to withhold their opinions, since they found water to not be a less critical issue in their community. If the survey were to be expanded to other communities, it would benefit from inclusion of other health factors besides those just related to water in order to achieve a full assessment.

Appendix

San Gregorio Overview

<table>
<thead>
<tr>
<th>Number of Families</th>
<th>28</th>
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<tr>
<td>Population</td>
<td>70</td>
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<tr>
<td>Number of Surveys</td>
<td>22</td>
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<td>Number of Families in Surveys</td>
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San Gregorio Water Test Results

<table>
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<tr>
<th>Sample</th>
<th>Coliform Results</th>
<th>Chlorine Results</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Positive Tests</td>
<td>DPD 1</td>
</tr>
<tr>
<td>Tank 1</td>
<td>3/5</td>
<td>0</td>
</tr>
<tr>
<td>Tank 2</td>
<td>5/5</td>
<td>0</td>
</tr>
<tr>
<td>Tank 3</td>
<td>5/5</td>
<td>0</td>
</tr>
<tr>
<td>Public chorro</td>
<td>5/5</td>
<td>0</td>
</tr>
</tbody>
</table>

References

Biographies

Amanda Below is a fourth year Anthropology Distinguished Major with a minor in Global Public Health. She has also been accepted into the five-year Masters in Public Health program.

Andi Maddox is a fourth year Anthropology Major with a minor in Global Public Health. She has also been accepted into the five-year Masters in Public Health program.

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Dr. David Burt, Director of the UVA-Guatemala Initiative; Jessica Gonzalez, In-country coordinator of UVA-GI; Santiago Sicay, In-country student team member; Kent Wayland and Suzanna Williams, UVA-GI advisors; Cat Herrington and Jonathan Abelson, UVA graduate student mentors; Richard Handler, UVA faculty advisor; and the many community contacts within San Lucas Tolimán.
Thomas Jefferson Area Coalition for the Homeless (TJACH) “Haven House” Project

Max Brenner, Christopher Chu, Phillip Redpath, Valeria Rivera, and Lauren Taylor

Abstract
In the summer of 2011, a team of five undergraduate architecture students from the University of Virginia worked with a graduate student mentor and faculty advisor under an innovative design-build program, Initiative reCOVER. The team worked with a non-profit community partner, the Thomas Jefferson Area Coalition for the Homeless (TJACH), on addressing the lack of shelter available to homeless people in Charlottesville, Virginia. The efforts of the summer involved research into a number of related areas, which coalesced in the design of a unique approach to housing the homeless. The pedagogy of Initiative reCOVER, paired with TJACH’s expert knowledge and creative approach to homelessness, aided the team in its efforts to produce an environmentally conscious and socially supportive design. The design proposal exhibits a novel prototype in the field of supportive housing and is a tool for spreading local awareness of the issues underlying homelessness.

Introduction

Initiative reCOVER, a research project founded by Professor Anselmo Canfora in 2007, supports collaborative and interdisciplinary research, design, and building to address the unmet needs of underserved populations. Partnerships with non-profit and community-based organizations form the basis of exploratory investigations between architecture students and community stakeholders in the design and implementation of safe, sustainable and innovative housing. The goals of Initiative reCOVER include: to design and build structures that stimulate positive change in communities around the world, to advance techniques and technologies in architectural design and construction, and to educate architecture students through real-world, hands-on projects. In the spring of 2011, Initiative reCOVER began to work with the Thomas Jefferson Area Coalition for the Homeless (TJACH), a volunteer-based, non-profit organization founded in 1998 to help reduce homelessness in Charlottesville (“The Haven: About Us”). TJACH operates The Haven at First & Market, a multi-resource day shelter, as part of the Community Plan to End Homelessness, put forth by the Thomas Jefferson Planning District Commission (Community Plan, 2009). Working within the partnership of reCOVER and TJACH, a team of undergraduate architecture students developed the “Haven House”, a comprehensive design for community-based supportive housing for Charlottesville’s homeless and working poor population.
Charlottesville’s lack of shelter for those in need is becoming an increasingly pronounced social challenge. TJACH’s 2010 Point-in-Time census for central Virginia found nearly three hundred people without a safe place to sleep (TJACH data file, p. 2). Throughout the summer of 2011, the reCOVER team considered these primary questions: How can thoughtfully designed housing provide a physically and psychologically supportive environment for the homeless? How can this environment facilitate access to a safe and healthy life within society? The outcome of the team’s research and experiential learning is embodied in the “Haven House,” a supportive housing community that employs sustainable building practices and socially-conscious community planning strategies. The design offers a safe environment in which the homeless can find opportunities to reintegrate into society, underscoring the belief that the social, physical, and environmental conditions which characterize homelessness may be alleviated by the support of holistic living environments.

Methods

During the summer, the team worked daily in a collaborative design studio to conduct research and generate design strategies through an iterative process of developing and analyzing ideas that might lead to creative solutions. The information acquired through research and monthly presentations to TJACH and additional community members informed the evolution of the design as the team synthesized findings and organized a series of proposals. As one example of the many design considerations, the following discussion of the spatial organization of the “Haven House” describes the iterative process of research and design development.

The team began by conducting research into global issues that could influence the design’s local application, including precedent studies of low-income housing, waste management systems, informal settlement growth patterns, human physiological needs, and healing landscapes and horticultural therapy. This research phase informed the first phase of design development, in which the team proposed spatial strategies for the housing unit. The development of comprehensive diagrams, conceptual sketches, and physical massing models synthesized these findings in preparation for the first presentation to TJACH.

Conversations with TJACH and community members during this workshop led to deeper insights into the housing unit’s organization and impact on the larger spatial needs of the community. Specifically, the workshop brought to light important implications of privacy, physical accessibility, and communal living in the design of a supportive housing community. With these insights, the team revisited initial work, refined design proposals, and identified new paths for investigation. This model of iterative design research and synthesis continued throughout the summer.
Academic research was augmented by visiting with the administration, staff and residents of The Haven, volunteering at the Patch Community Garden, and interviewing administrative figures at the Haven including Kaki Dimock, executive director, and Mark Jansen, vice chair. These direct experiences and valuable discussions provided information that informed the design strategy. In an interview with Kaki Dimock, the team gained a better understanding of the obstacles homeless people face and the ways in which The Haven in Charlottesville works to alleviate them. Ms. Dimock has been The Haven's executive director since August of 2009. The following paragraph reflects the insights offered by Ms. Dimock.

The Haven at First & Market offers daytime shelter with services such as storage and laundry, as well as two hot meals each day. These important services have a significant impact on people suffering from short-term homelessness, but do not provide for all the needs of those who are chronically homeless. Those without a home constantly cope with practical and psychological barriers that perpetuate their state of living and deplete their physical and mental health. A guest of The Haven describes this by sharing her personal experience: “If you walk around dirty and hungry, then you have lost your own self-respect and nobody can give that to you”. This remark speaks to the ways in which the effects of homelessness threaten one’s psychological state and social confidence. These psychological barriers, along with the physical and mental stress of living on the streets, increase the challenge of finding a source of income and changing one’s situation. People who are homeless need more than shelter to escape homelessness. They need support in restoring their social skills, rebuilding their sense of self-worth, and reestablishing their place in society. (K. Dimock, personal communication, November 17, 2011).

By the end of the summer, the team had produced a thorough body of research as well as a comprehensive architectural design proposal. This work is summarized...
in a set of visual tools that describes the team’s design, goals, and methodologies. These tools will enable TJACH to clearly communicate the possibilities of the project, promoting the “Haven House” to the larger Charlottesville community.

**Results**

The “Haven House” design consists of a collection of four to six housing units for up to six individuals each, surrounding a communal garden and supplemented by a shared kitchen and dining area. The combination of private and public spaces allows for personal reflection and healing as well as public interaction. This arrangement is intended to support the development of social skills and foster relationships among residents. At the center of the community is a working garden, which improves the environmental condition of the site and provides a place for residents to work as a team, cultivating social and vocational skills. The fruits, vegetables, and herbs from the garden could be prepared in the communal kitchen and enjoyed by the residents. The harvest could also be sold at the City Market or to local restaurants.

Additionally, the garden has the potential to alleviate health issues through direct contact with natural cycles of the landscape and an experiential understanding of seasonal plant growth. Studies have shown that proximity to nature can have a positive effect on health by decreasing stress and reducing strain on the immune system; a large body of medical research and design application supports this theory (Cooper Marcus & Barnes, 1999; Furgeson, 2006; Niklasson, 2007; Ulrich, 2002). As stress plays a major role in the lives of homeless people, a garden could have significant healing effects.

Sustainable building systems are vital in preserving resources and designing for healthy, environmentally-conscious lifestyles. Passive design strategies work to
maximize the benefits of the sun and wind in order to lower energy consumption and improve living quality by offering ample sunlight, fresh air, and comfortable indoor temperatures. Active systems within the design reduce energy consumption as well (Kwok & Grondzik, 2007). For example, the on-site water collection and treatment system provides an ample supply of water for use by the residents. These systems would provide more than the required water and energy for the housing community, allowing the “Haven House” to stay off the city’s water and sewer system grid. The positive effect of sustainable design strategies on the environmental impact and energy consumption rates of the “Haven House” would exhibit a real-world application of such strategies, supporting their use in Charlottesville housing.

In addition to integrating renewable and energy-conserving systems, the design of the “Haven House” incorporates reCOVER’s prefabricated panelized and modular system. The system’s core panel, a Structural Insulated Panel (SIP), has been integrated in the designs of previous reCOVER transitional housing prototypes. SIPs perform very well structurally and are energy-efficient due to their insulative capacities; they are manufactured off-site, allowing for effective on-site construction (SIPS of America, 2008). The floors, walls, and roofing system of the housing units and communal kitchen in the “Haven House” employ the reCOVER assembly approach allowing for safe and efficient on-site building. An outer covering system, consisting of a deck and large roofing canopy, provides a protective overarching structure in which the panelized housing modules sit. The use of reCOVER’s prefabricated system in the “Haven House” design not only supports material quality and building accuracy, but also promotes the adaptability of the design in meeting the needs of the larger community.
Limitations & Implications

The “Haven House” design presents a novel approach to housing by integrating the homeless into the community rather than placing them in segregated low-income housing projects. Despite the strength of this approach, the implementation of the design may provoke opposition from an unwelcoming community. The “Not In My Backyard” response is a potential limitation to the “Haven House” design. The integration of the “Haven House” relies on the receptiveness of the community, which presents certain challenges in securing funding and acquiring an appropriate site. The team focused on the production of visual tools as a means to promote TJACH’s vision for the “Haven House.” In continuing to raise awareness of and funding for the “Haven House,” reCOVER and TJACH hope to communicate the project to the larger community, not as an unmerited gift to the homeless population, but as a step toward ending homelessness and benefiting all members of the Charlottesville community.

The design of the Haven House, a synthesis of reCOVER’s architectural strategies, TJACH’s social goals, and the team’s research and creative efforts, serves as an innovative prototype for housing the homeless. The design intends not only to help mitigate the negative effects of homelessness but also the negative perceptions of homeless people. The proposed design would have a positive impact on the host neighborhood and environment by leaving behind a community garden while demonstrating sustainable building methods.

The research and design of the project expand the application of prefabricated and modular construction by pairing this building method with a social program. This same approach could be applied to broader global challenges, such as informal settlements, advancing the important role the architecture discipline plays in improving the built environment for marginalized communities.

Finally, the collaboration between reCOVER and TJACH promotes a collaborative relationship between the University of Virginia’s School of Architecture and the city
of Charlottesville. The search for additional stakeholders and potential investors will raise further awareness of design, which could strengthen the connection between the University and the city.

As a design proposal, the “Haven House” demonstrates the use of innovative technologies and methodologies. The design approaches the challenges associated with homelessness holistically and contextually, promoting strategies to alleviate the negative physical and mental impacts of living without a permanent residence while also building connections to the larger community. By addressing the underlying issues of homelessness, the “Haven House” could create lasting changes in the lives of Charlottesville’s homeless and working poor. The effect of such transformations would extend beyond the alleviation of immediate housing needs to benefit and strengthen the economic, environmental and social fabric of the entire community.

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**Biographies**

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Touchscreen Tablet Technology for Health Information Dissemination in Southwest Virginia

Hallie Eilerts, Kaylie Wallace, Lauren Webster

Abstract

Three Global Development Studies majors collaborated with Healthy Appalachia and the Health Wagon to create a health education program for communities in Southwest Virginia. The team identified a new method to deliver health education by creating interactive touchscreen tablet quizzes which patients could take while waiting for medical services. The quizzes allowed the team to collect information about the health knowledge levels of patients, and to provide a tutorial tailored to a patient's knowledge levels. Ultimately, the program would help to distribute health education while simultaneously identifying common knowledge gaps of patient populations.

Introduction

Southwest Virginia has some of the worst health outcomes in the state. Individuals in the Southwest region are almost twice as likely to die of heart disease as individuals living elsewhere in Virginia. The prevalence of diabetes and the percentage of adults in Southwest Virginia who report “fair or poor health status” is over twice the state average. In an informal, pre-project needs assessment, several Southwest Virginia healthcare providers were interviewed about their patient education efforts. These providers confirmed that they often were not able to spend sufficient time providing patient education. They stressed that the immediate care needs of patients in the region often go unmet.

To address immediate patient care needs, the region has utilized technology through innovative methods to compensate for the healthcare provider shortage. One of these efforts is telemedicine. Leading the effort to bring telemedicine to Southwest Virginia is Healthy Appalachia, an organization started by the University of Virginia Medical School. Healthy Appalachia's innovations in utilizing telemedicine provided the motivation for investigating whether other technologies could improve patient education in Southwest Virginia.
Methods: Tablet Development

Traditional health education programs often determine their content using surveys on assumptions made by patient educators about the likely baseline knowledge. This means that many traditional health education programs risk including content that is either too advanced, or so simple that participants perceive it to be condescending. Aware of this problem, the students involved in the project asked healthcare providers for appropriate initial content based on clinical interactions. Students also anticipated that they would need to update this information based on the patient feedback.

The team wished to design a health education program that was convenient for patients and different from typical passive health education methods. Touchscreen tablets proved both intuitive and mobile. Also, the team could easily alter content of tutorials in response to patient or health care provider suggestions. The tutorial would deliver answers to health education questions that participants answered incorrectly, allowing for immediate participant feedback. Participants’ answers to questions could be collected over the internet, and the tutorials could be updated remotely.

Methods: Content Development

Two separate quizzes, one on cardiovascular health and one on type II diabetes, were designed to test the tablets as health education methods. Both included an introduction and eight multiple choice knowledge questions. Both quizzes covered information related to exercise, self-care, problematic symptoms, diet and exercise. The knowledge questions were followed by two survey-style questions that asked the participants whether they felt that they learned anything from the quiz, and whether they felt the quiz was helpful. This information would assist the team in designing future models of the system.

Implementation

The team distributed the tablets to patients waiting for services at the Remote Area Medical (RAM) Clinic in Wise County, Virginia. The RAM clinic occurred at the Wise County Fairground where preexisting buildings were converted into a primary care center, vision clinic, and a medical supply room.

Audrey Snyder, a professor of nursing at U.Va. and coordinator of RAM, was especially helpful to the team. Audrey gave input on the tablets and introduced the team to various other medical professionals who were interested in the project or had valuable advice. One of these people was patient educator Karen Dawn, who specializes in diabetes patient education and had an education station set up in the
After the team’s meetings with the Health Wagon, Audrey, Karen and others at RAM, the team made changes to reflect their input.

One tablet was set to run the cardiovascular disease quiz while the other ran the diabetes quiz. Two team members walked around to different patient waiting areas with the tablets, and asked those waiting for clinic services whether they were interested in testing a new patient education tool.

Once patients completed the quiz, a team member would save their responses and restart the program. Thus a team member was close at hand whenever a patient was using a tablet. This was important so that patients could be assisted with any technical difficulties that they might have. Because team members accompanied the tablets, this also provided the patients the opportunity to discuss the quizzes, which encouraged patients to start a dialogue both with team members and other patients waiting for services. The tablets’ potential to provoke dialogue and generate further interest about these diseases was extremely promising.

**Results**

Patients had an overwhelmingly positive response. Over 90% of the 113 quiz participants stated that they liked the health education tutorial, and felt they learned something. Certain questions provided insight into the population’s assessment of their health risks relative to other health risks. For example, one question asked “Which of the following diseases kills the most women every year?” Forty-nine percent of participants selected “breast cancer,” while only 46% answered the question correctly by selecting “heart disease.”

Further, the information collected from the quiz questions demonstrated specific regional health knowledge myths that might contribute to unhealthy behaviors. For instance, 54% of participants who took the diabetes quiz stated that they incorrectly believed that peanut butter caused blood sugar levels to rise more quickly than white bread.

While questions frequently answered incorrectly demonstrate the prevalence of health-related misinformation, questions frequently answered correctly demonstrate that participants may have a greater level of health knowledge than their healthcare providers assume. For example, several healthcare providers suggested that we include a question on medication noncompliance. However, participants responded to the question on medication non-compliance overwhelmingly correctly, in contrast to health provider predictions. This demonstrated that knowledge is not necessarily the cause of many of these unhealthy behaviors. Results were shared with community stakeholders.
Obstacles and Challenges

The tablets were well-received at the RAM clinic. However, this is not to say that everything went according to plan. There is certainly much room for improvement, and perhaps many more effective ways to utilize the tablets than the team could have imagined. For example, some patients at RAM were hesitant to test the tablets. Patients might consider touchscreen technology intimidating, which is a sentiment that would dissuade some patients from even trying the tablets. It was not uncommon for elderly patients to refuse the tablets while younger people were often willing to participate. Younger patients might have been more familiar with touchscreen technology.

The team encountered several technical difficulties which were presumably related to the model of tablet used. If the tablets were to ever be left alone in a waiting room setting, such technical difficulties would detract from the tablets’ efficacy. In addition to the tablets’ technical difficulties, patients who are not confident in their reading skills might be discouraged from using the tablets.

At RAM, a team member was always accompanying a tablet. If the tablets were simply left on their own in a waiting room setting, the first question that arises is whether patients would pick up the tablets independently. Secondly, the team found one of the most beneficial aspects of the tablet to be the conversation the tablet tutorial would often provoke with patients. This led to conversations about other health-related topics, and sometimes a trip to the RAM patient educators. Without this person-to-person interaction, it’s doubtful that the tablets would be as effective.

Lastly, the tablets must be tested against other health education methods. Participants liked the tablets, but it is unclear whether they would prefer the tablets over a health brochure or a paper questionnaire.

Future Directions

The team will consider the obstacles and challenges discussed previously and adapt the tablets accordingly. As is the case for all community engagement projects, a priority for project developers is to respect agency—people are far more knowledgeable than many health education programs give them credit for. If a health education program is tailored to a participant’s knowledge needs, the participant may be more receptive to the possibility of receiving additional health education.

Future tablet project teams should include students with stronger software engineering backgrounds. Although we were able to create a simple quiz, students with greater technological acumen could make it more visually appealing and thus capture the attention of the subjects better. The success of the tablets at RAM seems to indicate that they have great potential for being integrated in patient education
programs. The original team of UVa students has been in contact with other students who are interested in continuing the project.

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Biographies

Hallie Eilerts will graduate from the University of Virginia in May with degrees in Global Development Studies and History.

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Examining How a Local Student-Run Organization is “Bridging the Gap”

Anna Funtelar, Corrie Sutherland, Ella Wong, Lena Shi

Graduate Student Advisor: Ethan K. Heil, Department of Environmental Science
Faculty Advisor: Professor Robert J. Swap, Department of Environmental Science

Abstract
Madison House has been serving the University and greater Charlottesville community for several decades. Our project seeks to look more in-depth at this particular tenet of Madison House’s mission statement through the program “Bridging the Gap.” Bridging the Gap is a Madison House program that helps refugee children resettle in the Charlottesville-Albemarle area. To what extent does Madison House facilitate serve the needs of the community? Through the use of focused observation and shadowing, our group examines the mechanics of community engagement involved with the student-run program, Bridging the Gap. Through careful observations, and in-depth conversations with Bridging the Gap mentors and Program Directors, we attempt to understand the ways in which we can provide the UVA volunteers with a third-party perspective to augment the effectiveness of the current program. By examining the way in which the student-run Bridging the Gap program “services” the community’s needs, we hope that the assessment we provide for Bridging the Gap will open the door for a more in-depth and holistic examination of the ways Madison House’s programs interact with the greater community, and the effects it has on the very community student organizations purport to serve.

Background and Introduction

According to a recent Stanford University study, the greater Charlottesville community has experienced shifting demographics, especially regarding the increased presence of international refugees and migrants (Center for Deliberative Democracy (CDC), 2005). As such, these newfound residents often face significant language barriers that impede important communication, particularly in regard to issues of health education, and gaining access to resources (CDC, 2005). While a number of local Non-Governmental Organizations (NGOs) and Community Service Organizations (CSOs) have stepped up to help address these issues, the Stanford study found that the provision of services to both the rural poor and refugees who are resettling into the larger Charlottesville communities are decentralized. This decentralization has been acknowledged as contributing to a lack of coordination for the care of children that can also contribute to a “lack of long-term relationships” (CDC, 2005).
Accordingly, a number of National and local NGOs have stepped in to help address the needs of the recent arrivals in the process of resettling. Several examples include the International Rescue Committee (IRC), Migrant Aid, and a university student run organization, “Bridging the Gap” (BTC), which is positioned underneath the larger umbrella service organization at the University of Virginia known as Madison House. The IRC seeks to provide crucial services to the many refugee families such as English Language classes, social services and community support, a furnished home, and health care (IRC website, 2012), whereas Migrant Aid’s mission is to serve the region’s migrant and Latino community in English as a Second Language (ESL), general academic skills, and other learning opportunities. A third organization that, like Migrant and Latino Aid, is more accessible to university students, “Bridging the Gap” is a student-run organization that pairs student volunteers (mentors) from the University of Virginia with mentees, refugee children currently involved in the resettlement process in the Charlottesville community. Like the IRC, BTG is involved with helping refugees, particularly refugee children, with the resettlement process through an academic and social mentorship program between University students, and refugee children. Through one-on-one and small group after-school activities, mentors provide refugee children with advice and guidance that will aid the children in achieving “greater academic and social success.”

The University of Virginia has a long tradition of students conducting service for the benefit of the greater Charlottesville-Albemarle area. The Madison House, a mostly student-run service umbrella organization is a 501(c)3 service organization located a short walk from the heart of the University of Virginia, was formally established in 1975 as a means to help students connect with the needs of the community through a number of student initiated programs. While a number of students approach this opportunity to give back, to conduct service with an impact, a question that commonly arises is whether there are ways to be more effective in engaging with the community and ultimately in the way that service is delivered. The student team approached BTG leadership to see if they were open to the idea of participating in a research project focused on studying the perspectives of those individuals, families and groups engaged by a Madison House program. The intention of this project was to understand the services provided to the refugee community of Charlottesville from the perspective of the community.

What makes the process of refugee resettlement in a small, college-town successful? Are there processes in place to both define and evaluate program successes through the point of view of the recipient of those services, the refugee families, and if so, how? And finally, at the heart of the student project was the following:

question: Is there a way to implement a sustainable tradition of self-examination for these students? Student researchers used a mixed methods approach of focus groups, individual interviews and shadowing of student volunteers to gather observations needed to provide insight necessary to begin to address the aforementioned questions. This paper intends to share the insights of those interviewed and engaged over the course of a one-semester project.

Methodological Approach

The student project was originally developed to include a multi-faceted approach, one that include mixed measures: focus groups, individual interviews and shadowing of actual student practitioners with their mentees. During the rigorous process of conforming to established guidelines from Institutional Review Boards and background security clearances, to working with children subjects, the student team was confronted with realities that caused them to reshape the proposed scope of activities, especially regarding focus group and individual interviews with mentees and their families. Although the student team was constrained, and thereby challenged the project’s ability to gain a holistic understanding of the BTG mentor and mentee program, the team still managed to make observations and draw some preliminary conclusions that are of interest to not only the BTG program, but possibly other local area programs like it.

Adherence to existing research protocols redirected the student group to use a non-participant observation approach where each team member conducted bi-weekly BTG shadowing. All mentees that were shadowed were males between the ages of 6 and 13 and from eastern African descent. Student mentors and mentees were observed during their usual activities, such as playing soccer, hanging out at mentor’s house, and arts and crafts. In total, observations were made during shadowing activities from twenty hours worth of mentor-mentee interactions. Each shadowing experience involved observing the mentor and mentee’s interaction, followed by recording observations from the shadowing experience. Post-shadowing, collaborative team discussion and reflection followed each set of observations.

Although shadowing offers insight into BTG program, the student team encountered several limitations, weaknesses, and biases with our non-participant approach. It is well understood that those who are observed may change their behavior, become uneasy, or stop activities altogether (Bless et al., 2006). Furthermore, it is also well documented that researchers enter into observations with conscious and unconscious biases toward the observed, which can lead to assumptions, inferences and subjective conclusions from those doing the research (Chambers, 1983). Even though the students sought to discern the perspectives on the BTG program of those participants actually engaged in the process, that is the mentees, the student team
was constrained by their own lenses and with the biases that each team member possessed regarding the interpretation of those interactions during the shadowing exercise.

**Observations during Shadowing**

Based on our shadowing experiences and conversations with mentors, we highlighted a few patterns in mentor and mentee interactions:

*Shadowing One-on-One Activities:*

The team observed that generally the majority of mentors fulfill their mentoring position by spending time with their mentees individually, at least once a week for a couple hours. A consistent pattern of the mentors primarily offering a space for play, relaxation, and bonding was observed. While recognizing the importance of fun and recreation, the student team thought that the mentors could better utilize the time together to invest in the mentees’ academic growth.

Mentors were observed often introducing the children to their college environment and American lifestyle. This interaction may benefit the mentees with the integration process into their new surroundings, however the student team felt that an unintended consequence of these unequal cultural exchanges could also hold discouraging consequences for mentees. The team also noted on more than one occasion that the mentees were often fascinated by the mentors’ technology, with one mentee expressing his intent to save up for an iPhone like his mentor’s. The student team understood these desires as part of a larger issue of the college students as representative of successful, educated members of this society. Having a college student as a role model can influence the mentee’s interests for their future.

2) **Shadowing Friday Soccer Games - Groups of mentors and mentees.**

The student team was able to shadow a group of several of the same mentors who often took a group of mentees on the Lawn, or to a nearby gym to play soccer once a week. The mentors observed conversations that contained educational material. During one of the conversations that the project team had with the mentors, they expressed concern that the mentees might shy away from direct learning activities (like tutoring or helping with homework). This concern arose from the belief of mentors that the mentees may be hesitant to ask for help or agree to be helped academically. Though the activities the mentors and mentees engage in are not academic in nature, some examples showed that mentors attempted to incorporate education during group activities. Specifically, the project team observed a group of mentees gathering around a mentor and upon discovering a tape measure, with the following conversation have taken place:
Mentee 1: Measure me! How tall am I?
Mentee 2: You’re fifty-three inches tall!
Mentor: How many feet is fifty-three inches, guys?
Mentee 1: Six feet tall!
Mentee 2: Four feet!
Mentor: Right, around four and a half feet!

3) Shadowing BTG program-wide events.

The student team had the opportunity to shadow BTG organized program-wide activities, such as Thanksgiving dinner and soccer kick-offs, events that were designed for all of the mentors and mentees to come together. Although designed to reinforce bonds between individual mentor and mentee pairings, as well as among and across mentors, most mentors stayed with their own mentee during these program-wide events. The team did note, however, that mentors with longer program involvement, such as the Program Directors, interacted more with mentees. Upon reflection, the project team believes that there may be additional value in encouraging more interactions across mentors and mentees during these large events, thereby creating a larger, mentee-friendly environment.

Discussion

As a result of our observations three main issues came to the fore and are discussed: the under-utilization of available educational opportunities; the limitations of our project approach; and lastly, some suggestions and possible implications for any service organization’s efforts to improve a particular program.

Our group found that the volunteers provided a mentorship and playful relationship more so than one focused on educational support. Nearly all of the mentees we shadowed were Mai-Mai speakers. Many public school teachers have little capacity to support these students’ education growth outside of ESL instruction, let alone how to address refugee students’ past experiences of violence, poverty, and refugee camps (UVA Curry School et al, 2011). Often, schools neglect those issues in relation to education outcomes. Although some Charlottesville organizations, such as the IRC, provide tutoring or legal advice, there is the suggestion that many of those efforts do not improve students’ learning in school. Similarly, BTG mentors often shied from these issues and recognized the challenge of consistently incorporating education into their time together.

The student team found that mentors generally lacked relationships with the mentees’ parents due to a lack of linguistic and cultural connections. Although the parents’ busy work schedule made it difficult to engage, mentors often spent time with the mentees outside their homes. The mentees showed signs of identify-
ing two different social worlds – one when they are with their family, and another with the college students, who broadly represent socialized and successful American students. BTG and other college mentoring programs have a strong opportunity to help strengthen a child’s confidence in his or her own culture by creating a space for symbiotic learning: while the mentor learns about the child’s background and gains cultural awareness, the child may gain knowledge from the mentor, both directly and indirectly. For example, one mentor was very familiar with the families’ cooking and etiquette for meals, thereby showing her familiarity within the household while another mentor had never met the parents before. The project team encourages BTG to facilitate additional training on cultural awareness prior to allowing the volunteers to interact with the families, as it is pertinent for these mentors to become aware of their own biases and assumptions, especially prior to entering these families’ lives.

Finally, many development and engagement theories encourage development workers to spend time developing a sense of understanding of the local. Although the student research group and the targeted student volunteer mentors shared a U.Va. connection, the project team recognized that as student researchers, the team appeared as strangers to both the volunteers and mentors. Given the perception of student team to be strangers, it is believed that this led to observer bias that also contributed to challenges in arriving at a more holistic understanding of the effectiveness of BTG. One of the conclusions from the reflection process of the student research team is that that the BTG program mentors have the strongest impact in determining how to enrich all parties’ experience. While the student team was able to observe the relationships throughout a microcosm of interactions employed by this program, it is the conclusion of the team that increased access to observations and interactions with mentors and mentees will allow for follow on investigation necessary to produce a more objective review of the program with well-defined metrics. Given the team’s education-based observations, the BTG program is also encouraged to explore how the incorporation of the perspectives of the recipients of the service program, that is the mentees, will better position BTG to meet its intended goals.

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Biographies

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Assessment of Education and Employment Gap in Himachal Pradesh, India

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with the assistance of Graduate Advisor, Ingrid Isin

Abstract
Our group in partnership with Arpana Charitable Trust, investigated the gap between education and employment in Chamba District, a region in the northern state of Himachal Pradesh, India. The goal of the investigation was to assess the feasibility of opening a boarding school located in rural Chamba district that would serve rural underprivileged youth ages 15–25, with language, mathematics, entrepreneurial, and technology skills that would allow them to compete for jobs with their peers in larger urban centers. We interacted with various groups through focused group discussions, interviews, and general conversations. We sought to understand challenges to employment, current opportunities for employment, and general attitudes toward employment in this region, in order to gain a comprehensive view of the situation. We found that there was a large disparity between the quality of education and the subsequent availability of jobs to youth in rural Himachal Pradesh. We concluded that an immersive educative experience combining subject instruction with hands-on activities can produce meaningful results for the youth of rural Himachal.

Introduction
Through the Jefferson Public Citizens grant, and in collaboration with Arpana Group of Trusts, we examined the employment and educational situation of youth in several villages in rural Himachal Pradesh. Arpana was originally founded as a faith-based organization near the city of Karnal, Haryana Pradesh. They have since created a separate branch within their organization that functions as a secular, Non-Governmental Organization (NGO) that conducts development projects to serve the poor of northern India. We mainly worked with their office in Gajnoi, a small town in the Chamba district of Himachal Pradesh.

Levels of educational attainment in Chamba District have ranked comparatively poorly within Himachal Pradesh, contributing in part to greater levels of unemployment and poverty in the area according to our interviews. Low population density and mountainous terrain have proven limiting factors to individuals’ access to educational institutions, such as higher education and training centers in the urban centre of Chamba Town. Despite the fact that Himachal Pradesh is consistently cited as having one of the highest average per capita incomes in India (Annual Status of
Education Report [ASER], 2009), the average family in a particular area we visited had an annual income of 1000 rupees, just under USD$ 23, according to a local administrator. Likewise, although Himachal Pradesh consistently ranks relatively highly overall in terms of literacy, arithmetic, and school attendance levels, literacy rates in rural areas in Chamba District have been measured at substantially lower levels (ASER, 2009; World Bank South Asia Regional Data, 2010).

Since Arpana’s first establishment in Chamba District in 1980, they have engaged in multiple community development projects, mainly related to issues of agriculture and health. Having informally recognized the increasing problem of youth underemployment in the region, members of Arpana expressed the need for a formal assessment to serve as a preliminary foundation for the development of future education-based projects in the region.

Based on our collaborative partnership with Arpana, we framed our process of inquiry with the following goals: 1) to assess the need for increased employability; 2) to explore the need for supplementary education; 3) to gain understanding of youths’ motivations, aspirations, and perceived challenges to employment; and 4) to evaluate the gap between rural youth and potential employers in terms of employment preparedness. In addition to conducting a situational analysis, we aimed to extrapolate from the conclusions of our assessment to offer recommendations to Arpana in regards to the future development of a rural education centre in Gajnoi.

**Methods**

Upon our arrival in Gajnoi, and prior to beginning data collection, our first objective was to become familiar with the expectations and desires of our community
partner. We discussed the visions and goals of the project with Arpana executives. We then employed the professional expertise of a representative from the development consultancy firm, Association for Stimulating Know How (ASK), to familiarize ourselves with the standard processes used for assessing community need.

We conducted semi-structured interviews and focus groups with the actors involved in the interrelated fields of education and employment in the Chamba district, as well as with professionals in Baddi and Delhi, two cities in northern India. We collected quantitative and qualitative data from our fieldwork sessions and exchanges with professionals. We focused our research inquiries on four broad groups of participants - village youth, existing educational institutions, administrators and non-governmental functionaries, and potential employers.

For each site visit, a prepared set of questions and activities were employed and then actively reevaluated based on the flow of the conversation and the responses from the participants. After each site visit, the data were recorded electronically and analyzed for themes and concepts related to our research goals; our team also allowed for additional themes to emerge in the data analysis.

Data Collection

To begin data collection, we conducted focus group discussions in three parts of the Chamba district. An Arpana correspondent native to the respective area recruited participants between the ages of 15 and 25 whom either had completed or were in the process of completing the 10th standard of schooling. Throughout these visits we interviewed a total of 56 youth. This category of students would be the candidates for enrolment in the future Arpana education centre. In Kolka Village, parents were recruited to participate in an additional focus group. A revolving group of translators facilitated communications.

In the second stage of the research process, we visited several existing educational institutes in the area. These included four computer-training centers in Chamba, three grade schools, and the Government Rural Self-Employment Centre in Chamba. At each institution, we held a combination of interviews and focus groups with directors, teachers, and students.

During the third phase of the project we interviewed individuals with experience in the evaluation and regulation of educational institutions in the area. We met with two representatives from Pratham, a non-governmental entity seeking to improve the quality of education in India, and several senior level Chamba District officials. In the final stage of the research process we met with human resource personnel from four large-scale employers in the Baddi industrial area to gain a perspective of what employers sought in applicants from rural Himachal Pradesh.
After each interview session we discussed our findings within our team, with Arpana members, and with various other contributors. Our observations regarding the effectiveness of the utilized methods and protocols led to the constant evolution of those methods. This constant, collaborative evaluation allowed us to increase data relevancy and the development of more effective research methods. Upon the conclusion of this research, we compiled our data into a report which was given to Arpana.

Results & Outcomes

Through our village visits, we found that the youth of rural Chamba district recognized a need for employment. Few people were employed outside of MNREGA, a government program that guarantees adults 100 days of employment. Many had received basic computer training but were still unemployed. Additional training programs were perceived as inaccessible by community members due to distance and cost. In general, we found that the youth were motivated to seek employment. More than 50% of all youth respondents were willing to seek further training in pursuit of employment. Willingness to leave the village for employment was higher in boys than in girls, which reflected parental attitudes and social norms. The employment aspirations of village youth favored government jobs even though these jobs were scarce and highly competitive.

Challenges to youths’ employment resulted from finances, family, lack of education, availability of employment, competition, and language. Youth could not afford training programs or the living costs of employment away from home. Agricultural responsibilities and the cultural expectation for women to remain in the village were a recurring challenge to employment. The youth felt disadvantaged because of their poor education and poor English skills. Through these visits we found that a rural education centre would be valued and used.

Training centers offered officially recognized certification in degrees and diplomas, evidencing the importance of certification as an outcome of training programs. Most programs were between six months and one year in length, and focused almost exclusively on a particular trade. While some of the centers offered English courses, no other supplementary training in “soft skills” - such as public speaking and critical thinking - was provided. The centers differed in their fee structures and services to underprivileged populations. Some offered support to impoverished students while others did not. After graduation, most trainees found government jobs or started their own training centers. Training centers did not necessarily open up a range of opportunities but rather prepared youth for specific tracks. Some of these training centers may be useful models for a future Arpana centre but should approached with caution considering Arpana’s goal of expanding employment opportunities.
The industry visits revealed both important data regarding the current state of employees from rural areas and employer perspectives. Retention rates of rural employees were low. Employers found rural persons to be unprepared on a professional level, expressing the opinion that elements of rural lifestyle were not conducive to the regimented work schedule expected in the industry sector. Employers considered professional preparedness more important than technical skills. Employers also expressed the opinion that rural people were unmotivated to leave the comforts of rural life and pursue industrial employment because MNREGA offers remuneration comparable to that of starting industry salaries.

Discussion

The overarching goal of this assessment was to determine whether there was a need for an education centre in Gajnoi to cater to marginalized rural youths ages 15–25 in Chamba District. Our fieldwork evidenced a distinct need for this type of service and institution for several reasons. The academic skills of the students affirmed the need for remediation, especially in the areas of English, math, and computer skills. In order to compete with their peers in Himachal Pradesh, the student participants need substantial supplementary instruction. In addition, students had an extremely limited amount of exposure to other possible job opportunities, entrepreneurial ventures, or people and places outside of their immediate locale. Students’ distinct lack of career guidance likewise underlined the need for a centre such as that which Arpana has proposed would be developed in Gajnoi. All the students who participated in our interviews were very motivated, had high expectations on the whole, but faced significant challenges to both education and employment. Interestingly, this finding contrasted with the opinions of our industrial interviewees, who found the rural population to be unmotivated in seeking employment opportunities. This gap in perception could be bridged through the curriculum of an Arpana center.

Our group encountered procedural, organizational, and preparation-based obstacles during our research, all of which placed significant limitations on our project and the conclusiveness of our research. Relying on translators undoubtedly affected the data we collected. Without proficiency in Hindi or Himachali, we were unable to directly communicate with the subjects of our village interviews.

It is imperative that we recognize the significance of our team’s position as outsiders aiming to “improve” the welfare of rural Himachalis. During all four visits with industry, words like “behavior,” “attitude,” and “emotion” were raised to explain why rural people were not prepared for work in industry. These words are culturally laden and we wish to avoid labeling anyone as emotionally immature or behaviorally underdeveloped. Instead, we interpreted these terms to mean that rural peoples were unprepared on a professional level and that, without making normative claims, the
culture they come from does not place significant value on the kind of regimented work schedule expected in these kinds of industries. This was a key finding of our visits, with all of our industrial interviewees stressing the importance of professional preparedness over the possession of technical skills.

After compiling and analyzing our research findings, we have identified a number of objectives that Arpana’s potential educational institution should strive to meet. These should address Arpana’s expressed aim of creating a high-quality, holistic learning experience for youth that addresses employability while developing capable, critically thinking individuals. We have made several recommendations to Arpana on how to achieve these goals. Although an Arpana Gajnoi Education Center has yet to be realized, we feel we have taken important preliminary steps in the establishment of a potentially transformative institution for the Gajnoi community.

References


Biographies

**Charley Adams** is a fourth year Global Development Studies and Foreign Affairs double major. Next year, he will be working at Deloitte in federal consulting. Charley forwent the trip to India to pursue employment during the summer.

**Shivesh Puri** is a fourth year Global Development Studies and Foreign Affairs double major. He is also in his first year the Batten School.

**Maggie Graham** is a fourth year Environmental Science major and French minor. She hopes to spend next year teaching English as a Second Language.

**Ingrid Isin** is receiving her PhD in Social Foundations of Education, which combines the disciplines of Anthropology and Education. Her research concerns the intersection of ethnic identity and education in Nepal.

**Julian Henderson** is a fourth year Global Development Studies major. Next year he will be taking a gap year while applying to medical school.
ecOREM0D2: Preservation and Design in Falmouth, Jamaica

Jonathan Coble, Elizabeth Engel, Matthew Jungclaus, Alexandra Lauzon, Effie Nicolaou

Abstract
ecOREM0D2 is a design/build project that focuses on the addition to and preservation of a historic house in Falmouth, Jamaica. With the help of community partner Falmouth Heritage Renewal, an interdisciplinary team of students worked to design a kitchen and bath “wet module” addition to a historic house and to preserve that historic house. The following article details the work of the students during the spring and summer of 2011 from design to construction, including a discussion of results and future work on the project.

Introduction
As the developing site of a major cruise ship terminal, Falmouth, Jamaica has the potential for significant expansion that may have a negative impact on preservation of the historic housing stock. Falmouth is one of the best-preserved Georgian towns in the Caribbean. The housing stock tells the story of slavery and free black culture in the area. Many historic homes in Falmouth, however, are not fit with simple indoor plumbing and sanitary needs. Because of this, community members are tearing down old, historically significant homes in order to make cheaper, easier to build homes, typically made of concrete block (CMU) that are outfitted with these basic amenities. Our community partner, Falmouth Heritage Renewal (FHR), strives to preserve and modernize the historic housing stock in order to prevent the unnecessary deterioration of the local culture. By adding affordable, sustainable “wet modules” (kitchen and bath modules) to the existing units, there is great potential to afford owners fundamental sanitary needs while also preserving their existing homes at a low cost to them. Additionally, preservation will ensure that the historic character of the homes endures as they are restored and upgraded.

The overarching objective of the ecOREM0D2 project was: “design and build in order to have a positive exchange of empowerment with the community and the client through the process of listening, engaging, and educating.” More specifically, the students developed five goals to guide work on the project, which were:

1. Listen, then Design: Build upon acquired knowledge.
2. Engage: Reach out to the local community to develop and nurture ideas.
3. Educate and Exchange: Design and build based on our interaction with local community members.
4. Empower and Improve: Construct new, functional spaces while improving existing conditions.
5. Perpetuate: Design and build an artifact that people can and want to incorporate into Falmouth.

In the broadest of senses, the ecoREMOD2 project originally sought to encompass the design-build process of a “wet module” addition to a historic house in Falmouth, Jamaica. The end result was to develop a series of “kits,” which presented suggested renovations for the ecoREMOD2 house in a manner that could easily be applied to other houses in Falmouth.

Approach

Each member of the ecoREMOD2 project team was enrolled in an architectural studio or seminar course in Spring 2011, which served as the research and preparation portion of the project. While the studio students worked on the architectural design, seminar students provided research to guide the designs, suggesting feasible options and evaluating the work of the studio. Integral to both studio and seminar were lectures on the history and culture of Falmouth and team-building design exercises. The course centered on a number of relevant works of literature, which helped set the stage for the project. One of the most helpful readings was a report created by a previous Jefferson Public Citizens team “The Oasis on the Horizon: Preparing Falmouth for Redevelopment.” This report details the results of a large-scale survey taken in Falmouth to assess the perceived impacts of the cruise ship terminal. In addition to this report, students read articles about the history of housing in the Caribbean, such as “The Architectures of Black Identity: Buildings, Slavery, and Freedom in the Caribbean and the American South,” written by Louis Nelson, director of the Falmouth Field School program, to give historical and cultural background to the ecoREMOD2 project.

Further research and preparation included traveling to Falmouth in March 2011. During this excursion, students spoke with local residents, visited local construction shops, and did extensive on-site documentation. This documentation included interviewing the homeowner, recording building inspection, drawing site plans, taking grading measurements, and taking note of vegetation and debris on the lot. All of these steps were conducted with the help and supervision of FHR.

During the remaining months of the spring semester, the seminar focused exclusively on the design of the intended features for the 8 Princess Street renovations. Engineering students conducted technical analyses of heat flow, material choices, structural stability, cooking options, and lavatory options for the home. Architecture students planned site layout, historic preservation strategies, and additions for the home. Throughout March and April, the team submitted several sets of drawings to FHR and the homeowner for review and feedback, seeking to involve the stakeholders
as much as possible. This work culminated in a series of professional drawings, models, and reports, which were all presented in a final review to many of the stakeholders. Soon after the final review, the students received news that the project could no longer be completed as planned at 8 Princess Street. The main tenant of the lot was unable to produce proof of land ownership, making both the ecoREMOD2 team and FHR uncomfortable continuing with the project as planned. The team immediately began searching for a new site, and upon arrival in Jamaica days later, had a new homeowner to work with at 10 Albert Street in Falmouth. Once it was clear that a site change was occurring, the team had to change its approach. Although the team had sought to create a design that could be easily applied to a “typical” Falmouth home, the design had become fairly specific to the 8 Princess Street site. For this reason, the students spent the first week in Falmouth repeating the site visitation process for the new site. Many of the issues faced on the two sites were similar, such as land crab infestation and poor drainage, but the homeowners had differing security, storage, and space needs, creating a complex design process which included constant feedback from FHR and the homeowner.

Students explored a variety of options to address the homeowner’s needs, testing varying numbers of structures and orientations on the site to meet the desired design aspects. Once these major decisions were made, the team began to focus on particular elements of the addition, such as the kitchen, bathroom, and security

Figure 1. Historic home at 10 Albert Street, Falmouth, Jamaica. Source: Jonathan Coble
measures, narrowing design options. Throughout this process, the students, FHR team, and homeowner gave input and voted on designs. The team continued to develop designs as the construction process began, changing them based on material availability and feasibility. Material procurement occurred through local hardware stores and the students worked alongside the FHR team to learn local building practices and gain hands-on experience in building. The team leaders met each morning to devise a plan for the day and made task assignments based on what students had worked on designing, so that they would be able to work through building their designs. Extensive documentation was critical to the success of the project. Students created both electronic and hard-copy design drawings in case they were unable to complete construction before departing. Each drawing was carefully reviewed with appropriate FHR team members in order to ensure understanding of the overall design concepts and details.

**Results and Outcomes**

ecoREMOD2 is currently still underway in Falmouth, Jamaica. Despite the onslaught of unexpected issues and setbacks, the team was able to successfully complete a design for the addition of a kitchen and bathroom unit for the historic house at 10 Albert Street before leaving Jamaica in June. The team held strongly to its strategy of involving the homeowner and the members of the FHR team in the decision-making process, resulting in a design that combines modern design concepts with traditional elements of Jamaican culture and building. In the month that the project team was in Jamaica, significant progress was made on both the historic house and the addition on the site. The ecoREMOD2 team, along with students participating in the Falmouth Field School program (a UVa program for historic preservation), thoroughly documented the historic home and assessed the condition of the existing materials. During this process, significant termite infestation and rot were discovered in the original structure. After much discussion and debate, the stakeholders decided to demolish the house, salvage as many of the original materials as possible, and rebuild the house with new and reused pieces. Extensive earthwork was performed on the site, both by hand and with a backhoe, which created major delays due to soggy weather conditions. Aggregate was brought in from a local source to stabilize soil and aid in drainage issues, and students built a concrete block wall to serve both as a property line and a drainage barrier. The team also constructed the majority of the concrete block walls of the addition, from foundation to reinforcement, and began the reconstruction of the “new-old” house, seeking to replicate as accurately as possible. In addition to on-site construction, students also worked in the carpentry shop at the FHR headquarters on elements such as the sliding doors enclosing the addition and the kitchen storage units.
Shortly after the students left, city officials saw that there was no building permit and halted construction. As a result, construction stopped for several months, as the drawings and designs created by the students required review and approval by both the building officials in Falmouth and the Jamaica National Heritage Trust, which seeks to preserve historical buildings throughout the country. With approval now in hand, the FHR team has resumed construction, in hopes of being completed within a few months. The team remains in communication with FHR employees, who send progress updates in the form of narratives and photos. A rendering of the proposed design is shown in Figure 3.

Discussion and Future Work

The ecoREMOD2 project, despite setbacks and limitations, demonstrated the possibility that a “wet module” could be successfully designed while respecting architectural history, local culture, basic human needs, and sustainable housing. At the completion of construction, it is our hope that the project will inspire other homeowners in the area to consider modern additions to the historic housing stock, rather than tearing homes down in favor of more modern accommodations.

The ecoREMOD2 team was fortunate to work with a community partner that has an established reputation in Falmouth. The students could not have completed this
project without the expertise and insight of the FHR team, who spent each day training and working alongside the students. In addition, the homeowner at 10 Albert Street was not only engaged in the design/build process, but was extremely knowledgeable and excited about the tasks at hand. This engagement with the homeowners and key stakeholders of the project solidified the purpose of the project and demonstrated further the importance of personal input and considering cultural differences between Jamaicans and Americans.

Over the course of the seminar and the Falmouth Field School, the ecoREMOD2 project faced numerous limitations and complications. From the beginning, communication was both slow and limited, relying heavily on e-mail to relay critical project decisions. The team found that building resources in Jamaica, particularly in Falmouth, are limited, necessitating additional research into plausible options that were economically and environmentally conscious. Undoubtedly, the last minute site change limited the amount of work that the students could physically complete while in Falmouth under time constraints, and governmental regulations slowed the progression of construction.

As construction restarts in Falmouth and the project nears completion, the team hopes that the project will spark an interest in modern addition and historic preservation for local homeowners. If so, this project has the ability to help Falmouth maintain its rich culture, while adjusting to the changing landscape of the emerging tourism industry.
References


Biographies

Jonathan Coble graduated in May 2011 from the University of Virginia with a masters degree in Architecture and Urban and Environmental Planning. He served as the graduate project manager on the project, and currently lives and works in New York City.

Elizabeth Engel is a fourth year Civil and Environmental Engineering major from Princeton Junction, NJ, and served as the undergraduate project manager on the ecoREMOD2 project.

Matthew Jungclaus is a fourth year Mechanical Engineering major from Moorestown, NJ, and has been involved with ecoMOD since 2009.

Alexandra Lauzon is a fourth year Civil and Environmental Engineering major from Pittsburgh, PA, and has been involved with ecoMOD since 2011.

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Recycled Resource Greenhouse in Mongolia

Sarah Culver, Claire Cororaton, Carlin Tacey

Abstract
A multi-disciplinary team of University of Virginia students, non-governmental organizations, professionals, and local Charlottesville partners, collaborated to meet the expressed need of a rural Mongolian community for a new greenhouse. The structural product of our project consisted of a greenhouse made out of recycled glass bottles, beetle-eaten wood and other local recycled resources. The following essay explores the difficulties of partnership management and the balance of process vs. product when establishing expectations for the project. The concluding discussion hopes to identify potential tools for students to realign project objectives when foundational ideals of community engagement become jeopardized throughout the planning process and during actual implementation. Through this service-learning project, the undergraduate team learned about the tradeoffs of excessive collaboration, the difficulties of balancing expectations and the importance of full transparency among all partners involved. Despite these problems, the most important highlights of the experience are the lasting relationships built while abroad, and the continued effort to learn from the challenges experienced.

Introduction
Mongolia faces a dilemma that many countries in the past have faced: the push for rapid development complicated by the difficulty of making such initiatives sustainable and environmentally conscious. It is within these two contexts – the pressing concern about environmental issues in Mongolia and the importance of sustainable development - that our greenhouse project can be understood. The project sought to understand whether existing resources could be used to meet the infrastructural needs of a rural community in Central Asia, which could increase self-sufficiency by decreasing the start-up capital needed for community construction efforts.

Approach
The main goals of this JPC project were to cultivate relationships, focus on the process of collaborative design, and to work with the local community. The initial JPC proposal was composed of two parts: the structural component of building a greenhouse, and more importantly, the priority of fully assessing the Hasu Shivert community’s need and working with them towards a collaborative design. Furthermore, we focused on cultivating solid relationships across different regions, especially...
in Central Asia. We invited Winrock Tibet to join as one of our collaborators, and we hoped that through this, our project could foster future partnerships between the Mongolian and Tibetan organizations in our group. We thought this relationship building would be promising, given the similarity of culture between the two countries and the issues both are facing.

Methodology

In order to develop a project based in the principles of community engagement and collaboration as outlined by Chambers (1997), where “reversals of power” occur that put the initiative into the hands of the community (p. 154), the student group used the following methods to build relationships with partners both local and international. To understand these methods, we have broken them into three phases of project implementation.

Pre-International Experience

In the Fall of 2010, Ken Dabkowski, an employee at Mosaic Collateral Asset Management (M-CAM), sought partnership with the University of Virginia through collaboration with a group of interdisciplinary students from a development course. To prepare for the trip, we worked closely with Bill Hess, an engineer and glass artisan from Afton, Virginia, to experiment with different ways of building the walls of the greenhouse. Because the type of kiln and conditions on the ground were still unknown, we experimented with a variety of ways to incorporate repurposed glass into various designs: slumping bottles to create shingle-like glass panes, melting wire into glass to attach them to a structure, and whole bottle earthen walls as had been used by M-CAM collaborator Krishna Gurung in Nepal (KRMEF 2010). The group also researched both traditional kiln-making processes and the process of using an electric kiln, which was a new technology our partner Mongolian engineers were highly interested in. We made small structural prototypes using computer aided design software to estimate the number of melted panes and whole bottles needed.

By June 1st, we had over eight partners interested in the project. Communication between our partners abroad was done via email and telephone, when possible, to discuss logistics and ideology of the project. While the list of collaborators involved in the project is long, the degree and length of their collaboration varied. This affected each partner’s expectations of the project and the physical shape of the greenhouse. For example, the Mongolian Academy of Sciences (MAS) did not agree to participate in the project until days before departure, contributing two students to our group, one of whom was able to stay on-site with us for all four weeks and became an integral Mongolian collaborator. Similarly, Greg Smith, a carpenter who had experience building a yurt and had used beetle-killed wood to construct his home,
also joined us a week before leaving for Mongolia. Once we arrived, we learned that our contact at Mongolian Innovation Commons Partners (M-ICP), who had served as our main point of contact with all our Mongolian partners, would not be traveling with us to the site in the Arkhangai aimag. Our on-site Mongolian collaborators included MAS students and Bat-Erdene Baasandorj, an M-ICP employee who functioned as both translator and partner engineer. The varying lengths of time that our partners invested into the project affected their expectations of its outcomes and their understanding of its ideological foundation, which, from our perspective as JPC students, was supposed to be about reuse of resources, collaborative design and community engagement.

*International Experience*

Our planned methodology once on site consisted of a combination of our pre-conceived plans with information gathered from evaluating our site and face-to-face interactions with our foreign partners. The design process was intended to be iterative and collaborative, combining the input of our partners and the local community to create a final product. However, it became apparent that little variation from the initial proposal would be acceptable to our partners, as this result was the only solution that created adequate space for multiple agendas as represented by the many “goals” of the project.
Attempting a collaborative design project with many participating individuals and organizations, each with their own interests and intentions for the project, is an extremely difficult balancing act. The JPC grant was the most important source of funding, but given the number of partners we had, it was hard to decide who exactly we were accountable to and where to prioritize spending. Were we primarily accountable to our partners in Ulaanbatar, who were all interested in the idea of a melted glass greenhouse? To our partners in the Mongolian Academy of Sciences who were interested in the technology of melting glass? Or, to the community at Hasu Shivert itself?

The challenge of having multiple collaborators became even more apparent once we arrived in Mongolia when we were confronted with previously unaired expectations from our partners. With the purpose of ensuring that local knowledge and opinions were included in the greenhouse design, the students felt it would be presumptuous to arrive with a fully completed design. However, upon our arrival we found out that some of our partners adamantly desired an entirely complete and functional greenhouse by the end of our limited time in the country. One graphic sketch, not a final design, created by our architectural student was immediately chosen as the structural framework of the greenhouse, before the majority of the group had a chance to visit Hasu Shivert and assess available resources on the site. Consequently, melding their vision of completing a greenhouse with our initial preparation to prototype possible ways to reuse waste materials became extremely difficult. Our desire to design a project with many national, regional, and international partners stemmed from an understanding that this could provide support and longevity to the project, but the conflation of partners and interests instead raised the expectations of the project too high.

Post-International Experience

During the final phase of our project, we intended to reflect upon our experience and synthesize our conclusion into various written works. This phase is perhaps more important than either of the earlier phases, as “Self-critical commitment demands personal insight and reflection. If believing is seeing, we have to question belief in order to see” (Chambers 1997, p. 100). We accomplished these ends by small and large group meetings with other returning JPC project groups, which allowed for discussion of the similarities and divergences of our projects, and regular discussions with our project advisor. The extensive amount of time we have dedicated to processing our intentions, our realities and our lessons learned, has contributed to a more holistic understanding of the impact service learning initiatives have on both the community partners and the students’ academic understandings. As we continue to learn from our JPC experience, we have focused on further fostering the relationships built with our contributors from Tibet, through continued discourse and a
writing workshop hosted by E-SAVANNA, an international service learning organization from the University of Virginia.

**Project Results: Structures and Relationships**

The physical greenhouse was constructed using a wide variety of techniques, from mixing cement by hand and laying it in homemade waste plastic forms, to felling beetle-killed trees and stripping them of bark for use as the main vertical supports, to using whole bottles wired and stacked into frames, to even a few panes of glass melted in our small electric kiln. This meant the collaborative design process occurred in a happenstance way, where we decided each night what the next day’s construction would focus on. When challenges to the vision of using local recycled resources arose, they were solved in ways that would continue the push for completed construction, even when these solutions directly contradicted our conceptual vision of using sustainable sources and reducing waste. For example, despite the heavy emphasis on repurposing glass waste, plexiglass was purchased in the capital and transported to the site to use for the roof. This was because “something had to be done” to complete the design, even though the first proposed suggestion was antithetical to the central vision of our project.

Despite the complications of the physical greenhouse construction and of partner communication, we successfully sponsored the collaboration of a wide variety of people from many walks of life to attempt to look at a common problem from a creative angle. The relationships formed between the University of Virginia, the Mon-
The project was successful in establishing friendships and relationships among those involved. But given the difficulties of balancing multiple partnerships, the lack of genuine communication and transparency, and the inflexibility of project goals, the result of our JPC project fell short of our intended aims. Through this experience of leading an international student development project, the undergraduate students in this project now understand more fully the crucial role of transparency and clear initial expectations. During the planning phase of the project, all partners involved participated in an optimistic discourse that upheld the importance of reuse, collaborative design and community engagement. During implementation, however, we realized that the unanticipated determination to leave the site with a finished, polished, and shining greenhouse outweighed the foundational values of genuine collaboration and service-learning. A construction-oriented project can be challenging, because the physical result is often the only seen outcome of team effort. In the balance between process and product, it is important to consider that the process can also become the lasting product or outcome of the project.

In successful community initiatives, the goals of the project evolve along with the organic development of relationships across all partners. If time is spent to foster relationships and merge project ideals and expectations, then the physical result will be less significant, and there is a stronger potential for further collaboration. We accumulated partnerships with a cavalier abandon, because we thought we would strengthen our project through various insight and perspective. Instead, with each new partnering individual or organization, we increased manifold the difficulty of creating an equitable partnership in a culture we’d never experienced, in a language we cannot speak.

The melted glass greenhouse was the idea that brought all partners together and we could not re-evaluate this idea without disrupting established partnerships. The students felt the responsibility to uphold these relationships and, despite the infeasibility of building a glass greenhouse within a month, the idea could not be completely overhauled. In conclusion, we would urge future JPC students to use the mandates from JPC as a directive, to engage a community, as the utmost goal if conflicts arise during the course of the project. As William Plater (2011) explains, “we can learn about a community without ever visiting it, but that learning is less than...”
what can be learned in and through the community itself, through the community as medium” (p. 33).

References


Biographies

Claire Cororaton is a fourth year undergraduate student studying History and Global Development Studies

Carlin Tacey is a fourth year student in the School of Architecture at the University of Virginia with a minor in Global Sustainability.

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Have a Stake in the Market: Collecting, Analyzing, and Sharing Data in Support of the Charlottesville City Market

Anne de Chastonay, Carla Jones, Natalie Roper, and Erica Stratton

Abstract

In the fall of 2010, the Charlottesville City Market was at a crossroads. Charlottesville City Council considered redeveloping the market’s current temporary location, and the body initiated a conversation about where the market should permanently move. It became clear that informed decisions depended on then unanswered questions about shoppers’ spending habits, reasons for attendance, demographics, and social interactions. The fact that there was no scientifically collected data about the market was a gaping hindrance to the debate. This article illustrates how a team of university students, faculty, community organizations, and market shoppers worked together to fill this information gap. Through a collaborative research design, implementation, and presentation process, this team helped propel constructive community dialogue about the market’s future. The authors elaborate their ongoing mutual learning process along with findings about the market’s role in Charlottesville’s social and economic fabric.

Introduction

Every Saturday morning the Charlottesville City Market brings the Water Street parking lot to life. It bursts with over 5,000 patrons consisting of families, college students, grandparents and vendors. Farmers’ markets like this one are recognized as valuable community spaces that connect and perpetuate social and economic capital. They bring local products and producers to the market, provide opportunities for enterprise diversification, incubate small businesses, and link market transactions to social interactions. In these four ways, farmers’ markets “join together and support the local resource bases and skills of producers, the needs and preferences of local households, and the development goals of communities” (Gillespie, Hilchey, Hinrichs & Feenstra, 2007).

In the Fall of 2010, Charlottesville City Council appointed a City Market Task Force¹ to research potential permanent locations for the Saturday market as they were considering developing its current location for other uses. As the process evolved, it became evident to both the research team and the Task Force that no current data was

¹ The Charlottesville City Market Task Force was appointed by the Charlottesville City Council in 2010 to research and propose locations for a permanent site for the Saturday Charlottesville City Market.
available to inform these decisions. This realization led the research team to focus their efforts on collecting the first comprehensive and scientifically collected data on the Charlottesville City Market. Data can help market managers, community partners, and interested investors determine what’s best for future growth. For instance, a study on farmers’ markets in Minneapolis revealed the importance of markets in regional food systems and also yielded recommendations to the city on how to determine strategies for the future of the market (Slocum, Ellsworth, Zerbib & Saldanha, 2009). Like this situation, data on the Charlottesville City Market specifically would be important in exemplifying its importance to the City as well as providing important information to inform best next steps in this time of change.

This research, conducted in collaboration with Market Central\(^2\), filled information gaps about who is attending the Charlottesville City Market and why. Data about shoppers’ spending habits, reasons for attendance, and social interactions at the City Market were the focus of the team’s research. These data have already catalyzed action and sparked a community dialogue on the Market’s future.

**Methodology**

*Forming Questions Collaboratively*

The researchers recognized the importance of community engagement to ground useful research questions and methods for this study. Through a strong partnership with Market Central, the research team was able to collaborate and develop relationships with several community stakeholders. These relationships enabled the development of a comprehensive survey tool and data collection technique. Some of these partners included the Jefferson Area Board on Aging, The Healthy Food Coalition, UVa Center for Survey Research, and the Farmers Market Coalition. The team then gathered information through a survey, a population count, and Photovoice.

*The Survey*

The research team administered a 34-question survey that strove to gain an understanding of consumer preferences, shopping habits, and demographics. Participants completed the survey from a consistent location surrounded by vendors over seven consecutive Saturdays from July through September, with the first week being a pilot. During the final weeks, a second booth was added to increase data collection efficiency. The surveyors counted adults who walked past a designated point, asking every seventh individual to take the randomized survey while recording any reasons of declining. The survey was available in print and on three laptops. The team also provided QR codes and a link for participants who wished to complete the

\(^2\) Market Central is a non-profit organization dedicated to preserving and enhancing the markets sponsored by the City of Charlottesville.
survey from home. Survey participants were entered in a weekly raffle for a $25 gift certificate to the Charlottesville City Market. Two hundred and sixty-one randomized participants completed the survey, and made up a statistically random sample based on population estimates described below. The final survey statistics were automatically generated through the survey platform, Survey Monkey. The researchers then further analyzed the information visually by creating graphs on Excel. In addition to the randomly collected surveys, interested patrons were able to take the survey and these responses were collected and analyzed separately.

*The Population Count*

A partner from Market Central used a hand held tally clicker to count the number of people that passed the Market Central booth for five minutes each half hour for the duration of the market. She recorded this information on a printed spreadsheet. The team multiplied each number by six to get an average count per hour and added the numbers together to estimate how many patrons visit the Charlottesville City Market each Saturday. They repeated this process for five weeks and averaged the results.

*Photovoice*

A data collection technique called Photovoice3 was used to display what attracts visitors to the Charlottesville City Market through a non-verbal or written method. Disposable cameras were distributed to interested patrons and participants were asked to photograph their favorite features of the market. After the cameras were returned to the booth, the team developed and displayed the photos each week. Many of the photos represented customers’ family and friends or their favorite vendors and products.

*Sharing Information*

A marketing campaign was launched to attract participants, generate awareness of the study, and disseminate results to the public. This process included a website, radio interviews, newspaper articles, local news spots, and magazine profiles. In the fall, the researchers presented results to vendors and held a vendor listening session4. Two public listening sessions were held in two different locations and times to provide an opportunity for community dialogue. To complete this phase of the project and to convey insights gathered from the listening sessions, the findings were presented to City Council. These listening sessions confirmed many of the survey and

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3. Photovoice is a technique that uses disposable cameras as a way to collect data unable to be captured in spoken and written word.
4. A listening session allows participants to gain knowledge from a brief presentation and share thoughts and concerns with each other and the presenters.
Photovoice findings. For example, economic access, location, price perceptions, and lack of marketing were central theme of the discussions.

**Findings**

*The Market’s Economic Impact*

The Charlottesville City Market has a significant impact on the local economy. Although 20% of shoppers cite price as a barrier to make more purchases at the Charlottesville City Market, the average shopper still spends at least $25 per visit. With over 5,050 shoppers per week, the Charlottesville City Market generates approximately $126,000 for local producers each Saturday. In addition, the Charlottesville City Market shares its patrons with the neighboring Downtown Mall. More than 75% of Charlottesville City Market visitors, sometimes or often incorporate a visit to the Downtown Mall with their trip to the market. This introductory data provided a framework for the City’s more in depth economic impact study planned for the near future.

*Loyalty to The City Market*

Half of survey participants report visiting the Charlottesville City Market at least three times per month during its entire April-November season. Most heard about the City Market through a friend, or have been visiting the market for so long that they have forgotten what first attracted them. Many of the comments expressed in the free-write section of the survey revealed that many market patrons have been coming for over 20 years and have strong feelings about future of this market.

Participants reported that the Market means more to them than providing an opportunity to purchase groceries and handicrafts. The majority of respondents often communicate with vendors and sometimes or often make new acquaintances when they attend.
Ninety percent of City Market patrons sometimes or always encounter and socialize with friends or acquaintances, indicating its importance as a community social space.

However, the population that frequents the Charlottesville City Market does not represent the City of Charlottesville as a whole. Eighty percent of City Market shoppers are white, and 75% hold a bachelor’s degree or higher. Only four respondents reported utilizing their Supplemental Nutrition Assistance Program (SNAP)5 benefits that allow shoppers to double their SNAP dollars when purchasing eligible items at the City Market.

The data reveal a large disparity between Charlottesville City Market shoppers and the Charlottesville community as a whole

Discussion

The Charlottesville City Market’s Presence and Future as a Vital Community Space

The Charlottesville City Market, like the markets studied by Gillespie, Hilchey, Hinrichs, & Feenstra, is a place of both economic and social activity (2007). Visitors make purchases at the City Market and on the Downtown Mall, investing a significant amount of money directly into the local economy. Visitors utilize the market as a venue for social networking, strengthening established friendships and making new connections, and learning about buying and preparing fresh foods. Yet Charlottesville City Market customers represent a very limited demographic of the Charlottesville community. These findings have helped developed the next two phases of this study that plan to focus efforts on vendors and barriers to prospective customers.

Limitations

Though the researchers randomly selected survey respondents, a respondent’s decision to participate may have been influenced by several uncontrollable factors. First, those willing to devote time on the lengthy survey were likely invested supporters of the market. This may have produced biased results, and it prevented many

5. This government benefit program, formerly known as food stamps, helps people with low incomes to buy food they need for good health.
out of town or first time visitors from responding. Second, those who completed the survey had the luxury of time to do so. Consequently, individuals with other responsibilities on Saturdays were unable to respond. This could have excluded people such as parents responsible for childcare and individuals with jobs on the weekends. Finally, the survey was offered only in English, which may have deterred non-native English speakers and illiterate market visitors.

Opportunities for Future Research

Information about those not attending the Charlottesville City Market is still missing, and members of Charlottesville City Council agree that more needs to be known about why this population is absent. The survey found evidence of cultural, physical, and economic barriers to attending the Charlottesville City Market. Future data collection could increase understanding on how to make the Charlottesville City Market a more inclusive community space.

In addition, while this research showed preliminary evidence that the Charlottesville City Market has an effect on the local economy and on neighboring businesses, the extent of its economic impact has not yet been fully assessed. A more in depth study would clarify how the City Market affects surrounding commercial activity, and further define opportunities for the Charlottesville City Market’s future.

References


Biographies

Anne de Chastonay is a fourth year student at the University of Virginia double-majoring in Urban & Environmental Planning and Global Development Studies.

Natalie Roper is a third year student at the University of Virginia studying American Politics.

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Developing a Sustainable Business Strategy for Women in Monduli, Tanzania

Katie Athaide, Leah Coates, and Arianna Parsons

Abstract
This project involved a year of exploratory research intended to provide a preliminary analysis of the business opportunities available to a group of female entrepreneurs in Monduli, Tanzania. We considered four possible business models and made suggestions to the women accordingly. Our research was conducted through dialogues with non-profit organizations and retailers with global distribution channels, as well as market research surveys and relevant literature.

Introduction
In the past few decades chains of production have become increasingly globalized, allowing individuals to buy goods from locations all around the world. Although the vast majority of these goods are the product of industrialization, the world market has also been introduced to, and ultimately deluged with, artisan products sourced from communities, co-ops, and individuals (Jena, 2010).

In July 2010, one of the researchers traveled to Monduli, Tanzania where she met a group of seventeen widows who had established an informal jewelry co-op that made local sales, but needed assistance reaching out to a global market. They sold jewelry through an American-based organization, Called-to-Serve, but had neither an established business structure nor any retailer relationships in the United States. Moreover, the group had limited production capabilities and relied heavily on the aid of a local business student, Pelo Nyangusi. With these women as an example, the team sought to analyze potential business strategies for the group, which would require assessing their business acumen and capabilities, as well as possible distribution channels available to them within the global market.

Throughout the research process, the investigators were confronted with several organizational roadblocks, as well as the expected legal challenges of operating internationally and the loss of their community partner. However, these challenges led them to conduct a more in-depth exploration of general business opportunities and challenges facing artisan producers around the world. The researchers sought to learn how other artisan production groups have been established and sustained, and explored the resulting benefits and consequences.
Approach

From the onset, the primary goal in researching business models was to find one that understood the women’s production capabilities and desires, while transferring the maximum return to the women rather than intermediaries. The team chose four business trajectories to explore; they were chosen by doing preliminary research to determine the current breakdown of businesses that exist in this market and work with small groups like these women. The four trajectories included: personal website, wholesale distribution, trade shows, and direct store sales.

To explore these different market strategies, the team used many methods of collecting both qualitative and quantitative data. Interviews were conducted with international organizations and distributors, individual retailers, community action and business development organizers in several countries, and countless consumers. In addition, a survey of one hundred participants was carried out to better understand consumer reactions and feelings towards fair trade.

To begin, the team conducted interviews with several small-scale vendors to gain a better understanding of the nature of global market relationships on an individual level. From there, they investigated larger retail chains to assess the consequences that distribution size has on artisan producers, like the women in Tanzania. To understand the issue from a consumer perspective, the researchers held a focus group with university-aged women who expressed interest in socially-conscious products. In addition, the jewelry was also sold in two different retail locations to pilot the possibility of a future business.

Results

Below is the information that was gathered about the different potential trajectories, based on the interviews conducted with current businesses.

**Personal website** – To explore the viability of starting and maintaining a personal website through which international sales could be conducted, the team interviewed both the president and the director of sales and finance of Chaka MarketBridge, a fair trade gift retailer. Chaka employs three full time employees, two of which are working on the ground in the countries from which Chaka buys products. In an instance like this, where a website is a major component of the business, the management is a full time job that would be almost impossible for a group of rural women, like those in Tanzania, to accomplish. Moreover, Chaka has found that website sales are not adequate to sustain the business and has been forced to look at other sales outlets like trade shows (G. Geiling, interview, April 2011). After using this interview as an opportunity to delve further into the cost structure, trade regulations, and time required, it became evident that given the education and resources of the group in
Tanzania, this business model would required continued support of external managers, and was therefore not a sustainable option (Wall, 2004).

**Wholesale distribution** – The team interviewed operations managers at Bridge for Africa and Hand Crafting Justice, both online distributors that sell to retail stores through their website, trade shows, and magazines. Both indicated that they maintain an efficient cost structure by having two to three suppliers per region in Africa, each connected to seven to eight artisans. They expand their market through personal connections and word-of-mouth, taking into account proximity to trustworthy shipping points. Using large shipping containers, suppliers in each region collectively ship in bulk to warehouses within the states (M. McGowan, telephone interview, April 2011). Further conversations with an American social enterprise selling Tanzanian paintings expressed that shipping costs and product price are the two primary decision points for a wholesale distributor in accepting a supplier (A. McKee, telephone interview, October 2011). Vince Mezzera, the operations manager at Bridge for Africa, said that in Africa, each country has very different customs regulations, and they heavily consider major air hubs and proximity to major cities when selecting a supplier. In terms of product pricing, although the focus of the research was on non-profits, social enterprises, and socially-minded distributors, a markup of around 100% was found across the board. (V. Mezzera, telephone interview, April 2011)

**Trade shows** – An interview was conducted with Pixan, a small artisan group in Xela, Guatemala. Pixan’s experience provided a real life example of the options available and the difficulties in entering trade shows. Small producers are generally unable to afford the fees associated with trade shows; their only option, therefore, is to become a supplier for a larger producer, which comes at the cost of ultimately limiting their business autonomy. In Guatemala, producers like Pixan have the ability to enter small trade shows. These local trade shows, however, are sometimes sponsored by larger producers, who are known to replicate designs brought to the show (B. Blevins, interview, March 2011). Because so many retailers buy exclusively in bulk from trade shows, fees to enter these shows can be exorbitant and spots are limited. Given this particular group of women’s limited financial resources and production capabilities, this option was not viable for them.

**Direct store sales** – Interviews were held with the owners of several retail stores in Virginia in order to gain a better understanding of what products retailers are looking for and to gauge their willingness to work with small-scale international producers. Both Stella Blue, in Charlottesville, and AlterNatives, in Richmond, have personal relationships with their producers. They began by bringing handicrafts back from travels abroad. Due to their network of pre-existing relationships, these stores are less willing to buy from new suppliers unless the product is of great quality or in high demand. Other stores, such as The Gift Gallery in Tappahannock, Virginia,
buy their artisan products from wholesale distributors. This one-stop-shop approach allows store owners to buy a myriad of products from numerous different countries from the magazine of one wholesale distributor. Therefore, The Gift Gallery was willing to sell the jewelry produced by the women in Monduli if individuals such as the researchers were delivering it and maintaining the relationship, but would have been reluctant to continue a relationship through email and priority mail with the producers themselves. Larger retail stores like Ten Thousand Villages also have their own producers. They are willing to accept new suppliers but they must be well established, certified producers capable of meeting numerous requirements and specific production levels (C. Warfel, personal communication, May 2011). Nevertheless, the researchers were able to successfully initiate sales at one small crafts shop, Pottery by Hand, in Colonial Beach, VA. Earrings and bracelets were both sold for $5 each. This price was decided upon based on suggestions given by the participants of a focus group held at the University of Virginia. In the past six months, the Tanzanian women have earned approximately $100 from sales at Pottery by Hand.

Discussion

Based on the researchers’ investigation of each business trajectory, it became evident that the most feasible approach for these women is to sell their jewelry directly through small retail stores and boutiques. This method has promise because many retailers, like Stella Blue, are willing to sell the merchandise of producers with whom they have a personal relationship. Since some of these retail shops maintain individual relationships with producers rather than maintaining strict policies, the women are able to make sales despite their small production capability (Smith, 2010). Wholesale distributors, on the other hand, generally require stringent production quotas and quality standards (Louw, 2007). Moreover, working with small retailers like Pottery By Hand allows the women to begin production without large overhead costs. Large up front capital would have been necessary to start a personal website or to participate in trade shows (McGowan, telephone interview, April 2011). Selling through individual retailers also more closely matches the management capabilities of the women, who at this time, despite some outside help, are unable to run a business themselves.

However, even with the small initial success that the sale of the jewelry has had at Pottery by Hand, it is imperative to note the many obstacles that challenge the sustainability of a business venture like this one. As noted above, many small retailers only take on suppliers with whom they have a personal relationship. One of the investigators had this kind of a relationship with the manager of Pottery by Hand, which is how the connection was initially established. In addition, most of the jewelry was imported via personal contacts of the researchers who were travelling...
between the United States and Tanzania. Without intermediaries to help nurture business contacts and offset transaction costs, it is much more difficult to continue making international sales.

Upon the conclusion of this research, the results suggest that placing their jewelry in small retail establishments is the best way for this particular group of women to ensure sales, while respecting their production capabilities and eliminating large transactions costs. By taking advantage of their existing international contacts, these women have an opportunity to build an extensive network of vendors so as to generate a worthwhile and sustainable global market for their jewelry.

References


Biographies

Katie Athaide is a third-year McIntire School of Commerce student, intending to concentrate in Finance & Entrepreneurship.

Leah Coates is a second-year student completing an Echols interdisciplinary major.

Arianna Parsons is a third-year student majoring in Global Development Studies and Economics, concentrating on economic development in sub-Saharan Africa.
Documenting the Benefits of Home Energy Retrofits

Ellen Buckley, Rachel Knee, Candace Pearson, Erin Webb, and Ying Wu

Abstract
This interdisciplinary JPC team worked with their community partner, the Local Energy Alliance Program (LEAP), to enhance LEAP’s mission of increasing energy efficiency in Charlottesville-area buildings. The team analyzed the energy savings and economic returns of homes updated by LEAP-approved contractors to be more energy efficient, and developed a database tool for ongoing analysis. The team also helped LEAP in other areas, including developing an educational program for ecoREMOD, the newly renovated historic home of LEAP, and helping to recruit businesses for the Better Business Challenge in order to promote sustainable practices in local commercial establishments.

Introduction
Our society has long considered increasing energy efficiency as a possible solution to meet its consumption needs. So far, some success has occurred in the residential sector, as total energy use has not risen substantially since the 1980s because increasing efficiency has offset increasing demand (U.S. Energy Administration, 2011). However, there is still much to be gained by further increasing energy efficiency in residential and commercial buildings. As a whole, homes and workplaces are responsible for 35 percent of all energy-related carbon in the United States, and they surprisingly account for a larger percentage than either the industrial or the transportation sectors (Battles & Burns). A reduction in this energy usage would therefore help to meet the well-publicized goals of decreasing pollution and reducing dependence on finite supplies of fossil fuels. Even more enticing for some, a reduction in energy usage also has the potential to save the nation money. Some estimates assert that an upfront national investment of $520 billion would yield a gross energy savings worth more than $1.2 trillion (McKinsey Global Energy and Materials, 2009). Such a comprehensive program may be difficult to implement on a national level; however, the significance of these figures seems to beg another question. Could homeowners realize such profitable returns directly by making small investments designed to increase energy efficiency in their home? The possibility would put money directly into the homeowners’ pocket, increase their own health and comfort levels, and give them the agency to decrease their carbon footprint.
The Local Energy Alliance Program

The team was fortunate to find a community partner in the Local Energy Alliance Program (LEAP), which has made energy efficient buildings a reality for Charlottesville residents since 2009. In order to promote home energy improvements as a worthwhile investment, they find ways to “streamline the home energy assessment-to-retrofit process in order to keep costs down for everyone” (“Local energy alliance program,” 2012). The organization first works to offset upfront costs by organizing available rebates and subsidies to homeowners willing to conduct energy upgrades. Homeowners are then matched with pre-approved contractors to do the work outlined by an energy assessment. Basic retrofits include sealing cracks, insulating walls, and replacing malfunctioning or inefficient systems.

Three JPC team members became familiar with LEAP’s mission and goals when they took a class, taught by Professor Marshall in the Spring 2011 semester, called ENGR 4599: Sustainable Housing. The class project was to create educational materials for display in LEAP’s new headquarters, the ecoREMOD house. This building was a historic house specifically renovated to show LEAP’s customers what kind of energy upgrades they could perform on their own homes. During the class project, the team developed a close relationship with LEAP and sought avenues to aid LEAP in ways that were, from the outset, relatively unplanned, but aimed to meet the fluctuating demands of the non-profit in the future. Only through a close relationship was the team able to be adaptable and sensitive to these needs, while still continuing to make progress on our long-term analysis.

Our Project

As LEAP has grown and expanded, it found that due to a lack of national data and limited examples of different types of energy retrofits, there was little documented evidence of the savings produced by home energy upgrades. This made it difficult for them to promote home energy upgrades to homeowners who wished to know exactly how long a payback period would be for each investment. LEAP understood the need to prove the return of investment on various energy efficient upgrades, stating:

*In time, LEAP anticipates being able to aggregate the efficiency gains of its membership into a monetized product. While our organization does not yet know how long it will take to reach a critical amount of “energy saved” in order to capitalize on these efficiency gains, we seek to measure and verify them for the future.* (“Local energy alliance program,” 2012)

It became the JPC team’s primary objective to enable LEAP to synthesize the information on the homes to provide hard evidence about the cost effectiveness of home energy improvements. To analyze and display this information, the team created a database showing the energy usage for pre and post-retrofit homes for easy com-
comparison and analysis. In the long-term this data could serve as concrete evidence that these retrofits are economically and environmentally worthwhile. It can also be used as a basis to predict in advance what kind of upgrades will be most effective for certain types of homes.

**Methodology**

The research was divided into two major sections—data collection and data analysis. In the first phase, the team collected two periods of energy usage of homes that had received energy-efficient improvements from LEAP: 12 months before and after the renovation. Before analyzing the data, the team had to obtain it from various sources. The first step in data collection was to gain access to targeted customers’ retrofitted profiles through our contact at LEAP. The profiles contain homeowners’ waivers to participate in the energy-saving competition, which authorized the release of their consumption data. The team entered the clients’ information into an Excel spreadsheet and organized them by homeowners and types of energy, such as electricity and gas. Based on the information, the team was able to group the clients by their utility companies and request energy usages of the homeowners according to their source of utilities. In addition to the data obtained from energy providers, the team collected information from contractors on what was done during the renovation and the cost of the various measures.

In the second phase, the team analyzed the data to specifically demonstrate the cost-effectiveness of the retrofits. Once a sufficient amount of homes and their corresponding information and utility data were obtained, the team chose Excel to store all of the data into a single file. This database needed to be designed in such a way as to be an ongoing system for data-entry, as LEAP’s clientele continues to expand. In addition, the database required a simple layout for a dense amount of information on each home. As the study on residential energy usage and retrofits continued within the University of Virginia and LEAP, the database needed to have an effortless data-entry system for multiple users that would suffice for years with little maintenance required.

**Results**

Implementing the plan to collect and organize household energy data resulted in two significant outcomes. First, a foundation for a database in Excel to analyze energy usage in any given home was established. This research tool allows for one to study the functionality of particular houses, and to observe the benefits of weatherization and other retrofit measures. A coding program known as “Macros” was implemented within Excel to automatically calculate quantitative results, establishing a user-friendly system for data entry and analysis.
This database includes critical details for analysis such as square footage, year built, and number of occupants. As more houses are added, the system is set up so the homes can be organized in numerous ways for research. For instance, houses can be sorted in terms of efficiency (energy usage per square foot) for a particular month or year and then can be filtered based on particular retrofits done such as insulating exterior walls, sealing cracks, installing new windows, or replacing heat pumps.

The second noteworthy outcome was the initial progress in calculating the savings homeowners are experiencing. Only four homes had enough significant data at the time of the project. This was because the majority of LEAP’s houses that have gone through the program are not yet ready to be analyzed. In order to fully understand the efficiency of a house, one must observe the energy consumption during all seasons of the year since heating and cooling play such a significant role in residential energy consumption. Many homes have yet to experience a full year of weather after retrofits have been completed. Nevertheless, the four homes that underwent retrofits a full twelve months prior to analysis do show promising results. Within at least the first 6 months after renovations were completed, the homes were performing more efficiently. Figure 1 shows the breakdown of monthly energy usage for these initial four homes, comparing how the homes consumed energy before and after retrofits were completed. Initially, there may appear to be an area of concern during the spring months for most of the houses, or not a very significant reduction in energy. However, the spring and fall seasons in Virginia tend to be so mild that there is not as much area for improvement in efficiency because no significant heating

Figure 1: Energy Usage Comparison Before and After Renovations
Figure 2 provides concrete values of the savings the four homes are experiencing. Furthermore, House C appears to be experiencing the most benefits. Based on its current energy consumption tendencies, the home is predicted to have its annual savings payoff the initial upfront costs of $4,800 in approximately 5 years.

Discussion

The findings of this project will prove very useful to LEAP in marketing the service they provide. The database has made it easy for the bills of the upcoming months to be entered and analyzed to determine if energy retrofits on the homes will result in lower utility bills. This concrete information can be used to encourage more homeowners to participate in the program. If participation increases, the community would experience many benefits. The retrofits ensure more comfortable and healthy places to live and work. New jobs in construction would be in higher demand to perform these retrofits, creating small business opportunities locally.

Despite making what we considered to be important advancements, there were several obstacles to making more progress. During the data collection process, some energy providers could not provide us with the data we needed because their systems only held the memory of the past 24 months. Another online database which housed utility data, Energy Compass, had no data for certain months, which made the analysis much more difficult. Since the goal was to assess the success of retrofits, having incomplete data for either the year before the renovation or the year after made the analysis less useful.

Furthermore, as Figure 3 shows, the team had to individually contact each electric or natural gas provider to obtain utility information for each person participating in LEAP. This process was incredibly slow, and many times one member had to go back and forth with the utility company to get the correct information. An improved process, shown in Figure 4, would considerably reduce burden on LEAP.

As a result of these challenges, and upon realization that dozens of homes will be ready for analysis in Spring 2012, the team took steps to improve the process for data gathering for the next JPC group that will conduct the continued analysis. This next round of analysis, beginning as data becomes available in the spring, will have more homes, a full year’s worth of data, and may have more extensive retrofits since LEAP has gained more credibility in the community. Information about the homeowners’ satisfaction, including condition of the house and overall level of comfort
would add a qualitative level to evaluating the success of home energy retrofits. The team therefore views this year’s work as importantly receptive to the needs of LEAP in achieving its mission to promote energy retrofits and as significantly enabling the possibly more conclusive work of the next JPC team.

References


**Biographies**

**Ellen Buckley** is a second year Civil and Environmental Engineering major. She also hopes to minor in Technology and the Environment and Global Sustainability.

**Rachel Knee** is a third year Mechanical Engineering major and has been involved with sustainable building projects for the past two years.

**Candace Pearson** is a third year English major with an Urban and Environmental Planning minor. Accordingly, she usually can be found reading a book on a park bench or mountainous trail.

**Erin Webb** is a fourth year concentrating in Information Technology in the McIntire School of Commerce and also majoring in Environmental Thought and Practice in the College.

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Establishing a Ceramic Water Filter Factory in Limpopo Province, South Africa

Molly Tyeryar, Caroline Hackett, David Harsh, Theresa Hackett

A need and desire for water purification in Limpopo, South Africa

In 2010, a team of undergraduates, graduate students and faculty members at the University of Virginia formed with the mission of determining if there was a want and a need for in-home water treatment technologies in Limpopo, a rural province in South Africa. The 2010 team conducted a survey of 220 households in two representative communities. The team found that only 3.9% of household water samples met the World Health Organization’s standards for safe drinking water. They also found that ceramic water filters (CWFs) fit the characteristics that households would look for most in water treatment technologies and 95% of households surveyed said they wanted to buy a ceramic water filter. With willingness-to-pay averaging $13, CWF would not only be socially acceptable and capable of improving drinking water quality but affordable (Tyeryar, et al., 2011). In partnership with the University of Venda (Univen) in South Africa and the Mukondeni Pottery Cooperative, a JPC team is helping to build a for-profit CWF factory that will employ fifty local potters and produce quality filters to be sold in the region.

The current study explores broader markets than individual consumers, such as a market for CWFs within governmental departments, non-governmental organizations, and health organizations.

With our partners, we began construction of a model filter factory, started developing marketing and health education strategies, established a non-profit organization called PureMadi, and determined a business strategy. The overall goal is not only to create one functioning filter factory, but to also create a model to be replicated in other parts of the world.

What is a Ceramic Water Filter (CWF)?

CWFs are a point-of-use (household-level) water treatment technology. They are manufactured by combining local clay, sawdust, silver nanoparticles, and water. When fired in a kiln, the sawdust combusts, leaving small pores in the ceramic matrix that are coated by the silver nanoparticles. The silver acts as a chemical disinfectant, eliminating bacteria, and the pores allow water flow and physical filtration, removing turbidity (Oyanedel-Craver & Smith, 2008). This low-tech, low-cost ($10
Establishing a Ceramic Water Filter Factory in Limpopo Province, South Africa

Retail price) CWF with a 3 year lifespan can provide a simple and sustainable solution to the diarrhea burden caused by unclean water.

Previous Research

In addition to the research study in 2010, we conducted research on a functioning filter factory in the Dominican Republic and an associated non-profit called FilterPure in order to learn from their mistakes and successes. We established relationships with South African embassy officials to learn about the construction and distribution process specific to South Africa. Through these conversations we learned about the importance of marketing the filters alongside a water and health education campaign. The South African Embassy and a commercial trade officer for the US Department of Commerce strongly encouraged us that our factory would be well-received in this water-poor region of South Africa.

Why the Mukondeni Pottery Cooperative?

Initial analysis of the data collected in 2010 led the team to make a preliminary proposal of partnering with potter Noria Mabasa. The ceramics skills that she possessed, along with her already established connections in the surrounding community, supported this decision. However, upon further communication with Mabasa, we decided that it would be better, for both parties, to build the factory with the Mukondeni Pottery Cooperative, located in the village of Mashamba. The cooperative has 46 women potters who are skilled in hand-made ceramics. One concern about a partnership with Mabasa was that running a CWF factory would take time away from her established pottery business. The women at the cooperative could work in shifts and make a product they find useful for their community, as well as continue creating artistic pottery.
Building relationships and learning about the region during construction this summer

As our team constructed the CWF factory, we investigated potential filter distribution strategies for the region. We built strong relationships with the University of Venda (Univen), non-profit organizations, government organizations, and a local hardware company. Contacts at these organizations provided insight concerning our business process and their support gives our efforts further credibility.

Government Departments and Municipality Interactions

We met with several members of local government departments and the Thulamela Municipality to determine if the filters could be easily sold and the willingness of the municipality to distribute filters in the future. Our Univen partners were especially helpful in communicating our project objectives and the role we hoped these departments would play. Our goal is to utilize these official departments as avenues for filter distribution to more rural communities in the region. A formal contract will also boost our filters’ credibility within these communities, as well as encourage sales negotiations with future buyers.

We received promising and valuable feedback that was consistent throughout the departments. Within the Department of Water and Forestry, employees enthusiastically declared they wished to purchase filters as soon as they were on the market. The Department of Agriculture also indicated interest and suggested we enter our finished product in the Young Aspiring Farmer Association and the Female Farmer Competitions. These are district events that could showcase the filter and help gauge

*Our factory under construction*
Establishing a Ceramic Water Filter Factory in Limpopo Province, South Africa

the market in the agriculture sector. Although we determined that there is a market for selling filters to government departments, we can only make contracts after the factory consistently produces filters. Therefore, we will need to revisit each department with a functioning prototype filter and our sales pitch before any contracts can be formalized. Additional literature and a demonstration would make the officials more willing to make a favorable decision.

Non-governmental Organizations (NGOs) Interactions

Prior to our arrival in South Africa, we researched NGOs and developed a preliminary list of those that work on water related issues in-country. We attempted to contact these organizations prior to arrival, but were unsuccessful. Upon arrival we were able to reach some organizations and learned valuable information from the phone calls alone. One of the main sentiments we heard was that our factory sounded like a great resource but until we actually had a product produced and ready to show, the NGOs did not feel that a meeting would be warranted. One of the organizations we talked to was the South Africa Water Research Commission (WRC). The WRC conducts research on different water issues and one of their areas of practice is water purification. Though we did not get to meet with anyone from WRC, our contact did send us a working paper on the different processes of using silver in ceramic water filters.

We also met with The Rotary Club of Louis Trichardt, Limpopo, to discuss our project. The club is a valuable body of knowledge on water issues in South Africa and helped us find materials needed to equip the factory. The network was invaluable in helping us understand differences between the US and South Africa.

Discussion: Business Plan Proposed

We used the information we gained from different organizations to start planning fundamental stages from production to in-home use by a customer. We worked to develop a business plan, with the goal of being a sustainable business without the continued need of outside funding. In April 2010 we visited FilterPure, a non-profit that provided the financial support to work with ceramicists and local managers to construct factories in the Dominican Republic and Haiti. FilterPure operates as a monopsony (sole buyer) for the two for-profit factories, which are independent from FilterPure, and acts as the sole distributor of the filters.

Similarly, we are planning for the production and distribution of filters in Limpopo to be split between two entities. Our non-profit organization, PureMadi, will be responsible for conducting filter quality tests, marketing the filters, establishing an efficient distribution channel, and having limited oversight of production. The for-profit factory will manufacture the filters and sell them to PureMadi. This separation will ensure quality control and effective marketing of the product; the
potters at the factory are experts in clay and ceramics and will control production, while PureMadi will be responsible for marketing and sales. After being packaged at the factory, the filters will be transported to the distribution center located near Univen in Thohoyandou, a city of about 44,000. Our main reason for supporting a centralized location is that it will provide easier access to many different remote areas surrounding Thohoyandou and will keep delivery costs down. Currently, filters are not being produced up to standard, but research on clay and sawdust ratios, kiln temperature, and flow rate is being conducted and filters are predicted to be ready for sale in Summer 2012.

Lead Univen marketing students, chosen by an application process, will work closely with faculty members and make periodic visits to the factory in order to further encourage a production rate as determined by current sales. While visiting the factory, these students can monitor production and make sure that all specialized materials, like silver, are ordered with ample lead time. Once the filters have been approved, these students will develop and conduct orientations for potential sales personnel. The objectives of these orientations will be to educate more marketing students about the filters so that they can market them as well. This process will limit the number of students needed to manage the factory but will allow for an unlimited supply of marketing personnel as the factory expands.

Because of the silver’s relatively high cost and importance to the filter, PureMadi will be responsible for providing it to the potters for incorporation into the filters. Current research supports that each filter can be produced and packaged for under 15ZAR. Depending on the validity of this assumption and in order to assure the factory’s profitability and ability to expand, PureMadi will set a price that is about 15–20ZAR higher than production costs.

This plan will be a viable option for providing potable water to the most people. This plan maximizes the skills of all parties involved and will truly engage our community partners both at Univen and at Mukondeni Pottery Cooperative. Many of the potters are also interested in working in our CWF factory. Splitting the production and distribution will allow the potters to continue to create their traditional pottery while generating a supplementary income stream through filter production.

*Our kiln under construction behind one of the Co-op’s pottery fire pits*
Handling the distribution business at Univen will make marketing, testing, and distribution of the filters more feasible, providing many practical experiences for students. For example, Univen marketing students can use the knowledge they have gained in the classroom to market filters, benefit from the real world application and engage the local business and broader NGO community. Microbiology students can gain experience while working as quality control testers in the laboratory. Our plan will also engage education students at Univen. Educating consumers on how to use the filter and the importance of sanitation is critical to the factory’s success. An educational pamphlet and short presentation are being developed by the JPC team.

With PureMadi establishing a monopsony through oversight of the factory, we will ensure that all filters meet high standards and are sold at an appropriate price for our target market in rural villages. Although there is uncertainty and risk involved in this plan, we believe it creates the greatest potential impact for the customers we hope to serve.

What next?

The business plan lays the foundation for years of collaboration between Univen and UVa and paves the way for follow-up through opinion surveys and health as-
sessments, which is the final phase of the filter factory vision. By the end of 2012, the infrastructure at the factory will be entirely assembled and training for the potters in the production processes will be complete. Once quality assurance criteria are met consistently, filter sales will begin through PureMadi, and Univen student salespeople will be brought on board. Educational materials and a water-and-health curriculum will be developed with our Univen partners and implemented alongside our marketing plan. We will continue to work towards a profitable filter factory that will provide effective water purification technology to communities in need.

References


Biographies

Caroline Hackett is a third year Civil and Environmental Engineering student with a minor in Environmental Science. She will return to Limpopo for the third time in 2012.

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Water and Health in Limpopo: Case Study of Tshapasha and Tshibvumo

Miki Aristorenas, Locke Bell, Jimmy Comfort, Dyanna Jaye, Siddhartha Pailla, and Rachel Woloski

Faculty Mentors: Professor Karen Firehock and Professor Garrick Louis

Abstract
Water infrastructure projects face significant social, cultural, and political hurdles in any community. In developing communities, these hurdles are compounded by a lack of human and financial resources, and by complex tensions between traditional and modern forms of government over issues of land ownership and water rights. Our Water and Health in Limpopo (WHIL) group focuses on two interrelated objectives: improving access to clean water supply and sanitation, and improving health and hygiene habits through education and community engagement. In particular, the ongoing WHIL Water Supply and Sanitation (WSS) and Health and Hygiene (HH) Education Project is developing a model that assures sustained access to water and improvements in community health. This model is validated through implementation of water systems in the villages of Tshapasha and Tshibvumo in Limpopo Province, South Africa. The project plan was developed and executed in partnership with faculty and students from the University of Virginia and the University of Venda. The group worked as two primary teams: the WSS team focused on access to treated water supply, and the education team developed an intensive curriculum focusing on Earth’s water supply, the water cycle, water storage, water treatment, and sanitation practices.

Introduction
Limpopo is a predominately rural province in Northeastern South Africa, bordered by Mozambique to the East, Zimbabwe to the North, and Botswana to the West. Limpopo ranks second-lowest among provinces in terms of access to piped water, with 72% of households having access (Schowabe 2011). Diarrhea, a water-related illness, is the second leading cause of death in Limpopo Province, behind HIV/AIDS (Schowabe 2011). According to the World Health Organization, water-related illnesses lead to over three million deaths per year worldwide, most of which are children under the age of five (WHO 2009, Hunter 2010).

Problem and Research Hypothesis
Access to information on interventions that could significantly reduce the risk of water-related illnesses is limited in developing communities due to language,
illiteracy, and institutional barriers. Without sustained access to clean water, low quality water being used for drinking and hand washing has become a large factor in increased rates of diarrheal disease. Tomlinson et al (2007) ranked improved hand washing education and practice as the second highest priority for research in South Africa in their assessment on the country's current needs.

The Water and Health in Limpopo (WHIL) project was initiated in 2008. The ongoing WHIL project partners University of Virginia's (U.Va.) and University of Venda's (UNIVEN) students to develop and implement work-plans addressing water and health in Tshapasha and Tshibvumo. Currently, both villages do not have access to “improved” water supply and sanitation, as per the WHO definitions. The WHIL collaborative has already helped to establish an improved water supply in Tshapasha, and has plans to finalize a Slow-Sand Filter (SSF) for treatment. While access points have been identified in Tshibvumo, the WHIL team has not yet helped to install water supply and distribution infrastructure there.

Physical infrastructure improvement alone cannot improve health conditions; social behavior change is required for adaptation of a healthier living style. To address this divided problem, this project explored the hypothesis of a paired intervention – water infrastructure development and health and hygiene education. The team predicted that the joint program will be more effective for long-term capacity building and, as a result, general health improvement in the villages.

**Approach**

The WHIL group employs a multifaceted approach that intervenes at several different points between water collection and consumption. The team’s main strategy is to educate stakeholders through every step of the water unit operations while collaborating to improve the water access infrastructure.

The walkthrough will focus on Tshapasha, pictured below. The water is accessed from the Pfaleni River and is brought down to the storage via two 50mm flexible PVC pipes. The water is treated through a slow-sand filter, a gravity-based particulate and pathogen filter, that removes harmful microbes from the water. The water is then stored and chlorinated in large “Jo-Jo” tanks –10kL hard rubber-plastic containers – before being released to the village twice a day. The goal is to deliver 25 liters per capita (lpc) each morning and evening, which would double the South African Water Law of 1998 and World Health Organization Water Guidelines. Villagers receive water through standpipes in their yard; many villagers often store it in open containers. As aforementioned, it is during open storage that the water tends to become re-infected, even if it has been treated before. Another WHIL-affiliated team is working on a point-of-use ceramic water filter product for villagers to store their water safely from standpipe to point of use.
Figure 1. Water unit operations of a typical water supply system.

Figure 2. Map of Tshibvumo's proposed water system expansion from 2011 Systems Capstone Team and Tshapasha's current water system as exists. (SIEDS 2011).
To achieve the above normative scenario, the interdisciplinary UNIVEN and U.Va. group met with leadership of both villages. The traditional leader – the village headman – gave us authoritative support on behalf of the village. The villages’ respective water committees worked with us more specifically on our design and choosing of alternatives. Our mutual expectations for progress were outlined at the beginning. In Tshapasha, we would troubleshoot the SSF and rehash the distribution system; in Tshibvumo, we would identify water access points, start to build an access system, and start to design the distribution network as illustrated in Figure 2.

While the WSS team focused on improving water quality and supply, the HH Education team worked with primary school children in both villages to increase understanding of how water and hygiene relate to their own health. A previous WHIL team had provided the community with a curriculum that mainly addressed “germs” and hand washing. The HH team added water storage, conservation and uses, and awareness of their local watershed. The end product was a four-day curriculum taught in the afternoons in Tshapasha Primary and Mboneni Primary in Tshibvumo. The aim was for pupils to take the hygiene message home to their families.

The curriculum was taught primarily in English by both U.Va. and UNIVEN students. Two of UNIVEN students were fluent speakers of the local language, Tshivenda, and were able to translate key points to ensure understanding. The teaching methods included interactive posters, student presentations, wipeboard question activities, note-taking, and homework. At the culmination of the program, the students were also left with a written pamphlet containing the main concepts taught during the class.

Figure 3. The curriculum highlighted the following: water cycle, water pollution, water use, local watershed, water filtration (slow-sand filter), water storage, hand-washing.

Figure 4. Clogged underdrain due to poor layering.
Implementation and Results

In June, as the SSF performed an initial assessment before implementation, several alarming changes were discovered. Over the last year while the SSF was shut down, weeds had grown, water was piled with unknown bacteria, and the distribution network was drastically modified. Immediately, it was recognized that poor communication protocol between villages and UNIVEN, and UNIVEN and UVA must be significantly revamped. Additional problems included:

- Use of poor quality materials during original construction
- Broken underdrain and weir system
- Improper maintenance
- Water flow problems from filter to storage (clogged pipes and pressure differential)
- Unclear water distribution network
- Improper practice of chlorination for disinfection of water

Over the next two months, the team cleaned, cleared, removed old pipes, installed new pipes, redesigned the filter with different materials, installed new underdrain and materials, lowered storage tanks for proper pressure differential, shocked the distribution network with chlorine to remove suds and bacteria, backfilled the SSF to wash out dust from filter materials, and finally tested water flow rates. Furthermore, the team mapped the original water distribution network so that we can replace pipes if needed in the future. At the end of the students’ visit, the SSF was not connected to the water supply because 1) the team ran out of time and thus could not test the revamped filter’s effectiveness in cleaning the bacteria, and 2) the filter needs to be observed over a longer period to ensure structural stability and flow consistency. However, one tangible success is that the local volunteers had learned a considerable amount about the methodology behind the filter, the pressure differential, and the general water supply system. By end of July, they were able to navigate the different water unit operations confidently, albeit with few errors.

The team’s work-plan did not anticipate the lengthy repairs in Tshapasha. As such, expectations for Tshibvumo were reassessed half-way through the trip. The team focused on source identification. The village’s Chief received permission from a neighboring village to access water from a different point in the Tshala River, which was previously assumed to be off-limits. This area has settled water – meaning lower turbidity and bacteria count. Furthermore, since it is at a higher elevation level, water can still be gravity-fed, which would eliminate the need for pumping. Data collection was emphasized such that future teams may redesign the system with new alternatives.

Primary school education programs facilitated by the HH Education Team were well attended in both villages. Attendance numbers varied from day to day in both
villages and ranged from 17 to 27 students. Class participation was very high; the children used the opportunity to practice their English through homework and presentations. At the end of each class, the children’s ability to paraphrase the day’s lesson, re-explain each interactive poster, or explain the importance of specific activities such as hand washing provided a good measure of the program’s effectiveness. The children’s hand washing skills improved noticeably due to daily practice during class. While behavior within the stakeholder group improved during the visit, longitudinal assessments must be performed to measure retention of knowledge. Furthermore, the team did not evaluate unintended consequences with respect children that did not participate in the program.

Discussion

The WSS team faced a range of issues – supplier uncertainty, communication with volunteers, and, at times, difference of culture. The team needed many supplies, the most important of which is sand grain of a particular size that seemed either too elusive or expensive. Procuring materials necessary for the SSF’s full functionality demanded significant time and resources. Nevertheless, the team organized a great
supplier network with discounts for future construction-related projects. Some suppliers even consulted on design and implementation issues. Most other issues were socio-cultural. The team sought to educate local volunteers in the methodology and importance of the individual water unit operations. It succeeded when the group was between four and six volunteers; any less were unproductive and any more were distracted. Future teams should specifically plan for high-labor days, and ask the Chief for additional volunteers accordingly. Otherwise, they should work repeatedly with a core group, which will increase efficacy similar to a smaller classroom.

The HH Education team encountered several challenges as well. The primary hurdle was logistics. Since the UNIVEN Nursing students were still in session, it was difficult to schedule and transport the team with additional constraints of the villages’ schools’ schedules. Moreover, while teaching the children, the HH team noticed that each village had different proficiencies in English. The two villages also differed in curricular aptitude. After the lessons were complete, the team met with the teachers and the principles of the respective schools. The team presented the idea of continuing the curriculum, albeit independent from U.Va./UNIVEN students. While Tshapasha seemed fairly receptive to this idea, Tshibvumo hesitated – the principal
felt that the largest benefit to the children was the opportunity for interaction with native English speakers and persons of a different culture.

**Conclusion and Future Work**

Previous teams sought to improve health in Tshapasha and Tshibvumo through infrastructural improvement alone and received lukewarm results. This team set out to see whether a paired education and water infrastructural improvement plan would enable a better path towards holistic capacity building and health improvement. The approach was divided by infrastructural development and education. While marginal benefits were noticed in the respective stakeholder groups through both teams’ activities, the link between education and infrastructure seemed more complex. Particularly, dissemination of new knowledge proved to be especially difficult in the male adult population. Nevertheless, a core group was able to demonstrate aptitude in maintenance of the existing system. With regards to HH education, longitudinal studies must be performed to evaluate behavioral change as well as effect on indirect stakeholder groups, such as women and other children in the village.

Future work should focus on bridging the gap between infrastructure maintenance and HH education focusing especially on the young adult male population. A technical training program that emphasizes the importance of water health and associated behavior, while providing technical knowledge on piping, chlorination, and water management, could build capacity in the otherwise disengaged male youth in the villages.

**References**


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### Biographies

**Dyanna Jaye** is a third year Environmental Science major at the University of Virginia.

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Perceptions on Women’s Health Needs & Resources in Santiago Atitlán, Guatemala: A Multi-Faceted Approach

Sareena Pabla Brown, Steffi Castillo, Shreya Kanth, Ariel Majidi, Onyeka Darlene Nnanyelugoh, Vatsal Patel, and Micaela Ramirez

Abstract

The general health needs of women in Santiago Atitlán, Guatemala are largely uncharted in public health literature and national records. Thus, the capacity of community resources to meet women’s health needs is unknown. To fill this information gap a team of undergraduate and medical students recorded the perceptions of the community regarding general and maternal health care, domestic violence and education. Their results revealed a dichotomy between allopathic and traditional care, though both forms can complement each other. A lack of financial resources for specialized care was a common obstacle towards accessing medical services. The community also recognized the prevalence of domestic violence, but did not mention any developments to decrease it. Additionally, educational opportunities for men and women are theoretically equal but differ in practice. The survey findings and methods will serve as a resource for future community initiatives to address women’s health issues.

Introduction

Santiago Atitlán’s municipality, housing 44,767 predominantly indigenous Tz’utujil people, demonstrates a need for attention to women’s health, involving issues of cultural confrontation, health education, and resource limitations. A University of Pennsylvania study on women’s health in Santiago Atitlán reveals a lack of accessibility to medical assistance, as well as the rarity of follow-up treatment (Shram & Etzel, 2005). With traditional midwives attending approximately half of all births in Guatemala (Callister & Vega, 1998), communication between allopathic physicians and traditional providers is essential. However, midwives may be reluctant to refer women due to condescending attitudes of allopathic providers, language constraints, and poor access to health facilities (Goldman & Glei, 2003). Education is a large determinant of how women receive care as well. 12% of women in rural Guatemala without formal schooling visit an allopathic provider versus 42% of women with six or more years of schooling (Glei et al., 2003). Domestic violence is also a determining factor influencing women’s health. Women in developing countries suffering from abuse often develop physical and emotional health problems that go unrecognized (Heise, Raikes, Watts, & Zwi, 1994). In all, a better understanding of accessibility, maternal health, education, and domestic violence will provide insight into the health needs of women in Santiago Atitlán.
UVA-GI:

This survey is a project of the UVA-Guatemala Initiative (UVA-GI), in collaboration with community partner Hospitalito Atitlán (HA), a non-profit hospital in Santiago Atitlán. The UVA-GI aims to develop partnerships between UVA students and Guatemalan communities by catalyzing community-based projects and providing students with cultural and language immersion opportunities in Guatemala.

Objective:

This study focuses on four facets of women’s health in Santiago Atitlán, as suggested by HA. These categories include accessibility to health care services, maternal health, education, and domestic violence. The approach involves analyzing the perceptions on women’s health of four distinct community constituencies - community leaders, service providers, women, and men - to capture a comprehensive understanding of women’s health. The aim of this study is to document and assess community perceptions and resources related to women’s health in Santiago Atitlán to facilitate future efforts to address women’s health needs.

Methodology

Community leaders were identified by the community partner as influential individuals in the community, including religious and governmental leaders, while service providers were primarily those who offered clinical health services. While appointments were scheduled to interview community leaders, convenience sampling was used to select all other interview participants. Most interviews took place in Santiago Atitlán’s urban district because a majority of the population resided there. Due to time constraints, the team surveyed three out of the seven districts in Santiago Atitlán. Surveys performed in the waiting room of HA were considered a distinct category, as the interviewed patients came from all districts, not just the urban center.

<table>
<thead>
<tr>
<th>District</th>
<th>Community Leaders</th>
<th>Service Providers</th>
<th>Women</th>
<th>Men</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban District</td>
<td>15</td>
<td>16</td>
<td>35</td>
<td>28</td>
<td>94</td>
</tr>
<tr>
<td>Cerro de Oro</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>Chuk Muk</td>
<td>0</td>
<td>1</td>
<td>21</td>
<td>13</td>
<td>35</td>
</tr>
<tr>
<td>Chacaya</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hospitalito Atitlán (HA)</td>
<td>0</td>
<td>1</td>
<td>24</td>
<td>23</td>
<td>48</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>19</td>
<td>23</td>
<td>87</td>
<td>72</td>
<td>201</td>
</tr>
</tbody>
</table>

*Figure 1. The 201 individuals interviewed were spread over four districts in Santiago Atitlán and the waiting room in HA.*
All questions solicited general perceptions of women's health rather than personal experiences in order to respect privacy. Interviews were conducted in either Spanish or Tz'utujil, and confidentiality was ensured. In collaboration with their community partner and in-country coordinator, students developed open-ended questions that were culturally sensitive and encouraged the discussion of women's health. Questions that would cause interviewees discomfort were omitted as advised by the community partner. The following are sample questions from the survey:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>What are the main obstacles that prevent people from accessing health care?</td>
</tr>
<tr>
<td>Maternal Health</td>
<td>Where do women go to receive care relating to maternal health?</td>
</tr>
<tr>
<td></td>
<td>What do you think pregnant women should know and do?</td>
</tr>
<tr>
<td>Domestic Violence</td>
<td>Under what circumstances does domestic violence occur and what do women do in such situations?</td>
</tr>
<tr>
<td>Education</td>
<td>What, if any, are the deficits in the overall regional education system?</td>
</tr>
</tbody>
</table>

Figure 2. Survey questions posited to community leaders, service providers, men, and women resembled the above.

Basic content analysis, a quasi-statistical approach that screens for regularities in words, themes, and concepts, was used to classify the transcribed responses (Crabtree & Miller, 1992). This analytical method was deemed best suited to extrapolate overarching community perceptions. A two to three letter coding system was developed to better organize and tabulate responses (Taylor-Powell, 2003) (Figure 3). Analysis included extracting general trends from the response counts and referring to the original transcripts for further information. All survey responses were and recorded in a spreadsheet to facilitate the tabulation and analysis of data.

Results & Discussion

Accessibility

Based on survey findings, the most commonly used health care facilities in the community are the Puesto de Salud and 24-hour Centro de Salud, both governmental health centers that provide free care. Rxin Tnamet, a NGO, provides private care at an affordable cost, and Hospitalito Atitlán charges based on a sliding payment scale. The nearest public hospital is in the department capital of Sololá, a two-hour journey from Santiago Atitlán. Other forms of health care include private clinics, traditional healers, home remedies and over-the-counter medication.

All groups cited allopathic health resources for general medical needs. A higher
proportion of women (48%) sought self-medication in non-emergent situations than men (26%). Self-medication included instances in which a person reported staying at home, resting, going to a local pharmacy, or treating him or herself without consulting other means. Among all community members, a lack of financial resources was the most commonly cited obstacle to accessing medical assistance. Though some organizations provide free consults, few had funds to waive pharmaceutical drug fees.

Other obstacles included inadequate medical supplies and a shortage of medical staff. One physician noted a deficiency of medical supplies, stating, “Because medicines are expensive, people [do not] buy the prescriptions even when we prescribe them. Then, they come back with a complicated problem that was left untreated.” His insight illustrates that insufficient medical supplies compounded with an inability to pay have created a vicious cycle of escalating medical conditions that are otherwise preventable.

Maternal Health

From the community leaders and service providers’ responses, a narrative of the community’s maternal health situation emerged, involving 1) the distinction between allopathic and traditional care and 2) the general lack of education related to pregnancy and childbirth. 71% of women reported receiving allopathic care for preg-
nancy, while 27% reported going to a midwife or staying at home. Service providers and community leaders reported that over 50% in Santiago Atitlán sought care from a traditional midwife as a cultural custom.

With regard to maternal health education, service providers voiced that women rarely adhere to prenatal care plans and are often unaware of dangers of overexertion during pregnancy. Community leaders and service providers agreed that preventive measures must be ingrained in the community mentality, and that more specialists and advanced medical facilities are needed. The resounding need voiced by men and women was specialized care for pregnant women.

**Domestic Violence**

Physical, verbal, emotional, and sexual abuse were reported to exist in the community, with *machismo* (male chauvinism) being a contributing factor to domestic violence. The majority of community leaders (58%) and service providers (63%) interviewed were unable to name specific programs. A common response to where women go when they experience abuse was that fear and shame impede on their ability to seek help. While there are mental health services for women in Santiago Atitlán, including a psychiatrist who purportedly visits the community weekly, the services were deemed inadequate.

The male and female populations in Santiago Atitlán both agreed that domestic violence was prevalent in the community. However, women stated that an abused woman might go to family or friends for help, while men believed women keep quiet. 65% of women and men did not know of any programs that deal with domestic violence.

**Education**

Although men and women theoretically have the same educational opportunities in Santiago Atitlán, their actual attendance differs because of domestic pressures imposed upon women and financial difficulties. While community leaders thought men and women had the same opportunities, many would mention cultural pressures as preventing women from seeking education. Service providers thought educational opportunities were not equal and referred to *machismo* and economic difficulties as reasons for this inequality. Both men and women agreed that their educational opportunities are equal and mentioned lack of financial means, family pressures, and discrimination as obstacles.

**Limitations**

Methodological limitations included language barriers as well as approaching participants in public settings with outside distractions. With regard to language barriers, when Spanish concepts could not be translated precisely into Tz’utujil, questions were sometimes reworded, or example answers were given. Such departures
from the standardized questions may have contributed to biased data, especially if answers were suggested.

Next Steps and Conclusion

While all survey topics from the assessment deserve attention, maternal health and domestic violence stood out as areas that can be addressed most readily by mobilizing community resources. For example, collaboration between physicians and midwives may result in greater patient referral and improved health outcomes for women. In addition, training local health promoters in basic mental health counseling may increase the availability of these services and help address the issue of domestic violence in the community.

The strong collaboration between the student researchers and HA has led to the training of local university students in survey administration. The survey methodology will be used by the community partner to expand on other projects in the area, such as assessments of cardiovascular and preventative health. This will lead to the sustainability of public health efforts as the community can utilize the survey methods to investigate and deeply address community health issues.

References


Biographies

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YWLP in Cameroon: Building Sustainability and Connection

Taikei-Ara Jarmon, Abigail Moul, Kate O’Donnell, Maj-Britt Frenze

Graduate Advisor: Caroline Berinyuy
Faculty Advisor: Dr. Jennifer Merritt

Abstract

The Young Women Leaders Program (YWLP) is a mentoring program that typically pairs college women with middle school girls in a one-to-one model. In 2009, Caroline Berinyuy established an adapted version of YWLP in Cameroon. In the interest of strengthening connections between international YWLP sites, a research team traveled to Cameroon to conduct a training workshop in order to increase the number of Big Sisters in Cameroon and encourage them to forge ties with Big Sisters in the United States. The team revised the YWLP Cameroon handbook with input from current Cameroonian Big Sisters, dividing the program’s curriculum into two years with varied discussions for each year’s sessions in order to provide a better and more sustainable structure. The team also initiated a technological connection between the US and Cameroon by teaching basic computer skills to Big Sisters in Cameroon and providing them with laptops, digital cameras and webcams. The JPC team interviewed current Cameroonian Little Sisters about their experiences in YWLP to gain insight into cultural differences between the US and Cameroon and to better the program’s “Global Connections” curriculum. The Data collected from a survey following the training suggested that the workshop empowered and educated Cameroonian Big Sisters on leadership and adolescent development.

Literature Review

Mentoring is a practice that is commonly used in an effort to initiate positive relationships with non-familial adults (Scales, 2003). Mentors can help facilitate healthy youth development by providing guidance and support as adolescents experience many changes in their physical, socio-emotional, and cognitive characteristics (Buckley & Zimmerman, 2003). Mentoring has also been shown to influence the development of sound educational habits that can help lay the foundation for a successful career path and future (Kao & Tienda, 1998).

The practice of mentoring has been applied in many different locations, as well as within different racial divisions and across nations, providing a global component
to the youth mentoring trajectory (Rhodes, 2002). One of the main groups that has helped facilitate global expansion of feminism was the United Nations World Conference on Women in 1995, where African women had a strong presence in advocacy for furthering women’s initiatives (Tripp, 2006). While the basic mentoring principles are widely utilized, programs vary based on location and population of participants (Buckley & Zimmerman, 2003). These differences change the dynamic within the mentor-mentee relationship and the types of goals that are established from the beginning.

Introduction

The Young Women Leaders Program was established in Charlottesville, VA in 1997 and has since disseminated to 10 sites across the US. It advocates a mentoring approach through which young girls adopt its core principles “competence, connection, and autonomy” to help provide direction in their lives and become leaders in their communities. In 2009, Caroline Berinyuy, a graduate student in the U.Va. Curry School of Education, brought YWLP to her native Cameroon. Concerned with factors that caused women to drop out of school, Berinyuy’s initial research findings in Cameroon indicated that 93% of village women who had dropped out of school between the ages of 13-17 desired to continue their education (Berinyuy 2011). Berinyuy determined that those four years were critical to deciding whether or not a young woman would remain in school, and thus adapted YWLP to target adolescent girls in Cameroon.

In 2009, Berinyuy used her research to create a 24-session YWLP curriculum, and implemented the mentoring program in seven schools across three regions in Cameroon. In the spring of 2011, a UVA undergraduate researcher helped Berinyuy to assess the revised program and discovered that a significant dearth of Big Sister mentors challenged the sustainability of the program.

Objectives

The main objective of the project was to increase the sustainability of the YWLP in Cameroon through three supporting objectives:

1. Conducting a training workshop to prepare 60 new Big Sisters to lead YWLP and provide an example for current YWLP Facilitators and Big Sisters on how to run similar training workshops in the future.

2. Revising the current handbook by interviewing current Big and Little Sisters on the program’s effectiveness and tailoring the curriculum to the Cameroonian culture.
3. Establishing a consistent connection with the program in Charlottesville through the Internet.

**Method**

*Training Workshop*

The training workshop was conducted at the Islamic High School of Kumbo after the school year ended. The workshop trained Big Sisters from the 14 institutions listed in Table 1. The girls were given booklets to record notes on the workshop and their experience. Daily attendance in the workshop remained at approximately sixty, but varied by school due to individual or group absences. Girls ranged in age from 13 to 22 depending on their level in high school.

**Table 1: The 14 Participating Institutions in the YWLP Leadership Workshop.**

1. Government High School Kitiwum*
2. St. Augustine’s College, Kumbo
3. Government High School, Kikaikom
4. Islamic High School, Kumbo*
5. Government Bilingual High School, Kikaikom*
7. Chalice Program, Tobin (Kumbo region)
8. Chaffee Memorial College, Kumbo
9. Government Bilingual High School, Kumbo*
10. St Francis Comprehensive College, Shisong
12. Government High School Elak, Oku
13. Immaculate Conception, Bambui
14. University of Dschang*

* Institutions where YWLP Cameroon had already been implemented.

The workshop, conducted from 9 AM to 3:30 PM daily at the Islamic High School, included lunch provided with the JPC funds. The first three days were structured as a presentation and discussion on physical, socio-emotional, and cognitive adolescent development, respectively. The intent of teaching adolescent development was to strengthen Big Sisters’ mentoring abilities and consequently strengthen the sustainability of YWLP. Other important aspects of the workshop included:

- presentation on leadership on the fourth day
- Discussions on “motherhood as leadership”
- Afternoon computer competency training
- Input from Big Sisters on improvements for the handbook
- A closing ceremony on the fifth day.
**Handbook**

During the training workshop, the team reviewed the previous handbook with current Big Sisters and facilitators to evaluate the curriculum and further adapt it to their culture. With the Big Sisters’ input, topics were divided into a comprehensive curriculum spanning two years that included new leadership topics, team-building activities and probing questions. This division provided new information about Cameroonian women leaders, tribalism, polygamous families and other pertinent cultural and gender-related issues.

**Computer Competency**

In order to establish a global internet connection, the team taught computer skills to Big Sisters so they were able to communicate via Internet with YWLP Charlottesville. The team placed girls in groups based on their computer competency with Word, Excel and the Internet to make instruction more effective. Unfortunately, The Islamic High School was unable to obtain an Internet connection during the workshop, so training was limited to Word and Excel.

In every group, the Big Sisters were first shown how to complete a specific task and then encouraged to try the task independently. Each participant received a chance to master the task with help from other group members before the group proceeded. Tasks ranged from turning on the computer to inputting formulas in Excel.

**Results**

**Workshop**

At the end of the training workshop, participants were asked to complete an optional survey evaluating the training. Overall, the survey results in Table 2 suggest that the training workshop was a constructive experience for the attendees. All participants completed the survey, but there are some discrepancies in the numbers because some Big Sisters left questions blank.

**Table 2: Responses of workshop participants to scaled questions about the topics covered each day.**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Not Helpful</th>
<th>A Little Helpful</th>
<th>Helpful</th>
<th>Very Helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Development</td>
<td></td>
<td>5</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Socio-emotional Development</td>
<td>1</td>
<td>11</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Cognitive Development</td>
<td>1</td>
<td>15</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>6</td>
<td></td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Computer Training</td>
<td>7</td>
<td>11</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
Open ended questions were also included on the survey. These questions were:
1. What things were most useful during the workshop?
2. What things were least useful during the workshop?
3. Were the leadership books you made during the workshop helpful?
4. Do you have any other Comments about the workshop?
5. Do you have any ideas to improve the workshop?

Many Big Sisters identified things that were useful during the workshop, such as “the handbooks, pens, and the markers were very useful, but the most useful thing was the knowledge given to us.” All of the Big Sisters who responded to the leadership books prompt indicated that the books were helpful, mainly because they “helped [them] to remember what had been taught” and “it will help [them] to teach the Little Sisters . . . and explain more to [their] friends.” The final two questions provided the researchers with information on how to improve the workshop and information for other groups interested in conducting research with YWLP Cameroon.

**Handbook**

Based on the collected information, the team created a 50-page handbook, tailored directly to the needs of YWLP Cameroon. Some of the topics remained the same, but the program needed new information to both attract new Little Sisters and retain the existing Little Sisters for a second year.

**Computer Competency**

The lack of web access inhibited the goal of initiating a cross-cultural internet connection during the workshop. However, the skills gained in Word and Excel provided basic computer skills that can be used once the internet connection is established.

**Discussion**

The results show that the workshop provided helpful information for new Big Sisters to be effective mentors and provided 60 new Big Sisters to promote YWLP’s sustainability. While our training session was held in Kumbo, the presence of the college women from Dschang ensures that training knowledge will be brought to YWLP Dschang. Though not in attendance, Buea was provided materials to conduct a similar training workshop.

Extending the program even further to accommodate more Little Sisters remains a central obstacle in sustaining the three present sites in Cameroon. The great enthusiasm among younger girls for the program has meant that the ratio of Big to Little Sisters remains high. The training of new Big Sisters in the workshop provided sixty
new Big Sisters to support the present sustainability of YWLP, but as the program expands more Big Sisters will still be needed.

Another challenge that remains is whether the Big Sisters who attended the workshop can introduce the new structure of YWLP to their individual schools. The new handbook for Cameroon, tailored to the needs of the program participants, will provide a stronger framework for program implementation that will be more conducive to both the expansion of the program and its sustainability.

The new institutions that participated in the workshop have begun the implementation of YWLP in their schools, as reported by the Islamic High School in recent emails. The internet connection between YWLP Cameroon and YWLP Charlottesville has not been successfully implemented, but email communication and video exchange of group activities between facilitators provides hope for its eventual success.

Reflection and Looking to the Future

“. . . Before I never listened to anybody, I never knew anything about myself. But I am proud to say that today, through YWLP, I’m not afraid to express anything, not being shy, not being afraid. I am always open to my parents and to anyone around me, and I want to thank everybody that has helped me to be at this level.”

—Testimony from a Big Sister in the YWLP at St. Francis

This testimony and others like it that we witnessed during the workshop are strong affirmations that the participants of YWLP Cameroon have been truly touched by their experience and the practical life lessons that they have learned while in the program. Furthermore, this evidence and the results of our project, specifically the success of the training workshop, have shown the potential for girls’ education across the African continent.

References

Berinyuy, Caroline (2011). Young Women Leaders Program Cameroon: From Just Girls to Leaders
Team Biographies

Taikei-Ara Jarmon is a third year student studying Accounting in the McIntire School of Commerce.

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