IPRO 327
Design of a water distribution system for Pignon, Haiti

Illinois Institute of Technology
Spring 2007
LIFE in PIGNON

- 15,000 + people
- Drinking water comes from hand-pump operated wells or nearby river.
- Existing 45,000 gallon (cistern?) from old distribution system
- Source not fully secure
- Poor road infrastructure
NEEDS of PIGNON
Sustainable Water Distribution System

• A water distribution system to supply 20 gallons per person per day to the town
• Technical support to design the system
• Easier access to the system including more public fountains and more private household connections
• Ability for future growth of the system
GOALS OF THE IPRO

• Accurately estimate town’s population
• Map the town, including all roads and buildings
• Determine elevations at critical points in the town
• Create an accurate model of the water distribution system
• Produce a report summarizing the details of the system
• Send all deliverables to the Haiti Outreach offices in Pignon, Haiti
ORGANIZATION

• Originally, we were divided into 4 groups:
  – Mapping, End User, Fundraising/Admin, and Design

• There was no set team leader, and by the end of the semester it became apparent that this hindered much of our progress
NEED FOR A TRIP

• Needed first hand information

• Specific, technical information

• Also, could go no further on what we had
<table>
<thead>
<tr>
<th>Group 1: Topographical Mapping</th>
<th>Group 2: Site Map, Existing Structures, End User</th>
<th>Group 3: Fundraising and Administration</th>
<th>Group 4: Design</th>
<th>Spring Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convert collected data into topographic maps: 100 hrs</td>
<td>convert site map to topo map: 40 hrs</td>
<td>Get Funding: 60 hrs</td>
<td>Research pumps and fountains: 30 hrs</td>
<td>Survey needed points: 40 hrs</td>
</tr>
<tr>
<td>Make other useful maps 30 hrs</td>
<td>estimate population: 20 hrs</td>
<td>Keep Accounts of all money received: 30 hrs</td>
<td>Identify and acquire needed software: 10 hrs</td>
<td>Locate current fountains, pipes: 10 hrs</td>
</tr>
<tr>
<td>Prepare list of needed data for next trip to site: 10 hrs</td>
<td>Determine average Haitian water usage: 25 hrs</td>
<td>Keep up to date with all deliverables: 40 hrs</td>
<td>Design pump improvements: 20 hrs</td>
<td>Examine link from source to pump, pump to cistern: 15 hrs</td>
</tr>
<tr>
<td>Collaborate with design team on what file type needed for maps: 2 hrs</td>
<td>Required v. Current Capacity: 40 hrs</td>
<td>Inform team of deadlines: 5 hrs</td>
<td>Work with End User Group on current system issues: 30 hrs</td>
<td>Examine other possible water sources: 20 hrs</td>
</tr>
<tr>
<td>Deliver useable maps to design team: 5 hrs</td>
<td>Identify locations of existing fountains and wells: 25 hrs</td>
<td>Help organize trip: 10 hrs</td>
<td>Design pipe network path: 35 hrs</td>
<td>Check water quality: 10 hrs</td>
</tr>
</tbody>
</table>
ADJUSTMENTS TO ORGANIZATION

• After Spring Break, we changed End User Group to Water Purification
• Due mainly to an overlap of work in the beginning of the semester
• Based on information brought back
OBSTACLES

• Funding
  – Money was needed for surveying trip, but because of short time before trip, was difficult to raise

• Software
  – Design of our system was impossible by the CAD programs available at school.

• Short Time
  – This cut into everything. For this project, there was simply a lot of information, leading to a very high learning curve.
OBSTACLES OVERCOME

• Funding – asked for large donations from on-campus sources
• Software – got trial versions
• Time – divided up tasks, prioritized
ETHICS and DIFFICULTIES

• Software
  – Used Specialty Software
  – Could have pirated
  – Instead used trial versions

• Workload
  – Optimal: Everyone does the same amount
  – Solution: Split into groups

• Ethical Responsibilities as Engineers
  – Design a working system that will fulfill the needs of the client
ETHICS and DIFFICULTIES

• Plagiarism
  – Could have taken credit for someone else’s work
  – Did not arise because everything was created from scratch

• Donations In Haiti
  – Many Haitians asked the group for money
  – Specifically instructed by Haiti Outreach not to give out any money
  – Create an economy of dependence
ETHICS and DIFFICULTIES

• Political Situation in Pignon
  – Multiple mayors
  – Who do we work with?

• Working with Haiti Outreach
  – Haiti Outreach is an NGO
  – Blurred boundaries between this IPRO and HO
  – What are the IPRO’s specific responsibilities?
  – Where does the money we raised go?
RESULTS

- RAISED $5000 IN DONATIONS
- ACQUIRED SOFTWARE FOR SYSTEM DESIGN
- COMPLETED ACCURATE POPULATION ESTIMATE
- SURVEYED THE TOWN OF PIGNON
- CREATED SCALE MAPS, INCLUDING TOPOGRAPHIC
- COMPLETED PELIMINARY WATER SYSTEM DESIGN
- RESEARCHED ALTERNATIVE SOURCING FOR SYSTEM
ACKNOWLEDGEMENTS

District 6450 & 5950

Mr. Tony Bouchard

Mr. Williams

Mr. Joe Schlasci
Mr. Rik Lewis
Mr. Paul Moyano

Dr. Krishna R. Pagilla

Mr. David Baker (VP Ext. Affairs)