Instructor: Herb Shields
Sponsor: Warehouse Education and Research Council & The Kern Family Foundation

Team: Khanh Duong
      Uchenna Egwu
      Justin Ma
      Arthur Mcanally
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      Douglas Oh
      Nickolay Schwarz
      Sarah Stone
      Aleksandar Sudar
      Arthur Zavala
Milestones

1. Project planning phase
   - Identify Objectives
   - Task Division
   Create Project Plan 02-16

2. Research Phase
   - Library Research
   - WERC Research – web
   - Interview Industry Workers
   Create Midterm Deliverables 03-23

3. Division into Sub-teams
   - Programming
   - RFI/RFP Development
   - FAQ Team
   Create Final IPRO Deliverables 04-25

4. Presentations
Semester Problem

Problem

- Help companies deal with cost analysis through a web-based tool
- Provide assistance to companies seeking to outsource logistics operations
- Provide web-based RFI/RFP tools for use with the program

Objectives

- Finalize and enhance model for use on WERC website
- Develop instructions (FAQ) for helping users of the model
- Develop an outsourcing and pricing tool within the model
Research Phase

- Library and Online Journal Research
  - Materials Handling Management Journal
  - Logistics Management Journal
  - WERC website resources

- Interviews with Professionals
  - Bob Shaunessey from WERC / **February 13**
    - Financial issues and Warehouse costs
  - Strive Group / **March 23**
    - Warehouse Operations and Activities
    - Financials
  - Barb Franch from Sears / **March 6**
    - Information about warehouse operations
    - Helpful to RFI/RFP development

- Research the layout and programming of the WERC website’s source code
Initial Task Division

Overall Team Assignments
- No sub-teams for project planning and research phases

Nickolay Schwartz
Team Leader

Aleksandar Sudar
Assistant Team Leader

Sarah Stone
Secretary
Division into Sub-teams

- Programming Team
- RFI/RFP Development
- FAQ Team
- Quality Assurance

Feedback connections to Programming Team and FAQ Team.
Objective: to create a model for the development team to utilize in their web tool for calculating warehouse efficiency and benchmarking

Research Contributions:
- Defined input and output variables
- Formulated calculations
- Defined basic model structure for generating outputs
- Implement output parameters of other companies for comparison

Our Primary Focus:
- Building and Equipment
- Labor, Maintenance, Utilities
- Output Results and Benchmarking
### Excel Model

#### Maintenance, utilities and other costs:

<table>
<thead>
<tr>
<th></th>
<th>Cost per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Equipment maintenance</td>
<td></td>
</tr>
<tr>
<td>Total building maintenance</td>
<td></td>
</tr>
<tr>
<td>Other maintenance cost</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td></td>
</tr>
<tr>
<td>Electric</td>
<td></td>
</tr>
</tbody>
</table>

#### Productive Hrs Cost calculation

<table>
<thead>
<tr>
<th>Number of vacation days (except weekends)</th>
<th>Weeks of vacation</th>
<th>hrs/day</th>
<th>unproductive hrs/day</th>
<th>productive hrs/day</th>
<th>cost/hr</th>
<th>working days/week</th>
<th>working weeks/year</th>
<th>Cost for productive hrs</th>
<th>Cost per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>120</td>
<td>8</td>
<td>15</td>
<td>6.5</td>
<td>8</td>
<td>5</td>
<td>50.80</td>
<td>13208</td>
<td>0</td>
</tr>
</tbody>
</table>

#### EQUIPMENT COST

**a) OWN**

<table>
<thead>
<tr>
<th>Group type</th>
<th># in group</th>
<th>Usage period (in month)</th>
<th>Total cost (in thousands)</th>
<th>Cost per month (in thousands)</th>
<th>Total work hours in day</th>
<th>Avg machine use hour</th>
<th>Rate of use of machine group</th>
<th>Productive cost per month (in thousands)</th>
<th>Maintenance cost (in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forklifts</td>
<td>5</td>
<td>24</td>
<td>120000</td>
<td>5000</td>
<td>15</td>
<td>14</td>
<td>0.875</td>
<td>4375</td>
<td></td>
</tr>
</tbody>
</table>

**b) Rent**

<table>
<thead>
<tr>
<th>Group type</th>
<th># in group</th>
<th>Cost per month (in thousands)</th>
<th>Total work hours in day</th>
<th>Avg machine use hour</th>
<th>Rate of use of machine group</th>
<th>Productive cost per month (in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forklifts</td>
<td>5</td>
<td>6000</td>
<td>16</td>
<td>15</td>
<td>0.9375</td>
<td>5625</td>
</tr>
</tbody>
</table>
The FAQ team developed an instruction manual for the model, which will be available to be developed into an instruction manual for the program.
FAQ/Instructions Sub-Team

- Frequently Asked Questions…
  - Instructions for the model
  - Definitions of key terms
  - Questions that the user might have
- Continuously updated through website feedback
Team is responsible for the development of cost based (DC operational cost model) online tool to provide users with easy step-by-step program that will analyze their data and will assist in decision-making process.

Nickolay Schwarz
Sub-team leader

Khanh Duong
Design and backend development

Arthur Mcanally
Design and backend development
Data structure for each page of the tool:
- Building
- Labor
- Equipment
- Maintenance
- Miscellaneous
- Benchmarking
- Results

Each structure is contained in a wrapper object called “Container”.

User-end web application is driven by “Container,” holds the user’s data and performs necessary calculations

Saves information as “Sessions”
- Tool created on Internet Information Services (IIS) server
- Written in C# .NET with combinations with .asp technologies
Each component is split into 3 files:

- "cs" which uses the templates of the container
- "aspx" which sets up the actual webpage layout
- "aspx.cs" which loads and stores the files from the Excel model
- Simple to use tool
- Comparison to market values (provided by WERC) and used to help calculate efficiency
The team developed the web version of the request for information form and the request for proposal form.

- **Aleksandar Sudar**
  - RFI

- **Justin Ma**
  - Sub-team leader

- **Arthur Zavala**
  - RFI

- **Uchenna Egwu**
  - RFP
RFP

- RFP’s are sent out to perspective companies to evaluate the benefits of outsourcing
- Construct a tool that would allow warehouses to easily create a RFP Form
- Allow for multiple fields of data to accommodate most RFP requests
- Capable of both electronic and hard copy formats
- Fully integrated into the warehouse logistics tool
### RFP Master Form

- Create an “At A Glance” table for the key elements of the returned RFP’s
- Added convenience for warehouse operators, allowing easy review of data
- Enhancing the flexibility of the model
RFI/RFP Development Sub-Team

Web Example

- A visualization of the RFI/RFP
- Could be used for implementation of the model
- Come with examples and instructions, links to Excel sheets
Barriers, & Obstacles - A Learning Process

Project Management

- Assign the work early and evenly
- Communicate between the team
- Make sure the project team is on task
- Review the status of the group at each step and revise tasks as needed
- Manage changes in the project and adjust the end goal if needed
Barriers & Obstacles - A Learning Process

Ethics

- Communicate and build trust
- Speak with respect
- Accept other team members and each person’s role
- Consider problems in cross-cultural communication
- Non-verbal communication is very important
Barriers, & Obstacles - A Learning Process

Teamwork

- Take some time to build a team with patience
- Establish rules for team behavior in one of the first meetings
- Make an effort to be a team member
- Accept the role of each team member
- Find ways to create early success in each sub-team and for the whole IPRO team
Questions and Answers

Thank you for your time and attention.

If you have any questions we will direct you to the appropriate team member.

Please provide the us with any feedback you may have to improve our project.