IPRO 334
Spring 2007 Project Plan

Resource Consumption Awareness in the Home

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1.0 Objectives

People are inadequately informed about their energy consumption behaviors in the home. Providing real time feedback at the point of decision making will enhance consumer awareness of energy consumption, and potentially lead to behavior modification. The IPRO 334 team will design and evaluate means of improving energy consumption awareness in the home. Team 334 will determine what metrics are most valuable to consumers and the best means to communicate that feedback.

During the course of the Spring 2007 semester, the IPRO 334 team will:

- Study existing technology and similar projects in the areas of energy consumption measuring and awareness
- Develop an ideal user profile, find suitable examples in the real world, research their needs, and develop a marketing strategy to target them
- Based on user interviews, develop design criteria for the most effective means of communication to people about their consumption
- Design and prototype an interface providing the feedback determined in the design criteria
- Test the effectiveness of the prototype in a residential environment
- Compile data and draw conclusions for future advances of the product (possibly for a continuing IPRO)

2.0 Background

A. Customer: This project attempts to serve people who are interested in reducing energy consumption in their homes. This customer may be interested in our product to save money, because of the new technology, or for the good of the environment.

B. User problems: We wish to create a system which creates an environment where a user can be made aware of their power consumption without having to adapt to a new or complex set of tools.

C. Technology: Wireless technologies are infiltrating the homes of average Americans more and more every day. These tools can be leveraged to create a better living experience not only for the comfort of those in the home, but to improve the world's environment.

D. Historical success and failure: The mileage monitor on new cars has changed the way we drive. We are now aware moment-by-moment of real time fuel consumption. This has resulted in a cultural shift in the way we think about a car's efficiency, and even how people drive. Some simply see this technology as a status symbol. Others have created personal competitions to drive down their own fuel consumption. With the cost of fuel on the rise and growing fears of global warming, this technology couldn't have appeared at a better time. Why is there no equivalent technology for people's homes? There are few options for consumers to monitor their consumption of energy beyond electric, gas, and water bills. These bills are often so complex it is difficult to discern all the metrics. Some products on the market now, like the Kill-A-Watt, give feedback in a format such as kilowatts which can be difficult for people to relate to. Other programs, like Aware @ Home, are web-based which leaves the program inaccessible to those who are not computer literate. Also, the lack of real time feedback gives customers very little chance of effectively modifying their behavior. Part of our design criteria is to develop an easy to understand product that gives real time feedback and does not require a computer to run.

E. Ethical and Moral Issues: While wireless networks give people a chance to quickly and easily attain information, it comes at a cost. We must be certain to investigate who will have access to the information sent over the networks. We must also make sure security measures are in place so unauthorized users can not gain access.

F. Societal Costs: If we are successful in our project, the benefit to society will outweigh the cost. Whatever reason people have for using our system, it will encourage them to lower their energy consumption. This can not only save people money, but reduce dangerous greenhouse gas emissions.

G. Proposed implementation outline: IPRO 334 will address these issues by working as a team to define, prototype, and test an ambient system to provide consumers with information about their personal energy usage.

3.0 Methodology/Brainstorm/Work Breakdown Structure

A. The primary problem to accomplish is to increase the awareness in home energy consumption. In order to accomplish this, we need to determine the most appropriate energy consumption metric that reaches consumers, and determine the most appropriate means to provide consumers with that metric.

B. In order to solve this problem, IPRO 334 is divided into sub-groups in order to efficiently complete its objectives. Team members will not be permanently assigned to a sub-group, but rather will help out on a sub-group as is needed. The project process will continue in circles around the four stages of research, analysis, synthesis, and implementation constantly and the sub-groups will change accordingly. At the beginning stages of the project the team will be split into a project planning/deliverable group, a user research group, and a business plan group. The project planning/deliverable group will put together a draft of the project plan for the team to review, and as the project continues, oversee the completion of the IPRO deliverables. The user research group will create and distribute questionnaires and interviews for the target users, collect the data, and summarize the data. The business plan team will research marketing techniques and strategies and determine the best way to market the product to the intended user. As the project process goes on a design team, a synthesis team, and a production team will be needed. As an entire group we will come together to determine how the

research will specifically inform the ideal user, as well as what information that user would fine meaningful in order to impact their energy awareness. These conclusions will inform the design of a product that we can test in the home.

The specific breakdown of the project process will be as follows:

- Research: business, market, people
- Analysis and Synthesis of collected information
- Develop design criteria informed by research
- Determine specific parameters to inform product design from the created criteria
- Develop a design(s) that address specific design criteria and parameters
- Create a prototype(s) that accomplishes the appropriate feedback for the determined user and addresses all the specific design criteria and parameters
- Test the prototype(s) on a diverse group of people in diverse home settings.
- Conduct research according specific to the homes and people within the homes that the prototypes were tested in
- Analyze the test results and research
- Determine the results found from the analysis of the testing

C. The testing of possible solutions to our problems will consist of designing from user research criteria prototypes to test in the setting of the user's home and then collecting data from those prototypes and the users. Designing the prototype will happen in response to the data collected from target user's questionnaires and interviews. It will be designed and built and then set in homes of people who fit the definition of our target user. Then the results will be monitored to find if the prototype accomplished what it was designed to do.

D. The results of testing these solutions will be documented by text documents, visual break-down of results, such as graphs and charts, as well

as drawings and renderings of the actual prototypes. These results will be useful in determining if the product is accomplishing its purpose.

E. Analysis of the test results will occur at every meeting of the IPRO. Each sub-group of the team will present what progress and what results they have yielded for the rest of the team. A discussion of data collected will occur in order to determine what information is important to respond to and how to respond to it.

F. The tasks involved in generating IPRO deliverables are the division of work amongst the experienced in the group and dividing the remaining work evenly amongst the entire group. Members will present their initial product to the group for peer editing at asset time before the determined deadline, allowing everyone to have the opportunity to review mistakes and critique the member's work. Scheduling of tasks will be handled by each team's leaders, and will be reviewed and updated at each IPRO meeting.

4.0 Expected Results

The IPRO 334 team plans to complete a prototype interface that provides effective feedback about energy consumption in the home. The prototype will utilize existing wireless technology to transmit real time data on electrical current usage. The data will be transferred into the desired type of feedback to be delivered at the point of decision making. The feedback could be visual or auditory information directed toward informing the users. It could also be a system of interaction based feedback directed toward 'coaching' the users' behaviors.

Team 334 plans to evaluate the prototype in a residential environment by allowing targeted users to experience the product first hand for a period of time. Analyzing video footage and conducting interviews of the users will help understand the effectiveness of the feedback method(s). From this analysis,

we will draw conclusions about the successes and failures of the product explaining why it worked the way it did.

We hope to make an impression on people's consumption habits in the home, giving them an opportunity to change their lifestyle and how it affects our environment. We will consider the extension of this concept and technology into a future product and how it could be put on the market.

5.0 Project Budget

The following Budget is based on initial cost estimates only. At this time it is difficult to arrive at precise values for printing and prototype materials, because those will heavily depend on the finished design of our product, which is not expected to be complete until later in the semester.

IPRO 334 Projected Cost Summary			
Item	Quantity	Unit Cost	Total Cost
General:			
Testing Materials			$500.00
Document Printing	varies	varies	$100.00
Investor Brochures	10	$5.00	$50.00
Client Brochures	5	$5.00	$25.00
Investor Contact Letter Printing	25	$0.10	$2.50
Client Contact Letter Printing	25	$0.10	$2.50
Business Cards	50	$0.50	$25.00
Posters	3	$50.00	$150.00
Brochures for IPRO Day	50	$1.00	$50.00
Name Tags	20	$2.00	$40.00
Product Advertising Mementos	50	$1.00	$50.00
Testing Incentives	4	$100.00	$400.00
Estimated Total Project Cost:			$1345.00

6.0 Schedule of Tasks and Milestone Events

(See attached Schedule)

7.0 Individual Team Member Assignments

Last Name	First Name	Major	Year	Skills	Attributes	Current Team
Cawvey	Jessica	Architecture	4	Autocad Microsoft Office Suite Adobe Illustrator Adobe Photoshop	Organized Creative Hard-working	Planning/ Deliverables
Christensen	Carissa	Architecture	3	Autocad 3D Studio Max Microsoft Office Suite Adobe Photoshop Rhino Dreamweaver	Organized Happy Creative Visual Hard-working	Planning/ Deliverables
Dannhausen	Anna	Architecture	4	AutoCAD Accurender (AutoCAD 3D rendering program) Microsoft Office Suite Adobe Illustrator Adobe Photoshop Dreamweaver	Organized Personable (good with phone calls and dealing with people)	Business Plan
Fischer	Jordan	Design	Grad	Adobe Photoshop Adobe Illustrator Adobe InDesign Macromedia Flash Macromedia Dreamweaver Rhino (surface modeling) Maxwell (rendering software) Photography Videography Rough Prototyping Interviewing	Extracting Meaning from complex data Motivation Consensus Building Creative Direction Improvisation Framing problems to provide a new perspective Leading during the generation of ideas, and following during the implementation of ideas.	User Research (Leader)

Henson	Jessica	Architecture	4	Autocad 3D Studio Max Microsoft Office Suite Adobe Illustrator Adobe Photoshop Mathcad SAP2000 Dreamweaver	Organized Leadership Outgoing Hard-working	Planning/ Deliverables (Leader)
Herrera	Stephanie	Architecture	4	Autocad 3D Modeling Animation Adobe Suite Microsoft Office Suite	Organized Enjoys working with hands Research	User Research
Jones	Sarah	Design	Grad	Adobe Photoshop Adobe Illustrator Adobe InDesign Macromedia Flash Macromedia Dreamweaver Rhino Solid Edge AutoCad Matlab Pbasic Page Layouts	Rendering Implementation Delegating	Planning/ Deliverables
Kestner	John	Design	Grad	Program in Java, Basic Stamp, etc Write HTML	Communicate effectively with words, illustrations, photos and models Design user- centered products and interfaces that look good and communicate what they're about	Business Plan (Leader)
McLeish	TJ	Professor	Prof	n/a	n/a	Professor

				Skills	Attributes	Sub-Team
Perry	Nicolas	Architecture	4	General Computer Skills (above average) Adobe Suite CS2 AutoCad Microsoft Office Suite Laser Cutter 3D Studio Max Sketchup Wood Shop Soldering electrical Circuits Knowledge of electronics concepts and components (beginner) Project scheduling and cost estimation	Organized Fast learner	Planning/ Deliverables
Pierce	James	Mathematics	4	Adobe Photoshop Adobe Illustrator Macromedia Dreamweaver Java Eclipse Machining Welding Fabrication Research, exploration, and analysis	Learning new skills (e.g. electrical/hardware)	User Research
Popov	Nikolay	Mechanical Engineering	3	AutoCAD Microsoft Office Suite Basic C++ and Matlab Basic Electronics	Honest Caring	Business Plan
Puschkar	Jackie	Business	2	Microsoft Office Marketing Business strategies	Personable Organized	Business Plan
Wong	Jacintha	Business	4	Adobe Photoshop AutoCad 3D Studio Max Microsoft Office Suite Sewing	Artistic	Business Plan

Sub – Team Descriptions

Planning/Deliverables: Sub-team leader – Jessica Henson

The Planning/Deliverable team will put together a draft of the project plan for the team to review, and as the project continues, oversee the completion of the IPRO deliverables.

Business Plan: Sub-team leader – John Kestner

The Business Plan Team will research marketing techniques and strategies and determine the best way to market the product to the intended user.

User Research: Sub-team leader – Jordan Fischer

The User Research Team will create and distribute questionnaires and interviews for the target users, collect the data, and summarize the data.

Synthesis: Team leader and members to be determined at later date.

The Synthesis Team will analyze the data collected to form design criteria, as well as collecting data from prototype testing and analyzing results.

Design: Team leader and members to be determined at later date.

The Design Team will develop a design and create a prototype that accomplishes the appropriate feedback for the determined user and addresses all the specific design criteria and parameters. They will also test the prototype on a variety of people in diverse home settings.

Production: Team leader and members to be determined at later date.

The Production Team will compile all data and design the final material used for presentations on IPRO day.

8.0 Designation of Roles

Role	Description	Assigned to
Master Schedule Maker	Responsibilities include planning a master schedule and keeping it current	Jessica Henson
Meeting Minutes Taker/ Organizer	Responsibilities include taking minutes of each meeting, recording the information on a standard form, and uploading minutes on to igroup site. (see grading criteria for specific details)	Jessica Cawvey
Meeting Agenda Maker/Timekeeper	Responsibilities include meeting with Master Schedule Maker and putting together a Meeting Agenda for each class. (see grading criteria for specific details)	Nicolas Perry
Weekly Status Reporter	Responsibilities include developing an individual Weekly Progress Report form, compiling a weekly status report that includes Meeting Minutes, Meeting Agendas, and Weekly Progress reports from each team member. (see grading criteria for specific details)	Anna Dannhausen Stephanie Herrera

Igroup Coordinator/ Communication Facilitator	Responsibilities include collecting all contact information and posting on igroups as well as keeping the igroups site and folders organized	Jacintha Wong
Webmaster	Responsibilities include setting up and design, and maintaining website for class	John Kestner
Head Researcher/ Historian	Responsibilities include applying to the internal review board for project testing and delegating necessary research as well as photographically documenting the progress of our project	Jordan Fischer
Presentation Coordinator	Responsibilities include delegating and managing all assignments that need to be done for final presentation on IPRO day and assuring all material is received on time.	Sarah Jones