

I PRO 315: Fall 2005

Project Plan

Faculty Advisors:

Prof. Ali Cinar

Prof. Emmanuel Opara

Prof. Raymond Trygstad

TEAM MEMBERS:

Russell Derrick- Leader
Meriyan Eren- Graduate Advisor
Michael Addis
Niyanta Arora
Elizabeth Bauer
Tina Chiu
Byung Kim
Jung Kim
Salman Mohiuddin
Benson Okeiyi
Floriann Stankovich
Shailvi Tyagi
David Zaboli

OBJECTIVE:

The main objective of this team is to learn the current software of GlucoSim and its website, and to improve them in it in four aspects: Nutrition, Glycemic Index, GlucoSim and Software. Each aspect will have a sub-group dedicated to the necessary work. The finished project will hopefully be published on the web as a free tool for those who are interested in learning the effects of glucose on the body, with the major demographic being diabetic patients.

BACKGROUND:

Diabetes is a disease that affects more than 150 million people worldwide and is predicted to double by 2025. There are two types of diabetes, Diabetes Mellitus Type 1 and Diabetes Mellitus Type 2. Type 1 occurs when the body's immune system reacts and destroys the insulin producing beta cells of the pancreas. Consequently, there is absolute deficiency of insulin in the body. Insulin allows the body to remove glucose from the system and use it as fuel for the body or to convert it to glycogen and store it for later use. The most common treatment for this is insulin injections to make sure that the glucose level in the blood is in the normal range. Dietary counseling and glucose monitoring are also part of the management regimen for the disease.

Type 2 occurs when the body does not respond properly to the insulin in the body. This most commonly occurs in obese individuals. The first line of treatment in these individuals is dietary counseling and exercise to induce weight loss and enhance the body's tissue response to insulin. If that does not work completely, it may be followed by a regimen of drugs and insulin therapy that can potentially increase the glucose utilization.

The website that the group is improving upon was created previously by a group of students under the supervision of Professor Cinar. It contains a meal-planning program that

simulates glucose levels in different parts of the body. This website and software is not designed as a means for prognosis or treatment, but as a means of teaching diabetic patients and non-diabetic individuals about glucose dynamics in the human body.

METHODOLOGY:

The nutrition group will research meal planning to aid diabetic patients in consuming proper meals. They will so research body mass index as a way to let the user input their data to inform them of their health risks.

The glycemic index group will research glycemic index and glycemic load values for all the food items already listed on the website. The group will also research equations so that they can show the effects of glucose and the glycemic index graphically.

The GlucoSim group will research previous work done with GlucoSim and create an instructional PowerPoint for the user about how the website and software works. A video tutorial will also be used as means of instruction.

For the software group, they will familiarize themselves with the computer language so that editing and improving the software is a feasible task. They will also compile information so that future groups will know how each part of the software works.

EXPECTED RESULTS:

At the end of the semester, the group hopes to add these new aspects to the website, while also making it more user-friendly. The results will hopefully be a more understandable and complete teaching tool that anyone can access online at no charge.

TIMELINE OF TASKS:

Goal:	Accomplished by:
Nutrition:	
Survey students about the website for feedback	10/07/05
Make the meal planning webpage easier to use	10/14/05
Create BMI input for user	10/14/05
Create sub-types for which the data is compiled	10/14/05
Improve website based off survey results	10/28/05
Change meal planning to warn user when their meal is not healthy	10/28/05
Glycemic Index	
Create an information page about glycemic index and load	10/14/05
Research and compile glycemic index/loads for the website	10/28/05
Incorporate formulas to calculate overall glycemic index/load for meals	11/04/05
Incorporate formulas to calculate glycemic index/load for GlucoSim	11/25/05
GlucoSim:	
Video Tutorial	10/13/05
Compilation of a PowerPoint Tutorial	10/20/05
Add color to results to show normal and abnormal levels	10/20/05

Tutorial Uploaded to Website	10/27/05
Redesign the webpage for ease of use	11/03/05
Redesign results page to be more understandable	11/17/05

Software:

Learn software and add comments for future development	10/07/05
Run tests on the new software and website with new additions	10/14/05
Correct problems found in test runs	10/28/05
Finalize software and work out remaining kinks	11/25/05

EXPECTED BUDGET/EXPENSES:

Currently, there is no proposed budget for this IPRO

ASSIGNMENTS:

Because the project involves critical thinking and planning around a complex topic, the team is strategically divided into 4 sub-groups. This arrangement will allow individuals to focus and contribute more to a certain aspect, therefore creating a more effective result. Each group of the IPRO team consists of 3 members. The names in bold are the group leaders.

I. Nutrition:

- 1) **David Zaboli**
- 2) Elizabeth Bauer
- 3) Salman Mohiuddin

II. Glycemic Index:

- 1) **Benson Okeiyi**
- 2) Tina Chiu
- 3) Russell Derrick

III. GlucoSim

- 1) **Floriann Stankovich**
- 2) Michael Addis
- 3) Niyanta Arora

IV. Software:

- 1) **Shailvi Tyagi**
- 2) Byung Kim
- 3) Jung Kim