IPRO 341

Creating a Prototype Museum Display of the Changes in the Cardiovascular System of a Newborn

Spring 2005

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Background

- The idea for creating a prototype and working with the Museum of Science and Industry came about in Spring 2004

- The idea was to create a prototype for an exhibit about how blood flow changes in the newborn, directly following birth

- The prototype, once created would need to tested on the general public at the museum

Objectives

- The revised model, showing changes in flow, would be modified to include electrical components
- The flash animation would be reworked to be shorter and more understandable to the general public
- The prototype would be brought to the Museum for testing
- The prototype would then be changed based on what was learned at the Museum and brought back for a second round of testing

How Did We Accomplish These Goals?

The IPRO team split into four groups:

– The Model Group
  - Revise and rebuild the bench-top model
– The Narrative Group
  - Rework the text, shortening it, and making it clearer to the general public
– The Picture Group
  - Find pictures to be used in the flash animation
– The Computer Animation Group
  - Revamp the flash animation to accompany the bench-top model

Model Group

- Decided to completely rebuild the model on a larger scale to better illustrate where the critical cardiovascular differences were

- Decided to add electric solenoids and glow wire to better illustrate flow points of change and to remove the need for human intervention in the model

- Decided to link the computer animation with the model so that it could run while people were learning about the changes

Model Group

- Began work by taking apart the old model and determining what was needed to create new model

- Rebuilt the model using EL wire to show oxygenated vs. deoxygenated blood, and solenoids to show the areas that change

- Designed and created a circuit system to link the computer and the model together, so that the lighting and valves would change with the computer

Narrative Group

- Took last semesters text and reworked it removing initially 2 minutes worth of text and eventually removing all but 2 minutes worth of text

- Made the text more understandable to the general public

- The guidelines for change came from the Museum: the text should be understandable to anyone from age 5-80 years old

Narrative Group

- Members of the narrative group began work on IPRO day as they finished their component

- Other members helped the model team to finish up its delivery date as requested by the Museum

Picture Group

- Found pictures to be put into the flash animation

- Needed clear concise pictures that had no copyright restrictions

- Needed pictures within a similar drawing scheme in order to ensure that the public could understand them. All pictures were hand-drawn and entered into the animation

Computer Animation Group

- Took the new text and pictures and created a more streamlined flash animation
- Added voice recordings of the text into the flash animation so that it could be heard while the public viewed the model
- Following the first iteration at the Museum the flash was cut down even more and was delivered back to the Museum at a length of only 2 minutes

Computer Animation Group

- Worked with the model group to combine the flash animation and the model in a computer controlled system

- For the second demonstration iteration, this team worked with the model team to have the flash animation automatically change the bench-top model

Obstacles

- In addition to obstacles the IPRO team on a whole faced, each group faced individual obstacles
  - The model group had to reschedule efforts relative to receiving parts and then had trouble with the lighting continually breaking.
  - The narrative group had trouble deciding what text was the most important part and what text was expendable.
  - The pictures group had trouble finding clear pictures that were not copyrighted material.
  - The computer animation group had trouble working with the codes designed to work the model.

Obstacles

- The biggest obstacle we had to overcome as an IPRO team was the lack of communication
  - Each group had its own objectives and obstacles
  - BUT the failure of communication between teams caused much grief towards the end of the semester
  - We learned how important it is to let the other members of your team know what is going on, even if it is only a small aspect of the project on the whole
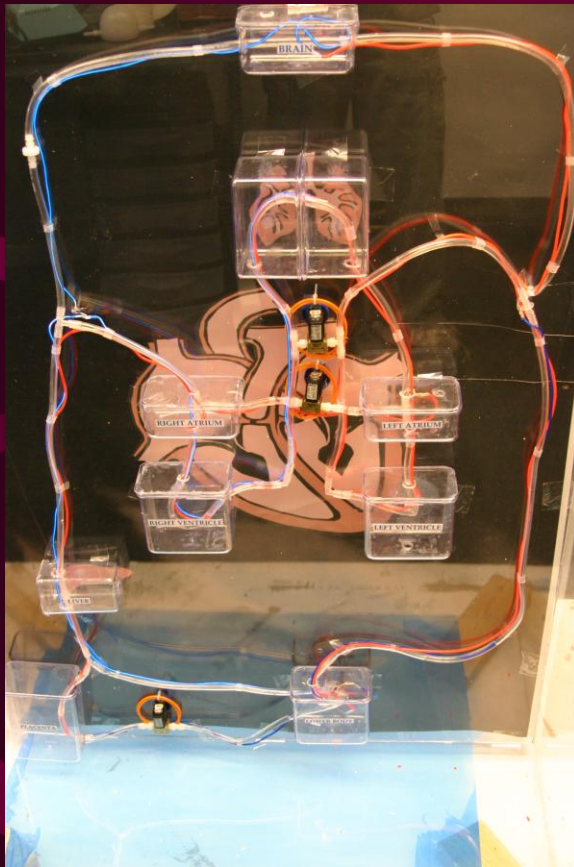
Results

- During the second half of the semester the prototype was brought to the Museum of Science and Industry for testing

- The first iteration produced results with the most common suggestions being:

  - Shorten the flash animation

  - Have the flash change the model and tell you when to look at the model to see the changes

  - Simplify the animation so more could understand it

Results

- The necessary changes were made to the flash animation; it was shortened to a little over two minutes; and the text was made much simpler
- During the second iteration the prototype tested much better with the visitors of the museum

Results

- Here is the finished bench-top model we delivered to the museum
- It has working lights, solenoids, and pump that pushes a clear liquid through tubes to show direction of flow

Results

- The finished product at the Museum

Results

- Once the prototype was completed it was brought to the museum for testing

- Here visitors are viewing the prototype, we then asked them a few survey questions to gain feedback

Recommendations

- Based on both the first and second testing of the display at the Museum, we will be sending the following recommendations to Museum staff:
  - Make the model more user friendly, have buttons to push so that visitors can interact with the model
  - Make the flash presentation more interactive by incorporating a touch screen and more buttons
  - Change the language slightly using blocks of text to make it more comprehensible to the general public

IPRO 341

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