Work Completed

During our first Senior Design meeting of the semester all of the parts that were ordered and that had come in were analyzed for accuracy. The parts that were received are the following: two-bolt flange bearing block, motion sensor, the SP03 module, function module, keyfob remote, foamed PVC, and IPS Weld-on 2007 with applicator. Everything was correct except for the keyfob remote. A five button remote was delivered when all that we need is a one button one. After consideration and some research we have come to the conclusion that this remote needs to be exchanged. We are returning the remote because we do not want the adults that will be playing the game to get confused at all.

Last semester the Interactive Wheel of Fortune game was thoroughly designed and evaluated. This semester so far the design has also been reanalyzed. The hardest part was to decide where to start in the planning and building of the entire design. The overall design of the game was looked at first. This is essential to the whole game because without the proper design the components of the game that are inside might be compromised. A model of the game was created so that we could actually “see” what the game will look like. The model was made out of a light-weight cardboard. From last semester we had decided that the base of the game would be twenty-four inches by twenty-four inches by six inches. The original size of the wheel was made to be twenty inches in diameter. However, after careful consideration we concluded that these sizes needed to be changed. The sizes needed to be changed due to the mold well that will have the wheel inserted into it. With the help of Bill we now have the possibility of obtaining a mold well that is already built. These pre-made mold wells have different size options and a twenty inch diameter is not one of the choices. A mold well with a diameter of twenty-four inches is an option. We have determined that this size is the best option available. With a pre-made mold well the remaining parts of the game will be built around it. Last semester we had problems with incorporating a clicking noise into our design. However, this semester we have solved that problem. With a smaller base of the game the clicker can be placed on one of the corners of the base. The wheel will not be centered on the base which will help in the placing of the clicker device. Having a smaller base of the game compared to the wheel will decrease the final weight of the entire game which will in turn make the game easier to transport around. Figure 1 shows a picture of how the wheel will sit on the base. The clicking noise will be made possible by some sort of device that comes into contact with a dowel that will be placed on each pie piece of the wheel. The clicking noise is so important because it will provide further visual and auditory stimulation. Building this cardboard model helped us as a group to determine the optimal dimensions of the game. All of the other components will also be able to fit inside the base of the game even though the size was decreased. This was something we wanted to happen last semester and it will definitely happen.
Once this model was completed Kristen and I continued to analyze the pie pieces that would fit inside the mold well. The pie pieces will be made out of foamed PVC (poly vinyl chloride). The pie pieces do not have to withstand since they will be inside the mold well so therefore foamed PVC works quite nicely. The foamed PVC will also add minimal weight to the game which will in turn help make the game transportable. Foamed PVC is simply two thin sheets of PVC on either side of a sheet of foam. The following figure depicts a cross-section of the foamed PVC.

There is one big problem with the foamed PVC that was ordered and received; it is not colored. The specifications that were provided by the ATCO sheltered workshop stressed that the game must have many visual stimulations. Having an all white wheel will not meet this specification. Therefore some kind of paint must be used to make the wheel colorful once again. However, after much research it was found that the actual painting of the PVC will be a difficult task. Regular spray paint was tested in lab to see if it would actually adhere to the PVC. At first it did but it did not withstand any scratching at all. This problem led to more research on other forms of painting PVC. The best way for PVC to be painted was to thoroughly clean the surface of the PVC and then use sandpaper to roughen up the surface. A mixture of water and bleach was found to be the best cleaning solution. One hundred and fifty grit sandpaper is the optimal sandpaper to use on the surface of the PVC. A database online described many different ways to apply
the paint. A simple method was to clean the PVC with acetone, instead of the water and bleach solution, sanding down the PVC, and then applying the spray paint directly onto the PVC. The recommended spray paint with this method was Krylon™ Fusion spray paint. Another method called for sanding of the PVC, using Purple Primer which can be found at any hardware store, and then using paint with a high amount of solvents. This method recommended using Rust-Oleum™ spray paint. The most advantageous method called for sanding of the PVC, layering it with epoxy, sanding it again, and then applying the paint. A clear epoxy should then be applied on top of the paint to provide another layer of protection. The paint does not adhere to the PVC but rather to the epoxy which is a good thing. This will solve the major problem of the paint not adhering to the PVC.

Future Work

Next week the definitive method to paint the PVC will be decided upon. A visit to a local hardware store will also take place. This visit will help us with the choosing of the paint and will help us to become more educated on the different painting methods. Once the materials are all together different test samples of the PVC will take place. Once the PVC is painted it will be tested on durability and adherence. The tests will help us ultimately determine the correct method that should be used to paint the PVC.

Throughout this week and into the next the SP03 text-to-speech module will be worked upon. The computer program that will allow the phrases to be entered into the computer and then sent to the SP03 module will be downloaded and learned. This piece of the game is important because it can be worked upon without the entire circuit having been built. Once the SP03 module’s program is burnt onto the microchip the push buttons can be ordered that will attach to the SP03 and will activate the audio comments.

Some additional parts that need to still be ordered will be ordered in the next week. Contact will also be made with the supplier of the mold well (Mike Zenker). Exchanging the five button remote with the one button remote will also be looked into. Working on the final game circuit will also be worked on so that it can ultimately be put into the game.

Project Review

Our project has gotten off to a good start so far. The parts that we received at the beginning of the semester are allowing us to start the assembly and testing of the game. We have prioritized what needs to get done. This will help us as the weeks go on so that we stay on task. The planning of the game leads much to the imagination and if time permits extras can be incorporated to further stimulate the adults at the ATCO sheltered workshop.

Hours Worked
8 hours