Heartbeat Drum Phase 2

Overview
Our task was to design the second phase of the Heartbeat Drum, a science exhibit for Discovery Space Science Museum that reads a person’s heartbeat and plays the heartbeat back in real-time on a bass drum. Added features such as lights and a heart rate display will improve the appearance and educational value.

Objectives
- Improve exhibit’s durability
- Improve exhibit’s portability
- Improve the exhibit’s aesthetics
- Maintain the exhibit’s safety

Approach
- Gathered customer need by visiting sponsor and asking questions about the Phase 1 design. The questions included “what features of Phase 1 need to be improved?” and “what features would you like added to Phase 1?” The answers to these questions were used to compile customer needs.
- Each team member brainstormed ideas and created concept sketches. Used a Pugh Matrix to determine the design that best met the customer needs.
- Created CAD model to finalize chosen design.
- Built new base to improve durability, portability, and aesthetics. The new base included handles and slots where the sensors could be placed within the base. The circuitry was permanently soldered to a circuit board. New lights were added lights to improve aesthetics.
- Tested the accuracy of the sensor’s new placement within the base. Compared the accuracy of this set-up with the handle-bar set-up from Phase 1.

Outcomes
Finally, list the outcomes for this project making sure to clearly convey their implications for the sponsoring company:
- The team spent $606.38 for the semester.
- The cost to build the exhibit from scratch is $915.46.
- The project produced a more durable base for Discovery Space. Discovery Space will not need to perform as much maintenance on the exhibit as a result of the soldered electrical components and the placement of the sensors in the base.
- The aesthetics of the base were improved by the inclusion of lights around the circumference of the drum and the finish applied to the drum. Signage was added to provide a more professional appearance.
- The project reduced set up time, assembly time, tool wear, etc.