

Reaction time measurement time device (09/20/10)

Team Members: Clayton Lepak, Darren Klaty, Hope Marshall, Nathan Retzlaff

Problem Statement: A device is desired that will measure and compare simple visual and auditory reaction times in order to demonstrate the difference between audio and visual processing times in a classroom setting. The device must be intriguing and intuitive for its target audience. There is also the potential to incorporate other sensory reaction times into the device.

Client requirements

- Portable to allow for easy transportation and setup
- Simple and easily operable
- Low cost (a maximum of \$200)
- Digital time display
- The device must be thought-provoking and appealing
- Must be accurate (down to the millisecond)
- Allow for bimodal testing
- Must clearly demonstrate that auditory reaction times are faster

Design requirements

1. Physical and Operational Characteristics

a. *Performance requirements:* This device must be able to operate on a continuous basis for short periods of time during demonstrations. It must be able to be disassembled and loaded into the back of a van for transportation. Performance must clearly demonstrate quicker reaction times for auditory vs. visual stimuli.

b. *Safety*: Must be child-safe. All electrical components must be secured in a safe manner. Moving components should not pose any harm for user. The device should always be operated by an adult and small children must be supervised while using the device. The components of the device must be easily sterilized.

c. *Accuracy and Reliability*: The time measurements must be accurate to the millisecond. Device must be designed for repeated assembly, disassembly and operation.

d. *Life in Service*: Must be designed for use at a maximum of 10 times a year for a duration of 4 hours at a time. Device should be designed to last indefinitely with minimal maintenance.

e. *Shelf Life*: Device should be designed to last indefinitely with minimal maintenance. Any batteries used should be easily replaceable.

f. *Operating Environment*: Operation will be in a classroom environment at room temperature. Device should be stored in standard indoor environment. The device must be protected against various weather conditions while in transit.

g. *Ergonomics*: The device should be operable with adult supervision for ages 6 and up.

h. *Size*: Must be able to be disassembled and transported in the back of a van.

i. *Weight*: Easily transportable by a single adult (<40 lbs)

j. *Materials*: All materials are allowed barring anything that poses a threat to user (i.e. common allergenic materials).

k. *Aesthetics, Appearance, and Finish*: Appearance should be the strong point of the device. It must be attractive to all audiences

with an emphasis on middle school-aged children.

2. Production Characteristics

a. *Quantity*: One is desired

b. *Target Product Cost*: Minimal cost is preferable with a limit of \$200.

3. Miscellaneous

a. *Patient-related concerns*: In order to limit the spread of common germs and illness the device must be easily disinfected.

b. *Competition*: The intention of building this device is strictly for educational purposes and therefore will not compete with current devices. It will not be used for marketing purposes.