

Automated Locker

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Background

- ▶ Opening a locker is an easy job for most of us in daily life. However, it turns out to be a difficult task for people with physical impairment.
- ▶ The goal of this project is to help students with impairment that may not able to open their lockers on their own in Depew High School.



Problem

Traditional locker :

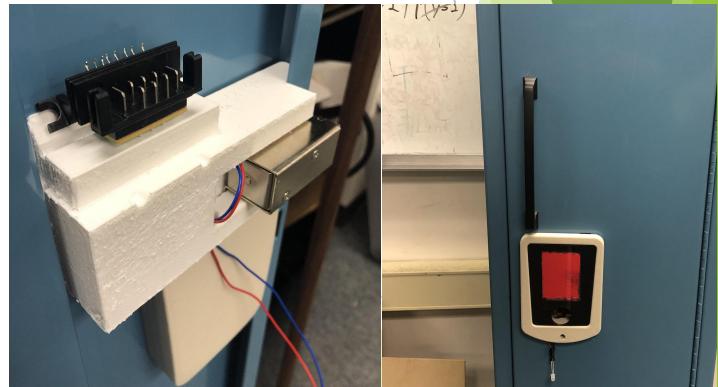
- Uses separate locks
- Disabled students need assistance to unlock



Solution

Automated Locker :

- Pre-registered RFID tags unlock locker
- Door will unlock, and with a slight pull of the handle, the door will open
- Backup lock with mechanical key (not shown)



Original Design of Outside (Interface)



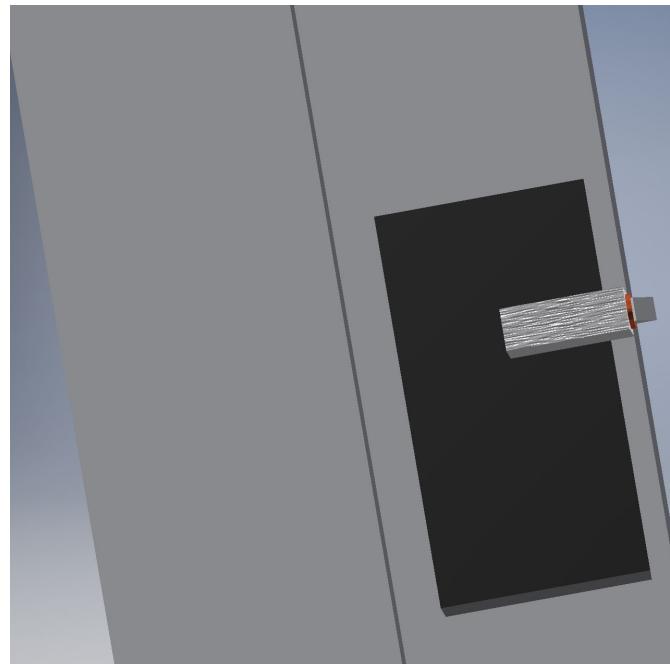
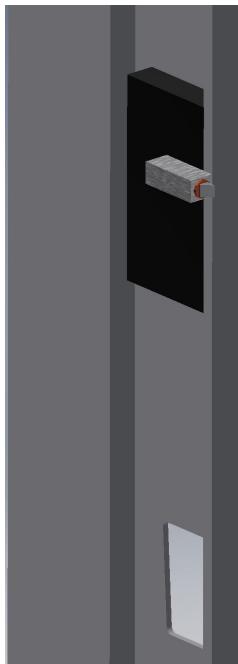
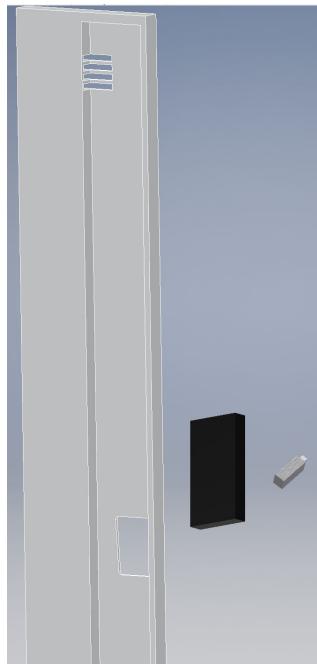
Standoffs for Arduino placement. Extra space for prototype board



Lid holes for RFID placement. Bottom hole for push button placement.



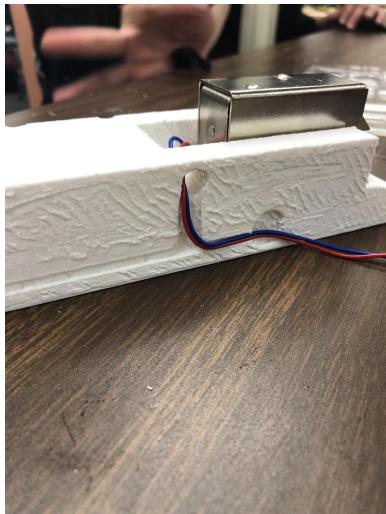
Original Initial Design of Inside



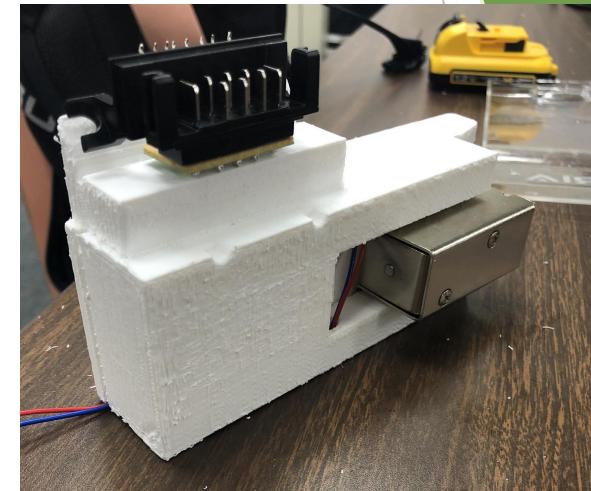
What Did We Keep?

- ▶ We kept the locker interface design as well as the locker lid from the original design. Only made small measurement adjustment so it can fit snug into the door locker hole.
- ▶ We did not keep initial design of the inside because instead of making our own battery pack, we decided to use the Dewalt battery pack and charger. So we made changes accordingly

The New Design



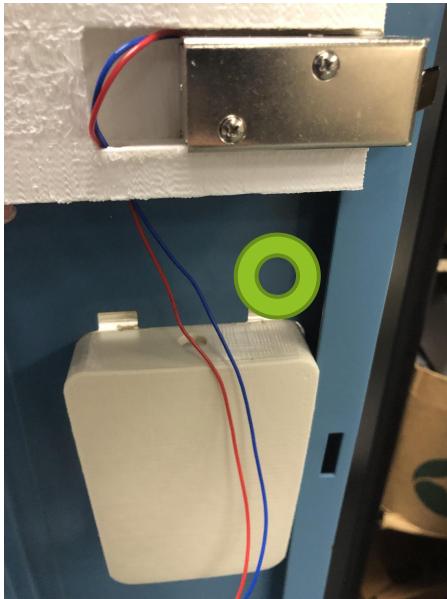
Little channels for cable management



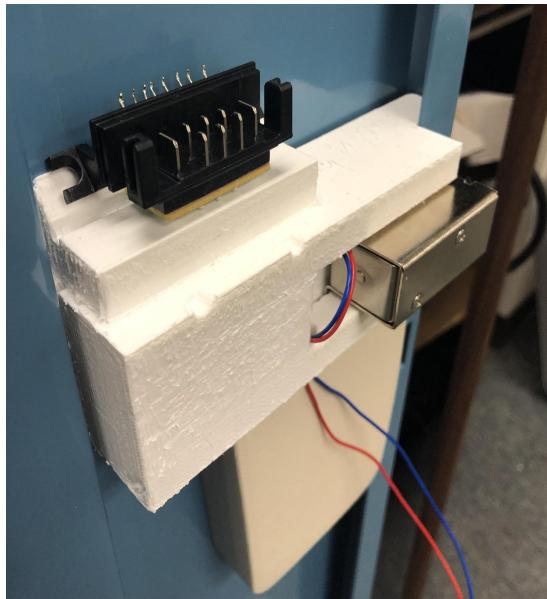
Sliding mechanism for override key



New Design Inside of Door



This green circle area is where we will use a mechanical override lock.



Battery placement will be on top. Will be glued, and adhere tightly to the base.



Our lock design uses a sliding mechanism.

Prototyping

<https://www.youtube.com/watch?v=v9mkjrAbcDI&feature=youtu.be>

Operation

Step 1:



Step 2:



Step 3:



Step 4:



Implementation

What makes it unique?

- A single design catered for the needs of all of the kids.[Accessibility]
- Everything designed from the root level.[Convenience]
 - Bought every single thing.
 - 3D Printed the whole structure.
 - Integrated the whole system ourselves. Not only is the new design is less bulkier but it is also more convenient (no barrier in opening, handle introduced, LED as visual aid).
- Loosely coupled system. If another kid needs it, we just need to add the id of another RFID tag.[Reproduceable and Retrofitted]
- External button for security purposes.[Security]
- Mechanical override lock and key for sudden failure.[Fault Tolerant]
- Wires and all parts insulated to account for safety.[Safety]

Q & A