Smart LED Lights

Team 21
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COVID-19 is disrupting an increasingly connected world to be apart at a distance, forcing people to connect using technology, careful social practices, and locational adjustments.

Schools are also subject to social distancing requirements, as they are public spaces; however, social distancing can be hard to implement in certain locations, such as narrow hallways.
School Hallways

- Students and staff have to use hallways to go in and out of the school and in between classrooms, counselors, nurses office, cafeteria, lockers etc.

- People have to get to where they need to go and are typically cramped in a narrow hallway.

- In the school we’re concerned with, there are six hallways, each one about six to eight feet wide and around thirty feet long, as well as two 120-foot-long hallways of the same width.

- Because these hallways are so narrow but have to carry several hundred students as well as dozens of faculty members around the school, social distancing can prove difficult to implement.

- In order to keep the space functional, features such as lockers and classroom doors must be maintained.
Our Solution

○ We discussed the number and dimensions of the hallways we would have to work with in order to determine what was the most efficient and cost-effective solution.

○ We came up with a lighting system that would signal when each grade level would enter the hallways in order to limit contact between individuals in the hallways and make social distancing easier.

○ We will place a 12-in. strip of LED lights in each classroom that turn on and off through Bluetooth control in order to signal when to enter and exit the hallway.

○ In order to implement our solution, we will need the help of electrical and software engineers.

○ Our solution is innovative because it establishes a cohesive signaling system that is efficient, decipherable, and has never been implemented in the average school before.
Barriers to our Design Implementation

- A 33-ft long LED light strip would cost $33.00, and our project requires an LED light strip of 20 ft.

- This design will require a 20 ft LED light strip and a Bluetooth app.

- Each strip will be attached to the ceiling, meaning that very little classroom space will be lost.
How our Solution will Change the Hallways

○ This solution will set up a strict schedule for when to enter and exit the hallways so that only one grade level is allowed in the hallways at a time.

○ This solution will eliminate face-to-face contact between individuals in the hallway; however, it may be a slight inconvenience to class scheduling.

○ There will be little change to the function of the hallways; they will still serve as a means of transportation for students and faculty throughout the school. However, non-essential activities such as conversations between peers will be limited within the hallways.
What we Learned and How we Worked as a Team

- We went through numerous designs in order to determine cost-effectiveness and functionality, and we went from a plan that cost over $7000 to one that cost less than $50.

- We were able to effectively communicate with each other and develop a clear and cohesive solution to our problem.

- We learned how to refine our design so that it would be the least costly and invasive solution to our problem.
Sources

- Cost of LED light strips
- How smart light bulbs work
- How to get LED light strips to the desired length
Picture Credits

- Slide 3
- Slide 3 Hallway Diagram by Abigail Bowers
- Slide 4
- Slide 6 Classroom
- Slide 6 Hallway