Using RFID to Enhance a 2-Piece Puzzle

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In the digital age, screens are everywhere. Despite the detrimental impacts of prolonged screen exposure on young children and teens alike, both age groups are spending an increasing amount of time on screens. Younger children need an engaging non-screen toy while older children need an effective non-screen study tool. This project investigates the applicability of a device that combines the benefits of puzzles and the entertainment factor of colorful LEDs to the problem. The device uses RFID to read data off a puzzle piece, RGB LEDs that correspond to the puzzle pieces, an LED as the correct status indicator, and light sensors to detect the puzzle pieces. The software that accompanied this prototype took in data from the RFID readers and light sensors and translated that into LED output. The initial design, which used a phototransistor as the light sensor, met all established design criteria except for accurately responding to the presence and absence of a puzzle piece. The redesign of this device switched the phototransistor for a photoresistor and updated the LED lighting software. This iteration of the device reacted almost statistically perfect in terms of LED lighting during testing. The design investigated in this project is a viable non-screen children's toy and study tool. This conclusion is based off design criteria from user feedback, not user testing. Future user testing will qualify this conclusion as interactions and enjoyment are completely subjective measures. This prototype is a good proof-of-concept, but updates are needed prior to market application.

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