

**Implementation Report**

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| **Date** | **October 2022 – March 2023** |
| **Description** | **Gas Sensor with Arduino Learning Scenario**  **Imagine creating a gas sensor that can detect harmful gases like carbon monoxide (CO) and carbon dioxide (CO2) in the air. In this learning scenario, designed for 10 to 11-year-old students with basic knowledge of electronics and programming, we embark on a journey to build such a sensor using Arduino technology.**  **The motivation behind this project is not just about creating a gadget; it's about real-life problem-solving. The students are inspired to measure these gases, not only for educational purposes but also to make a positive impact on their environment. The goal is simple: detect high gas concentrations, signaling when safety measures such as wearing masks or evacuating an area are necessary.**  **This scenario blends real-life and technology-assisted learning methods. Students start by researching the appropriate gas sensor and platform for their project. They opt for Arduino, a user-friendly choice that aligns with their level of knowledge.**  **The challenge is divided into two dimensions. First, they learn how to connect the gas sensor to Arduino and create a functional circuit. Second, they delve into the world of programming, using Arduino's interface to develop a code that can interpret sensor data and trigger responses when gas concentrations cross critical thresholds.**  **Through hands-on experience, these young learners not only build a gas sensor but also develop crucial problem-solving skills and a sense of environmental responsibility. As they see their sensor come to life, they realize that this is just the beginning. They brainstorm other applications, from improving school buses' environmental impact to assessing their parents' cars and monitoring various environmental pollutants.**  **This learning scenario empowers students to apply technology in meaningful ways, fostering curiosity, collaboration, and innovation. By merging real-world challenges with technology, we nurture young minds to become the problem solvers and innovators of the future.** |
| **Estimated Reach (students)** | **100** |
| **Results** | **Students aged 10-11 with basic knowledge of electronics and programming engaged in a real-life and technology-assisted learning scenario.**  **The main project involved creating a gas sensor for detecting CO and CO2 in the air to inform people or trigger safety measures.**  **Students used Arduino, gas sensors, LEDs, resistors, and wires to build the sensor.**  **They also simulated the sensor using Tinkercad, allowing them to see a virtual representation of the circuit.**  **Learning activities included splitting the problem into hardware and programming dimensions, connecting the gas sensor to Arduino, and programming the Arduino board.**  **Students considered the applicability of their gas sensor to school buses, cars, and other pollution detection scenarios.**  **A sample programming code was provided for the gas sensor.**  **The scenario encouraged hands-on learning and problem-solving among students.** |