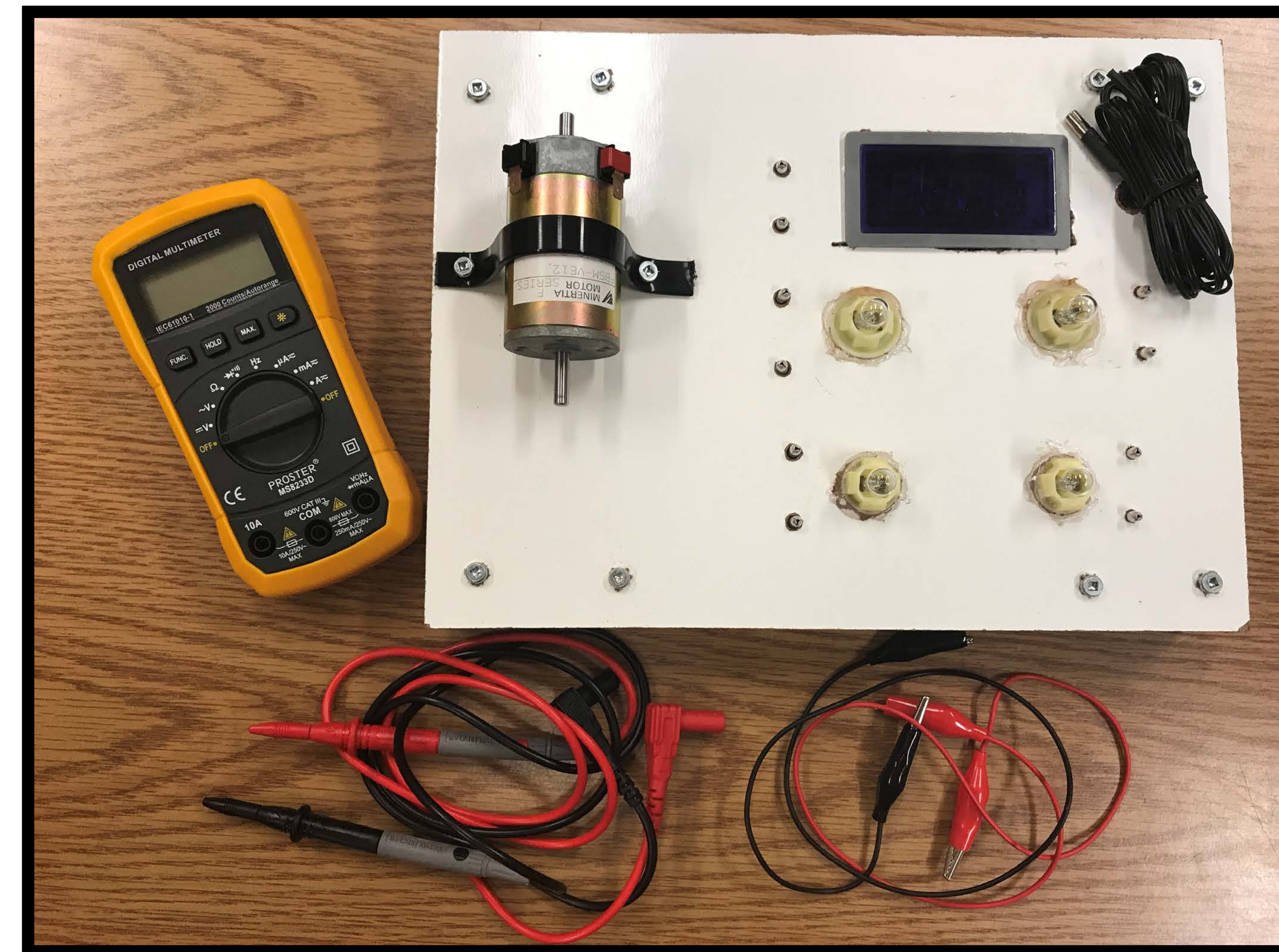


Clayton Badskey (ASM), Ross Fox (ASM)

### Statement of the Problem

- A new, modern electrical trainer for ASM 104
- Introduce basic sensor demonstration, current students have no experience with sensors in a classroom setting
- Updated lesson plan and lab manual for students to understand
- Current students have trouble understanding the basic principles that the current electrical trainers teach them



### Impact & Sustainability

- Will give ASM students a basic understanding of wiring and circuitry that can be applied when moving forward real world application
- Demonstrate sensors and sensor technology that will be used in industry with the increase on reliance on sensors

### Background

- 2 hour lab period split in half
  - 1 hour for wiring lab
  - 1 hour for sensor demonstration
- ASM students need a basic understanding of wiring and sensors due to the prevalence in modern industry



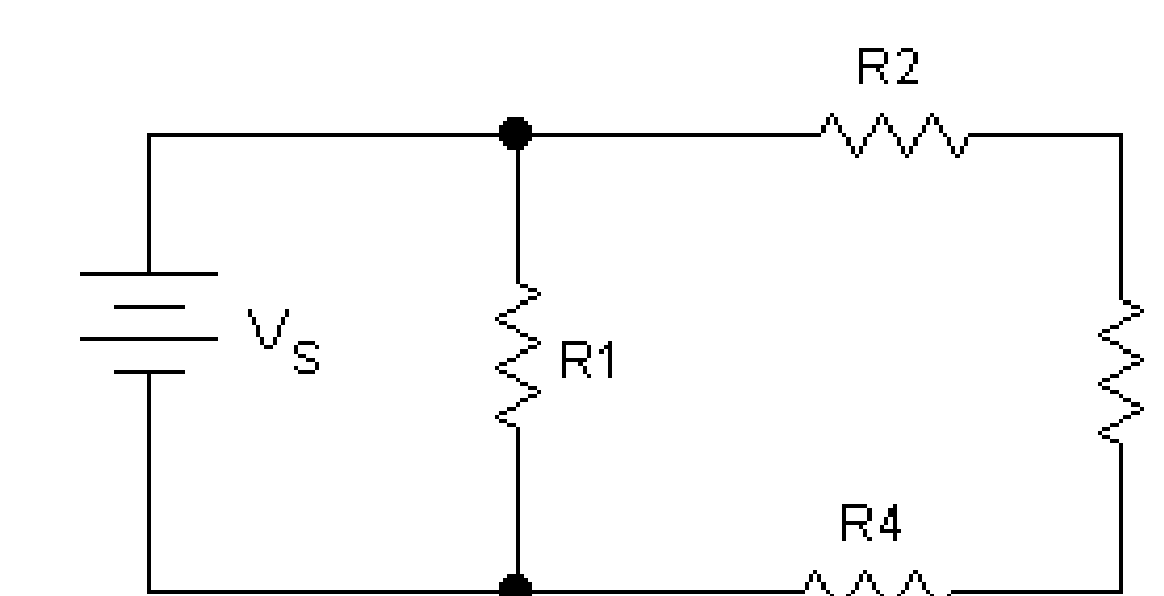
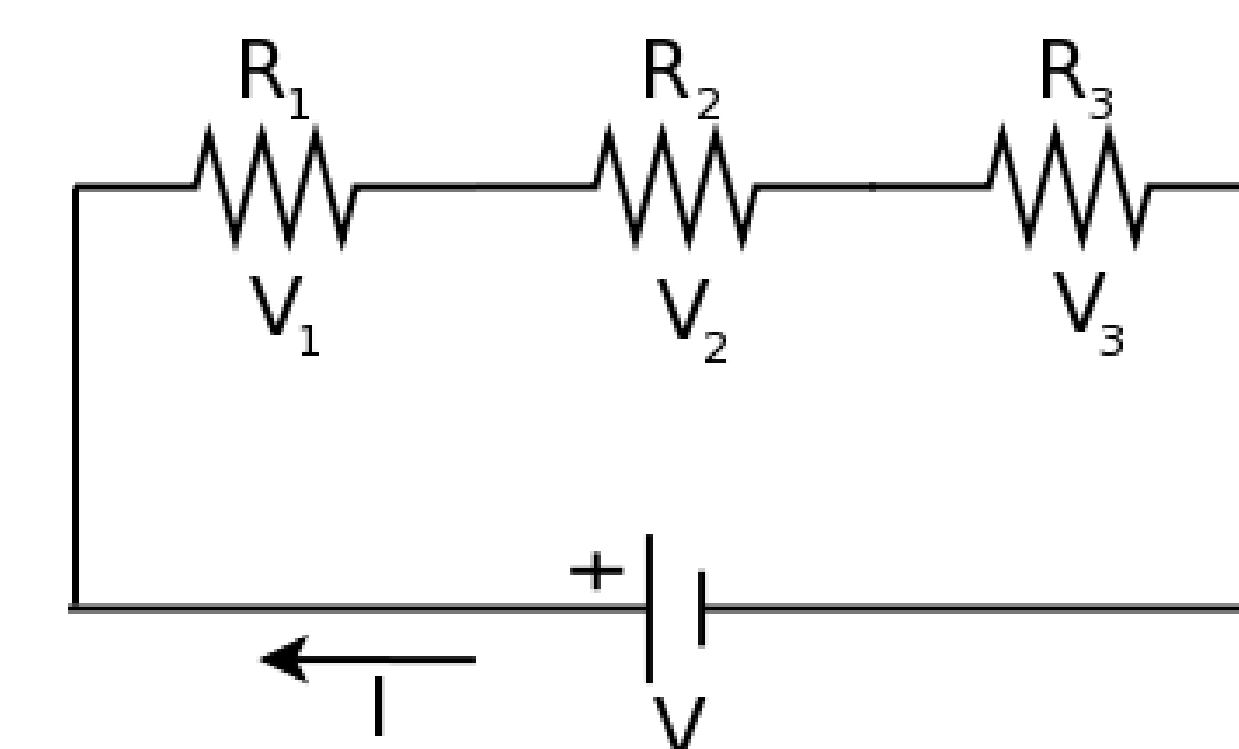
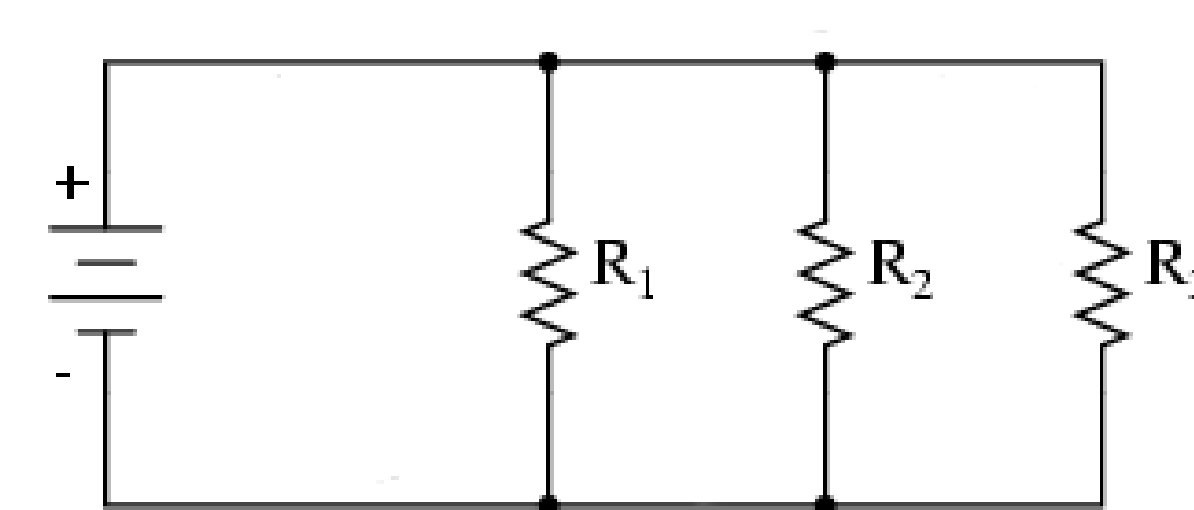
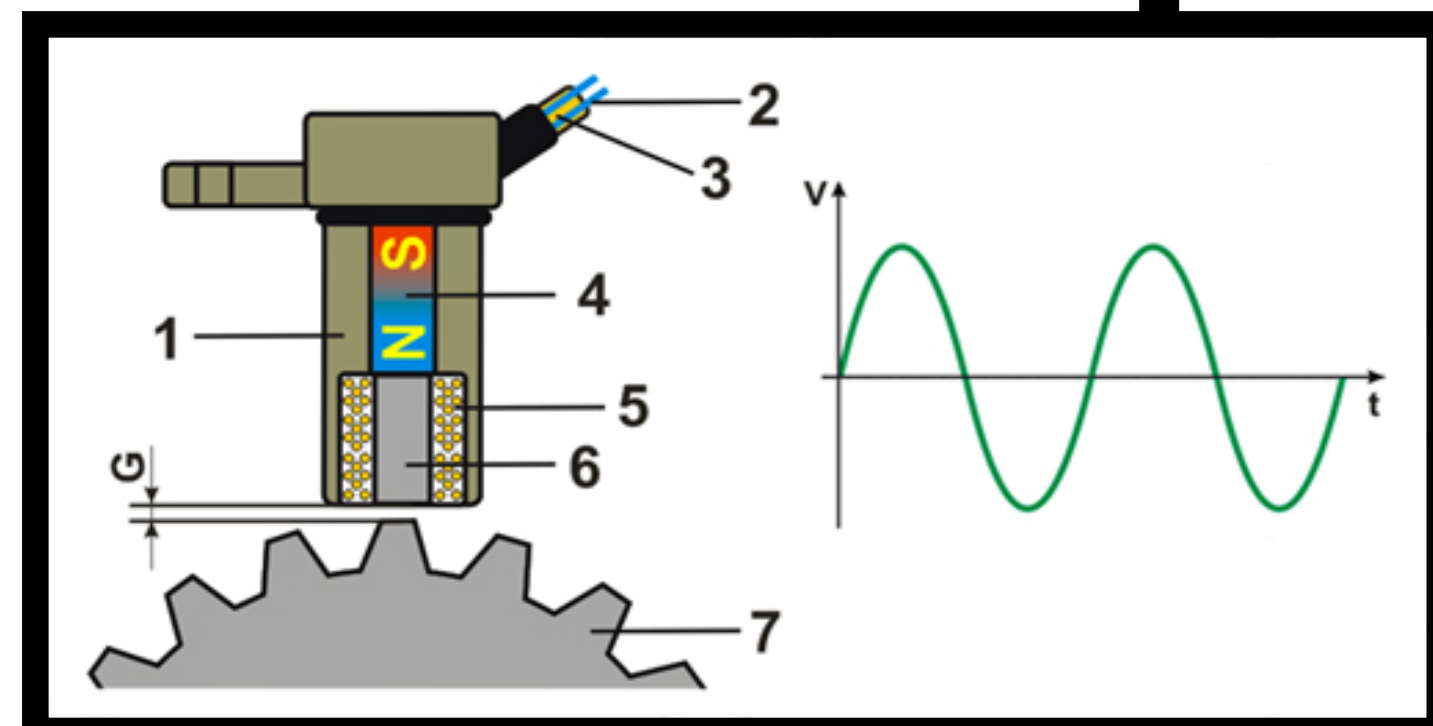
### Final Design & Qualification Analysis

- Lights and wiring setup
  - This configuration of lights allow circuits of parallel, series and combination to be shown
  - These lights allow the bulb to be removed and show how power will flow through these different circuits
  - Alligator clips for convenience of connection, focus on concept not physical wiring
- Power Source
  - AC-DC power converter
  - Allows for variability when making circuits and setting up sensors
- Temperature Sensor
  - Resistance Temperature Detector for the best accuracy at the best price
  - Use of body heat and ice water to give different readable temperatures
- RPM Sensor
  - Hall effect is used for the prevalence of its use in industry today
  - Shaft speed created by a small electrical motor
- Storage/Organization
  - Storage Tray with circuit parts mounted on board
  - Allows trainers to be stored easily
  - Mounted pieces allows the circuits to be made easier



### Alternative Solutions

- Power Source
  - AC – DC power source
  - 6V lantern Battery
  - 12V mini Automotive battery
- Temperature sensor
  - Negative Temp. Coefficient Thermistor
  - Resistance Temp. Detector
  - Thermocouple
  - Semiconductor-Based
- RPM Sensor
  - Laser
  - Hall Affect
- Storage/Organization
  - Storage tray with organized board
  - Loose items in storage box



### Economics

- Preliminary budget of \$150 per set

Description	Cost Per Set		
	Quantity	Cost	Total Cost
AC-DC converter	1	\$ 59.99	\$ 59.99
Multimeter	1	\$ 25.99	\$ 25.99
Lights	4	\$ 2.59	\$ 10.36
Light Sockets	4	\$ 3.89	\$ 15.56
Terminals	1	\$ 2.99	\$ 2.99
Test Leads	10	\$ 0.60	\$ 6.00
RPM sensor	1	\$ 15.99	\$ 15.99
Temperture Sensor	1	\$ 10.87	\$ 10.87
Storage Container	1	\$ 13.57	\$ 13.57
Building Supplies	1	\$ 15.00	\$ 15.00
<b>Total Cost</b>			<b>\$ 176.32</b>

### Design and Project Assessment

- Shows the basic principles of wiring and sensors.
- Good for students with limited knowledge on subject

### Recommendation

- More time should be spent on sensors then the time allotted for this demonstration
- ASM students have a lack of knowledge when using sensors and sensor technology