

2023-2024 Quality Education Fund Thematic Network - Tertiary Institutes

STEAM Education with Self-directed and Progressive Learning of Engineering Design Process for Problem-solving

透過STEAM教育自主及循序漸進學習以工程設計流程解難

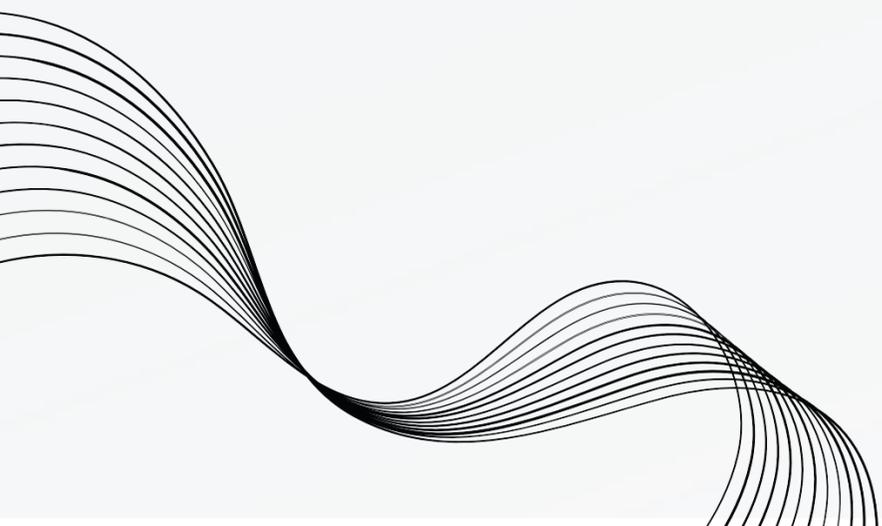
植物淋水裝置

匡智屯門晨崗學校

動物恆溫裝置

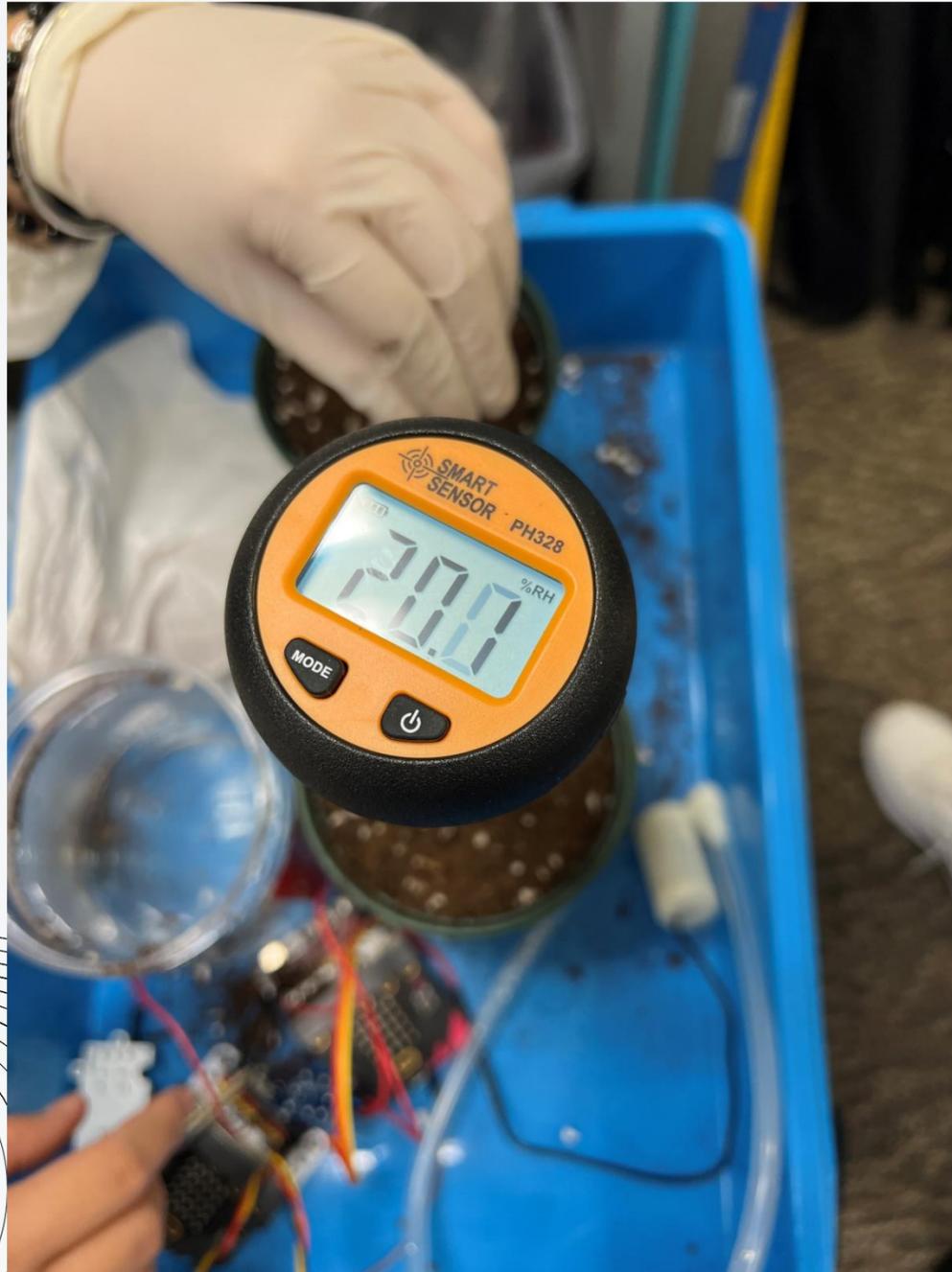
溫度探測自動提示裝置

器材物料：Micro:bit，濕度Sensor，Relay，擴展板，
杜邦綫，電池盒。



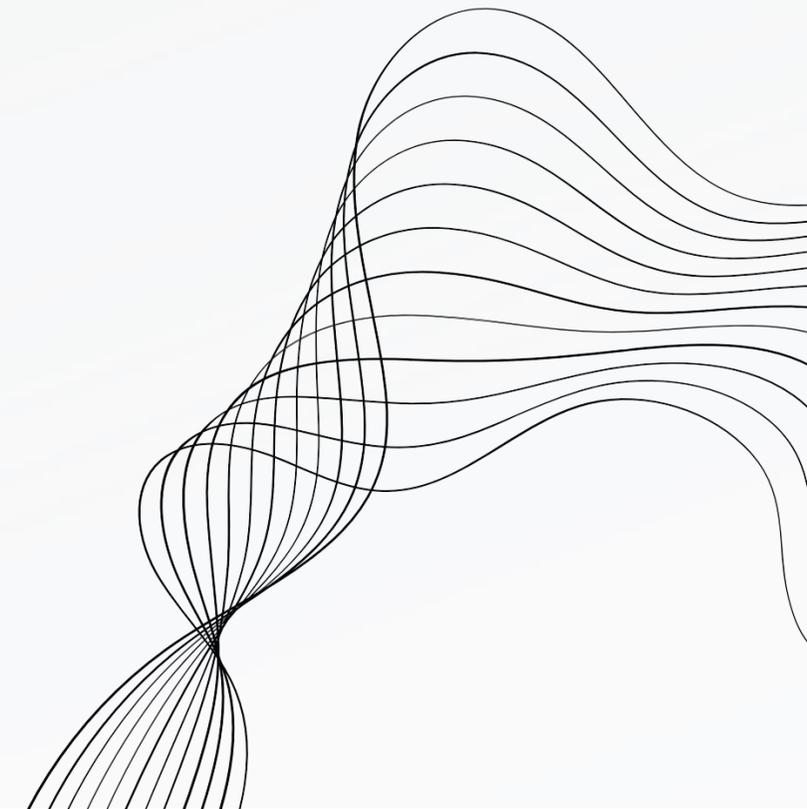
土壤濕度探測數據

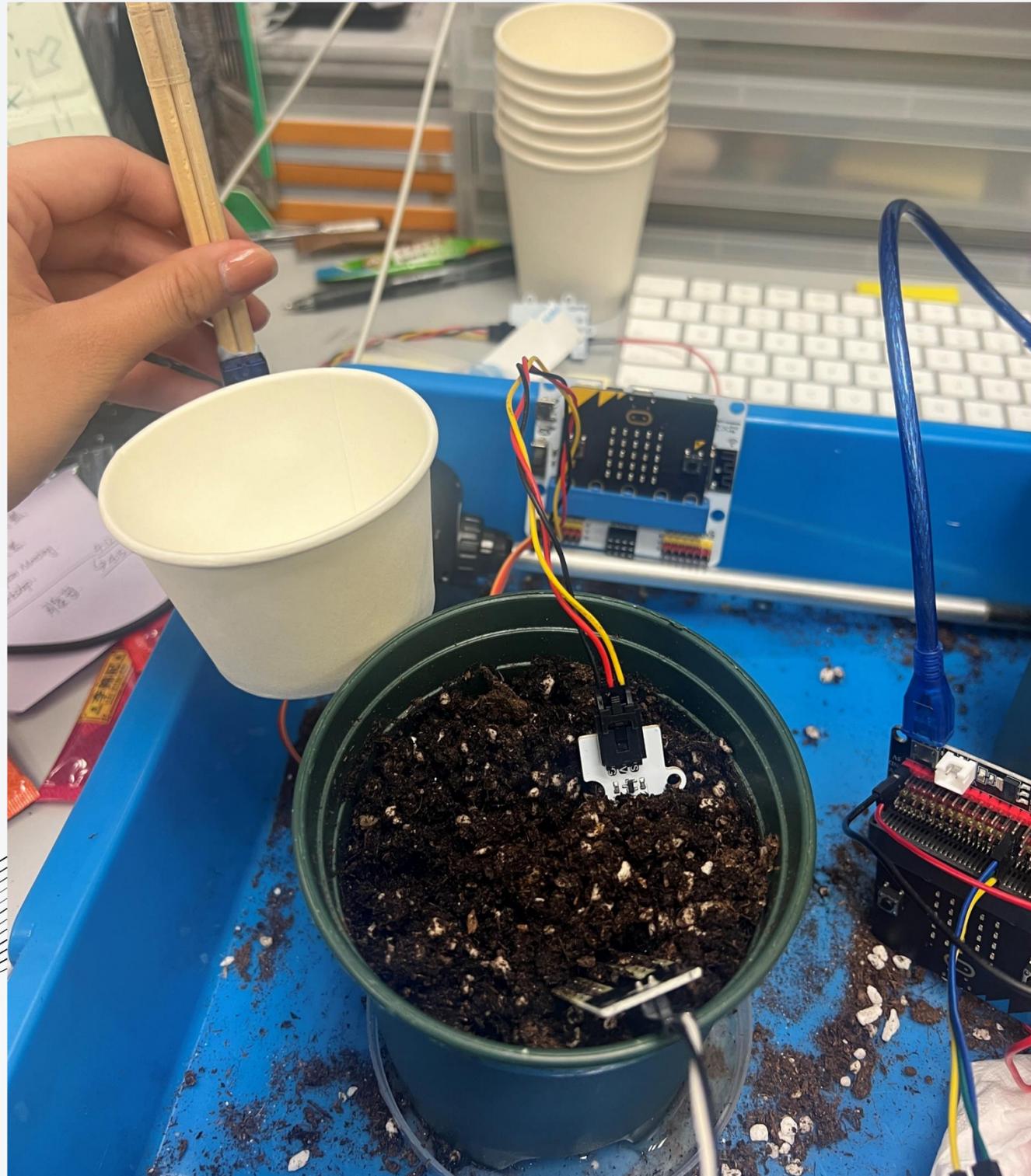
加水量	0 ml	50ml	100ml	150ml	完全濕潤
濕度計	20.6	80.15	82.53	82.5	83.17
Soil moisture sensor	754	825.5	816	812.75	810



測試結論

- Sensor能夠精準探測的範圍有限
- 水分的不平均分佈，導致讀數不穩定
- 無法模擬完全乾燥的土壤環境以顯示更大的濕度差異





水杯式灑水器

所需裝置

- Micro:bit
- 擴展板
- 濕度Sensor
- 連接綫
- 水杯，水杯支撐物
- 電池盒

水杯式灑水器編程

```
forever
  servo write pin P1 to 90
  show number value of soil moisture(0~100) at pin P3
  if value of soil moisture(0~100) at pin P3 < 720 then
    servo write pin P1 to 0
    pause (ms) 2000
  else
    servo write pin P1 to 0
```

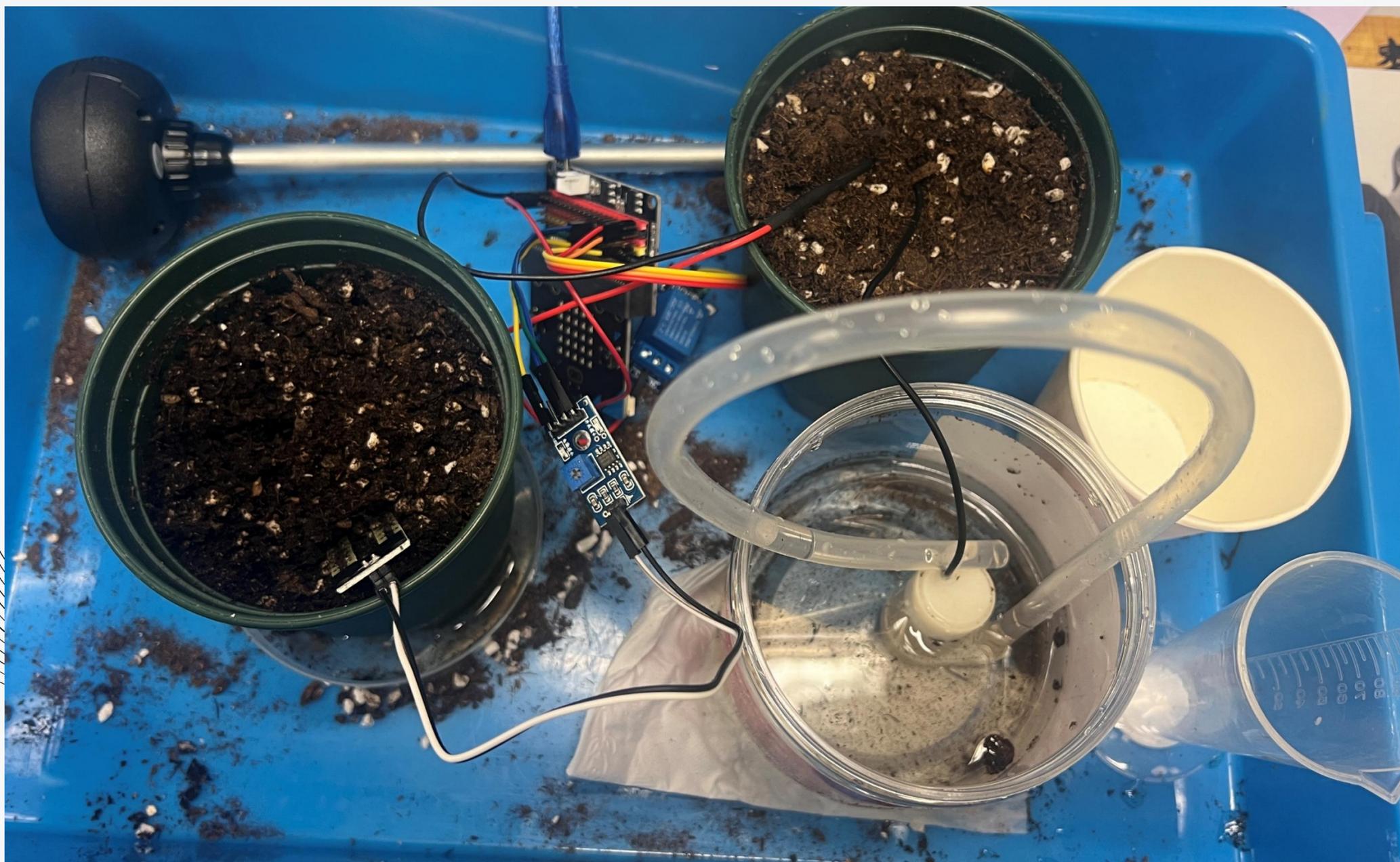
裝置特點

- 連接方式相較簡單
- 灑水方式直觀

- 需要手動加水
- 水杯與servo motor連接容易跌落



水泵灑水器



所需裝置

- Micro:bit
- 擴展板
- 濕度Sensor
- Relay
- 連接綫
- 水泵
- 額外供電

水泵灑水器編程

```
on start
  set hour to 8

forever
  if (1024 - analog read pin P1) / 800 < 100 < 55 then
    digital write pin P0 to 1
    pause (ms) 7000
    digital write pin P0 to 0
    pause (ms) hour * 3600 * 1000
```

裝置特點

- 加水量確定
- 自動化灑水

- 需要連接Relay
- 需要5v電池供電



Thanks for your attention

