

## Supplementary information

### S1. Online feedback survey to identify the factors impact on ESE in physical laboratories

Survey question:

1. Have you performed experiments in physical laboratory?  
 Yes     No
2. Did you feel any anxiety while performing experiments in physical laboratory?  
 Yes     No
3. What are the experiments and issues that contributed to your anxiety while performing chemistry laboratory experimentation? (Open ended question)

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### S2. Online feedback survey to identify the impact of factors ESE in physical laboratories

**Please share your feedback on causes of anxiety in performing experiments in the laboratory**

Background Information:

- *Conceptual understanding refers to the grasp of the theory behind experiments.*
- *Anxiety from hazards represent instances such as accidental breakage of apparatus and spillage of chemicals.*
- *Procedural complexity represents the difficulties faced by students in performing mathematical calculations and following the experimental procedural steps.*
- *Lack of sufficient resources represents the unavailability of physical instruments, apparatus or sufficient instructions to perform experiments individually with confidence.*

1. Have you performed Acid-base titration in the laboratory?

Yes     No

1.1. Select all factors you experienced while performing this experiment

- |   |                          |
|---|--------------------------|
| a) Difficulty in Conceptual understanding | <input type="checkbox"/> |
| b) Anxiety from hazards                   | <input type="checkbox"/> |
| c) Procedural complexity                  | <input type="checkbox"/> |
| d) Lack of sufficient resources           | <input type="checkbox"/> |

2. Have you performed Determination of viscosity of organic solvents in the laboratory?

Yes       No

2.1. Select all factors you experienced while performing this experiment

- a) Difficulty in Conceptual understanding
- b) Anxiety from hazards
- c) Procedural complexity
- d) Lack of sufficient resources

3. Have you performed EMF measurements of cells in the laboratory?

Yes       No

3.1. Select all factors you experienced while performing this experiment

- a) Difficulty in Conceptual understanding
- b) Anxiety from hazards
- c) Procedural complexity
- d) Lack of sufficient resources

4. Have you performed Flame-photometry in the laboratory?

Yes       No

4.1. Select all factors you experienced while performing this experiment

- a) Difficulty in Conceptual understanding
- b) Anxiety from hazards
- c) Procedural complexity
- d) Lack of sufficient resources