

Combating fear of nuclear science (NS) by measuring radioactivity

Antonio A. W. L. Wong

Learning domains of NS

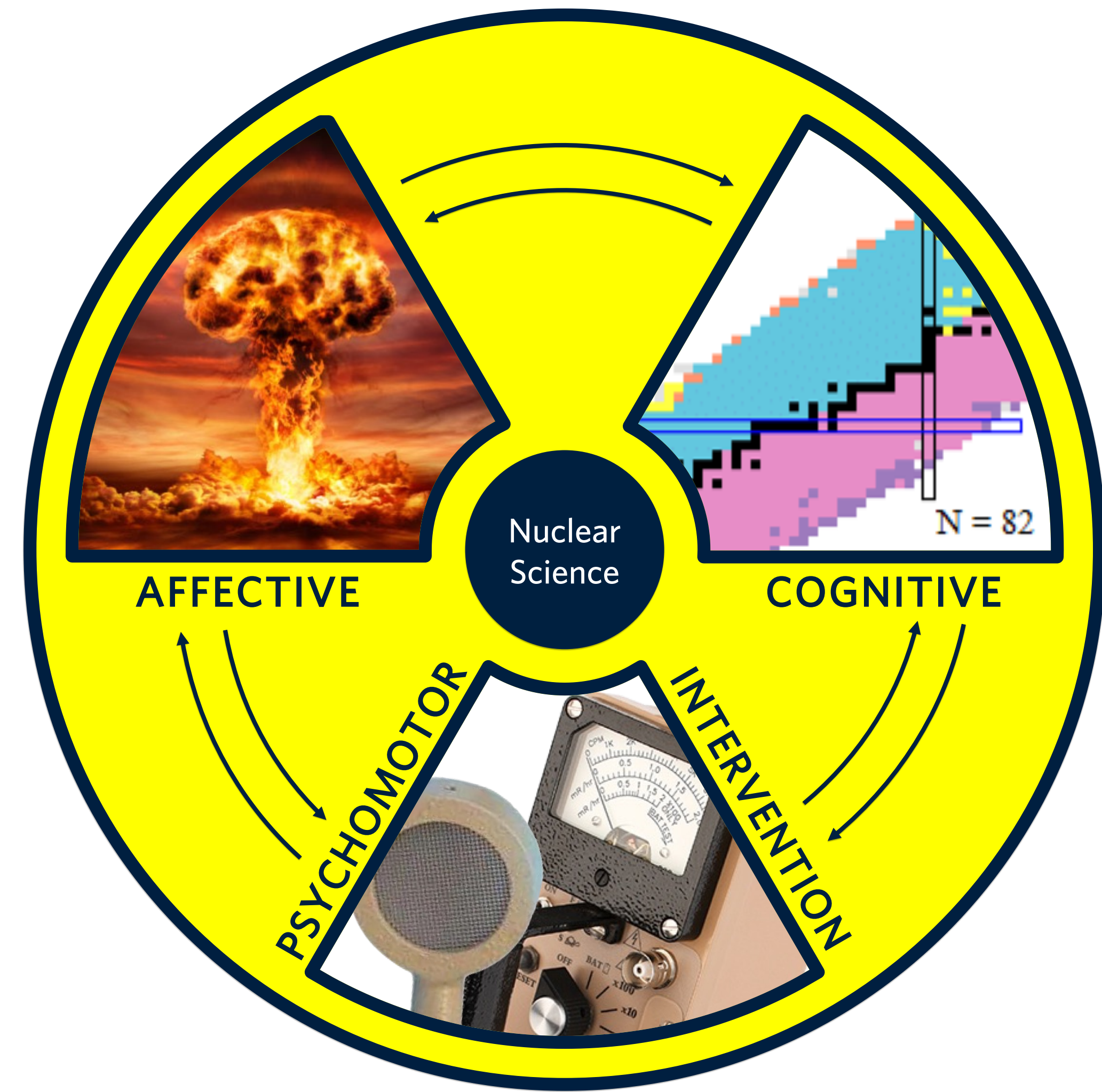


Figure 1. Using instrument as an intervention to complete the three domains of learning.

Research Question

How does the use of instrumentation reduce fear in radiological education?

Research Design

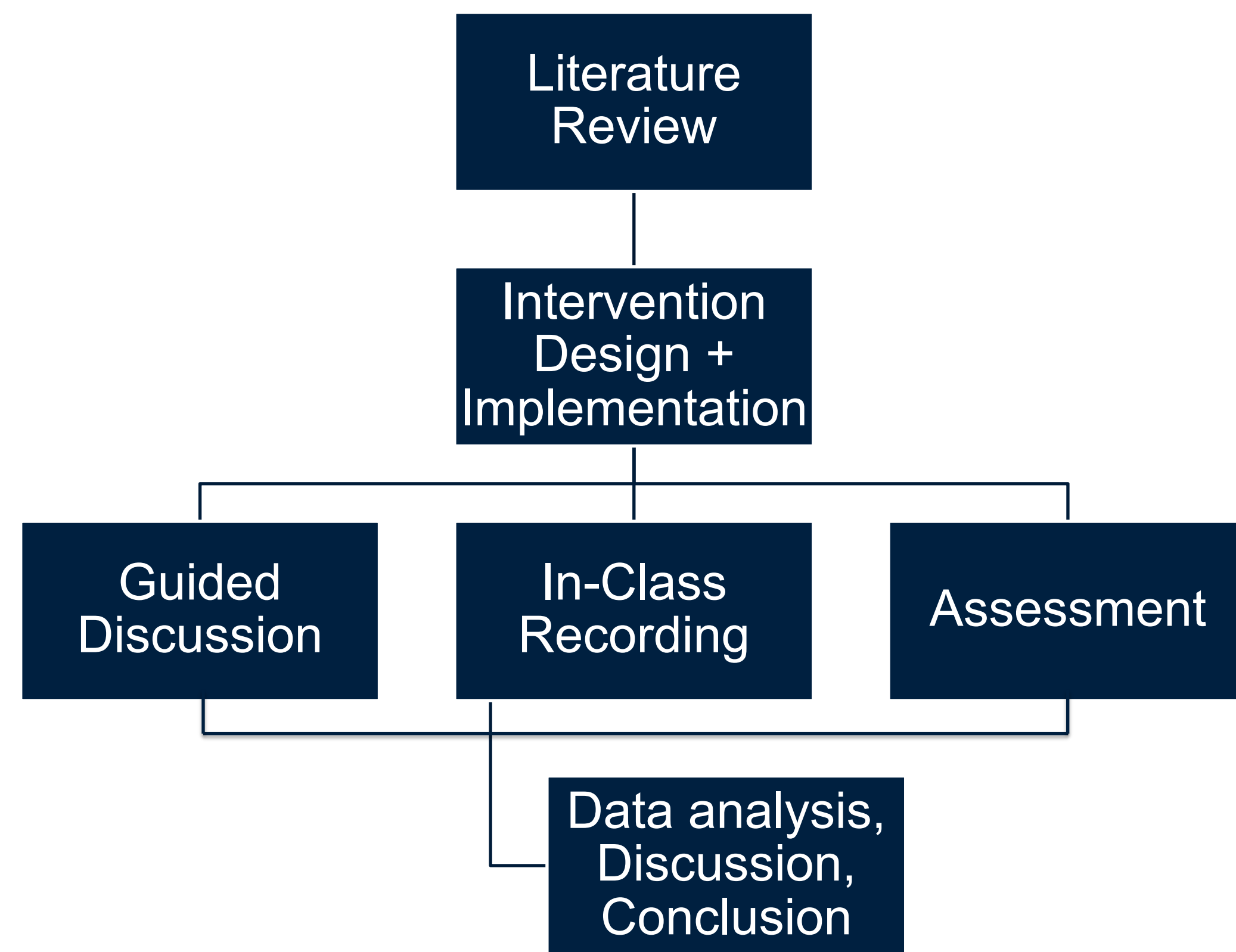


Figure 2. Research work-flow chart.

Operating the **Geiger-Müller counter** was effective in **reducing fear** in **nuclear science (NS)**.



Scan to access supplemental information!

Results

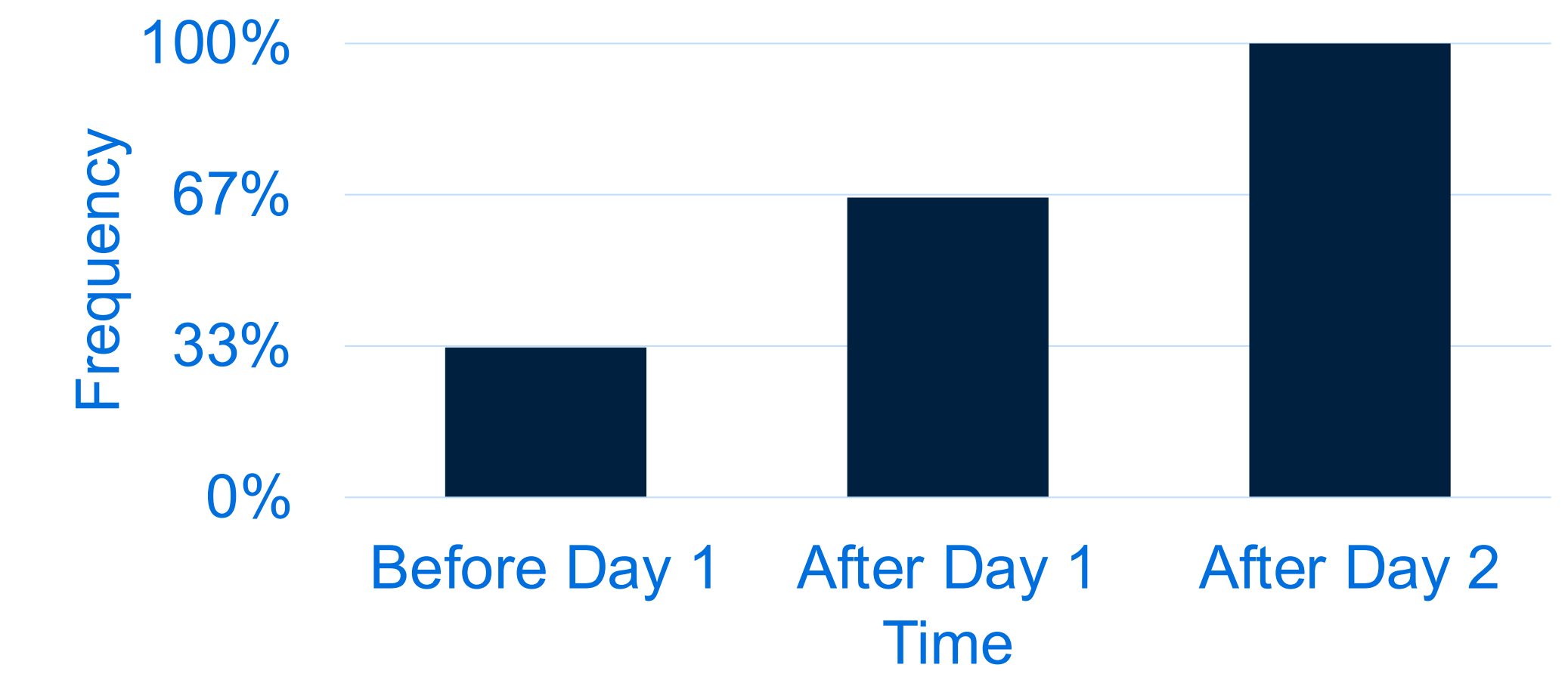


Figure 2. Percentage of student having a comfortable attitude towards radioactivity.

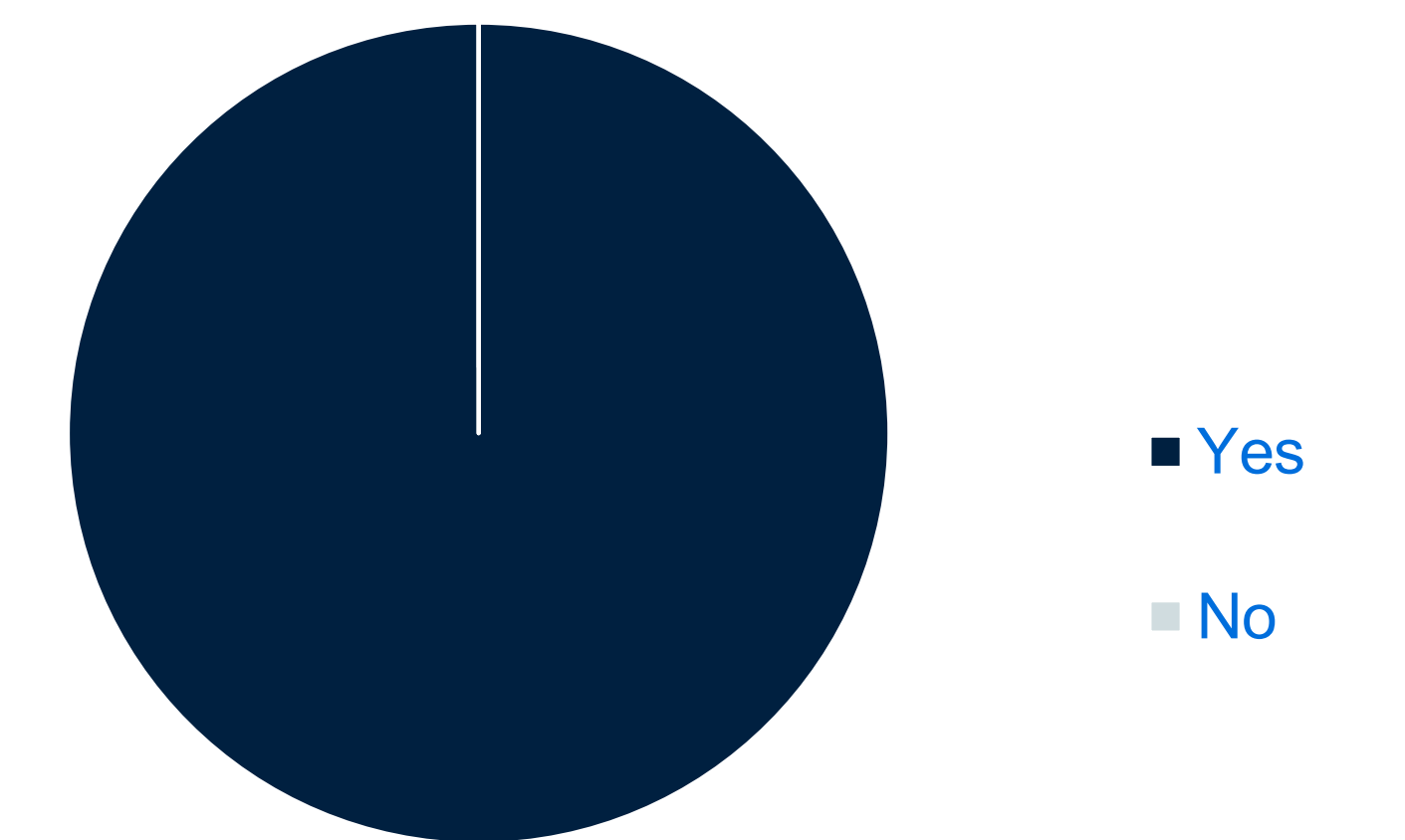


Figure 3. The use of the instrument enhanced your comfort level with radioactivity.

Other feedback

- It contextualizes radioactivity as a tangible phenomenon
- It resolves conflicting misconception
- It confirms my learning of radioactivity
- It increases the number of sensory inputs (visual, tactile, aural)

Limitations

- Small non-homogeneous sample ($N = 3$)
- Short study period; difficult to determine long term impact

Bibliography

Dauer, L. T., Thornton, R. H., Hay, J. L., Balter, R., Williamson, M. J., & Germain, J. S. (2012). Fears, Feelings, and Facts: Interactively Communicating Benefits and Risks of Medical Radiation With Patients. <http://dx.doi.org/10.2214/AJR.10.5956>, 196(4), 756-761. <https://doi.org/10.2214/AJR.10.5956>

Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2014). Experiential learning theory: Previous research and new directions. In *Perspectives on thinking, learning, and cognitive styles* (pp. 227-248). Routledge.

Morales López, A. I., & Tuzón Marco, P. (2022). Misconceptions, Knowledge, and Attitudes Towards the Phenomenon of Radioactivity. *Science and Education*, 31(2), 405-426. <https://doi.org/10.1007/S11191-021-00251-W/FIGURES/5>

Taşoğlu, A. K., Ates, O., & Bakac, M. (2017). Prospective Physics Teachers' Awareness of Radiation and Radioactivity. *European Journal of Physics Education*, 6(1), 1-14. <http://31.220.4.173/index.php/EJPE/article/view/51>

Acknowledgement

Sai Diwan, Facilitator, CIRTL Summer Institute 2023
Brett Gilley, Facilitator, CIRTL Summer Institute 2023