



Maynooth University
National University
of Ireland Maynooth



Virtual Laboratory Teaching & Learning: A Blended Approach

Denise Rooney



Teaching & Learning Conference 12th Dec 2024



Rialtas na hÉireann
Government of Ireland



Project Partners

Academic Partners



Enterprise Stakeholders



Jazz Pharmaceuticals.

Project Steering Committee



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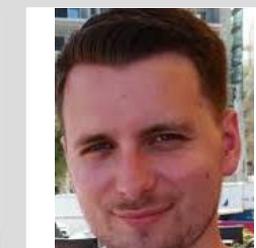
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[Dr Bernard Drumm](#)
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Dundalk Institute of Technology



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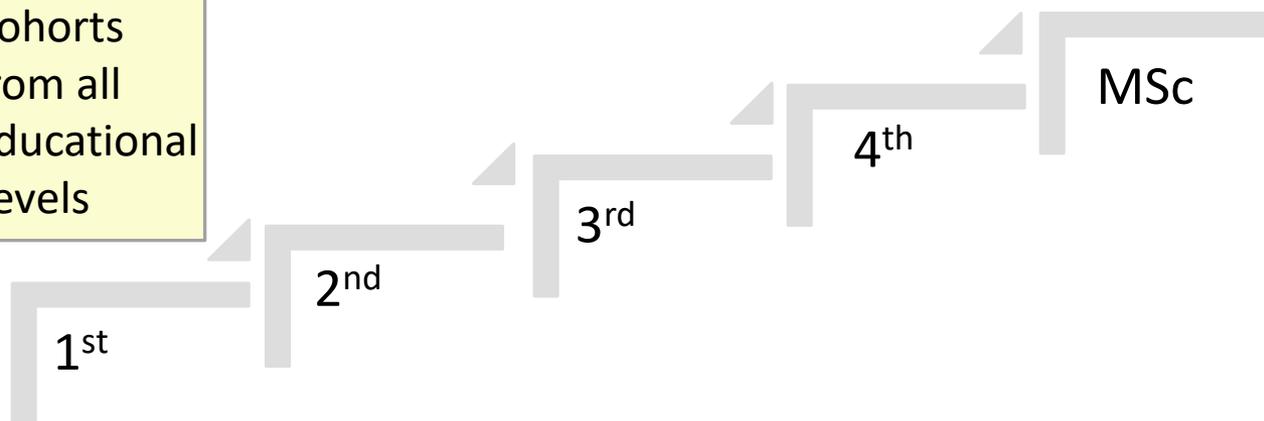
[Dr Christopher Burke](#)
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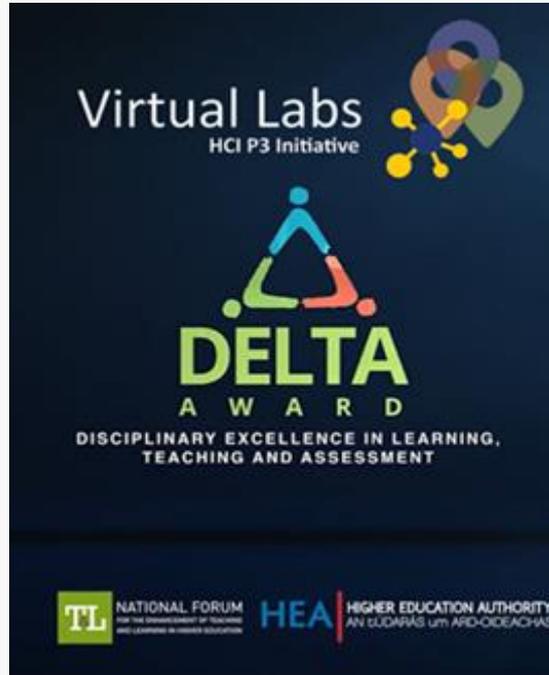
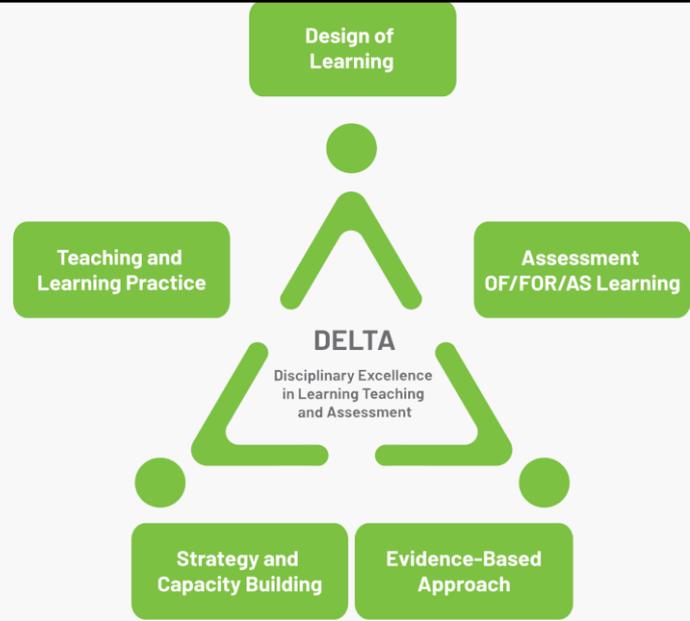


Student Partners

- General Chemistry
- Analytical Chemistry
- Bioanalytical Chemistry
- Biochemistry
- Biotechnology
- Pharmaceutical Science
- Biopharmaceutical Chemistry

Students
Cohorts
from all
Educational
Levels





Laboratory Based Teaching

Objectives



The Chemistry Teaching Laboratory: A Sensory Overload Vortex for Students and Instructors?
Aishling Flaherty Journal of Chemical Education 2022 99 (4), 1775-1777

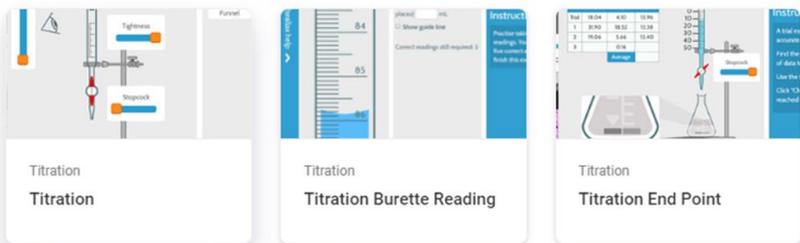
1. Engagement
2. Visualise concepts taught in Lectures
3. Practical skills
4. Scientific approach and making conclusions based on data
5. Problem-solving abilities

Obstacles



1. Lack of clear/consistent instructions of academic expectations
2. Lack of student preparation
3. Effectiveness of the instructor
4. Limited lab time

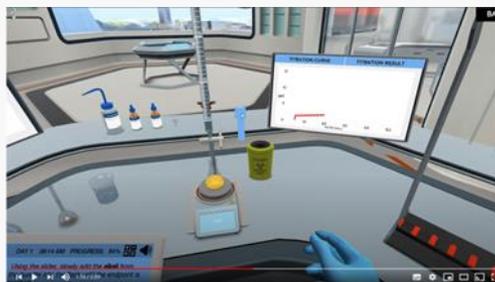
Lab-Design



Pre-Lab Work

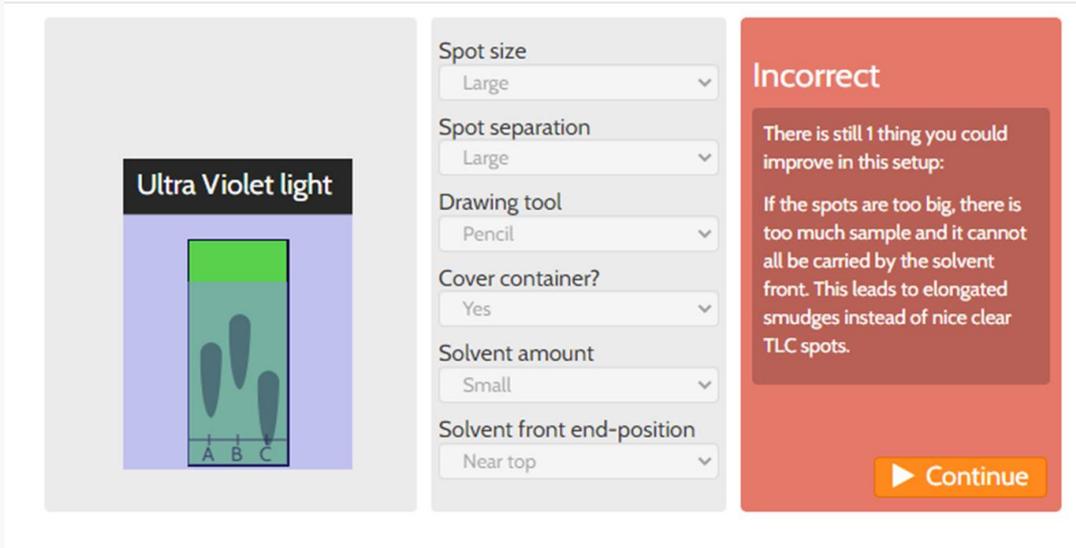


Face-to-Face labs



Post-lab for Reinforcement

Commercial packages



Ultra Violet light

Spot size
Large

Spot separation
Large

Drawing tool
Pencil

Cover container?
Yes

Solvent amount
Small

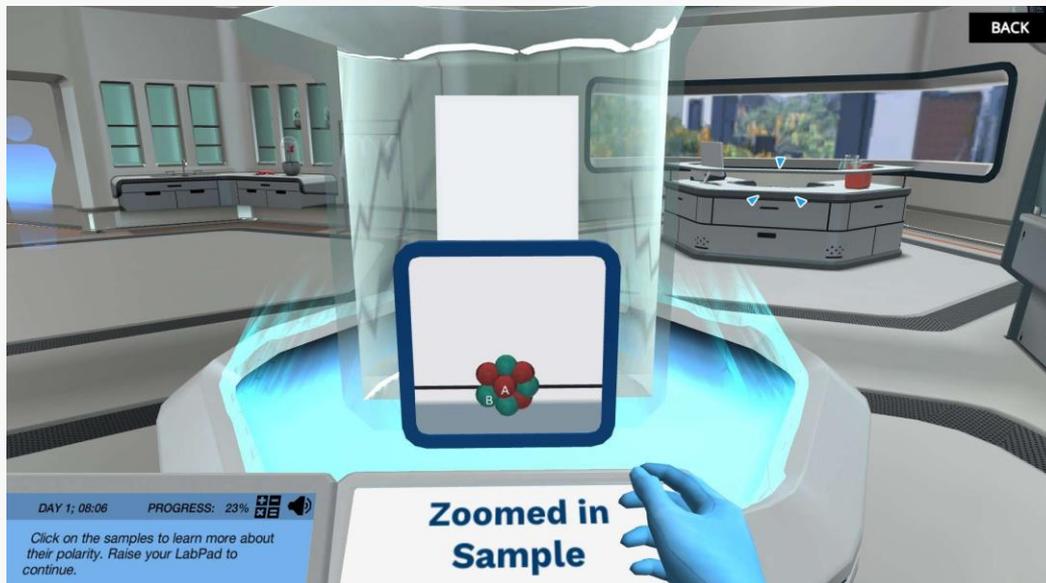
Solvent front end-position
Near top

Incorrect

There is still 1 thing you could improve in this setup:
If the spots are too big, there is too much sample and it cannot all be carried by the solvent front. This leads to elongated smudges instead of nice clear TLC spots.

▶ Continue

Pre-lab learning the technique



BACK

Zoomed in Sample

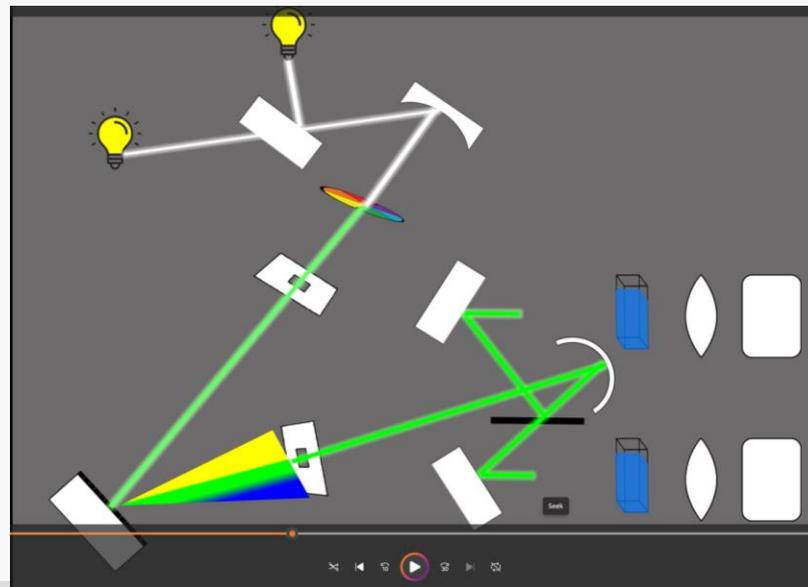
DAY 1; 08:06 PROGRESS: 23%

Click on the samples to learn more about their polarity. Raise your LabPad to continue.

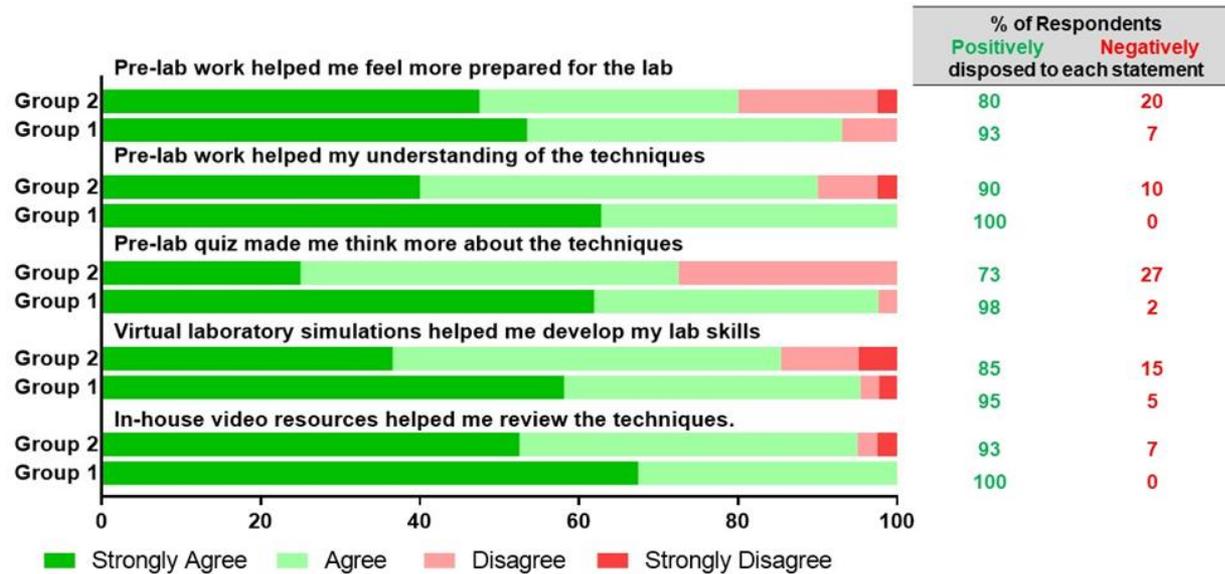
Post-lab to visualise what is happening on a molecular-level



2023 Ireland's first Science Studio opens in UCC



Student Feedback



... more prepared....
 ..helped my confidence...
 ... enjoy the lab...



...work is very similar between the lab
 and the simulations....

....felt I could do a lot more in the lab
 because I had done the pre-lab work.....

...definitely an effective way to help your learning..... better to learn in a lab,
 but they really helped reinforce what you were learning.

Teaching & Learning Outputs



Virtual Labs
HCI P3 Initiative

- Innovating with using digital technologies to support laboratory practicals.
- Reviewing teaching, learning and assessment practices through a UDL lens
- Implemented a Digital Badging programme to promote identification and enhance student perception that technical skills can improve competency for employment.
- Hosted multiple enterprise engagement events: advisory panel discussions, site visits and invited seminars.
- Evaluated the project through staff and student surveys and focus groups.
- Developed a strong geographically disparate, collaborative team across 5 HEIs.



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