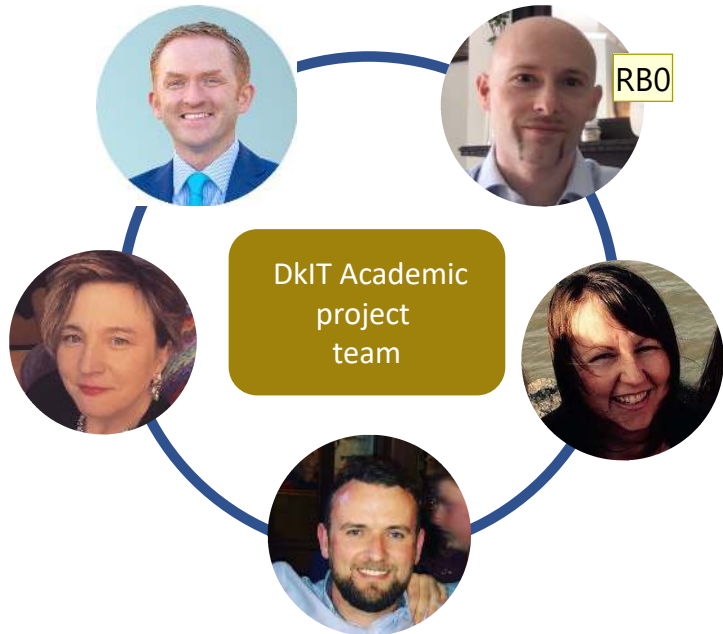


# Transforming practical teaching in the digital age: an overview and some findings from the multi-institutional Virtual Labs Project

Sinead Loughran, Bridget Kelly, Ronan Bree, Bernard T. Drumm, Caoimhin S. Griffin, Arjan van Rossum, Aoife Morrin, Brian Murphy, Eric Moore, Marwa Aly, Carmel Breslin, Frances Heaney & Denise Rooney



# Overview



Also including Departmental and School management and student partners

1	Background & Overview
2	Aims & Objectives
3	Review of Preliminary Findings
4	Future Plans



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## Slide 2

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**RBO**

We will also be joined by senior management members of the team, Arjan and Edel, but can perhaps mention this is the academic team. but also on the call from the team is.....

Ronan Bree, 2022-12-06T20:46:33.122

# Academic, Industry and Student Partners



# The Virtual Labs Project



Human Capital Initiative Pillar 3, Innovation and Agility

October 2020 (submitted pre-COVID):  
received €2.97m.

**5 partner HEIs**  
(MU lead; UCC, TUS, DCU & DkIT).

*Enterprise & EdTech partner focused.*

*Student & transversal skill centred*

Minister Harris announces 22 innovative projects to be funded under Human Capital Initiative



By Maura O'Shea

Posted: 5 October, 2020



# Background



Future proof graduates and ensure that there is a greater focus on promoting and embedding transversal skills.

Innovative methods: learners will benefit from improved quality and more engaging ways of learning on enterprise-focused courses.

*“These projects will **develop and change** teaching and learning. This global pandemic has reinforced the need for us all to be **agile and diverse**. Crucially though it requires us to **develop new skills and equip the next generation** with the critical importance to the economy and the workplace of the future.”*

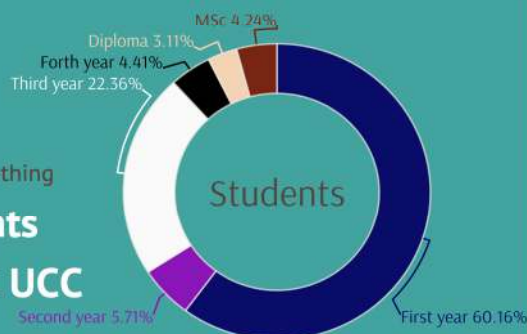
# Progress across the Project



~ 2500

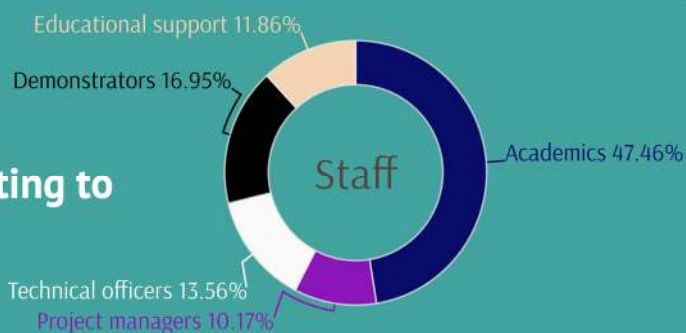
Type something

Rolled out VL to ~ 2500 students across MU, DCU, DkIT, TUS and UCC



75

75 staff are contributing to the Initiative



25<sup>+</sup>

Integrated VL with more than 25 programmes including; general chemistry, Pharmaceutical, Biopharmaceutical, MSc Analytical Chemistry, Biochemistry and more...

5

EdTech partners



26

Conducted 26 students/staff focus group meetings, and surveys



7

Ran 7 industry events and meetings



17

Presented VL at 17 national and international conferences, events & showcases



Virtual Labs  
HCI P3 Initiative



Developed and launched the virtual labs website, social media channels & brand identity



# Project engagement in DkIT to date



DkIT progress within the 'bio' space. Expanding to new areas, and engaging new staff.

## DkIT Programmes

- Lv8 General Science Programme
- Biopharmaceutical Science Programme
- Environmental Science Programme
- Pharmaceutical Science Programme
- Bioscience Programme
- Health and Physical Activity Programme
- Agriculture programme

## Modules

- Bio/analytical Science
- Environmental Chemistry
- Biotechnology / Pharmaceutical Biotechnology
- Immunology
- Biochemistry
- Molecular Biology
- Upstream Processing
- Pharmacology and Physiology
- Biology
- Chemistry

## Students

182 licences  
last year

247 licences  
this year

**Academic  
Staff: 10**



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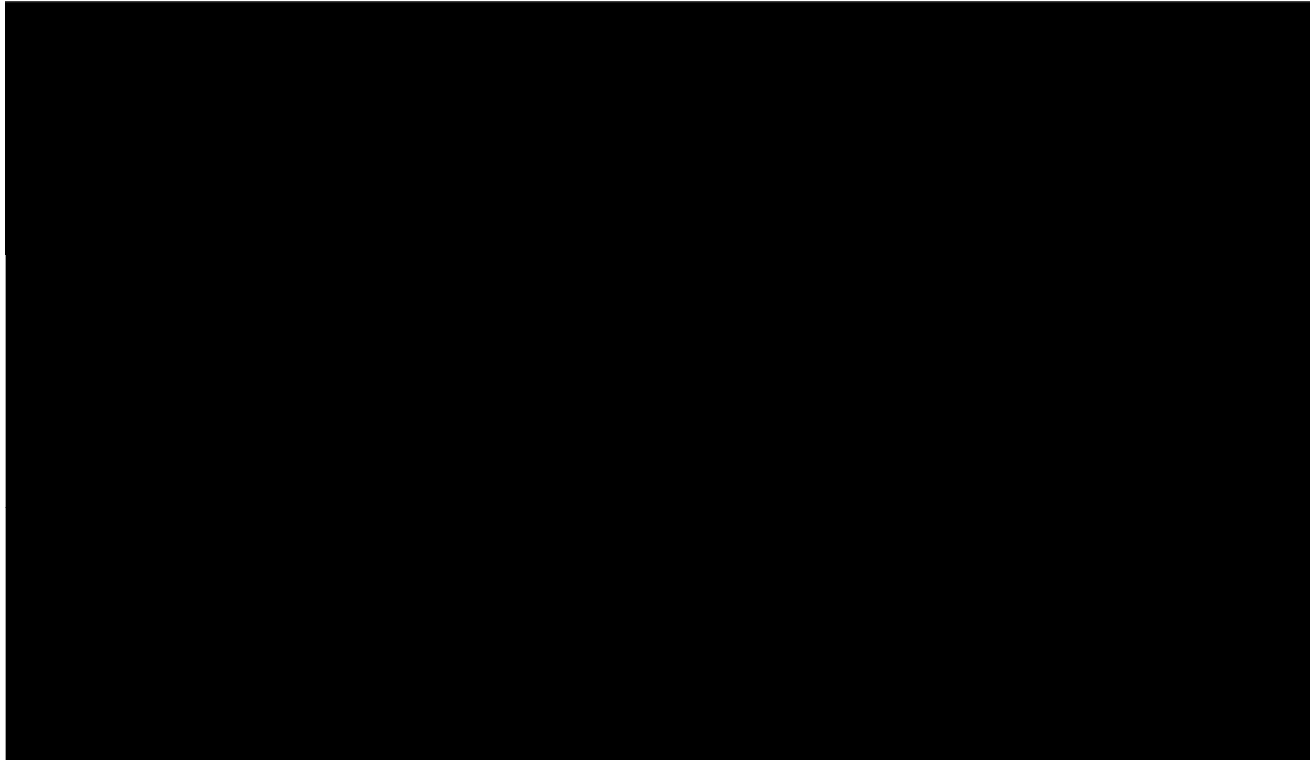


# Potential for Virtual Lab Resources/Simulations



To enhance students'

- learning experience,
- employability and
- transversal skill development



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# How do Virtual Laboratory Sessions 'fit'?



**Pre-Lab  
VL Work**



**In-lab experiments**  
(& VLs to support learning about  
unavailable, specialised equipment)



**Post-Lab VL  
Work**

# Research Data and Analysis



- Primary Objective - Establish students' **perceptions** of virtual laboratories (VLs) and VL resources.

## 1. Student Surveys (Nov 2021 & 2022)

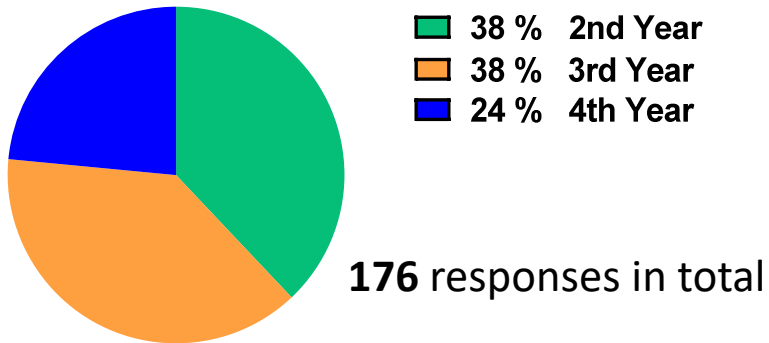
- **What?** are current student perceptions of VLs.
- 14 questions in total
  - MCQs
  - Rating style Q's (1 to 5)
  - Open ended Q's

## 2. Student Focus Group (Apr 2022)

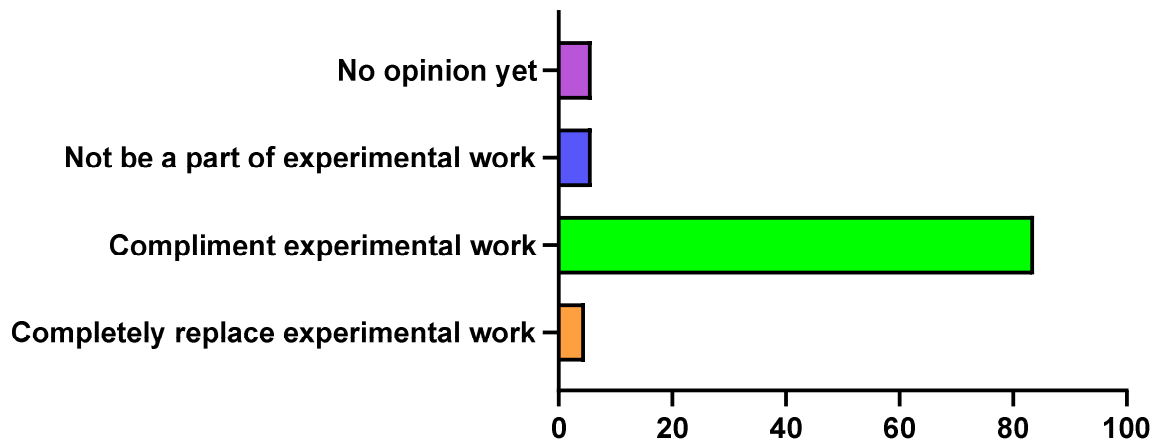
- Explore the **How?** and **Why?** Students have these perspectives on VLs



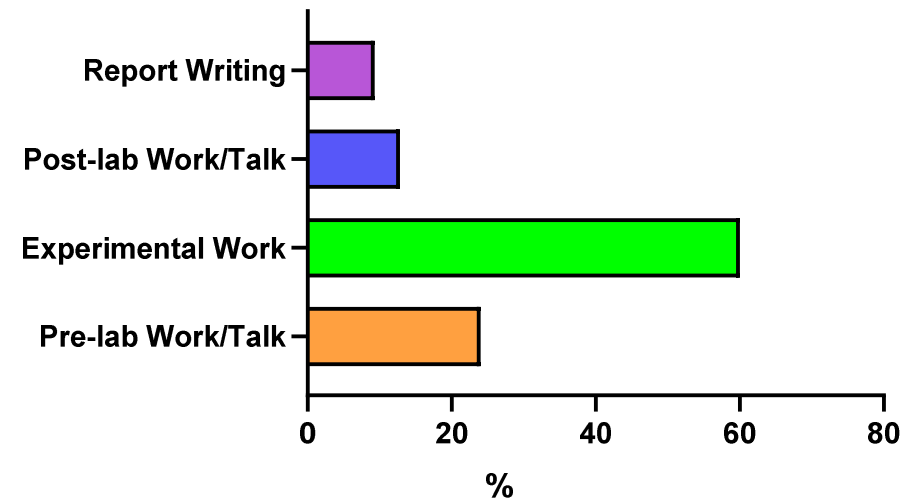
# Student Survey Findings



Which of the following statements best reflects how VLs should be used for experimental work?



What part of practical work do you find most beneficial to your learning?



# Student Focus Group Findings



*"F2F practicals were much preferred but the virtual labs offered opportunities to see resources and techniques that would not normally be available"*

*"Importance wasn't emphasised enough so that at some points they were seen as a job on a 'to-do' list rather than as very important"*

*"Able to repeat/review as much as they wanted, being able to try things many times and one student mentioned deliberately making errors to see what would happen in the simulation and learning a lot from that"*

*"Some found it hard to engage with virtual labs and just 'got through' them"*

## Additional Research

**DkIT Staff Focus Group**

**DkIT Graduate Survey**



# Enterprise/Student events



## Enterprise Partner Workshop



## Career Paths in Science



### Past Graduates from Industry

- Norbrook Laboratories
- Almac
- WuXi Biologics
- Bristol Myers Squibb

### DkIT lecturers

- Past students at DkIT

Head of Careers and Employability at DkIT



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# Student testimonials



Daina Carroll, 3rd year Pharmaceutical Science



Angelique Cheryl,  
3rd year  
Bioscience



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# STUDENT FEEDBACK

REAL WORLD  
APPLICATION

OPPORTUNITY TO SHARE  
AND CONNECT WITH  
INDUSTRY

REPEATABILITY

CONFIDENCE BUILDING  
OPPORTUNITIES

SUPPORTS PUTTING THEORY  
INTO PRACTICE

A SAFE SPACE TO FAIL

CAN REPEAT SIMULATIONS  
NUMEROUS TIMES

EMPLOYABILITY; DEVELOPING AN  
AWARENESS OF WHAT INDUSTRY  
WANTS POST GRADUATION

LEARN IN OWN TIME

IMPROVED CONTEXT  
UNDERSTANDING

TEAMWORK A REAL POSITIVE

HELPFUL FOR FIRST YEARS MISSING A  
SCIENCE SUBJECT (CONFIDENCE  
BUILDING)

CAN APPLY ASPECTS OF  
PREVIOUS LEARNING

LEARN OUTSIDE OF  
LABORATORY

IMPORTANT COMPANIES ARE  
AWARE OF WHAT STUDENTS ARE  
LEARNING WITH SIMULATIONS

ANOTHER MODE TO LEARN



# ENTERPRISE FEEDBACK



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PROJECT IMPACT

MAKES PEOPLE MORE CONFIDENT  
AND BUILDS IN LEVELS OF  
ROBUSTNESS

VIRTUAL LABS COMPLETELY  
ENHANCE THE EXPERIENCE - NOT  
REPLACE IT

REAL WORLD SCENARIOS / IN-  
CONTEXT VISUALISATIONS

BUILDING TEAM SKILLS  
ENVIRONMENT

TECH SAVVY STUDENTS

SKILL SET / READINESS FOR INDUSTRY  
A POSITIVE

A SOLID FOUNDATION FOR  
THE NEXT LEVEL OF TRAINING

STUDENTS PRIMED FOR  
DIGITAL/VIDEO INDUCTIONS

BRIDGING GAP FROM EDUCATION  
ENVIRONMENT TO INDUSTRY

PROMOTES SOFT,  
TRANSVERSAL AND TECHNICAL  
SKILLS

IT RAISES THE BAR; STUDENTS  
MORE READY

LEVELS THE  
PLAYING FIELD

SUPPORTS CONFIDENCE BUILDING;  
CAN REPEAT/REVIEW IN OWN TIME

GIVES THEM THE SKILLS WE'RE  
LOOKING FOR FROM UNDERGRAD.  
DEGREES

IMPROVING CRITICAL THINKING,  
COLLABORATION AND  
COMMUNICATION

PROBLEM SOLVING ON EQUIPMENT  
LINES STUDENTS UP TO START  
TROUBLESHOOTING

# Acknowledgements

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- Dr. Ronan Bree
- Dr. Bernard Drumm
- Dr. Caoimhin Griffin
- Dr. Arjan van Rossum
- Dr. Edel Healy
- Student Partners
- CELT

Thank You

Partners MU, TUS, UCC, DCU, WuXi Biologics, Almac, WuXi Vaccines, Carbon Coaching, NIBRT



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