TRANSLATING PRACTICAL LEARNING EXPERIENCE & LABORATORY DELIVERY TO THE ONLINE DOMAIN

BLENDED LEARNING COMMUNITY

Sharing and fostering good practice in blended learning across all disciplines for both educational practitioners and developers. The BL Community is collegial based and coordinated by A/Prof Yasir Al-Abdeli and Michelle Pedlow at ECU. We welcome members from staff at any Perth based university.

Edith Cowan University
Centre for Learning and Teaching

BL Community 08.09.2021 Wrap-up

0915 - 0945	**Settle-in, Light morning tea courtesy of the Faculty of Science and Engineering, Curtin University**
0945 - 0950	**A/Prof Chris Rawson, Dean Learning and Teaching - Faculty of Science and Engineering**
	Opening / Welcome, Acknowledgement of Country, and Housekeeping
0950 - 0955	**A/Prof Yasir Al-Abdeli, Co-coordinator Blended Learning Community, School of Engineering, Edith Cowan Univ**
	Agenda / Theme: Translating Practical Learning Experience and Laboratory Delivery to the Online Domain
Themed Presentations	
1000 - 1010	**(1) Dr Paul Ellery, Curtin Medical School, Curtin University**
	Learning Karyotyping Asynchronously, Independently, and Remotely
1010 - 1020	**(2) Dr Rina Wong, School of Medical and Health Sciences, Edith Cowan University**
	Reconfiguring Powerpoint to Build Semi-adaptive, Interactive Lessons for Lab Based Microbiology
1020 - 1030	**(3) Dr Ahmed Ibrahim, School of Science, Edith Cowan University**
	Virtual Environments for Cyber Security Labs
1030 - 1040	**Q&A time for presentations 1-3**
1040 - 1050	**(4) Siavash Khaksar, School of Electrical Engineering, Computing and Mathematical Sciences, Curtin University**
	Strategies For Teaching Practical Components of Electrical Engineering Units Using Blended Learning
1050 - 1100	**(5) A/Prof Nick Timms, School of Earth and Planetary Sciences, Curtin University**
	A Virtual Geology Field Trip Learning Object Using a 360 Degree and AR Immersive Experience
1100 - 1110	**(6) Dr Alexandra Yeung, School of Molecular and Life Sciences, Curtin University**
	Using Electronic Notebooks to Encourage Student Engagement during the COVID Pandemic
1110 - 1120	**Q&A time for presentations 4-6**
1120 - 1130	**(7) Dr Georgina Sauzier, School of Molecular and Life Sciences, Curtin University**
	Lights, Camera, Reaction! A Blended Approach to Chemistry Laboratories with Filmed Experiments
1130 - 1140	**(8) Dr Rina Wong, School of Medical and Health Sciences, Edith Cowan University**
	A Pilot Trial of McGraw Hill Virtual Labs for Remote Learning in Haematology
1140 - 1150	**(9) Jenny Jongste, Sessional / School of Education, The University of Notre Dame Australia**
	Digital Workflows for Documentation and Sharing During School Placements for Pre-service Teachers
1150 - 1200	**Q&A time for presentations 7-9**
1200 - 1230	**Michelle Pedlow, Co-coordinator Blended Learning Community, Senior Learning Designer, Centre for Learning and Teaching, Edith Cowan University**
	Open floor discussion, wrap-up, networking

https://intranet.ecu.edu.au/learning/academic-development/learning-communities/blended-learning-community

Want to be part of our Blended Learning Community?

Join us for our next event and **forward** this to other colleagues at ECU and any of Perth's based Uni's who may want to join the BL C

✉ y.al-abdeli@ecu.edu.au or m.pedlow@ecu.edu.au

Co-coordinators, BL C

Acknowledgements: Thank you to presenters for consenting to share their slides.

Access: Summary notes (slides) of earlier BL C activities:
https://intranet.ecu.edu.au/learning/academic-development/learning-communities/blended-learning-community

Learning Karyotyping Asynchronously, Independently, and Remotely

Paul Ellery, Ross Graham, and Milo Radunski

Curtin Medical School

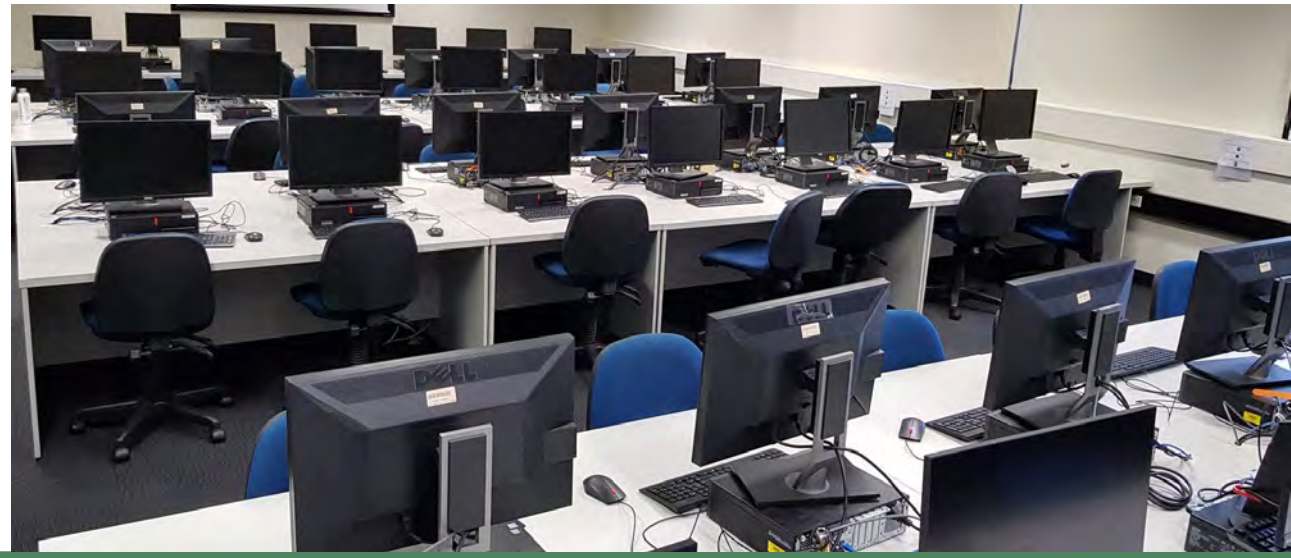
Curtin University

Background

- Karyotyping = analysis of metaphase chromosomes for structural and/or numerical abnormalities
- A graduate scientist requires 6-12 months of full-time training to become competent
- Our students have somewhere between a 3-hour practical and a 25-credit unit!

Background

- Karyotyping has traditionally been taught in our School's computer laboratory
  - 56 seats = 56 students
  - Requires SmartType software
    - Authentic ✓
    - Use is restricted to the computer lab ✘
      - Can't teach during lockdowns
  - Huge amount of demonstrator feedback ✘



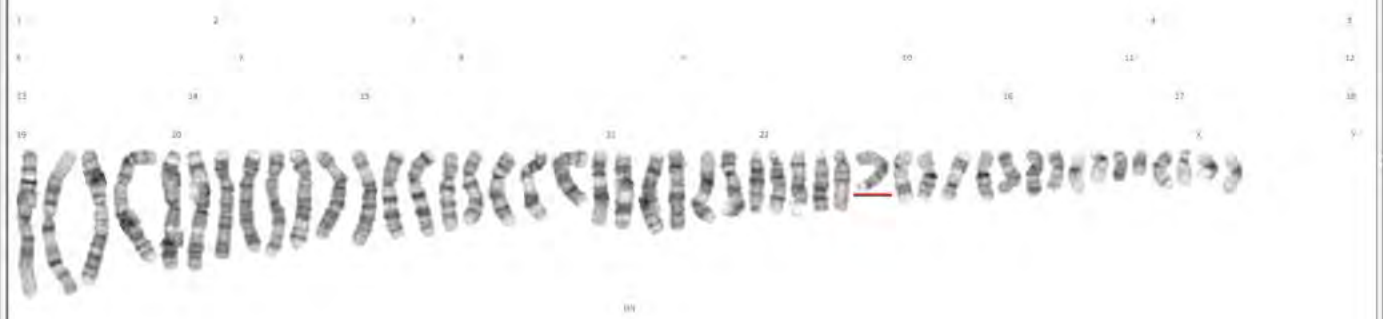
test-01.kry

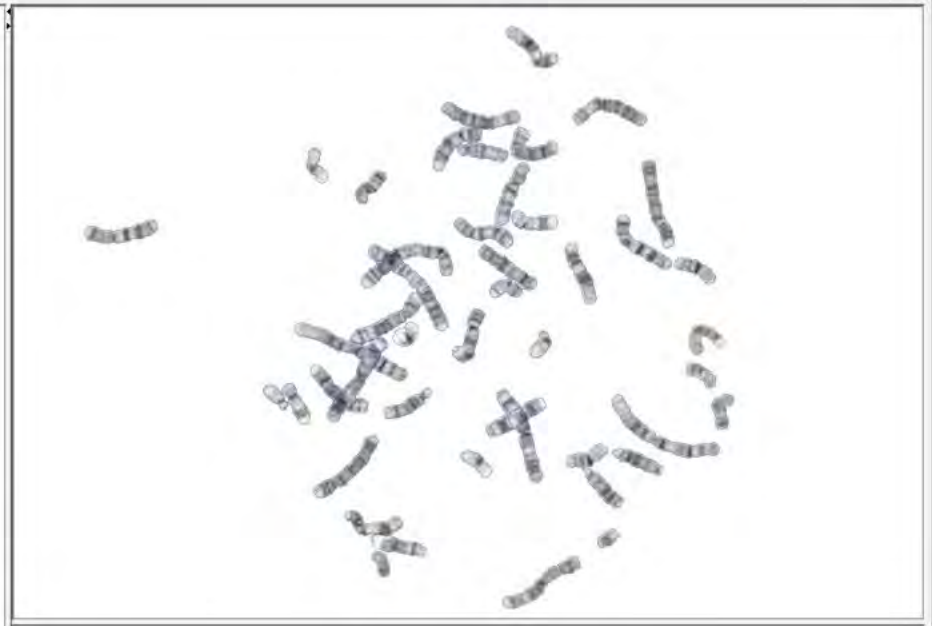
Options | Connect USB Device | Send Ctrl-Alt-Delete | Health Lab (308-104)

Karyotype Case Edit Classify View Window

Select | Free Cut | Overlap | Join | Rotate | Mirror | Shift | Erode | Dilate | Fill Holes | Split Apart | Include | Exclude | Swap Views

chromosomes:46
crosses:0





Type here to search

7/05/2020

Aims

Develop tools that help students identify chromosomes and learn the karyotyping process outside of the computer laboratory

Method

Go to Milo!!

He developed:

1. Karyotyper
2. Karyotype Error Identification Tool

/_8551529_1/index.html

Karyotyping Practice

Paul Ellery, 216847b

Exit

Metaphase 1

< 1 (current) >

Save/Print

Submit

1 2 3 4 5

6 7 8 9 10 11 12

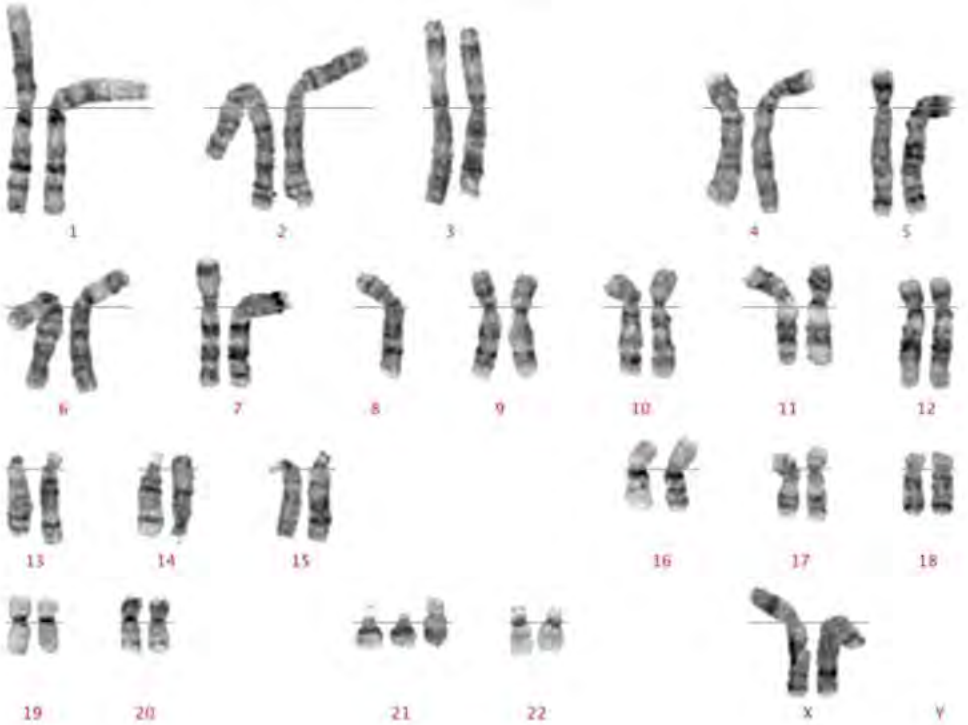
13 14 15 16 17 18

19 20 21 22 X Y

UN

Question 11

Inspect the Karyogram and identify the issues in the table below.



#	Chromosome	Position	Issue/Abnormality	Additional
1	Please Select	Please Select	Please Select	
2	Please Select	Please Select	Please Select	
3	Please Select	Please Select	Please Select	
4	Please Select	Please Select	Please Select	
5	Please Select	Please Select	Please Select	
6	Please Select	Please Select	Please Select	

PDF Reset Submit Exit

Conclusions and future directions

- Karyotyper and Karyotype Error Identification Tool promote independent learning of chromosome characteristics and the karyotyping process
- Combined with pre-lab videos and/or Collaborate sessions, they facilitate asynchronous learning, and remote classes at scale
- iSOLT project
  - Do formative karyotyping tools improve student's grades in summative karyotyping assessments?
    - Both tools output learning analytics data that we plan to correlate with results in summative assessments

Acknowledgements

- Ross Graham
- Milo Radunski
- Mahony Fenn
- Rebecca de Kraa

School of
Science

AUSTRALIA ECU EDITH COWAN UNIVERSITY

Virtual Environments for Cyber Security Labs

Dr Ahmed Ibrahim

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@ai8rahim

Context

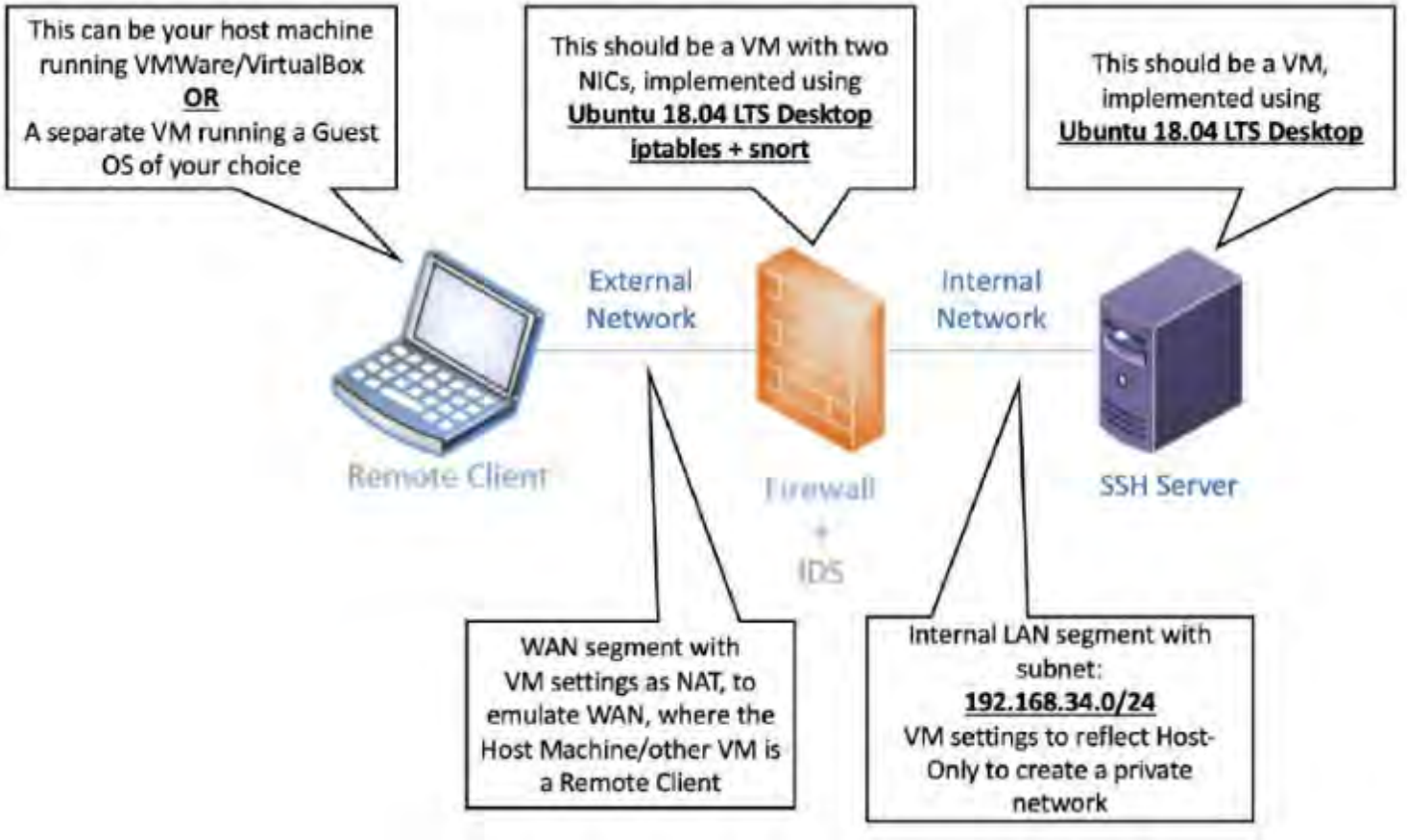
Unit & Student Details

- PG Network Security
- 1st year, 1st semester
- On-Campus + Online
- Non-tech Background

Tasks

- Practical Tech Activities
- Major Assignment (40%)

Virtual Environment



Problem – Initial Setup by Student

Virtualisation Software

Operating System Platform

Install & Configure Software & Libraries


```
ai@MAC:~$ sudo apt update
[sudo] password for ai:
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [830 kB]
Get:5 http://archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:6 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1175 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [162 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [8604 B]
Get:9 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [374 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [53.7 kB]
Get:11 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 c-n-f Metadata [500 B]
Get:12 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [638 kB]
Get:13 http://archive.ubuntu.com/ubuntu focal-updates/main Translation-en [254 kB]
Get:14 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [14.1 kB]
Get:15 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [411 kB]
Get:16 http://archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [58.8 kB]
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Get:19 http://security.ubuntu.com/ubuntu focal-security/universe Translation-en [101 kB]
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Get:23 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 c-n-f Metadata [540 B]
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Get:26 http://archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 Packages [24.6 kB]
Get:27 http://archive.ubuntu.com/ubuntu focal-updates/multiverse Translation-en [6776 B]
Get:28 http://archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 c-n-f Metadata [620 B]
Get:29 http://archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [5812 B]
Get:30 http://archive.ubuntu.com/ubuntu focal-backports/universe Translation-en [2068 B]
Fetched 5541 kB in 6s (989 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
98 packages can be upgraded. Run 'apt list --upgradable' to see them.
ai@MAC:~$
```
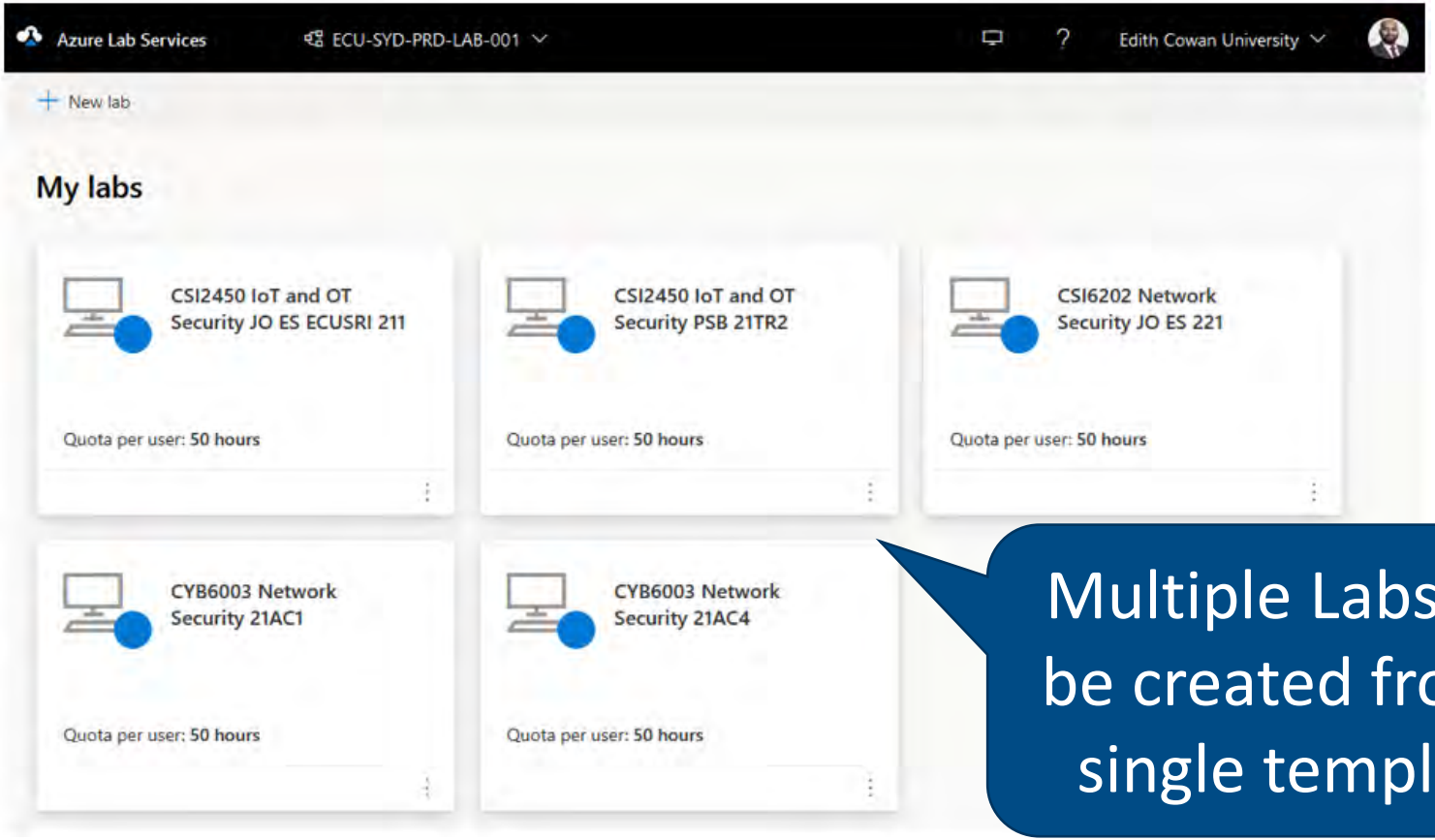
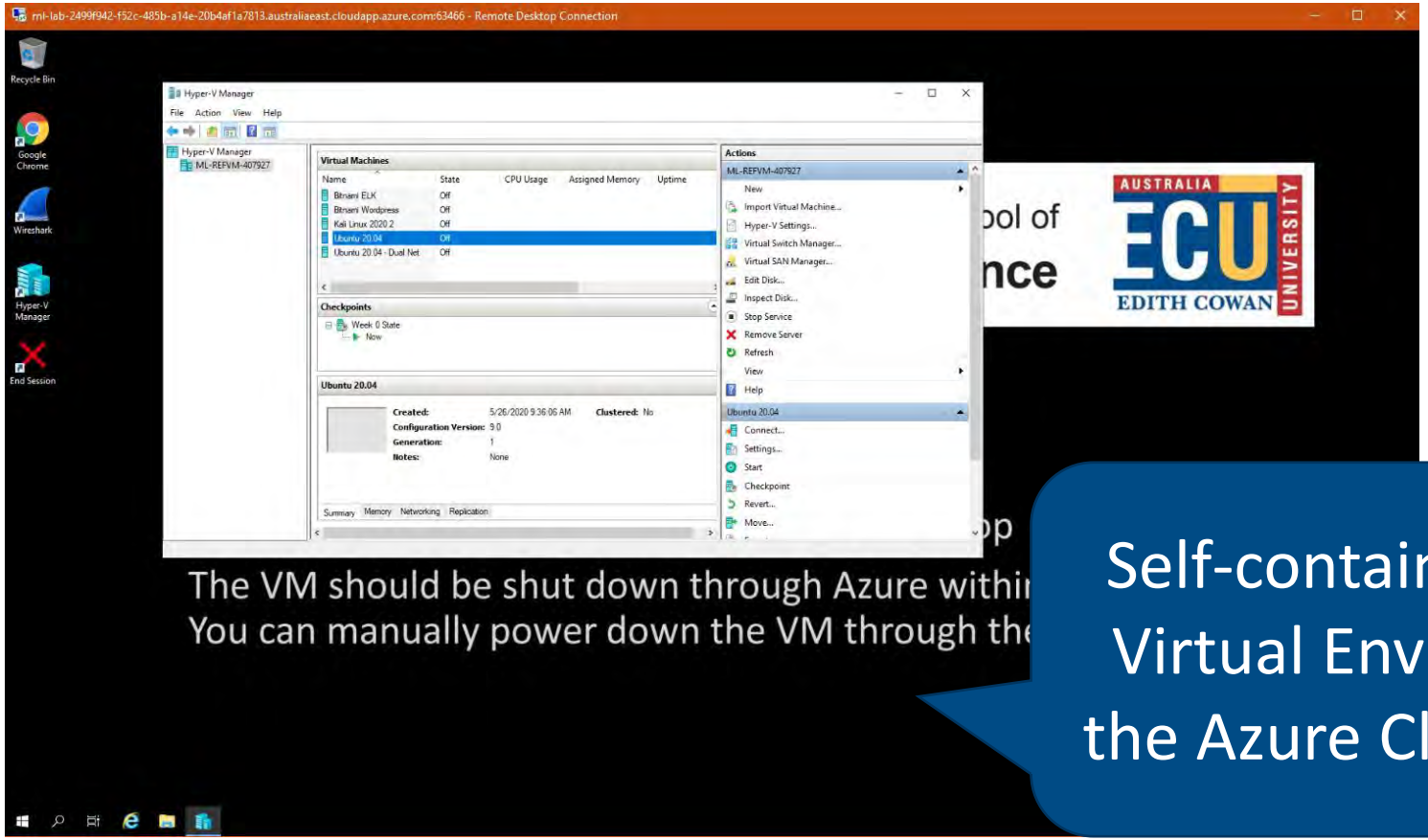
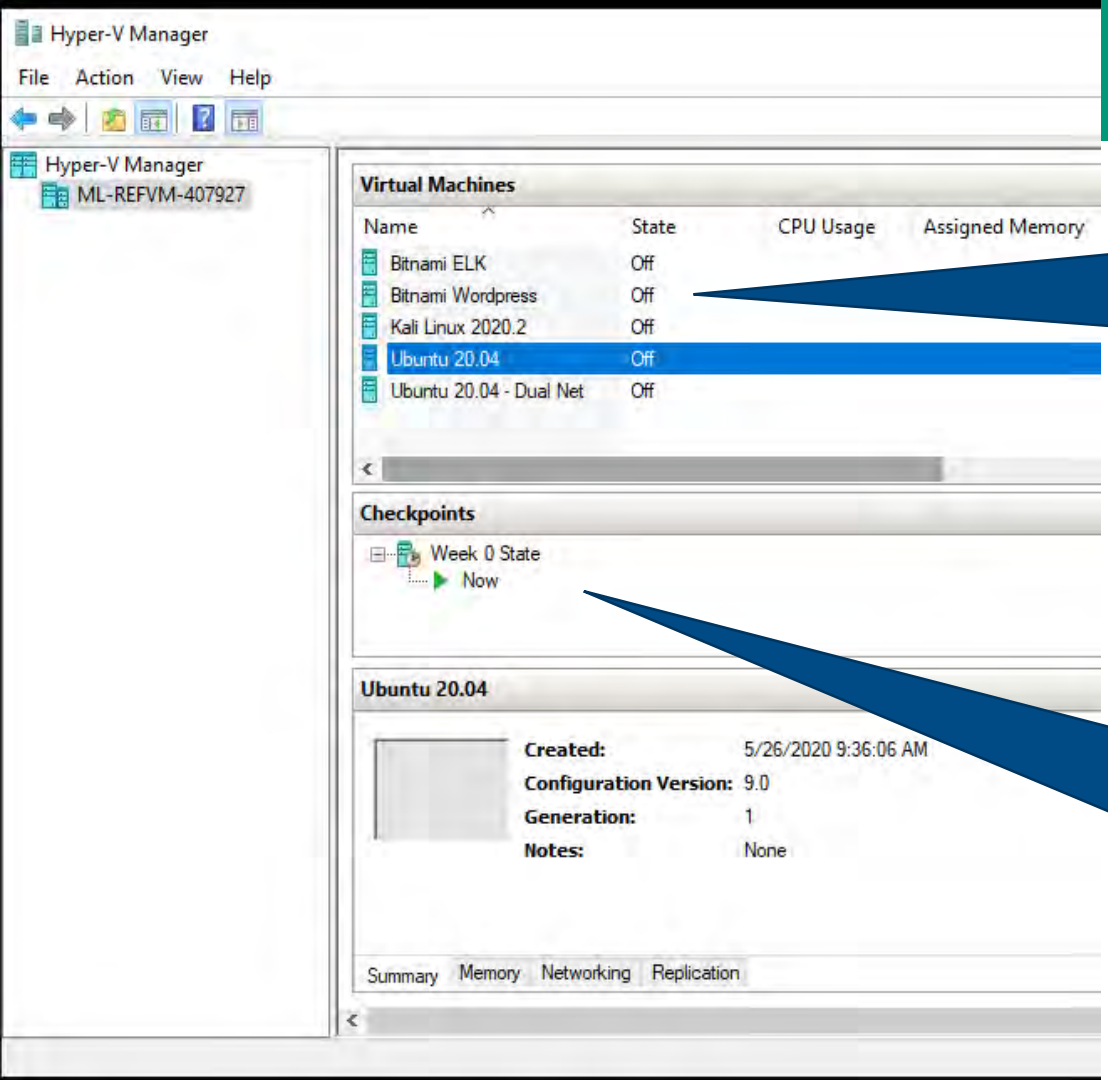

Solution – Initial Setup by Staff



Solution – Initial Setup by Staff



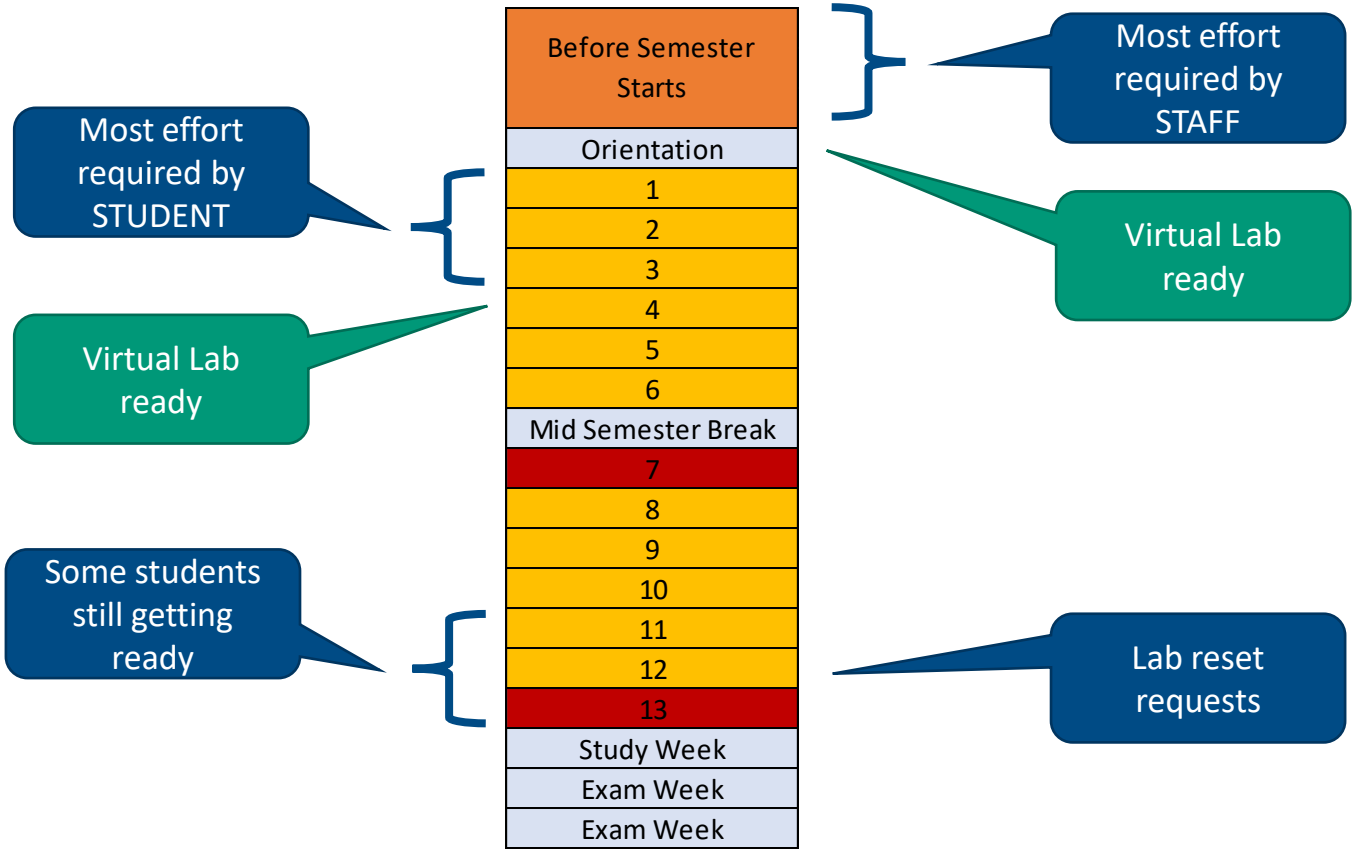
Self-contained Virtual Env on the Azure Cloud



Multiple VMs can run simultaneously in Azure

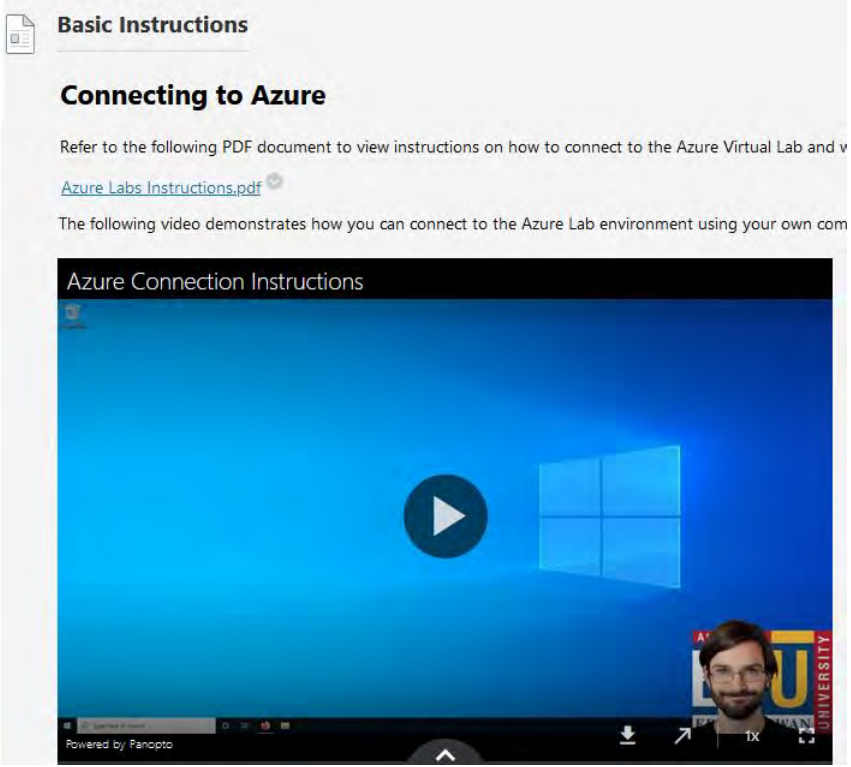
Checkpoints allow rolling back changes when things break

Results


Before Semester Starts
Orientation
1
2
3
4
5
6
Mid Semester Break
7
8
9
10
11
12
13
Study Week
Exam Week
Exam Week
Most effort required by STUDENT
Virtual Lab ready
Some students still getting ready
Most effort required by STAFF
Virtual Lab ready
Lab reset requests

Lessons Learnt

- Plan and prepare early
- Onboard during O-Week
- Week 0 Instructions
- Lab Resets, resolved through Checkpoints



Thank you

ahmed.ibrahim@ecu.edu.au

@ai8rahim

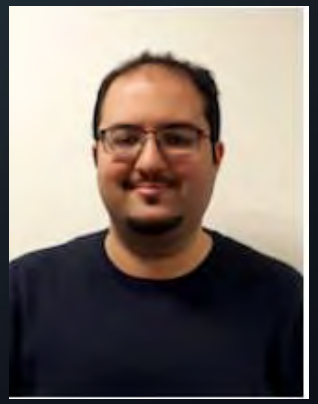
STRATEGIES FOR TEACHING PRACTICAL COMPONENTS OF ELECTRICAL ENGINEERING UNITS USING BLENDED LEARNING

PRESENTED BY:

SIAVASH KHAKSAR
FACULTY OF SCIENCE AND ENGINEERING
SCHOOL OF ELECTRICAL ENGINEERING, COMPUTING AND MATHEMATICAL SCIENCES
CURTIN UNIVERSITY

INTRODUCTION

- Mr Siavash Khaksar
  Associate Lecturer
  Faculty of Science and Engineering
  School of Electrical Engineering, Computing and Mathematical Sciences
  Curtin University
  UG and PG coursework project coordinator
  Teaching units in Digital Design, Embedded Systems, Sensor Networks, Microcomputers



THE COHORT

- Group A: First Year Students studying “Hardware Fundamentals”
- Group B: 3rd and 4th year students studying “Advanced Digital Design” (Project for this unit was previously designed by Prof Cesar Ortega-Sanchez and Mr Clive Maynard in 2012)

THE SOLUTION FOR LECTURES AND TUTORIAL

- Fairly straight forward with pre-recorded online lectures
- Live Tutorial and Q/A sessions
- What about the practical components?

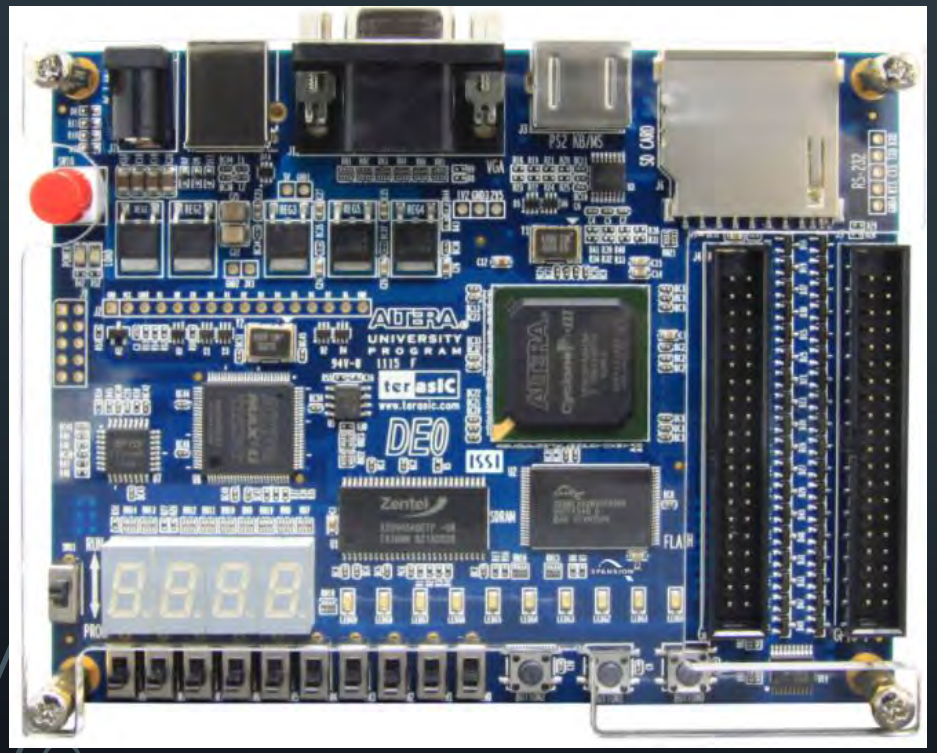
CHALLENGES IN HARDWARE FUNDAMENTALS

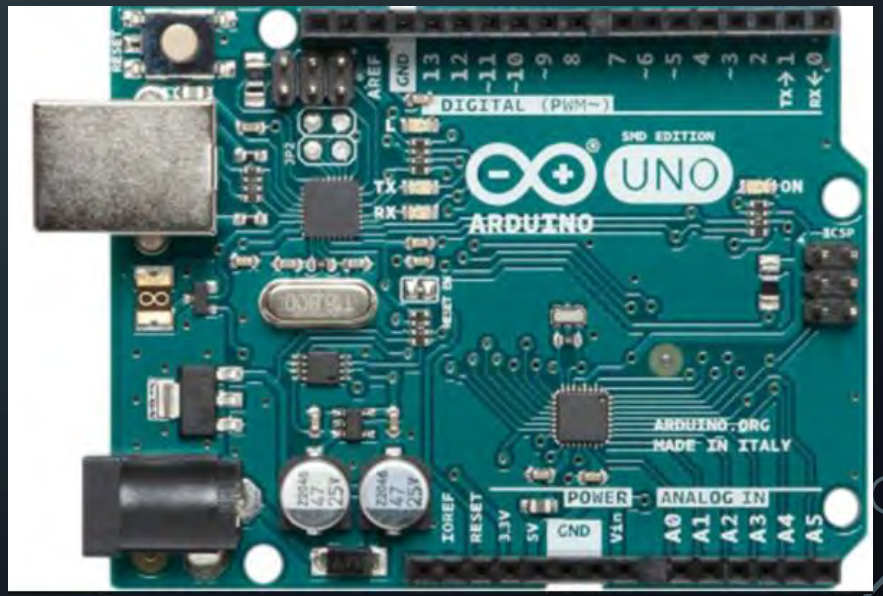
- First year students with no experience in higher education
- More than half the unit involved using field programmable gate arrays (FPGAs)
- Assessment became an issue
- Large number of students (about 245 combined)

THE SOLUTION FOR HARDWARE FUNDAMENTALS

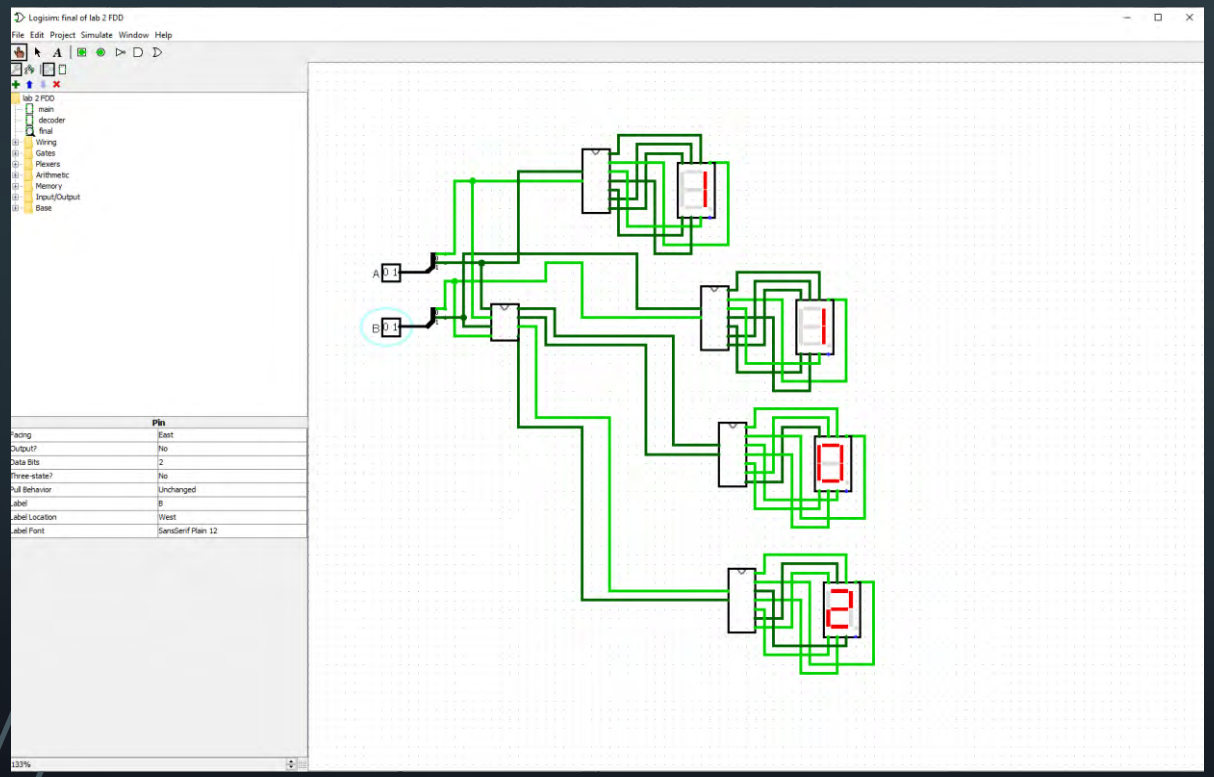
- The following simulators were used to design digital circuits
  - Logisim (Free digital design software)
  - Altera Quartus II (Free student version available)
- The students were given step by step guides for using the simulators
- Multiple Q/A sessions were held throughout the week so students could reach us

SOME OF THE HARDWARE USED IN THE LABS

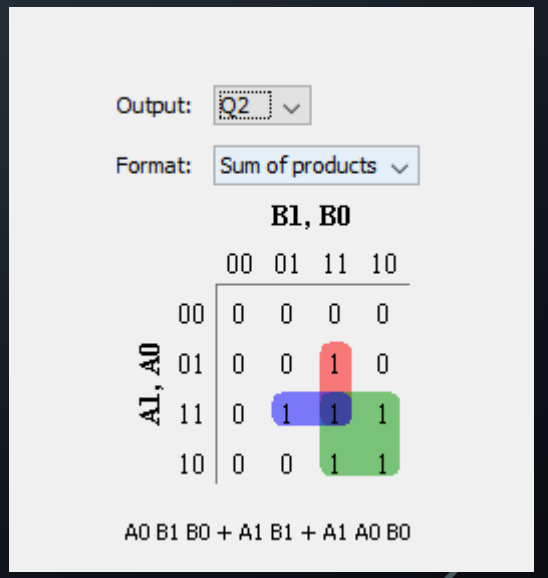




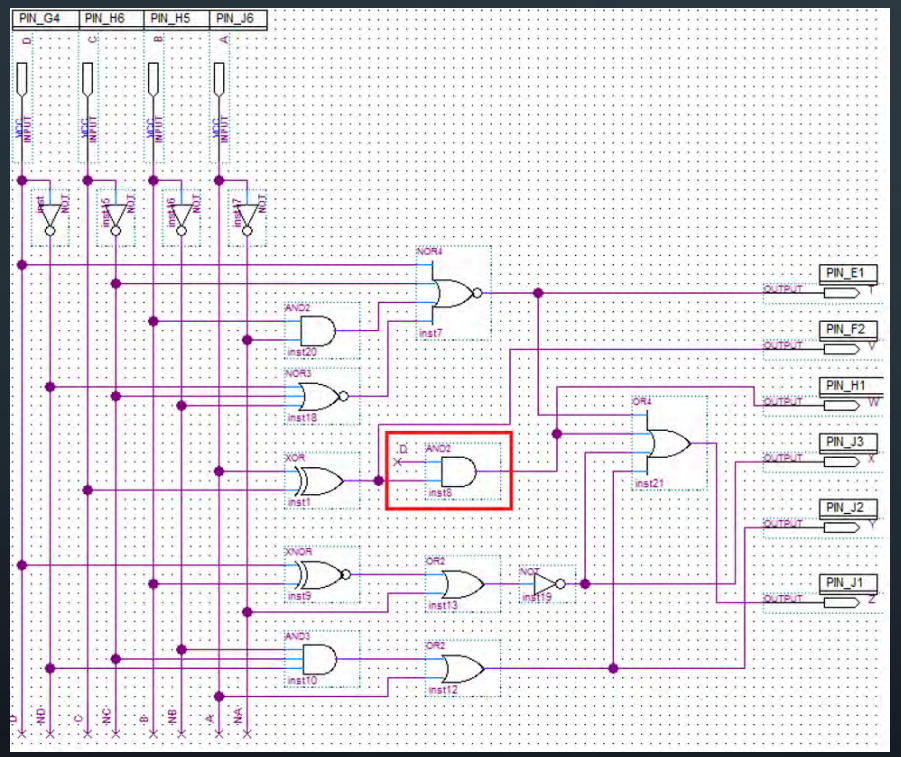
LOGISIM

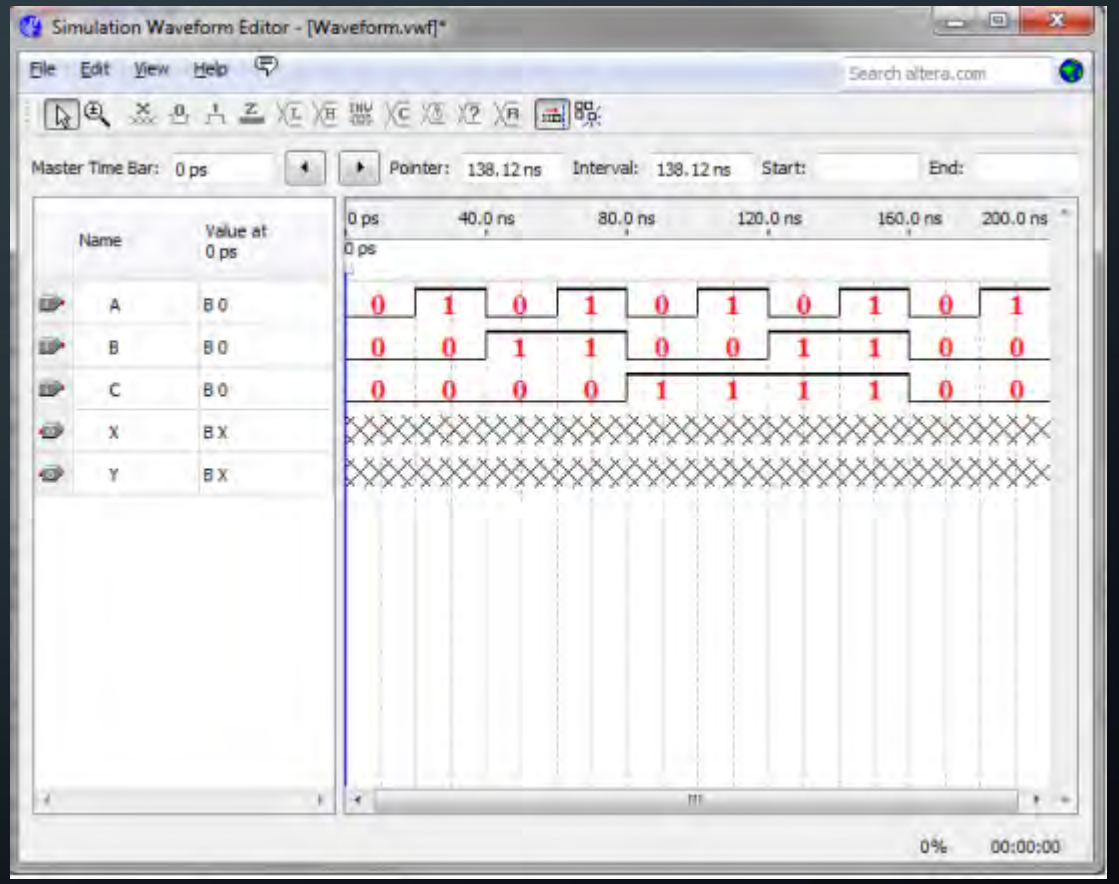


A1	A0	B1	B0	Q3	Q2	Q1	Q0
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	0	0	0	1	0
0	0	1	1	0	0	1	1
0	1	0	0	0	0	0	1
0	1	0	1	0	0	1	0
0	1	1	0	0	0	1	1
0	1	1	1	0	1	0	0
1	0	0	0	0	0	1	0
1	0	0	1	0	0	1	1
1	0	1	0	0	1	0	0
1	0	1	1	0	1	0	1
1	1	0	0	0	0	1	1
1	1	0	1	0	1	0	0
1	1	1	0	0	1	0	1
1	1	1	1	0	1	1	0



QUARTUS II


PIN_G4
PIN_H6
PIN_H5
PIN_J6
PIN_E1
PIN_F2
PIN_H1
PIN_J3
PIN_J2
PIN_J1


Simulation Waveform Editor - [Waveform.vwf]*
File Edit View Help
Search altera.com
Master Time Bar: 0 ps
Pointer: 138.12 ns
Interval: 138.12 ns
Start:
End:
Name
Value at 0 ps
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120.0 ns
160.0 ns
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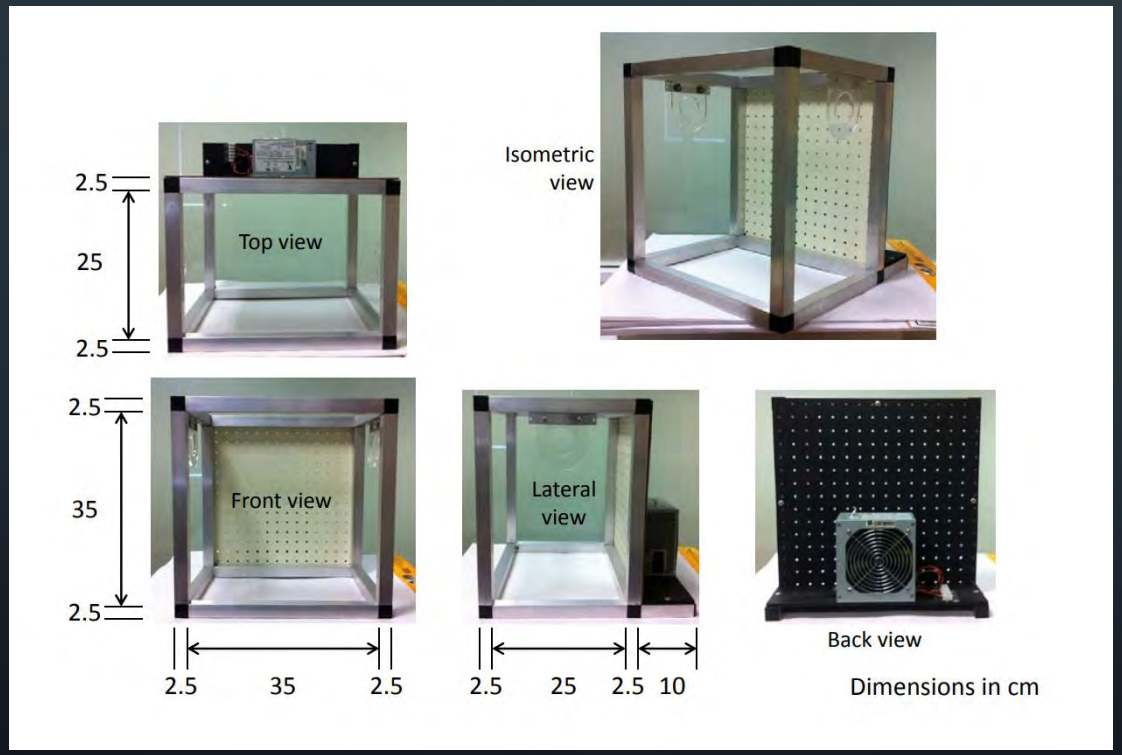
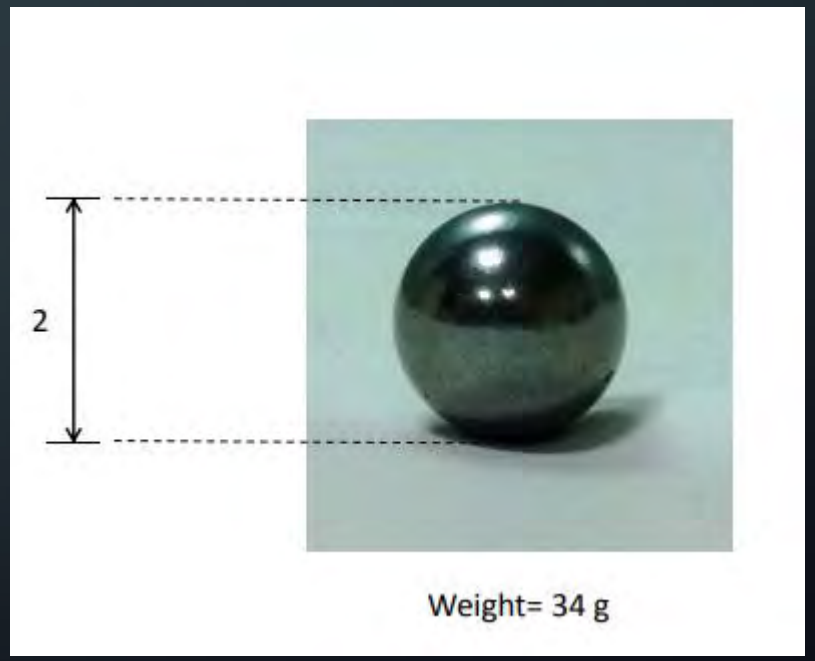
CHALLENGES IN ADVANCED DIGITAL DESIGN

- 3rd and 4th year students
- Project based unit
- The project was group based
- No final exam, so the unit just had the project
- Largest run of the unit (jumping from 50 Students to 90)

THE PROJECT IN ADVANCED DIGITAL DESIGN (THE CRAZY MACHINE PROJECT)

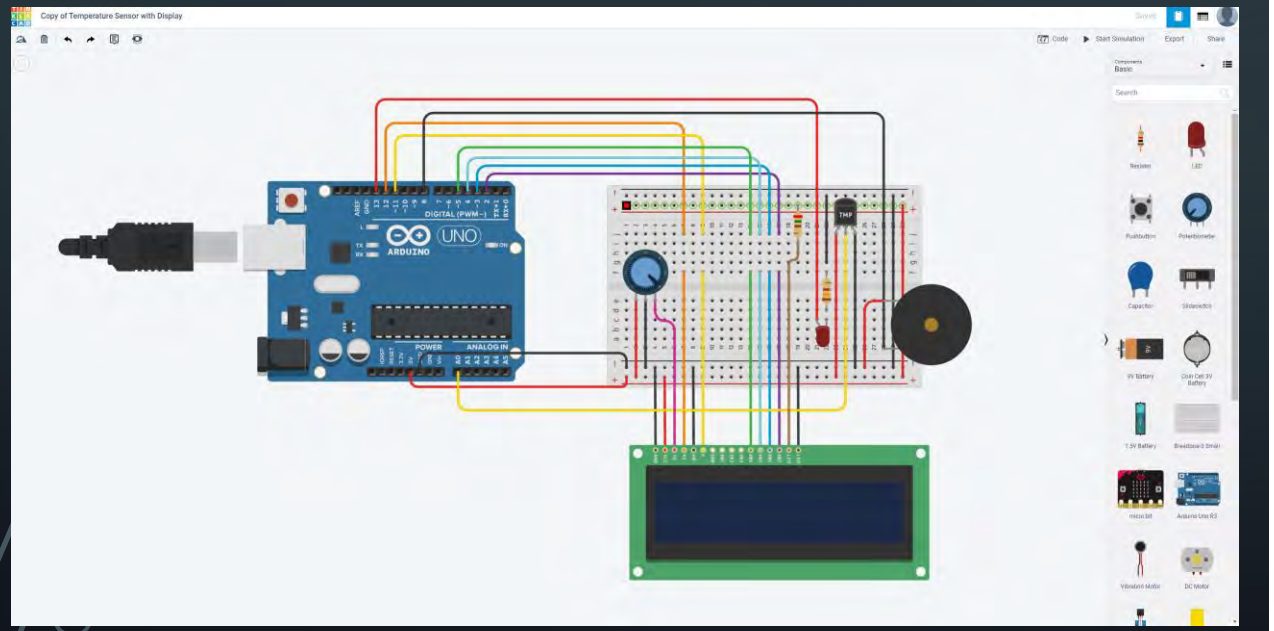


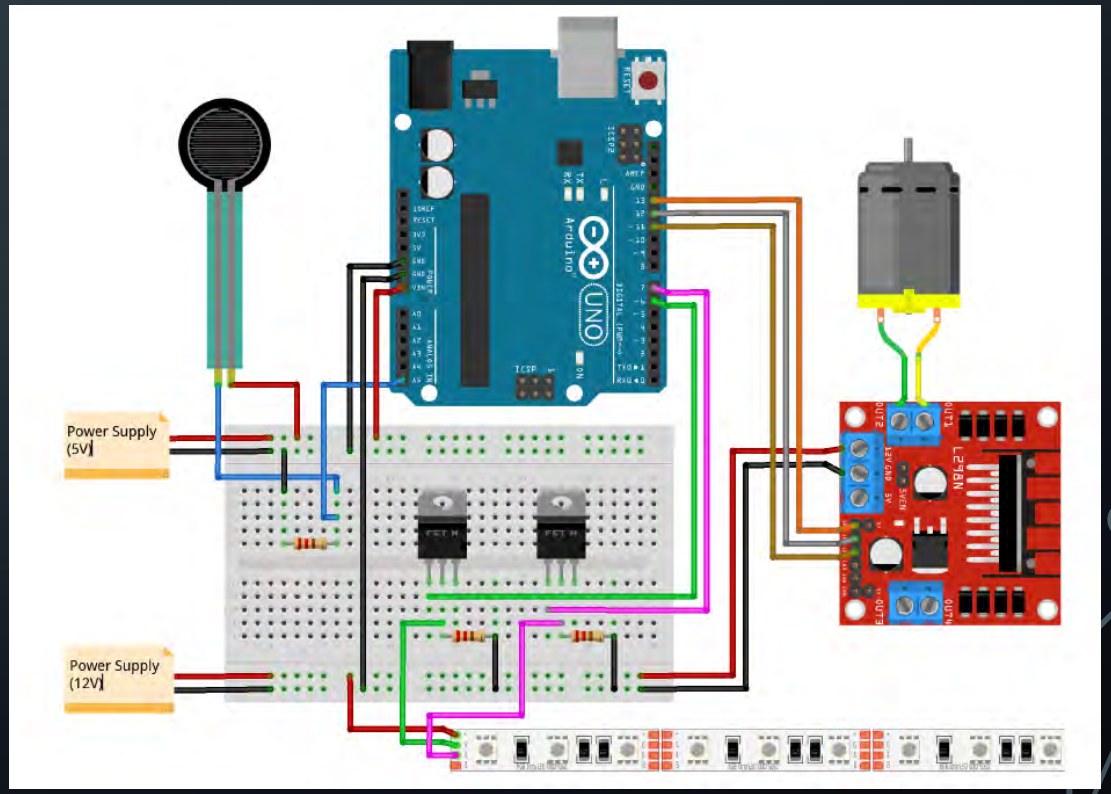


THE SOLUTION FOR ADVANCED DIGITAL DESIGN

- Blackboard collaborate environments were created so students can hold their group meetings
- Sensors and actuators were purchased so students could take the crazy machine boxes home
- Different parts of the construction were broken down and assigned it to different team members
- All project presentations were held online
- For overseas campuses Tinkercad was used

EXAMPLES STUDENT CIRCUITS IN TINKERCAD

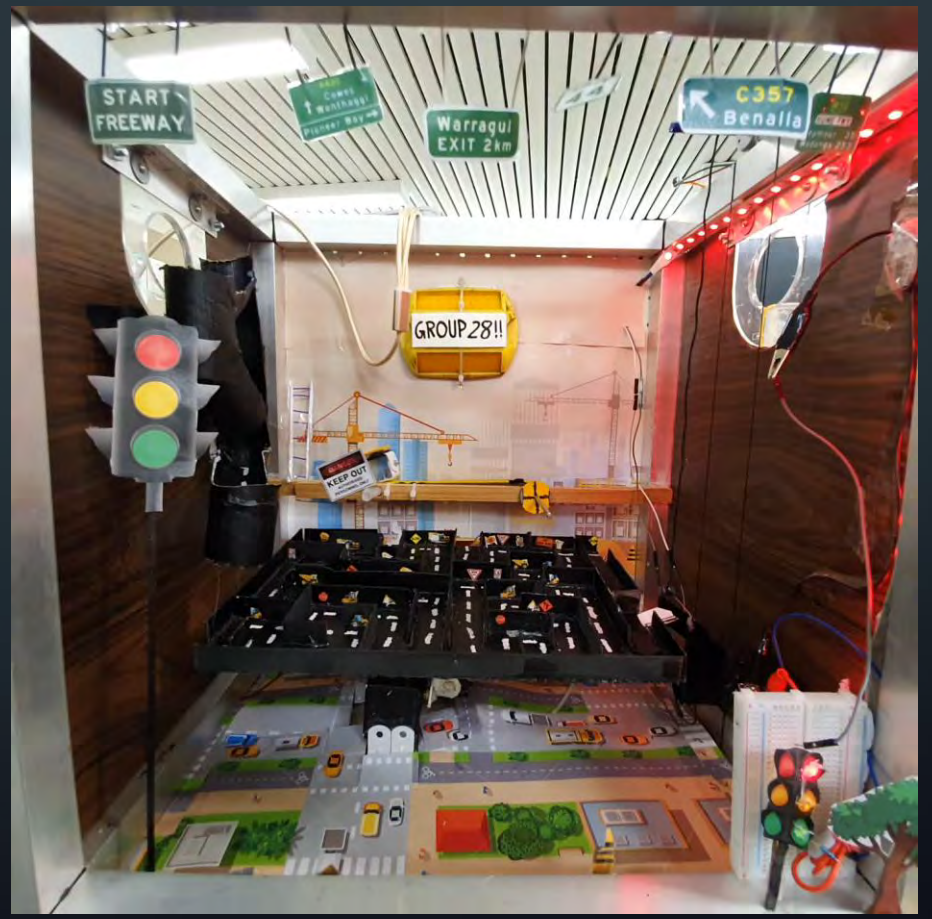




EXAMPLE OF THE SIMULATED CRAZY MACHINE

EXAMPLE CRAZY MACHINE PROJECT

EXAMPLE CRAZY MACHINE PROJECT



UNIT EVALUATE RESULTS DURING LOCKDOWN

Unit Name: Advanced Digital Design	Responses(n): 20		
Unit Code: CMPE3006	Enrolment(N): 92		
	Response Rate: 22 %		
eVALUate quantitative items	**Percentage Agreement**	**Percentage Disagreement**	**Percentage Unable to Judge**
1. The learning outcomes in this unit are clearly identified.	90	10	0
2. The learning experiences in this unit help me to achieve the learning outcomes.	80	15	5
3. The learning resources in this unit help me to achieve the learning outcomes.	80	15	5
4. The assessment tasks in this unit evaluate my achievement of the learning outcomes.	90	10	0
5. Feedback on my work in this unit helps me to achieve the learning outcomes.	80	10	10
6. The workload in this unit is appropriate to the achievement of the learning outcomes.	95	5	0
7. The quality of teaching in this unit helps me to achieve the learning outcomes.	80	10	10
8. I am motivated to achieve the learning outcomes in this unit.	90	10	0
9. I make best use of the learning experiences in this unit.	85	10	5
10. I think about how I can learn more effectively in this unit.	85	5	10
11. Overall, I am satisfied with this unit.	85	15	0

Unit Name: Foundations of Digital Design	Responses(n): 65		
Unit Code: CMPE2001	Enrolment(N): 245		
	Response Rate: 27 %		
eVALUate quantitative items	**Percentage Agreement**	**Percentage Disagreement**	**Percentage Unable to Judge**
1. The learning outcomes in this unit are clearly identified.	94	5	1
2. The learning experiences in this unit help me to achieve the learning outcomes.	91	8	1
3. The learning resources in this unit help me to achieve the learning outcomes.	91	8	1
4. The assessment tasks in this unit evaluate my achievement of the learning outcomes.	88	11	1
5. Feedback on my work in this unit helps me to achieve the learning outcomes.	80	11	9
6. The workload in this unit is appropriate to the achievement of the learning outcomes.	91	6	3
7. The quality of teaching in this unit helps me to achieve the learning outcomes.	91	8	1
8. I am motivated to achieve the learning outcomes in this unit.	91	9	0
9. I make best use of the learning experiences in this unit.	91	8	1
10. I think about how I can learn more effectively in this unit.	88	9	3
11. Overall, I am satisfied with this unit.	90	8	2

STUDENT COMMENTS

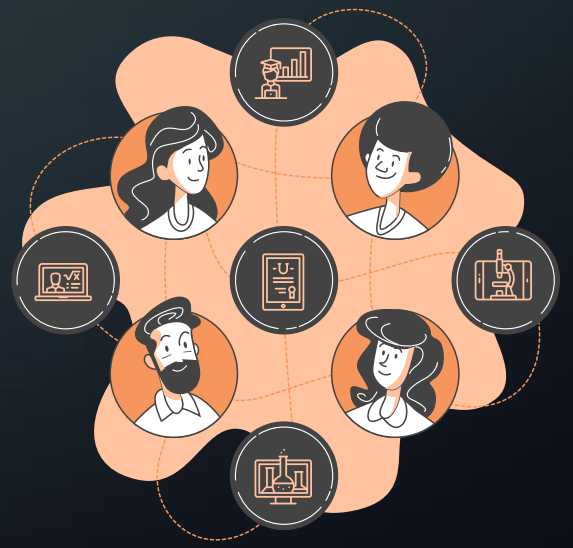
- *"I thought that the unit did a fantastic job of transferring to online classes, in particular the tutorials being available for download was very helpful, and the lab help sessions were also useful."*
- *"Currently It is the fastest adapting to the issues that have plagued uni studies"*
- *"Despite the sudden shift to online learning, this unit has still done well. Siavash should be commended for his willingness to help during EXTRA consultation sessions every week. The unit content has been great and very interesting, and it has been useful material. THANKS SIAVASH!"*
- *"All of the content on Blackboard was organised very well and I knew what I needed to be working on each week. The lectures and tutorials were easy to follow and new information was explained in a very helpful way. The lecturer made himself available via Blackboard Collaborate to answer questions and actually keep up interactions with the students after isolation started"*

WHAT DID WE LEARN?

- Student engagement is an issue so students need an extra push
- It takes a lot of patience to answer the same question over and over
- Talking to a screen for long time without being interrupted takes a toll on your vocal cords!
- All the simulators in the world don't replace hands on experience

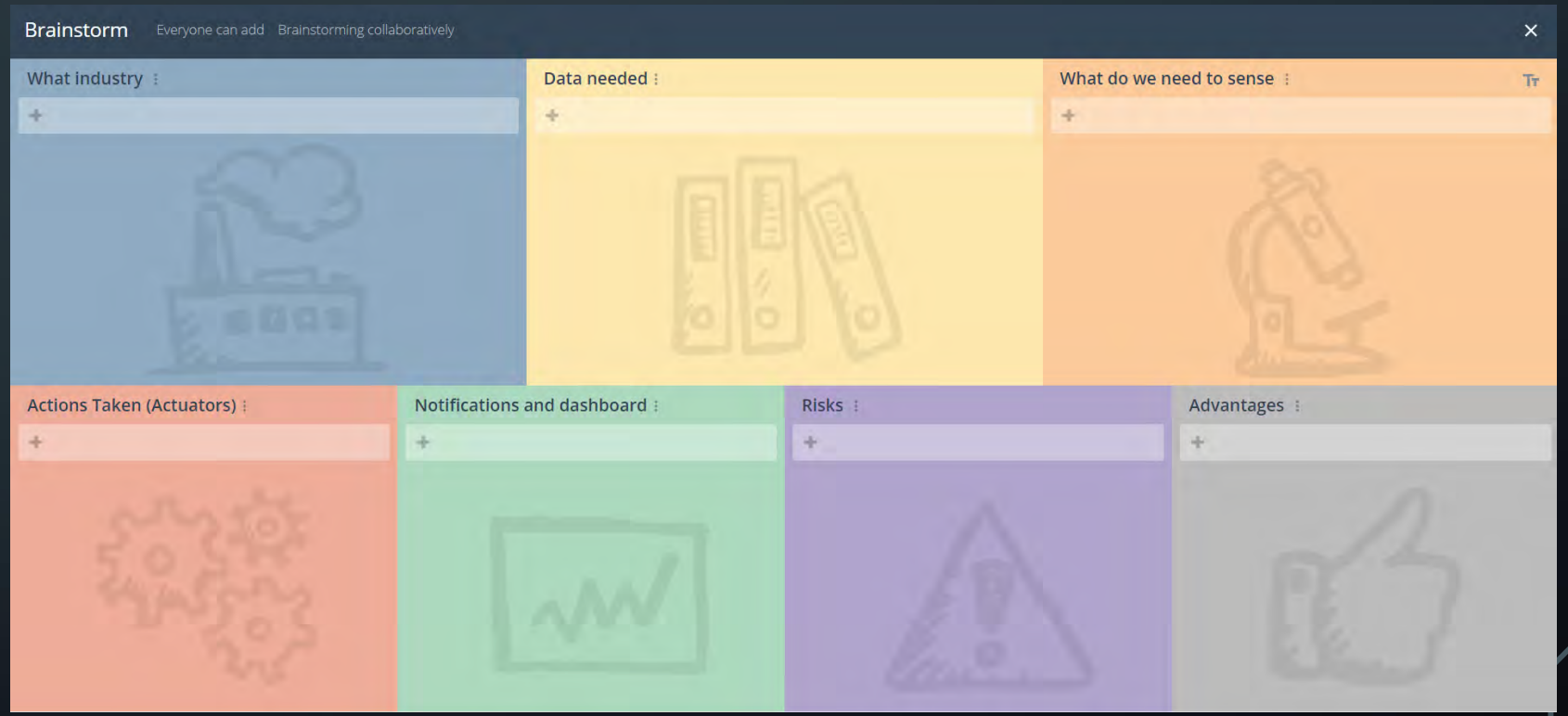
WHAT ABOUT THE GLASS HALF FULL?

- Simulators can be power tools to build assignments and exams
- The pandemic challenged us to get out of our routine
- Things being online made us experiment with assignment and project-based assessments rather than the traditional final exam



WHAT DID WE KEEP AFTER LOCKDOWN?

- Blended doesn't mean move everything online
- Short video recording of theory
- More interactive tutorials
- Collaborative mind maps

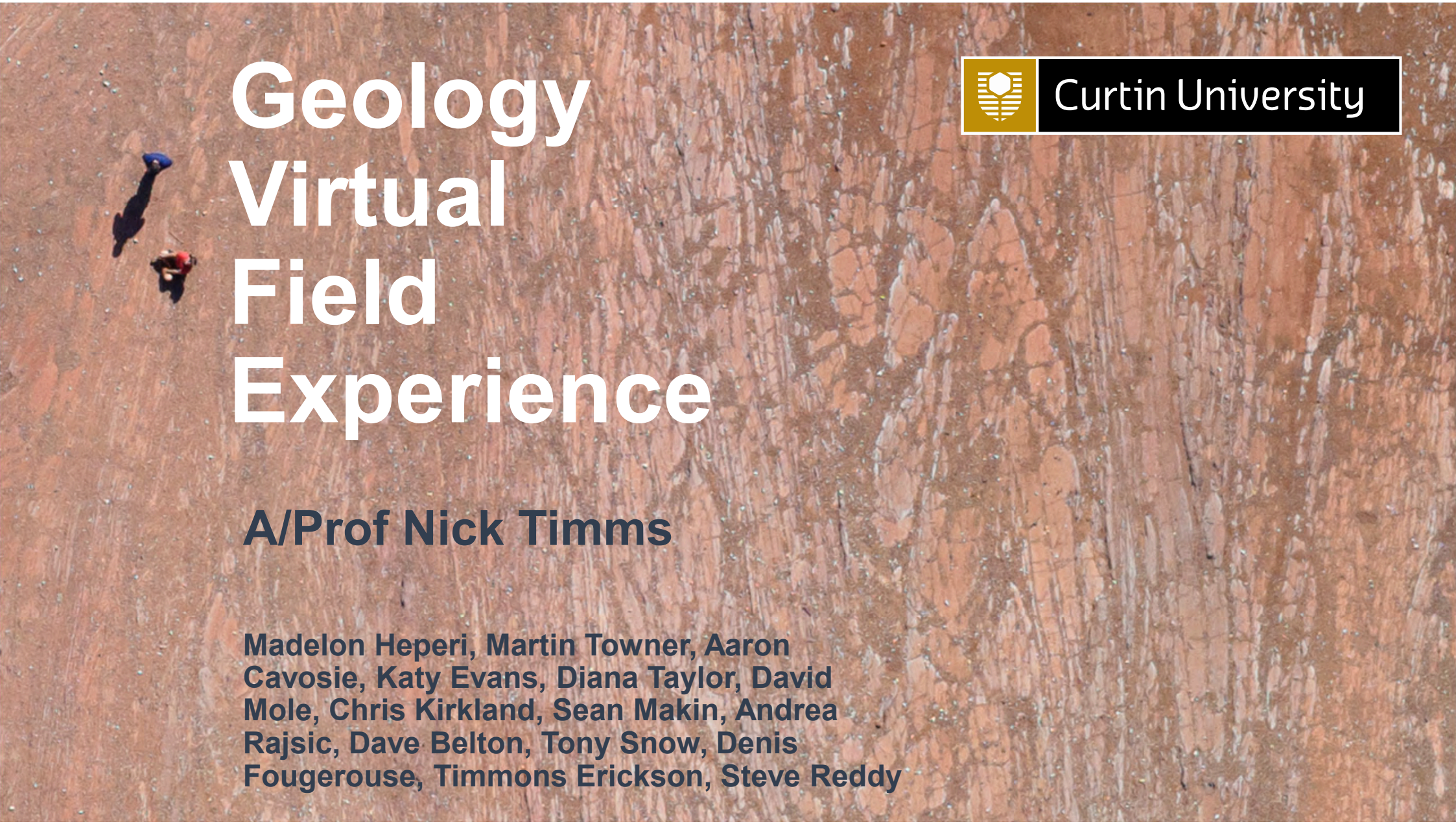


UNIT EVALUATE RESULTS WITH BLENDED LEARNING

Unit Name: Foundations of Digital Design	Responses(n): 68		
Unit Code: CMPE2001	Enrolment(N): 252		
	Response Rate: 27 %		
eVALUate quantitative items	**Percentage Agreement**	**Percentage Disagreement**	**Percentage Unable to Judge**
1. The learning outcomes in this unit are clearly identified.	**99**	**1**	**0**
2. The learning experiences in this unit help me to achieve the learning outcomes.	**99**	**1**	**0**
3. The learning resources in this unit help me to achieve the learning outcomes.	**96**	**4**	**0**
4. The assessment tasks in this unit evaluate my achievement of the learning outcomes.	**93**	**7**	**0**
5. Feedback on my work in this unit helps me to achieve the learning outcomes.	**93**	**6**	**1**
6. The workload in this unit is appropriate to the achievement of the learning outcomes.	**96**	**3**	**1**
7. The quality of teaching in this unit helps me to achieve the learning outcomes.	**96**	**4**	**0**
8. I am motivated to achieve the learning outcomes in this unit.	**97**	**1**	**2**
9. I make best use of the learning experiences in this unit.	**100**	**0**	**0**
10. I think about how I can learn more effectively in this unit.	**99**	**1**	**0**
11. Overall, I am satisfied with this unit.	**97**	**3**	**0**

FIXING BLENDED LEARNING'S IMAGE

QUESTIONS?



Geology Virtual Field Experience

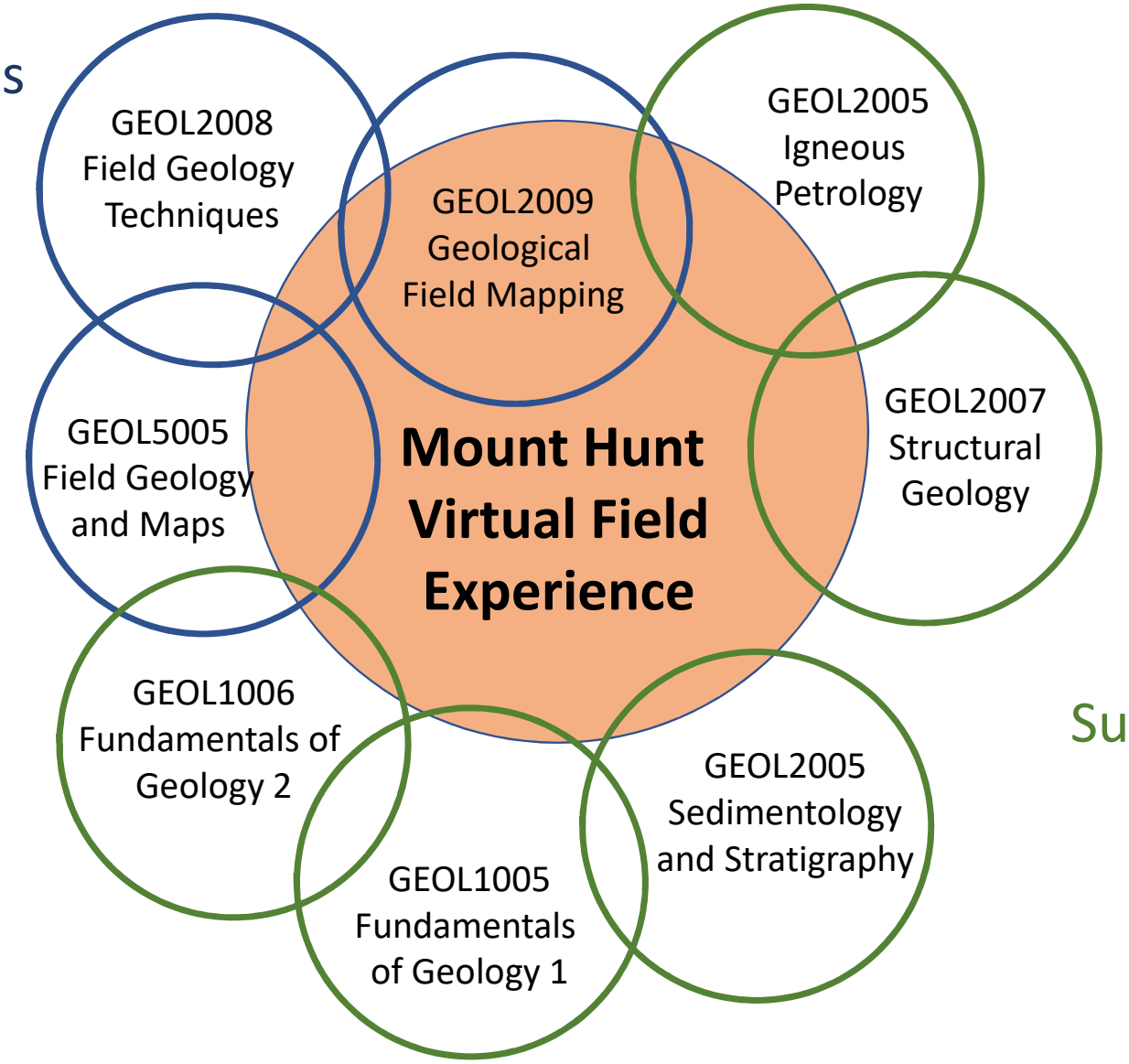
Curtin University

A/Prof Nick Timms

Madelon Heperi, Martin Towner, Aaron Cavosie, Katy Evans, Diana Taylor, David Mole, Chris Kirkland, Sean Makin, Andrea Rajsic, Dave Belton, Tony Snow, Denis Fougerouse, Timmons Erickson, Steve Reddy


I am here

Field-based units



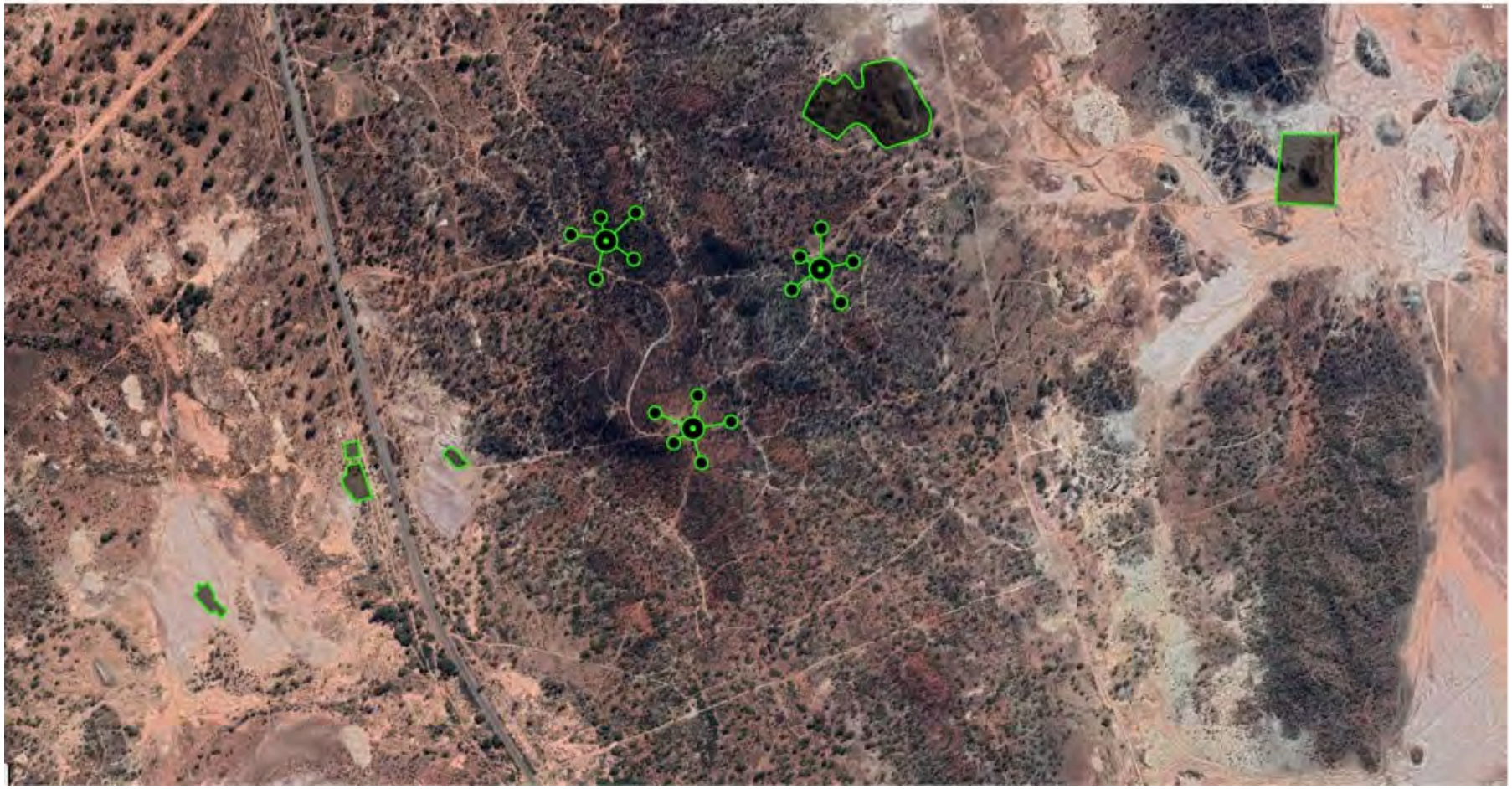
Sub-discipline units

Field learning activities/skills

Learning activity / field skill	Level	GEOL1005 ULO	GEOL2008 ULO	GEOL2009 ULO
Rock description, identification, and interpretation				
Describing rocks using various criteria (e.g., colour, grain size, texture, mineralogy)	novice		1	1
Identifying and classifying rocks based on descriptions	novice / intermediate		1	1
Interpreting how rock units formed (e.g., geological process, environment/conditions, timing, etc)	novice / intermediate		1	1
Use contact relationships to infer the relative ages of rocks in the field	novice		1	
Recording geological observations in the field (e.g., systematically in a field notebook)	novice		3	1
Interpreting field relationships among rock types/units	novice		1	1
Measuring structures in the field (e.g., bedding, foliations, lineations, planes, small-scale folds)	intermediate		2	1
Collection of quantitative data from rock units (e.g., making a sedimentary log, etc)	intermediate		3	1
Making geological sketches of rocks and their relationships (range of scales?)	novice		3	1
Plotting structural data on a stereonet (e.g., to compile data, calculate geometry of folds, etc)	intermediate		n.a.	1

Making a field map				
Locating yourself on a map (e.g., using aerial photos/images, GPS, compass)	intermediate		4	2
Subdividing rock in the area into mappable units	intermediate		1	2
Mapping observable geological boundaries (sharp, gradational at scale of mapping)	intermediate		3	2
Inferring geological boundaries through cover	intermediate		3	2
Plotting measured structural data on to a map using appropriate map symbols (e.g., bedding, foliations, lineations, planes, small-scale folds)	intermediate		3	2
Showing geological relationships using appropriate map symbols (U/C, large-scale folds, faults, etc)	intermediate		3	2
Other skills/activities (advanced? Linking field and lab observations)				
Synthesise a geological history from field-based observations and mapping	intermediate		n.a.	2,3
Use microscope-scale observations to aid interpretations of field relationships	expert		n.a.	n/a
Interpret geochemistry data in context of field relationships	expert		n.a.	n/a
Interpret geochronological data in context of field relationships	expert		n.a.	n/a
Developing mineral exploration strategies	expert		n.a.	n/a

Virtual Field Experience - The Geology of Mount Hunt

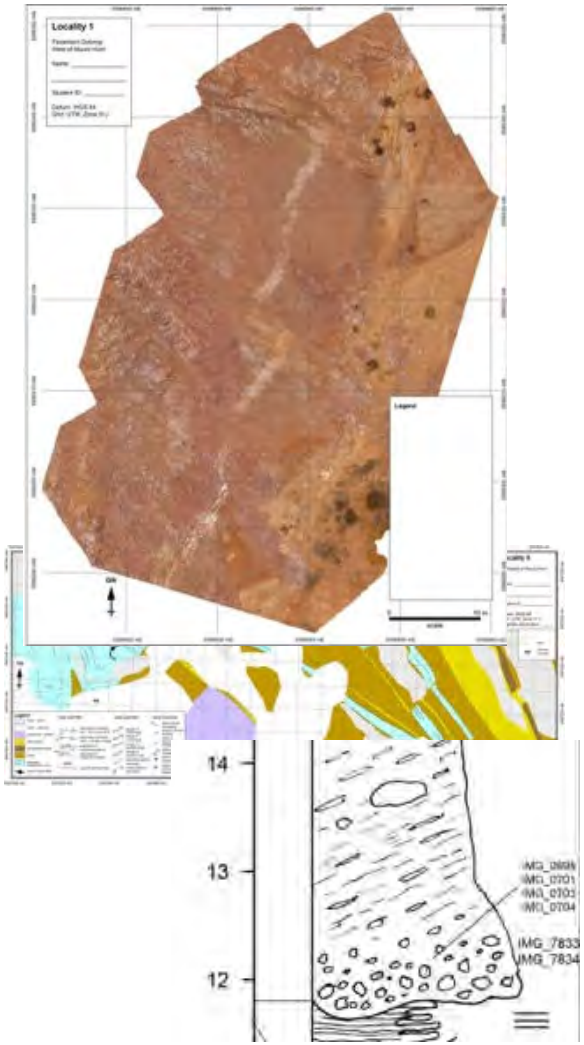



https://360example.netlify.com/

Video explanations

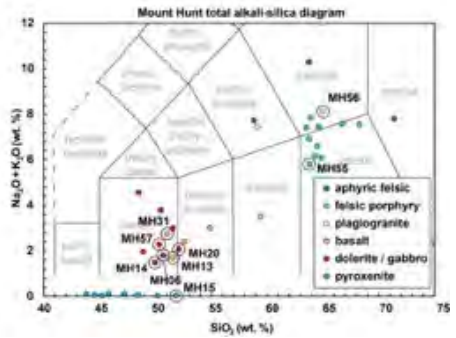
Field Photos

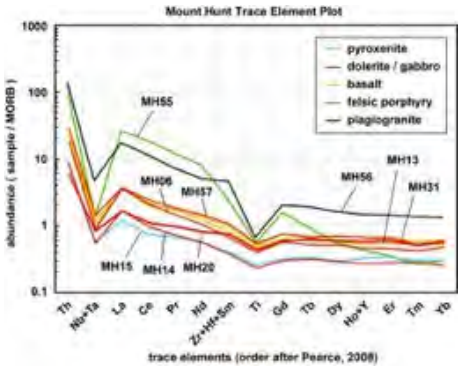
Maps to make / logs to interpret

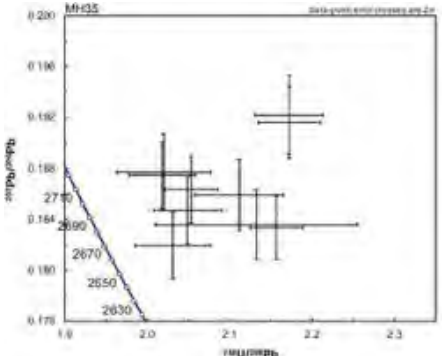


Photomicrographs to interpret

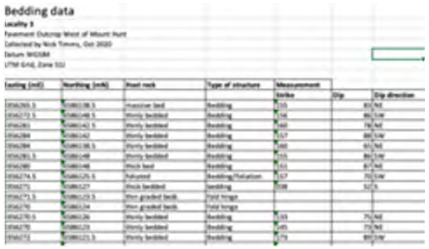
Geochemistry and geochronology data / plots

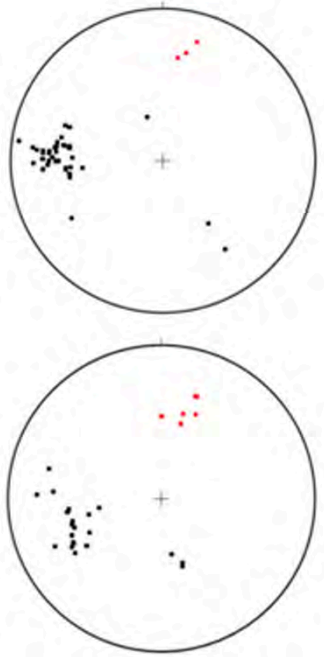






Structural data to plot

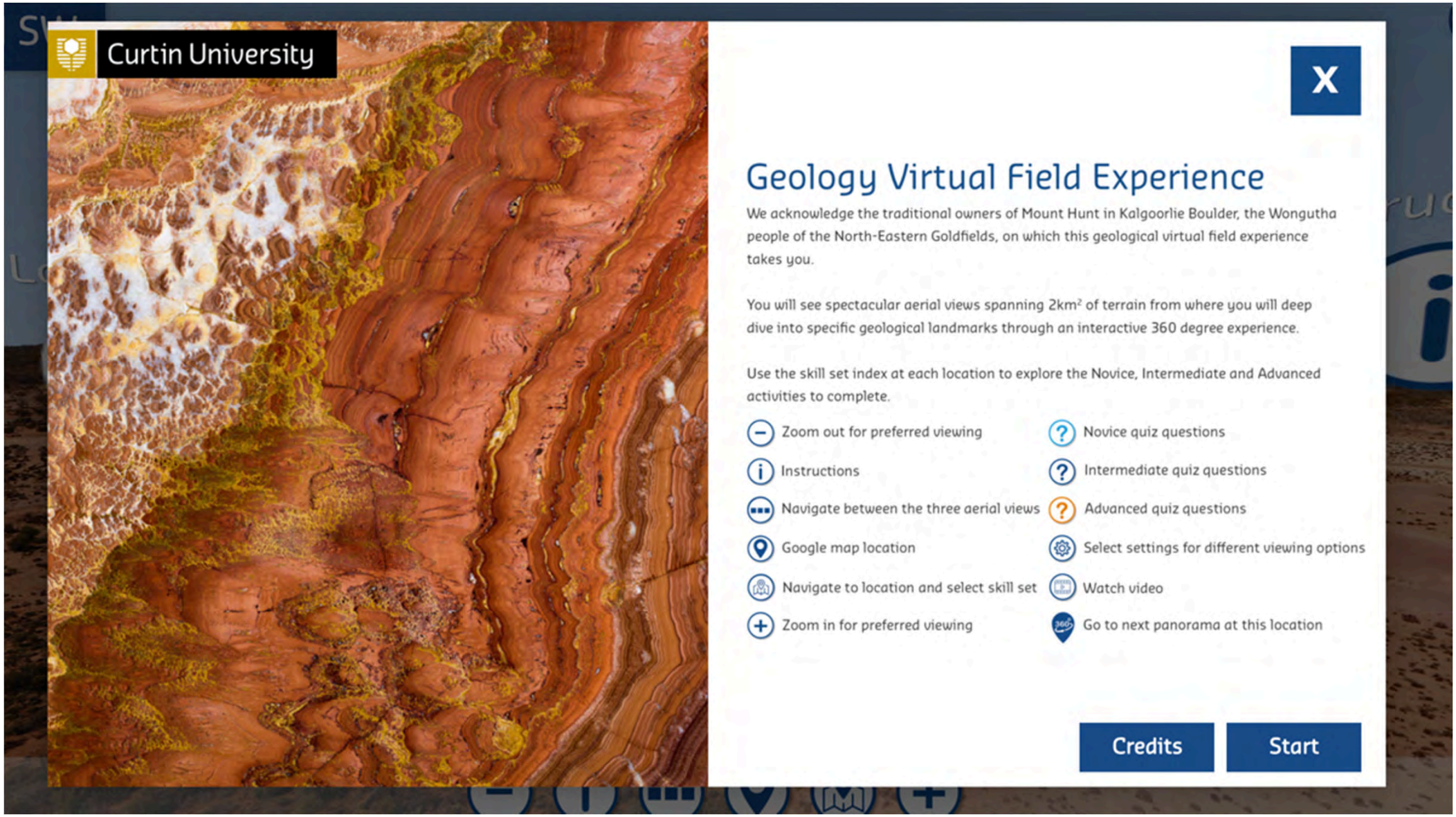




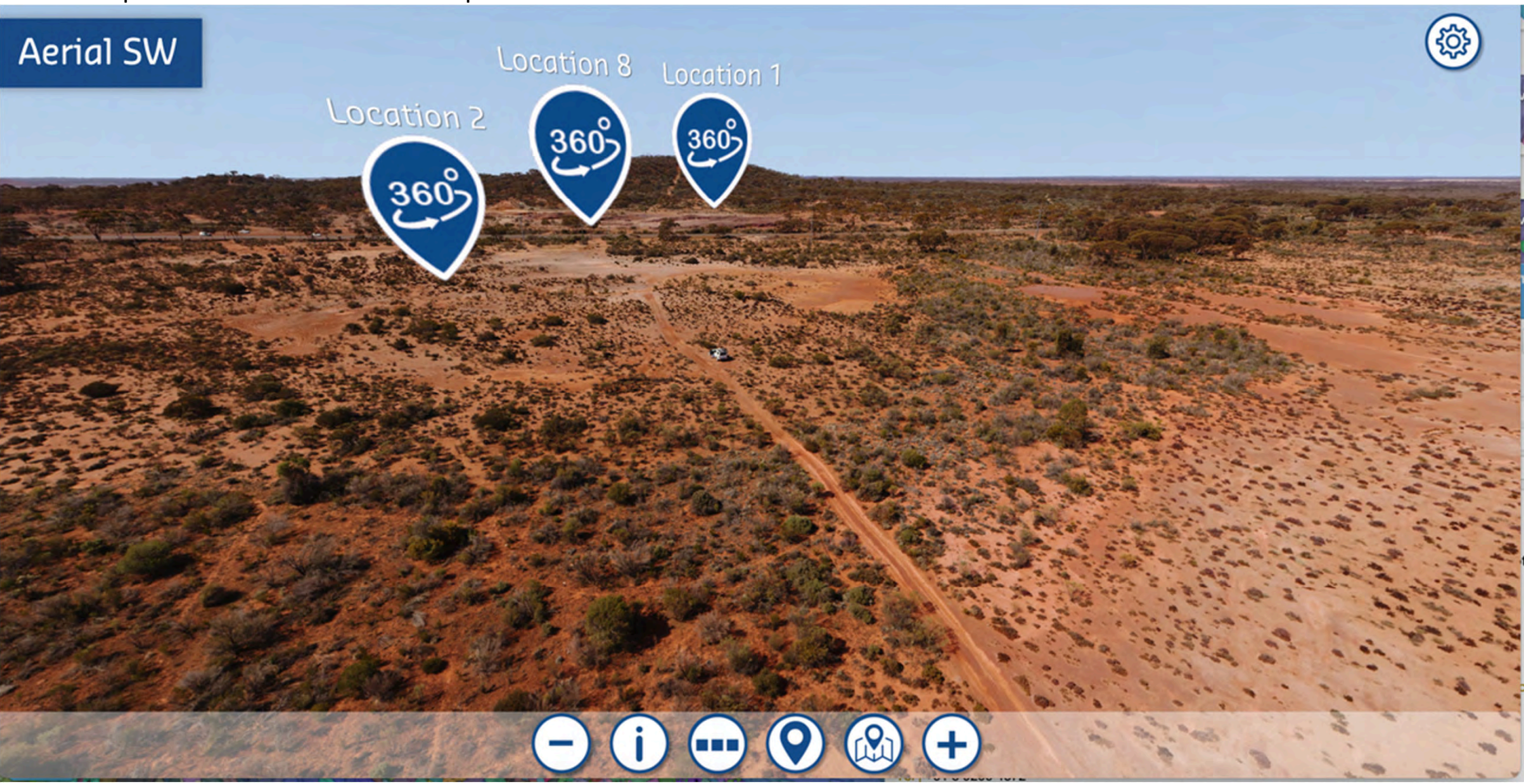
Link to VFE

https://storage.net-fs.com/hosting/6412700/5/

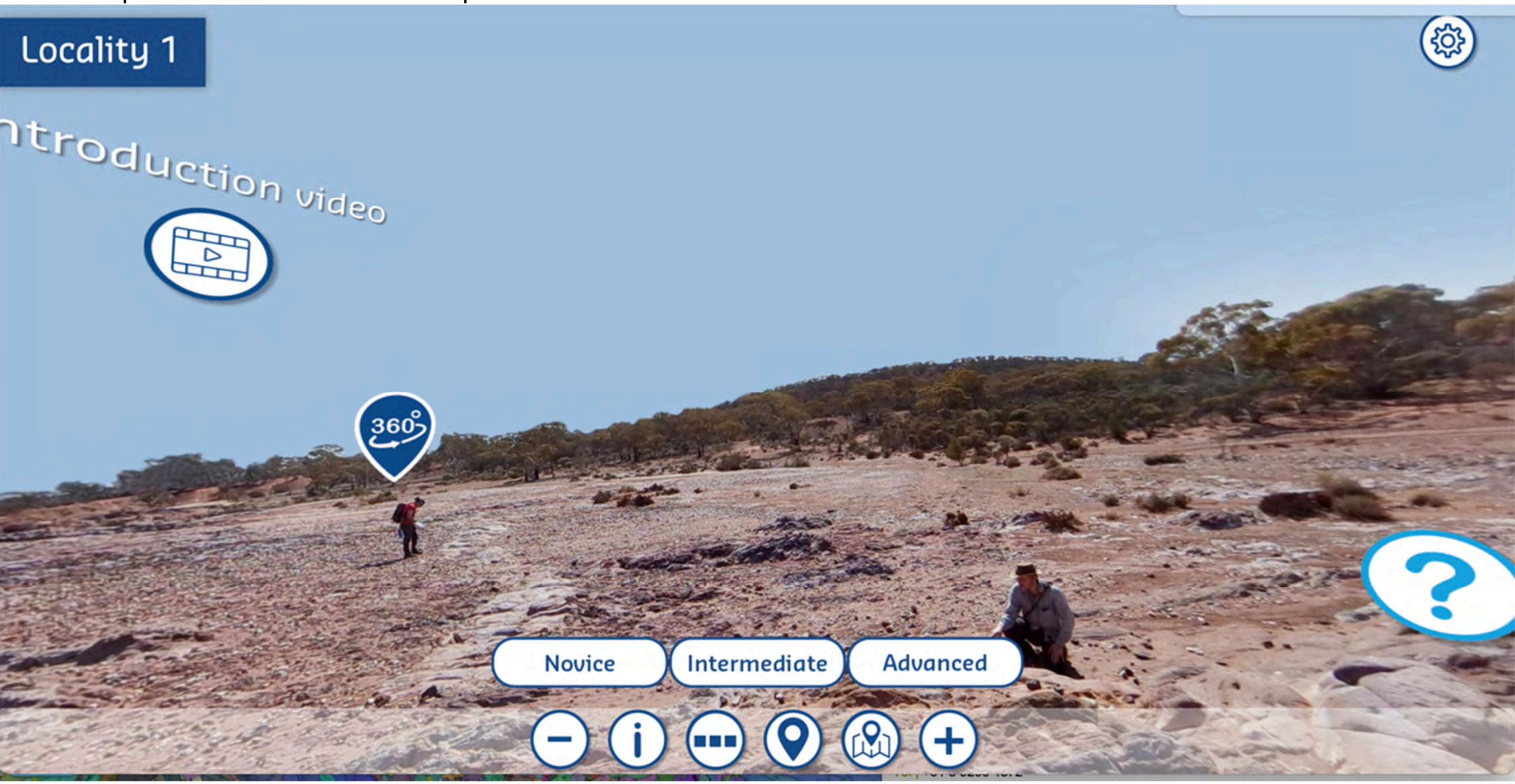
Screen capture from the virtual field experience



Screen capture from the virtual field experience



Screen capture from the virtual field experience



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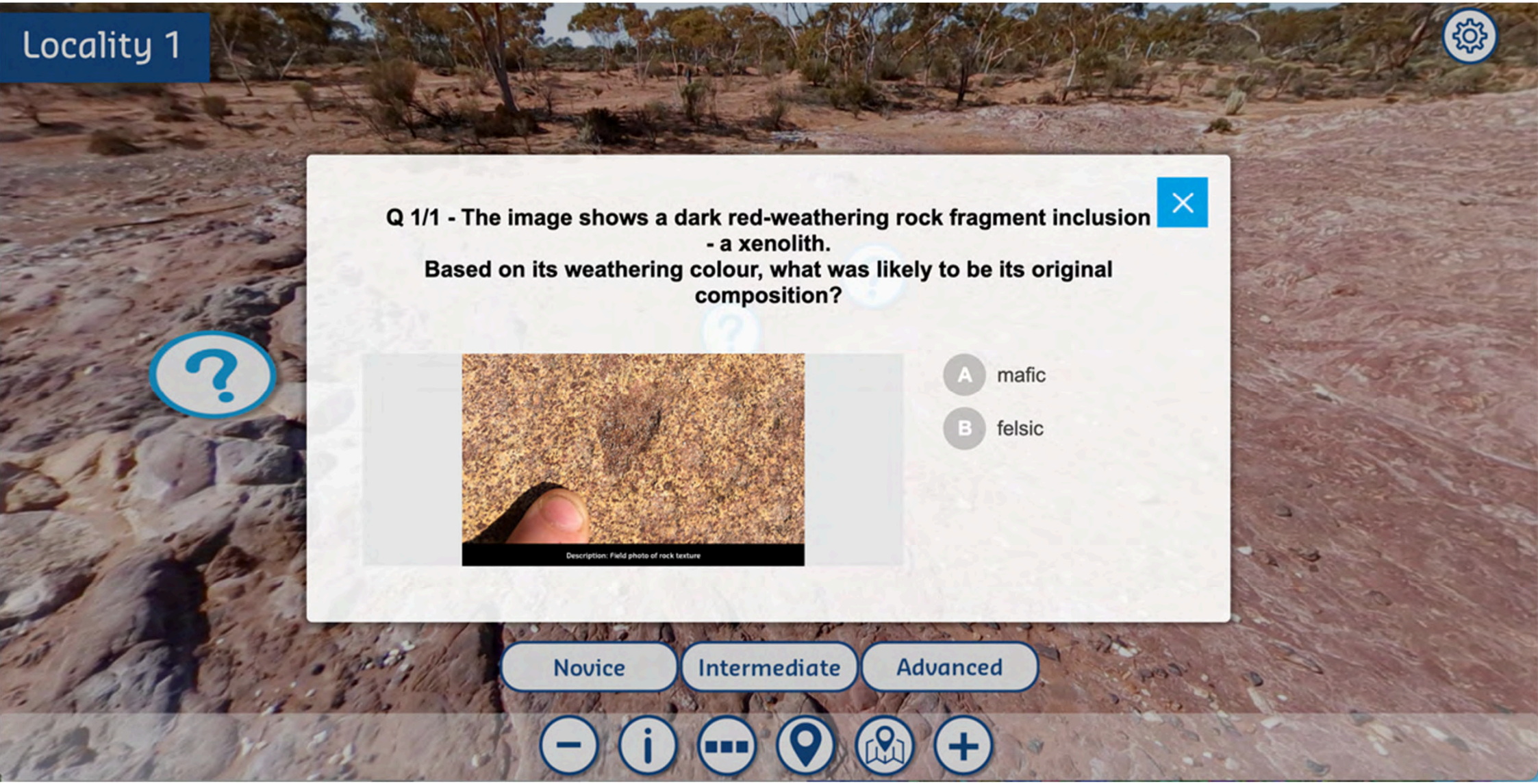
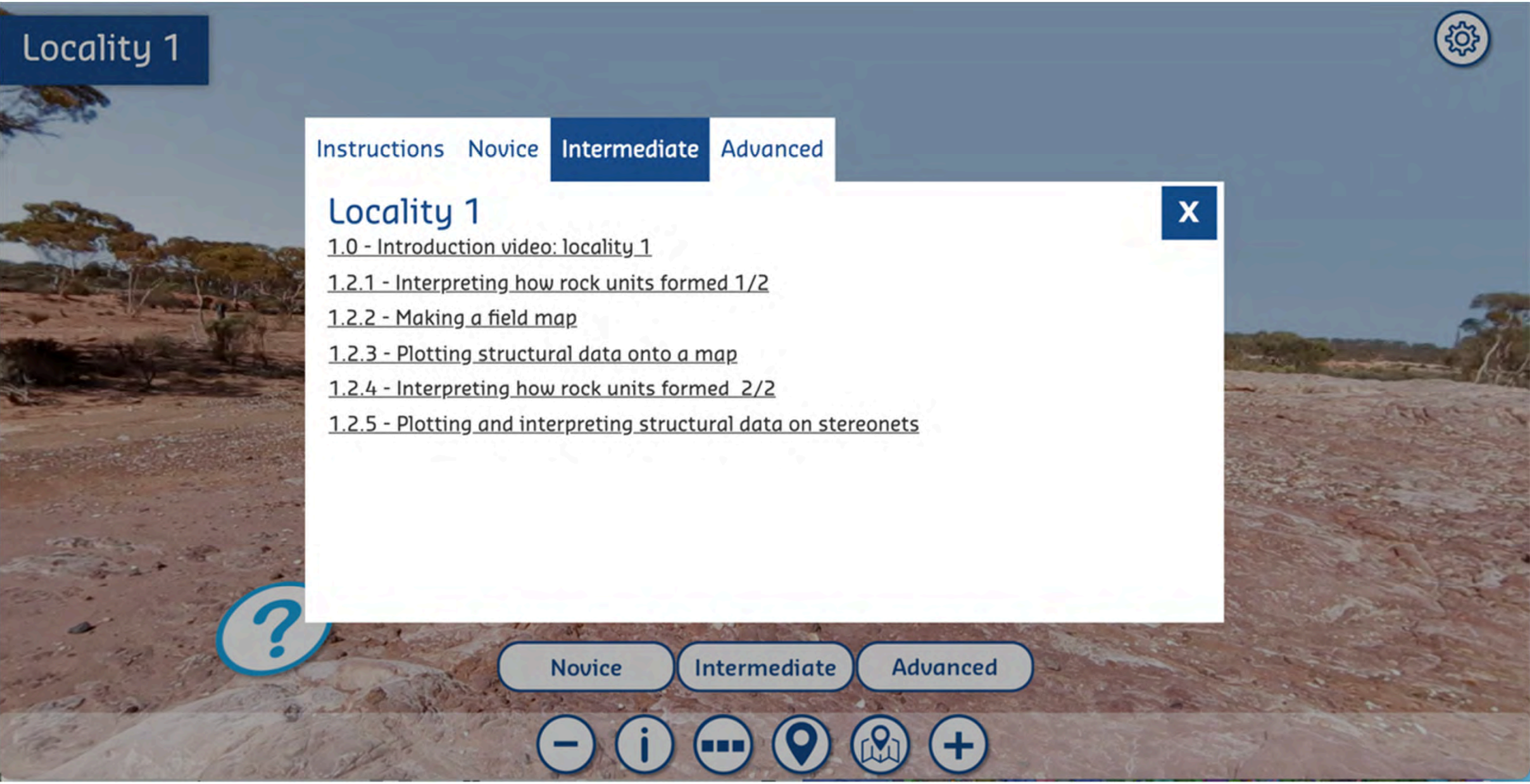


Screen capture from the virtual field experience



Credits

Nick Timms (Curtin EPS) – mastermind, overlord and acknowledges support from a Curtin Media Grant

Madelon Heperi (Curtin FLET) – programming, graphic desing and teaching and learning design

Martin Towner (Curtin EPS) – drone pilot, cameraman, sound guy, field model, drone mosaic data processing

Aaron Cavosie (Curtin EPS) – geochemistry data and petrology wizard

Katy Evans (Curtin EPS) – teaching and learning design and acknowledges support from a Curtin Media Grant

Diana Taylor (Curtin FLET) – teaching and learning design

David Mole (CSRIO at the time) – whole geochemistry sample collector and acknowledges support from the Science Plus Leader program of CSIRO

Chris Kirkland (Curtin EPS) – geochronology data collection and processing

Sean Makin (Curtin EPS) – drone pilot and data processing

Andrea Rajšic (Curtin EPS) – 360 camera operator, structural data collection and field model

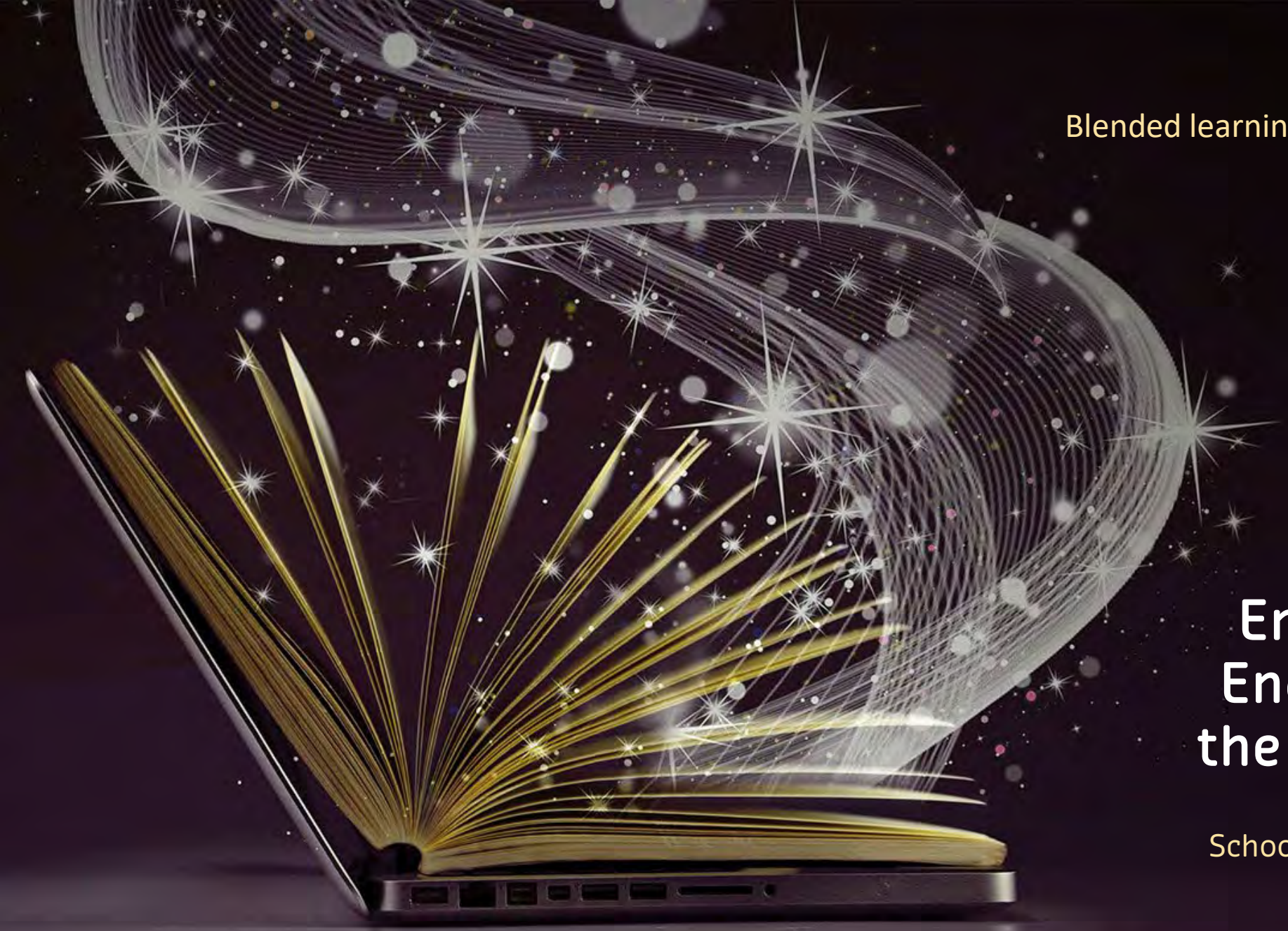
Dave Belton (Curtin EPS) – areal 360 drone pilot and data processing

Tony Snow (Curtin EPS) – areal 360 drone co-pilot and assistant

Denis Fougerouse (Curtin EPS) – field model

Timmons Erickson (Curtin EPS, now at NASA) – sample collector

Steve Reddy (Curtin EPS) – sample collector



Curtin University

Blended learning community – 8 September 2021

Using Electronic Notebooks to Encourage Student Engagement during the COVID Pandemic

Dr Alexandra Yeung
School of Molecular and Life Sciences

Background and context – ELNs

- ✓Electronic laboratory notebooks (ELNs) are increasingly used in the workforce
  - o accepted practice in industry
- ✓Ideal time to introduce ELNs in undergraduate classes
  - o up-skilling students with electronic recording and data management skills
- ✓Need to prepare students for a technological rich workplace
  - o help them develop skills that are easily transferable to any workplace environment
- ✓Institutional push towards electronic data management and record keeping
- ✓Interest from department in using ELNs in teaching

What is an ELN?

Electronic Laboratory Notebooks (ELN) is a digital platform that is designed to replace traditional paper research notebooks with a digital and secure version.

Key features:

Research data management and organisation	Searchable	Portability	Sharing	Inventory	IP protected	Data security	Seamless
You are able to manage and organise all of your research data and information in one place (central HUB).	Can be searched by keywords or tags	The cloud-based platform can be accessed anywhere, anytime.	Data can be accessed by your research group and collaborators.	samples, reagents and consumables can be kept up-to-date	IP is protected with third party data and timestamps.	Data is centrally stored including historical versions	Files, photos and documents can be stored

https://www.monash.edu/library/researchers/researchdata/eln

Daniel Southam

Context of our units

Students
Mainly a service taught unit with students from Health Sciences

CHEM1001/1005
Biological chemistry

Tuition pattern pre-COVID
- 1 x 1 hour lecture
- 1 x 2 hour workshop
- 1 x 3 hour lab

Students
Bentley: Mixed cohort – Chemistry majors, Engineering, Health Sciences, Education
Miri: Engineering

CHEM1002
Reactivity and Function in Chemistry

Tuition pattern pre-COVID
- 1 x 1 hour lecture
- 1 x 2 hour workshop
- 1 x 3 hour lab

Technology uplift

Program of works to fit out teaching laboratories with tablets for electronic laboratory note keeping

Specifications:
Four teaching laboratories
20 to 32 student capacity
Up to four three hour labs per day
Labs run Monday to Saturday

Technology:
Microsoft Surface Pro

Challenges

- Provide an equivalent experience to students despite not being able to run laboratories – All labs moved online
- Maintain interaction of students between peers and teaching staff
- Provide feedback to students in an online way
- Assessment was moved online – needed an efficient way to do so

Moving things online

Online laboratory content

Videos developed and sample data were provided to students in LabArchives

Online workshop assessments

Workshop assessments were completed in class pre-COVID. Workshops were run synchronously but the assessments were moved online and released in LabArchives.

Electronic laboratory notebook (ELN)

LabArchives was already used and was a seamless transition

Online Help Desk

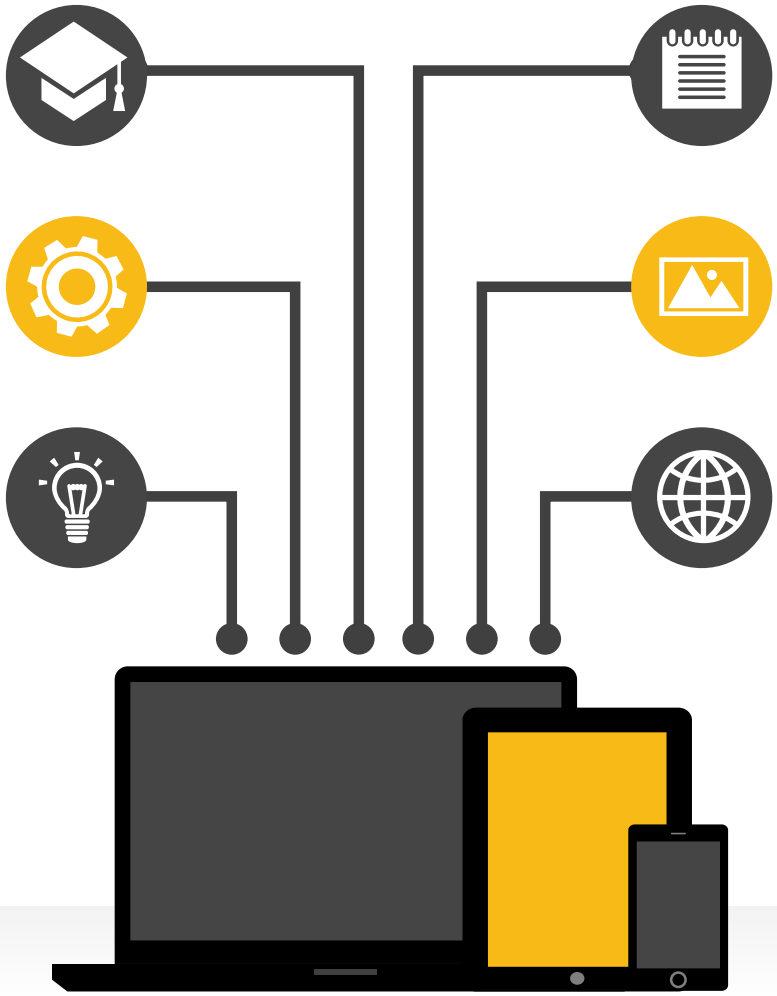
Established to allow students to ask questions and interact with teaching staff

LabArchives

Two forms – classroom edition (CE) and professional edition (PE)

CE has the same features as the PE but with specialised instructional features

Features of CE: teacher control, gradebook, every edit is logged against users name and time stamped, pages can be converted to pdf and submitted through Turnitin.



Flexible design and permanent record

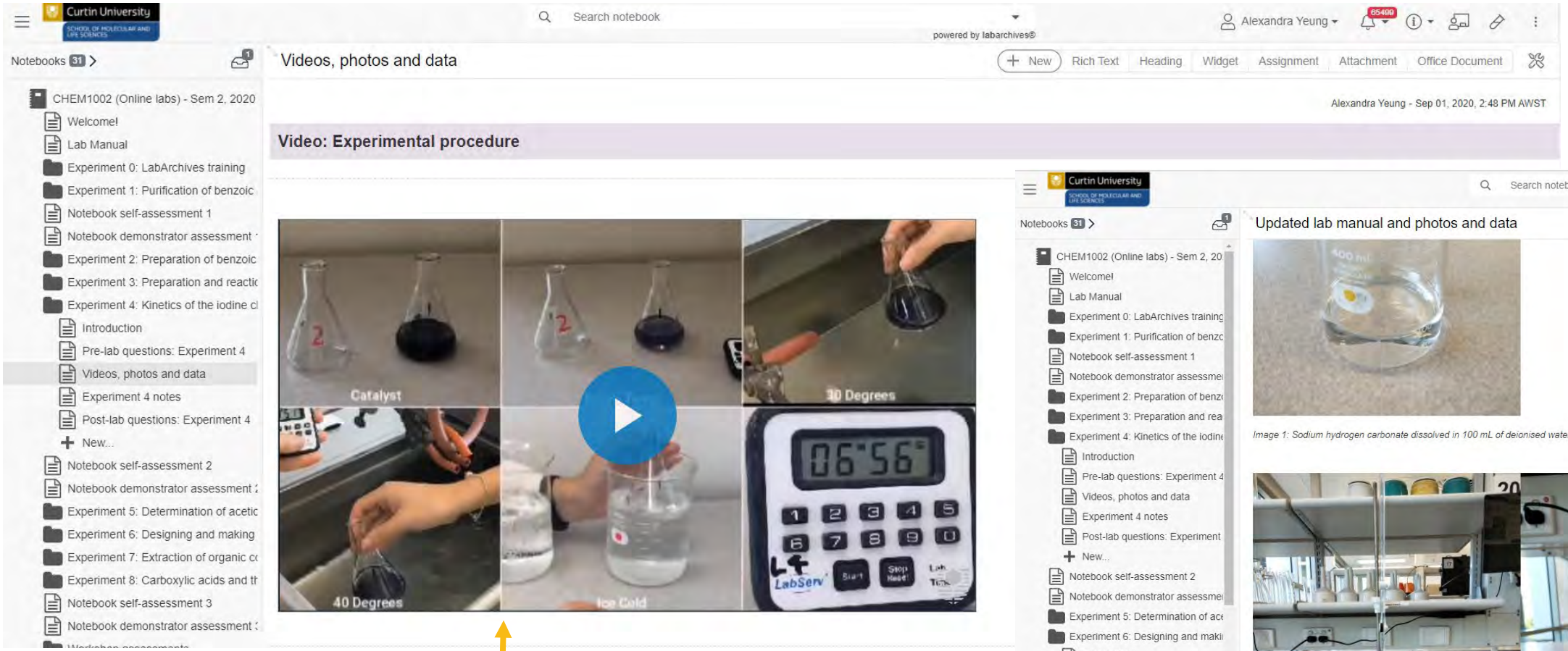
Add photos, videos, graphs, math calculations etc.

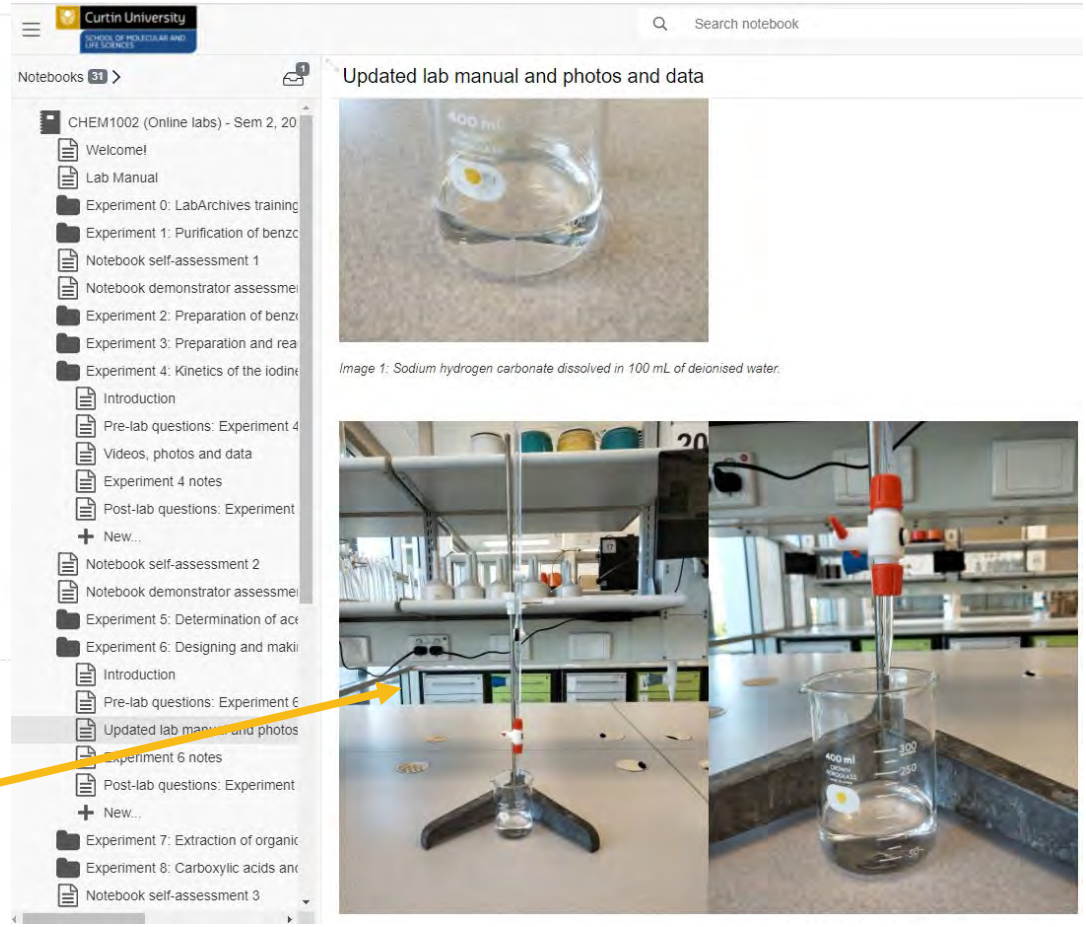
Data hosted in Australia

Showcase of ELN

Examples of what we have done!

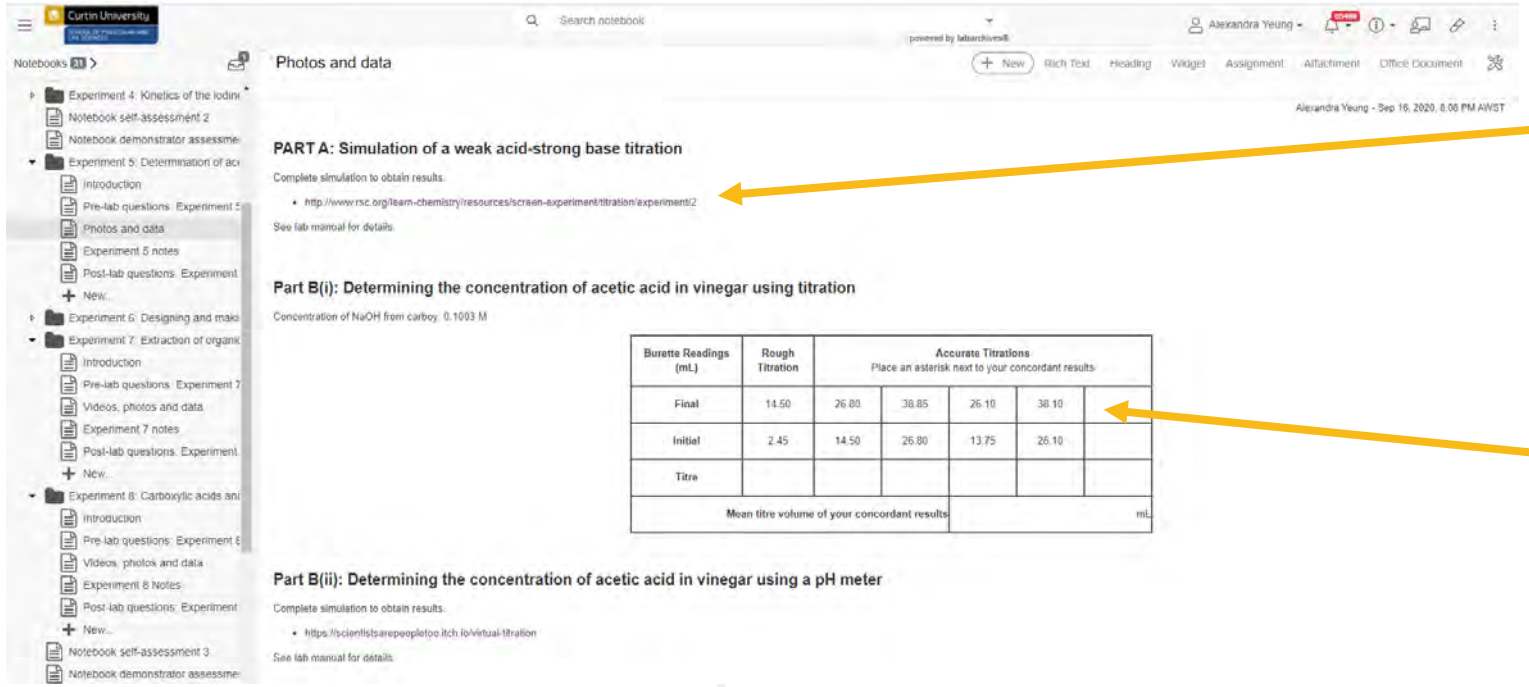
Videos and photos provided





Students watched the videos and looked at the photos to collect data and write observations/inferences

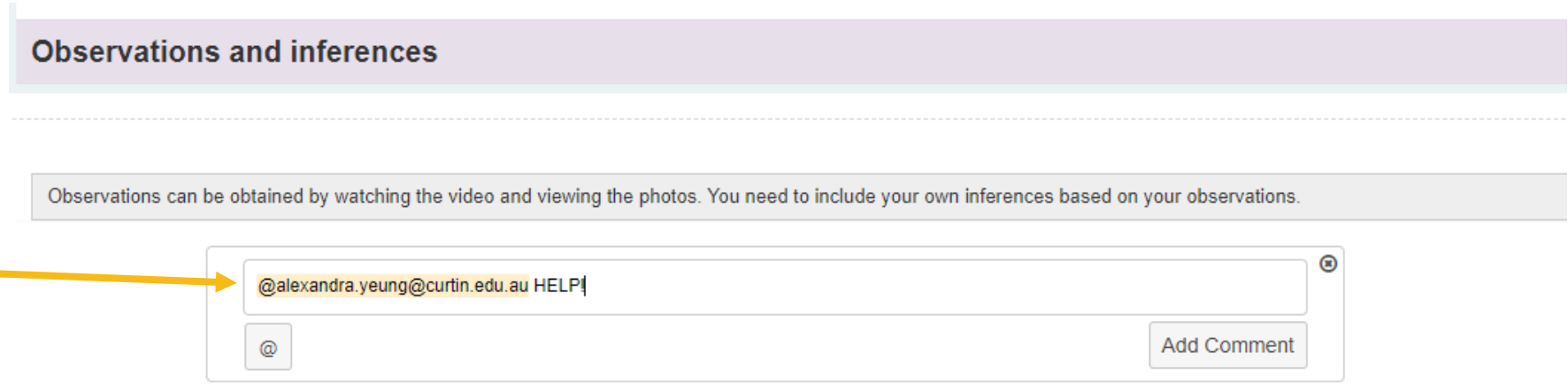
Data and feedback



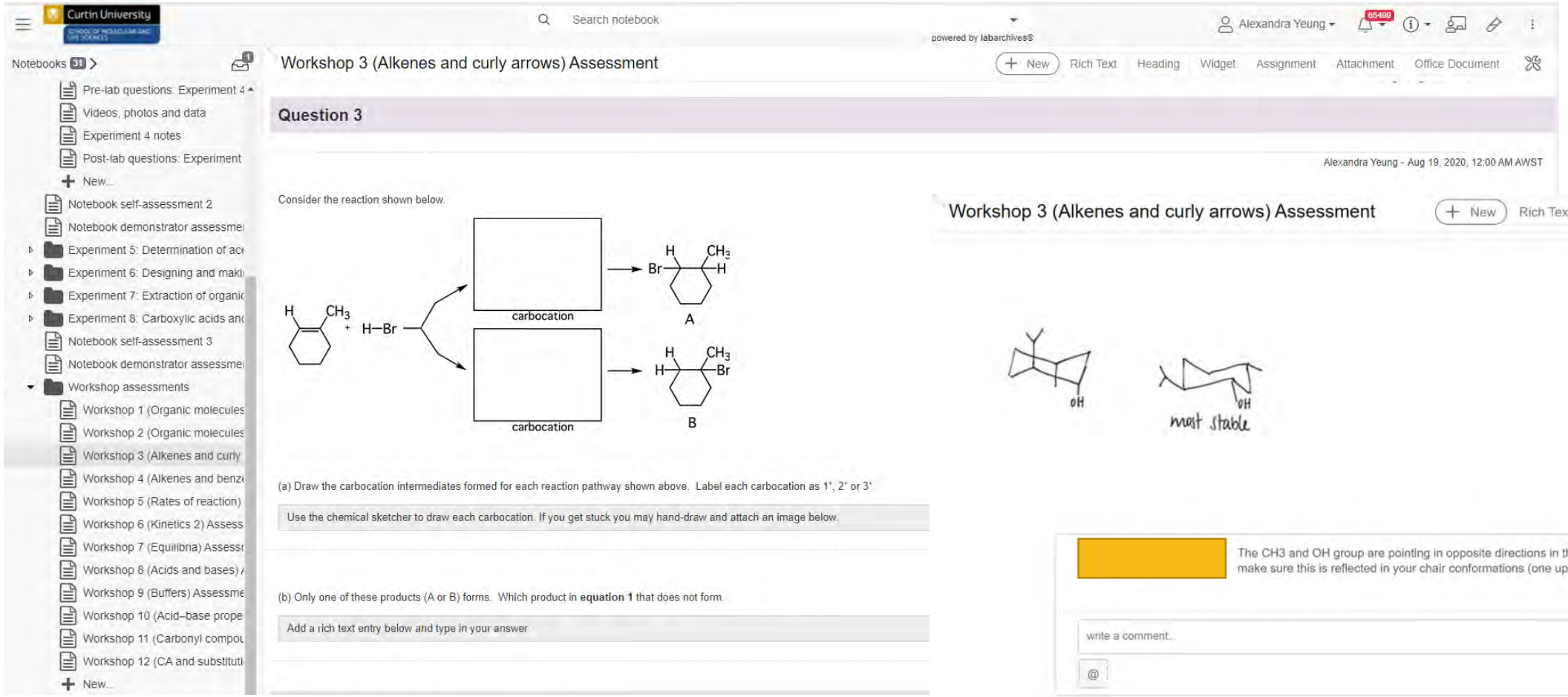
Some experiments required students to computer online simulations

Students were also provided with data that allows them to complete the data analysis and obtain results for the experiment

- Students could tag teaching staff to get feedback and help for their lab work
- Teaching team could tag students with feedback



Workshop assessments



Students completed their workshop assessments online. Facilitators were able to mark and provide students with feedback online in a timely fashion

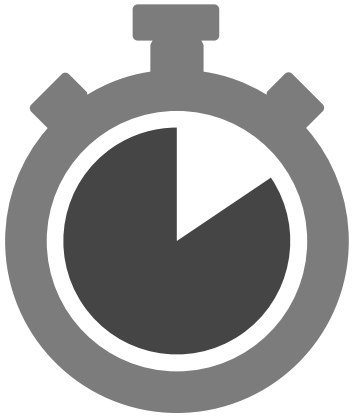
Student and staff perceptions - Feedback

Students (n=32)

93%

Strongly Agree / Agree
Using an ELN allowed me to receive feedback easily

Demonstrators (n=8)



88%

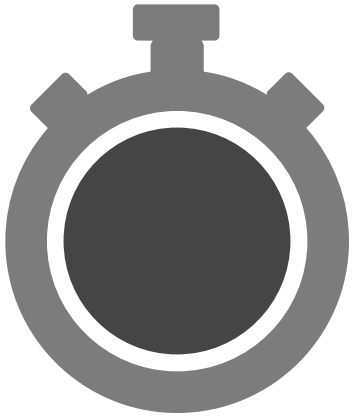
Strongly Agree / Agree
Using an ELN allowed students to ask me for feedback easily

Students

86%

Strongly Agree / Agree
Using an ELN allowed me to ask for feedback easily

Demonstrators



100%

Strongly Agree / Agree
Using an ELN allowed me to provide feedback easily

Student and staff perceptions - Interaction

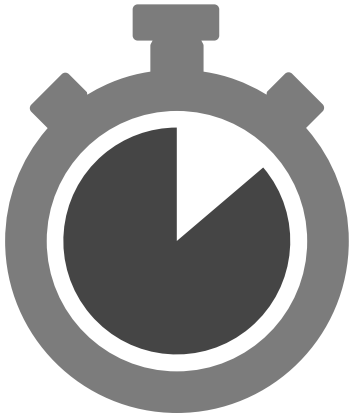
Students

75%

Strongly Agree / Agree

Using an ELN allowed me to interact with teaching staff

Demonstrators



88%

Strongly Agree / Agree

Using an ELN allowed me to interact with my students

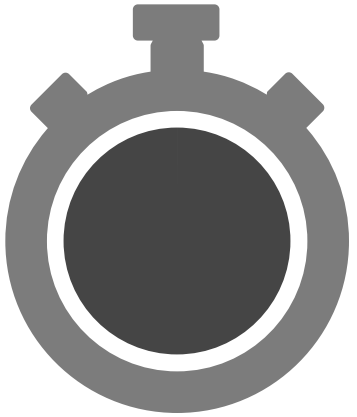
Students

71%

Strongly Agree / Agree

I utilised the tagging feature on LabArchives

Demonstrators



100%

Strongly Agree / Agree

I utilised the tagging feature on LabArchives to tag my students

Student and staff perceptions

Students

61% **Strongly Agree / Agree**

18% **Strongly Disagree / Disagree**

Using an ELN enhanced my participation in this subject

Demonstrators

88% **Strongly Agree / Agree**

18% **Neutral**

I was satisfied with the overall experience with using an ELN for teaching

Student comments

What do you think are the benefits of using an electronic laboratory notebook?

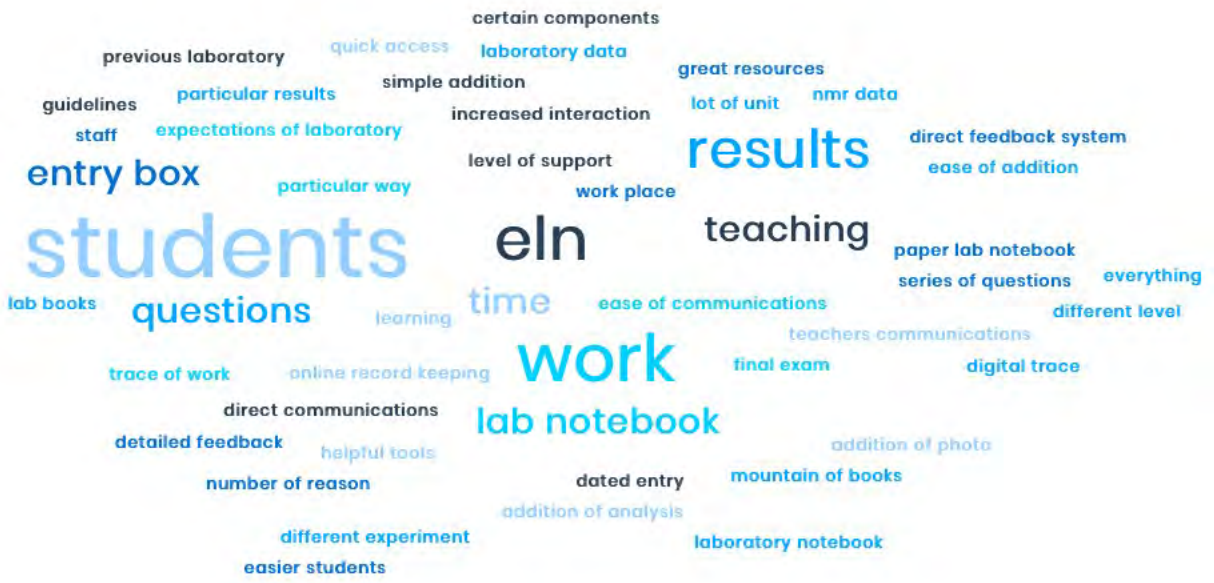
ELN makes it so ***much easier to keep up with the content of the class****, making sure you are prepared before each experiment as you had to complete the designated work.* ***I have done this unit with both an ELN and PLN and ELN was far better****. I was able to* ***get feedback on all of my work*** *and ask my teachers for help.*

We were able to access and edit the workbook from any location at any time and the electronic tools made it far easier for "non-creatives" like myself to ***create diagrams and graphs*** *that were more aesthetically pleasing.*

Considering the current the climate ***with regards to the Corona Virus, the ELN was an efficient method to complete chemistry work online****.*

Staff comments

What do you think are the benefits of using an electronic laboratory notebook?



*The **ease of communication** between students/staff. The @comment feature is an incredibly helpful tool for both parties, and I think it's worthwhile implementing ELN's across a lot of units purely because of this tool.*

*I think it **sets students up well for the work place**, where there has been a shift to online record keeping. It is also advantageous to a paper lab notebook for a number of reasons, primarily being able to keep all laboratory data in one place (e.g. where excel files, spectra or pictures have been utilised). This makes **everything more organised** and easy to find.*

*Using the ELN allows students to **access their lab notebook and prepare at any time**. It provides a great resource for the students to easily refer to when studying for final exams. The ELN keeps work neat, easy to read and safer (in the sense that there is a digital trace of work so can not be lost or damaged).*

*I **love teaching with the ELN and wish I was fortunate enough to use this software throughout my undergrad**.*

Staff and student comments

Do you prefer using an electronic laboratory notebook (ELN) or a paper laboratory notebook (PLN)?
Give reasons for your answer.

Preference	Students	Staff
ELN	Though I may be biased because of my tech-mindedness, I prefer ELNs. Other than possible data loss, **electronic mediums for data storage will always be superior to physical ones**. It's remotely accessible, editable, TurnItIn-friendly, customisable, impossible to misplace, far more useful (embedded video) and better for the environment. **It's odd to me that this technology wasn't implemented a decade ago**.	I prefer an ELN because there is easier **accountability for students and demonstrators**, and it allows for easier interactions outside of the lab/classroom.
Either	I like the **electronic lab notebook and paper lab notebook equally**. The electronic notebook does allow for all notes to be in one place rather than writing notes on multiple pages of the paper notebook and trying to find them. The paper notebook is more portable. Allowing for any observations and measurements to be written down where they are occurring. It also means can bring the instructions to the experiment rather than moving back and forth if not right near the tablet…	I prefer using an electronic lab book. For the **coherence of storing all useful data in one place**, i.e. flow of looking back over work without having to find supporting analysis. **Paper lab books are better for keeping an accurate up to date description**, as sometime using electronic, you may not have the means to enter something at a given time and have to go back to enter it later.
PLN	Although I do see the benefits of a ELN I found it very time consuming and **not very accommodating to my learning style**. **I have ADHD** so struggle with reading off screens and I also struggled with the coding required when writing chemical formula. Personally I find using PLN a lot easier to grasp concepts.	**I like PLNs because that was what I started my career with**, but I can see the benefit of ELNs and am considering switching to using a ELN for my PhD once I have a better device to use it on in the lab.

THANK YOU

Questions ???

Curtin Teaching Academic Scholarship Seed Grant
Department of Chemistry

Diana Taylor
Demonstrators
Technical staff
Students

alexandra.yeung@curtin.edu.au @alexandra_yeung

Lights, Camera, Reaction!

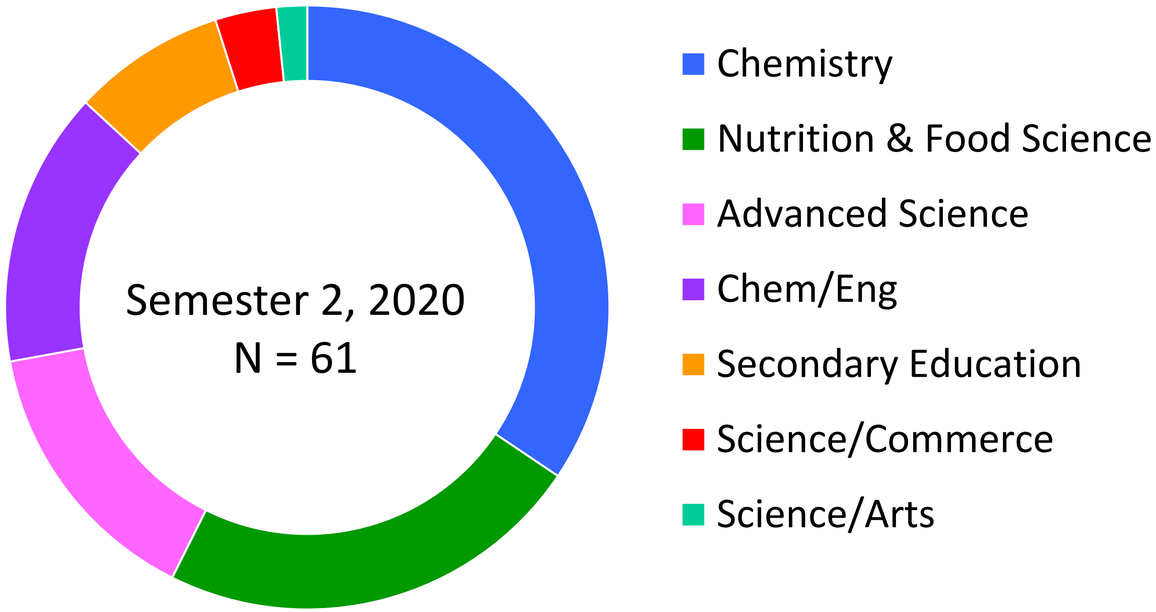
A blended approach to chemistry laboratories with filmed experiments

Dr Georgina Sauzier

School of Molecular and Life Sciences, Curtin University, Perth, Western Australia.

CHEM2005 Analytical Chemistry

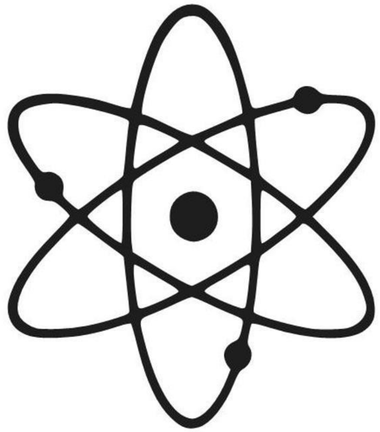
- Second-year core unit developing "*mastery*" of analytical chemistry skills
- Laboratories: Seven experiments (four 'wet lab', three instrumental)



Laboratory Assessment

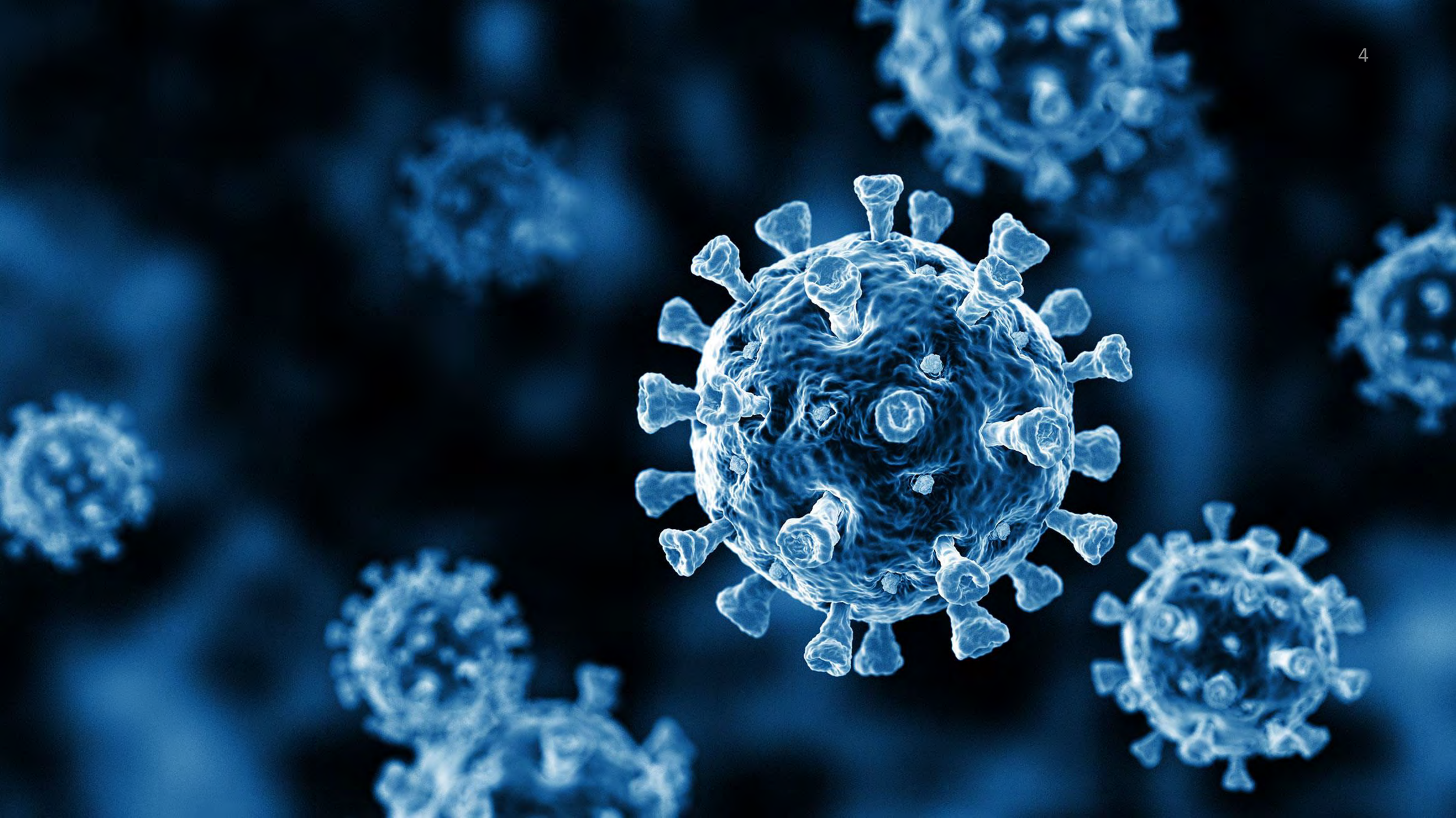
- Pre-laboratory: Concept questions and risk assessment
- Post-laboratory: Written report (Experiments 1-3 only)

Safety



Chemical knowledge

Communication

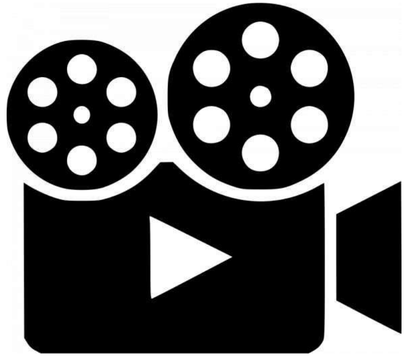


Considerations

- Prioritisation of laboratories for face-to-face instruction
- Online laboratories – not just a matter of providing data
  - *Context*
  - *Support*
  - *Assessment*

How do we provide an equivalent learning experience?

‘Online Laboratory Package’



Sessional staff re-deployed to assist with development

Exercise 1: Selective Redox Extraction of Iron

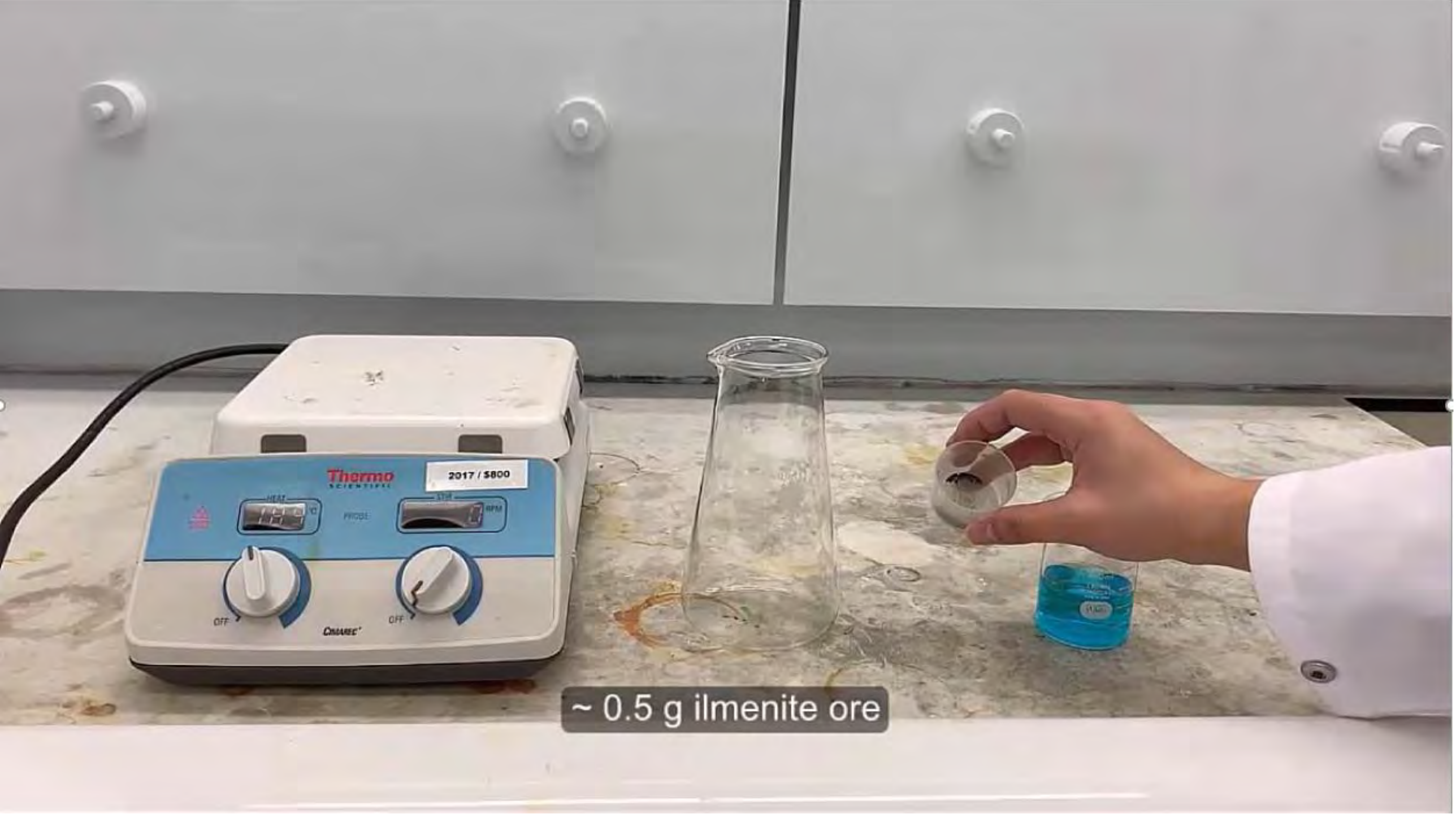
The use of aqueous solutions to recover metals from ores, concentrates or residual materials is known as hydrometallurgy. In this exercise, you will determine the percentage of iron in an ilmenite ore based on hydrometallurgy using selective reduction and oxidation.

This exercise builds on the following concepts that you may have encountered in first-year chemistry units. If you wish to review these concepts before attempting this exercise, please view the resources below.

- Uncertainty analysis
- Weighing by difference

Before attempting this exercise, watch the following video. This outlines the experimental procedure and contains important information that will assist you in completing your report.

Download the information sheet for this exercise: Selective Redox Extraction of Iron
Complete your written report and submit using the Turnitin link below. All reports must be completed individually and in your own words. Advice on structuring your report can be found here


Thermo
SCIENTIFIC
2017 / $800
HEAT
°C
PROBE
STIR
RPM
OFF
OFF
~ 0.5 g ilmenite ore

Student Feedback

"The online content was delivered very well… Online [laboratories] were very useful for learning."

	% Agreement	
	2019	**2020**
"Learning experiences help me achieve the unit outcomes"	79	100
"Learning resources help me achieve the unit outcomes"	84	100
"I am motivated to achieve learning outcomes"	74	82
"Overall, I am satisfied with this unit"	74	100

Acknowledgements

- Dr Ching Yong Goh, Rhiannon Boseley, Ashley Hollings and David Hartnell (Curtin University)

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Curtin University

Digital workflows for documentation and sharing during school placements for pre-service teachers

Jenny Jongste
University of Notre Dame Australia

Our issue emerged during the 2020 practicum placements

We needed a solution for potential remote supervision
We needed to be able to ‘see’ the PST’s paperwork and remotely observe lessons

NDA prac placements in the School of Education

- 1st year – 2 weeks
- 2nd year – 10 weeks
- 3rd year - 10 weeks
- 4th year – 10 weeks

What was the problem?

Supervisors were not allowed on site in many schools for our placements in Term 2 and 3, 2020

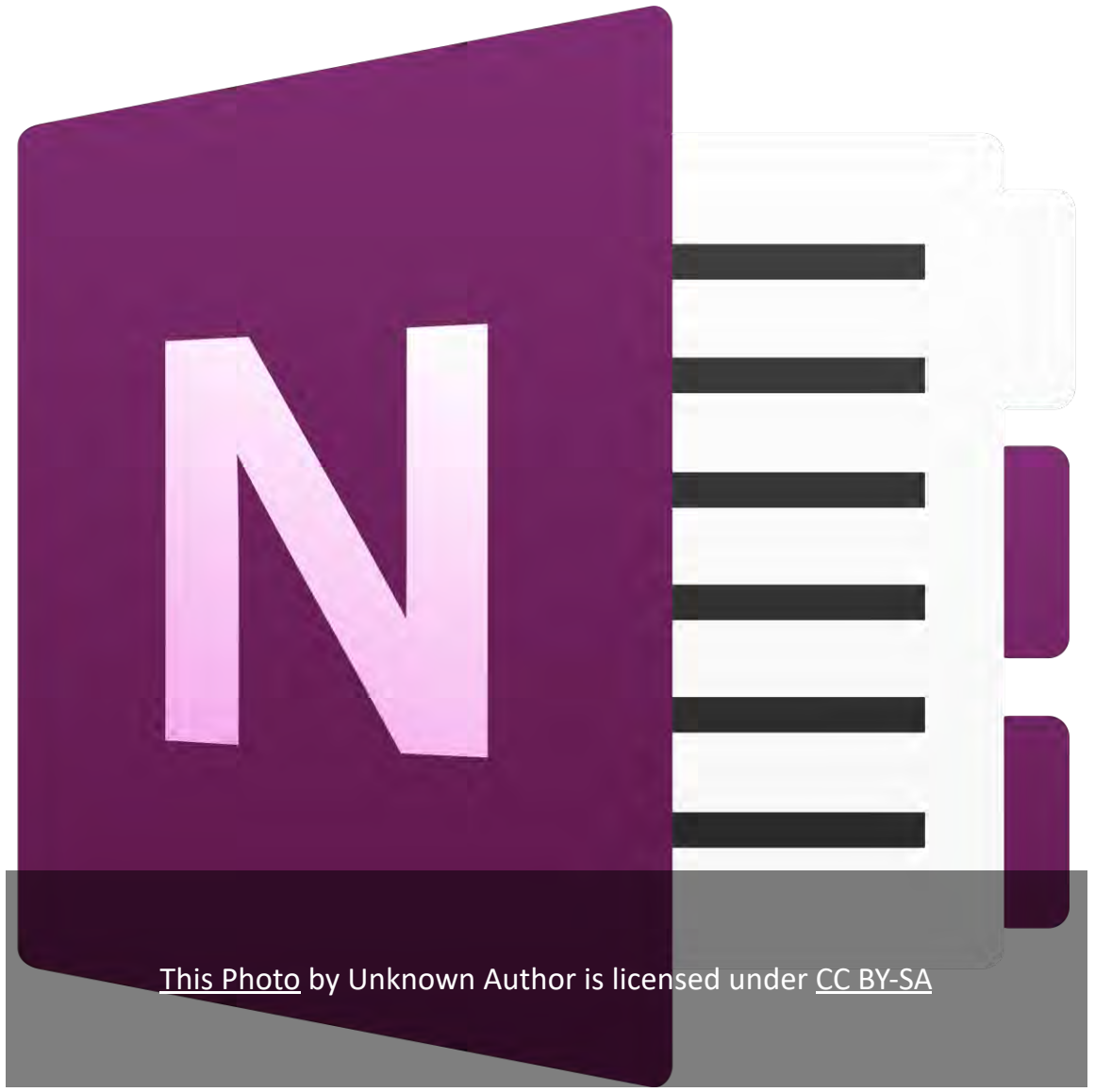
We needed a ‘lockdown proof’ solution for visibility into our prac placements paperwork requirements

Pre-service teachers needed quick and easy to implement solutions

No budget for new software

We created a simple solution OneNote + Zoom

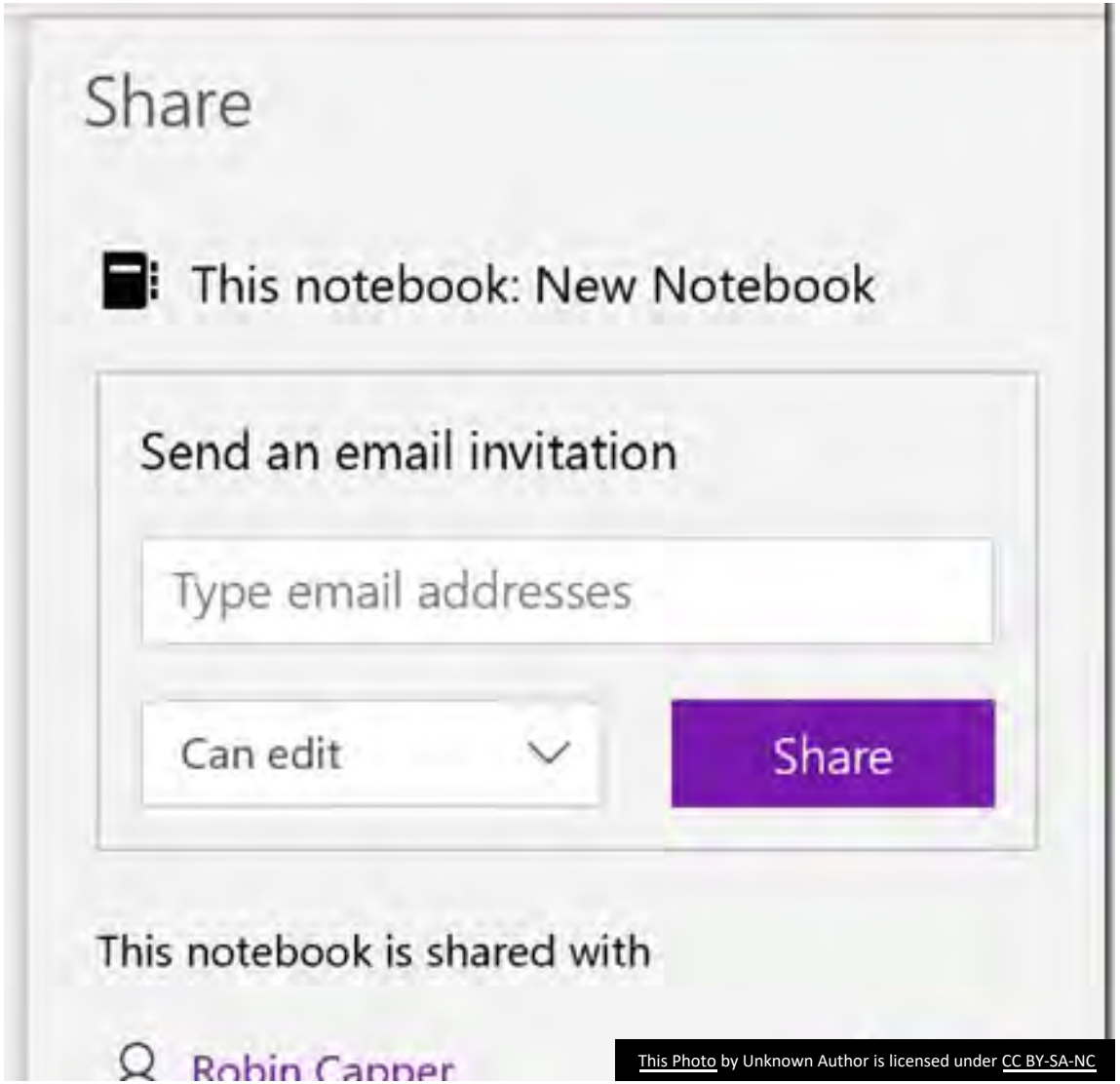
Paperwork = Onenote



Observations = Zoom

Shared OneNotes

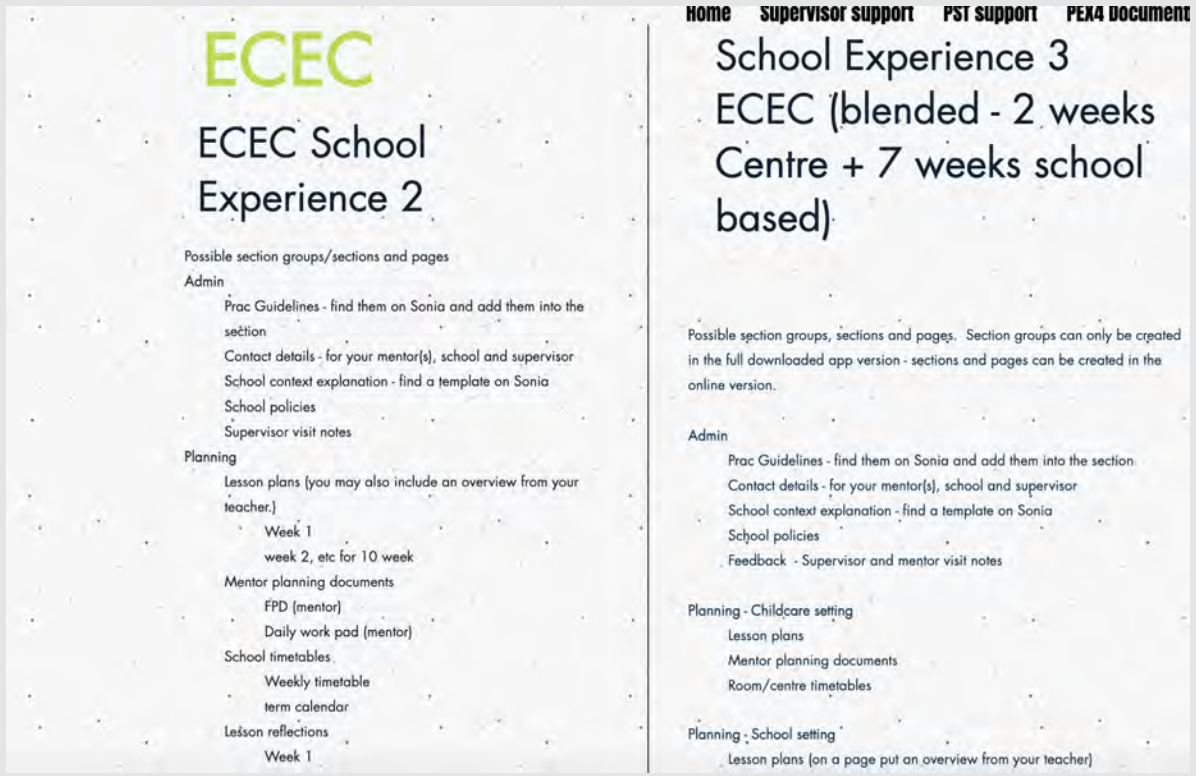
- Every PST is required to create a OneNote for each practicum
- They share the link with their Mentor, the Professional Experience office and their Supervisor



Advantages

- No set up costs
- No extra investment
- Minimal training for staff or students
- One click share link for all users

Process of deployment



ECEC

ECEC School Experience 2

Possible section groups/sections and pages

Admin
- Prac Guidelines - find them on Sonia and add them into the section
- Contact details - for your mentor(s), school and supervisor
- School context explanation - find a template on Sonia
- School policies
- Supervisor visit notes

Planning
- Lesson plans (you may also include an overview from your teacher.)
  - Week 1
  - week 2, etc for 10 week
- Mentor planning documents
  - FPD (mentor)
  - Daily work pad (mentor)
- School timetables
  - Weekly timetable
  - term calendar
- Lesson reflections
  - Week 1

Home Supervisor support PST support PEX4 Document

School Experience 3 ECEC (blended - 2 weeks Centre + 7 weeks school based)

Possible section groups, sections and pages. Section groups can only be created in the full downloaded app version - sections and pages can be created in the online version.

Admin
- Prac Guidelines - find them on Sonia and add them into the section
- Contact details - for your mentor(s), school and supervisor
- School context explanation - find a template on Sonia
- School policies
- Feedback - Supervisor and mentor visit notes

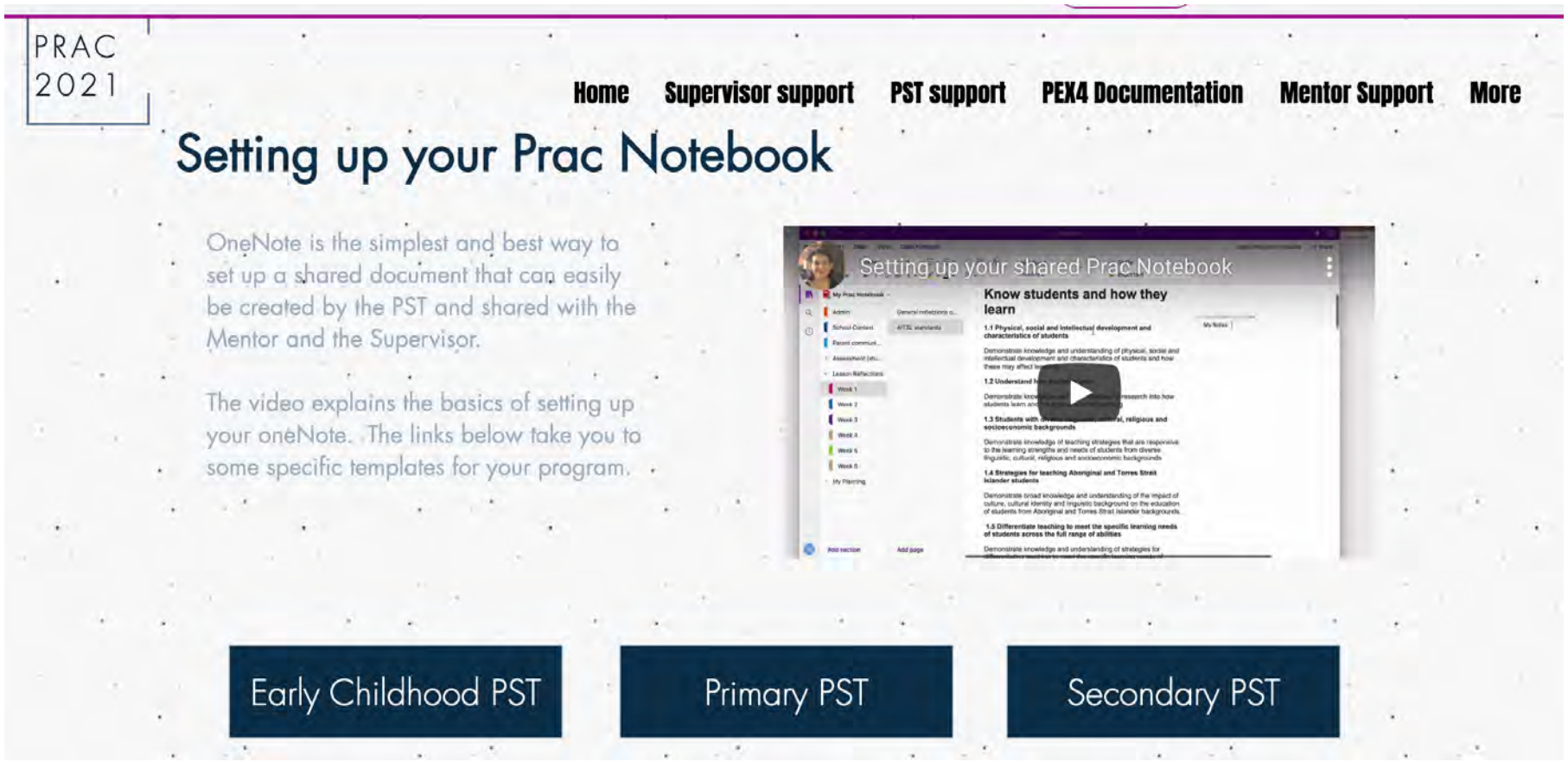
Planning - Childcare setting
- Lesson plans
- Mentor planning documents
- Room/centre timetables

Planning - School setting
- Lesson plans (on a page put an overview from your teacher)

- We created a simple template for each of the years of prac placement based on our general requirements

Process of deployment

We made a website with full details – written and video format



Process of deployment

We ran online sessions for all supervisors and mentors about the use of the Onenote

Process of deployment

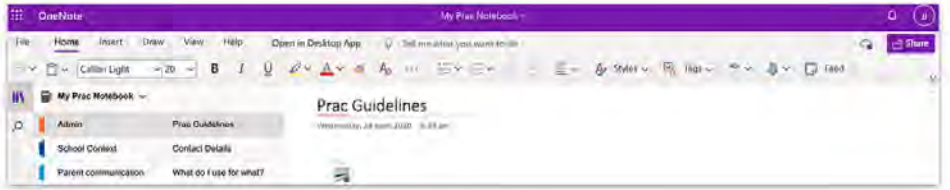
We built the use of OneNote into our 1st and 2nd year ICT courses

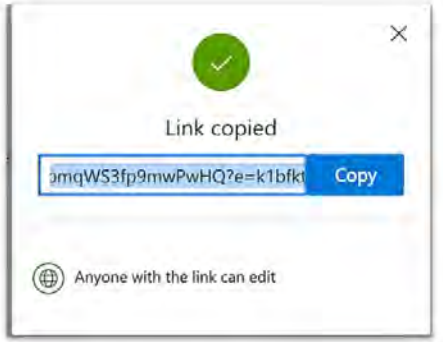
Creating your OneNote for Professional Experience

You will need a OneNote - this site explains the sections and how to create your OneNote for your School experience.

Prac 2021 Site

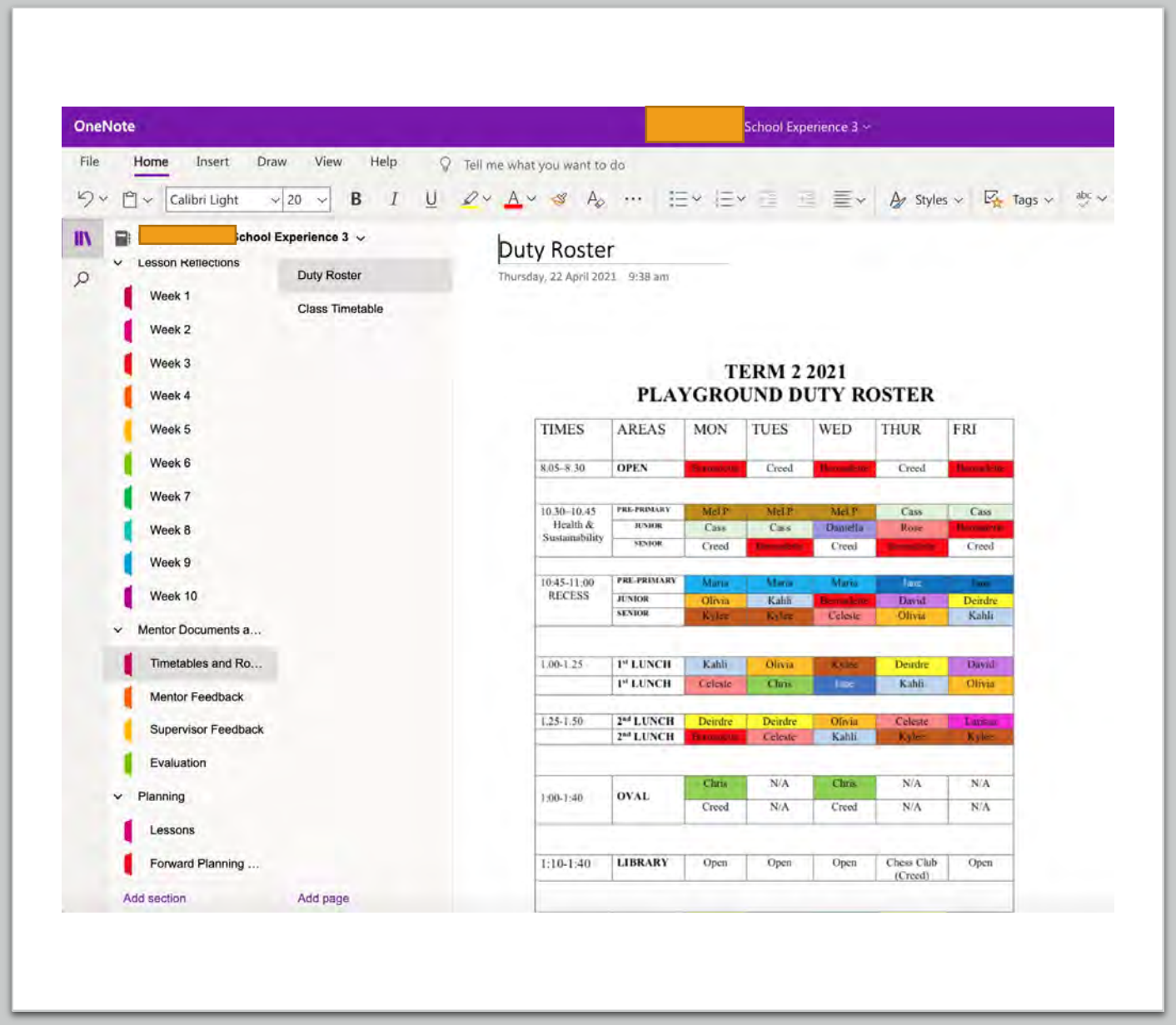
1. Open OneNote Online - log in to Office365 using your Uni email.
2. Create a new OneNote and name it your name and your School Experience number eg Joe Bloggs School Experience 2 Prac Notebook
3. Find the share button on the top right. Ensure it says 'anyone with the link can edit'
4. Copy the share link and add it into Sonia + send the link to your mentor and to your supervisor (do this by the beginning of Week 1).



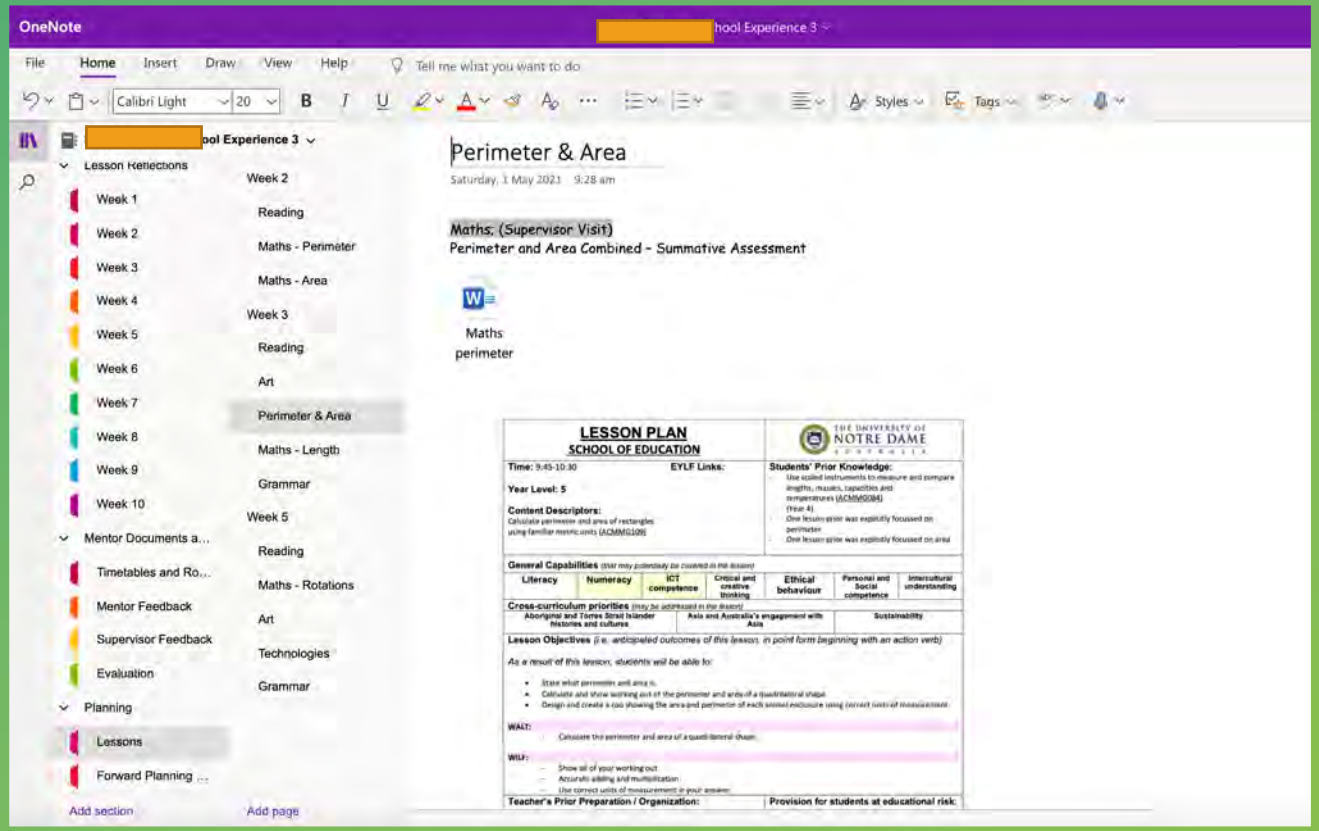


What does a PST OneNote look like?

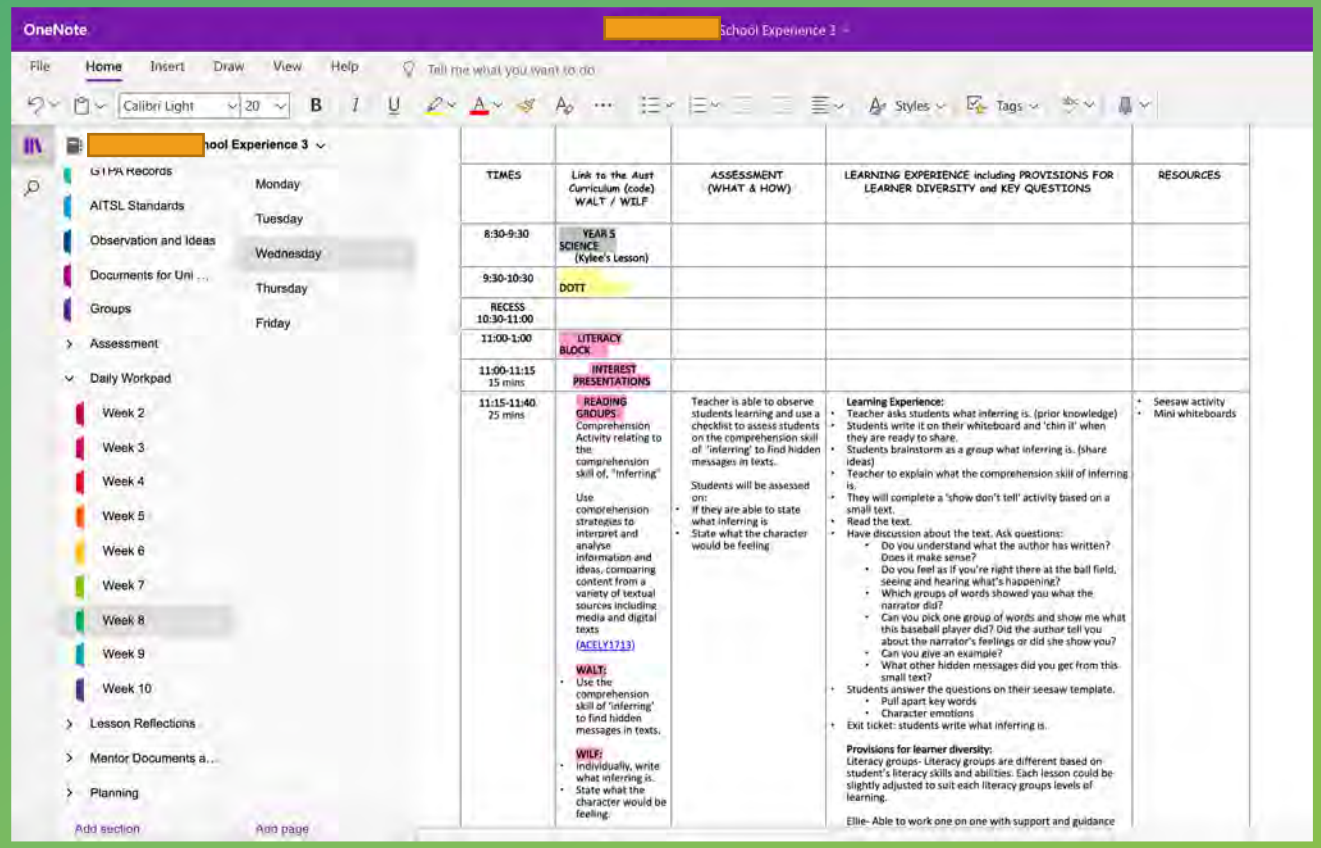
- Absolutely amazing!
- Full of detail
- Planning, assessment and other details are all visible



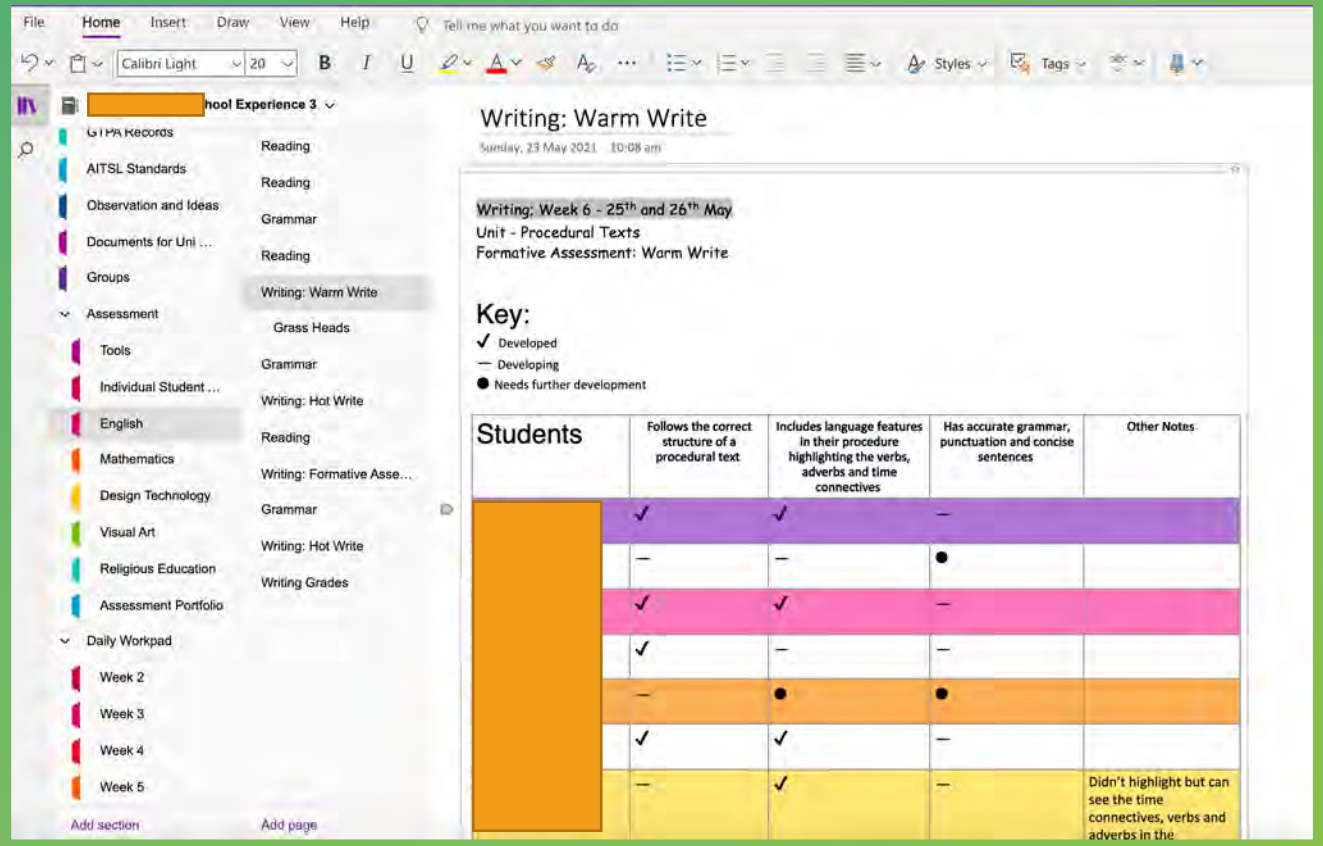
Lesson Plans



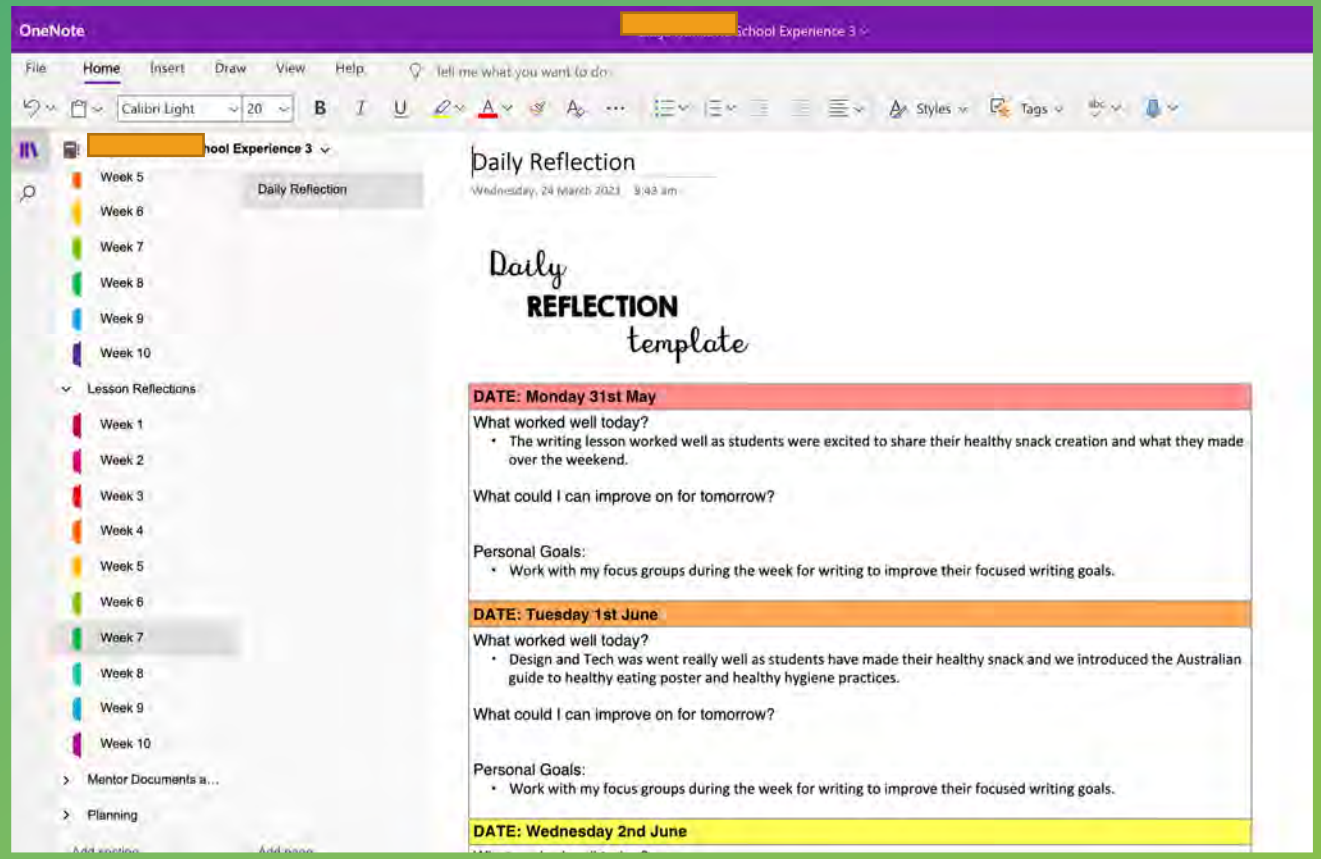
Daily Work Pads



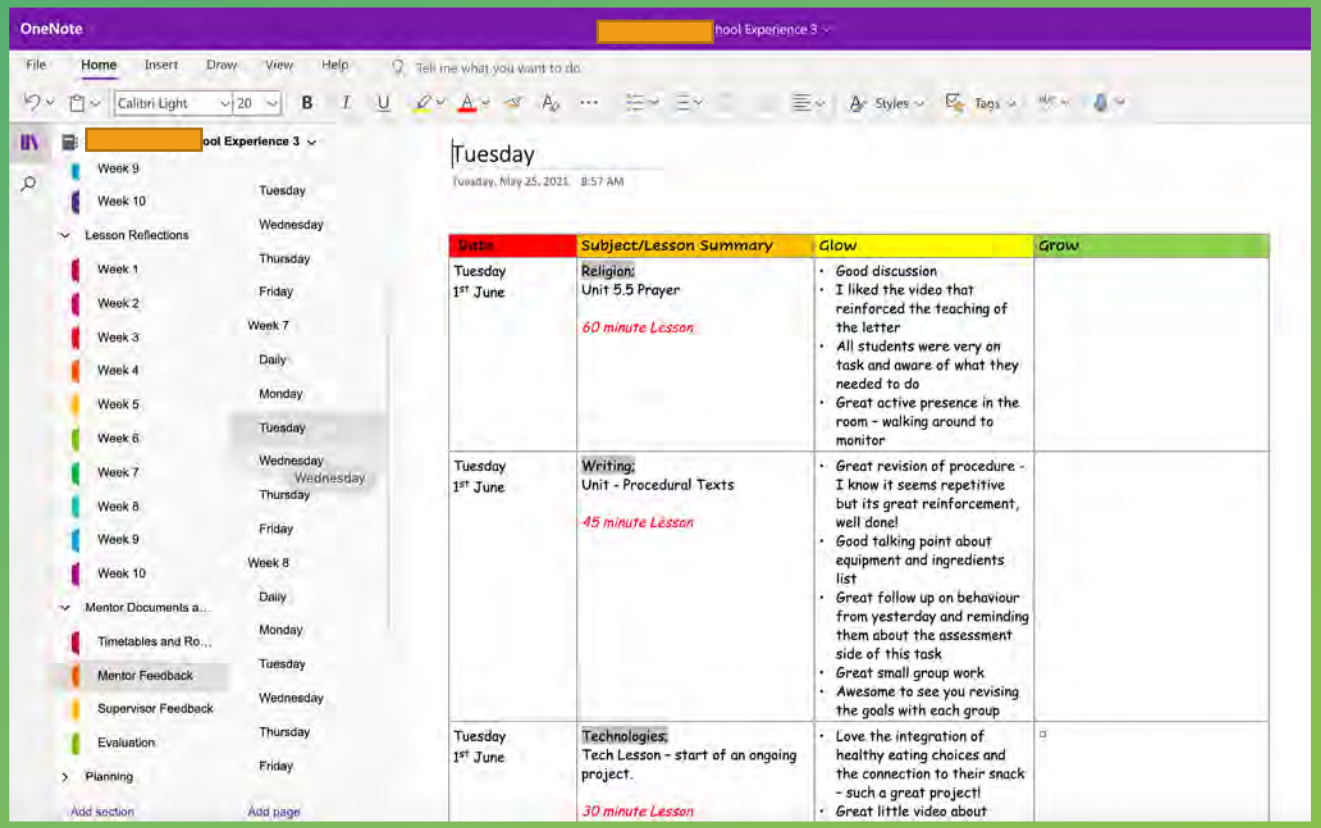
Assessment records



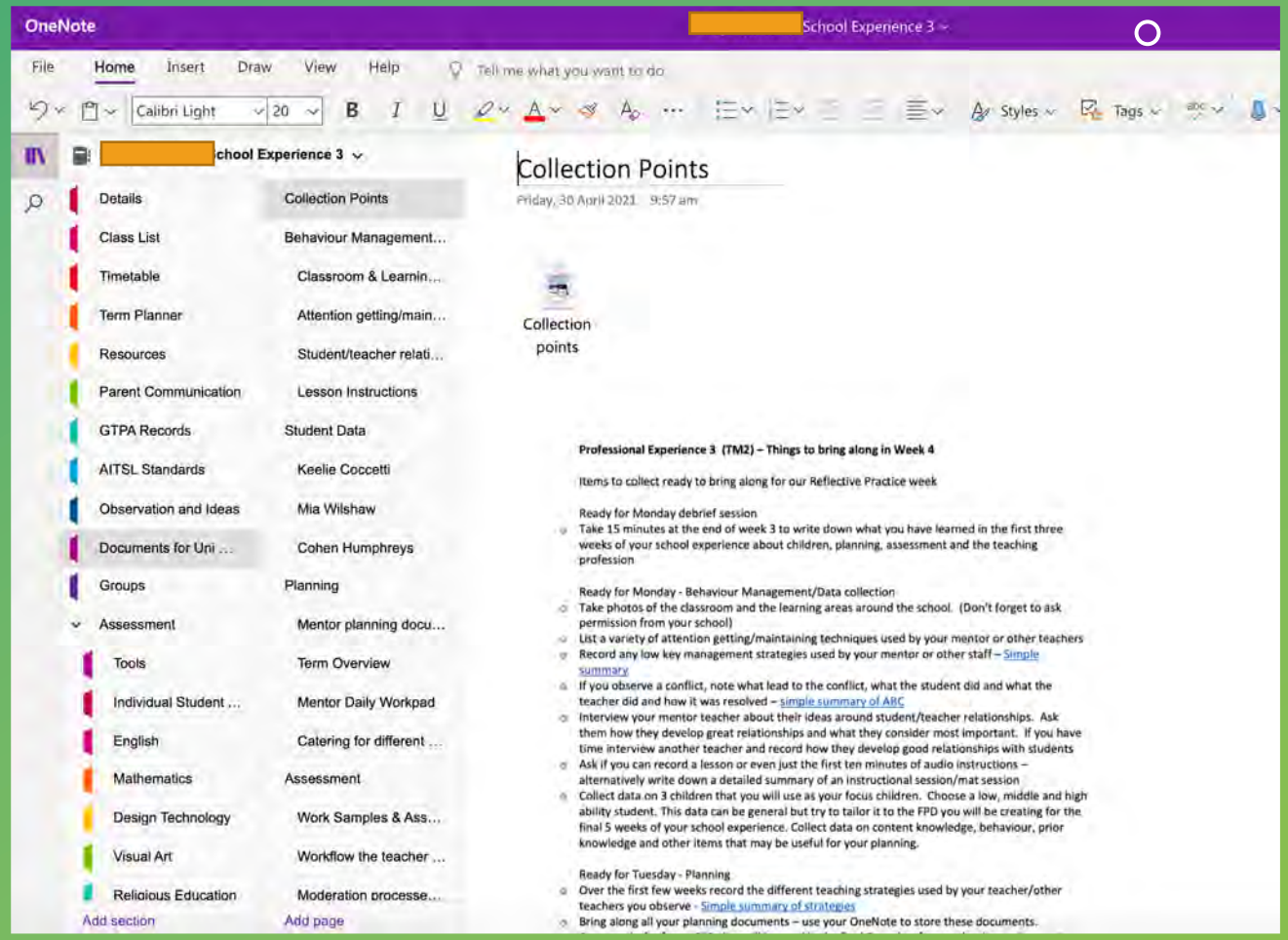
Personal Reflections



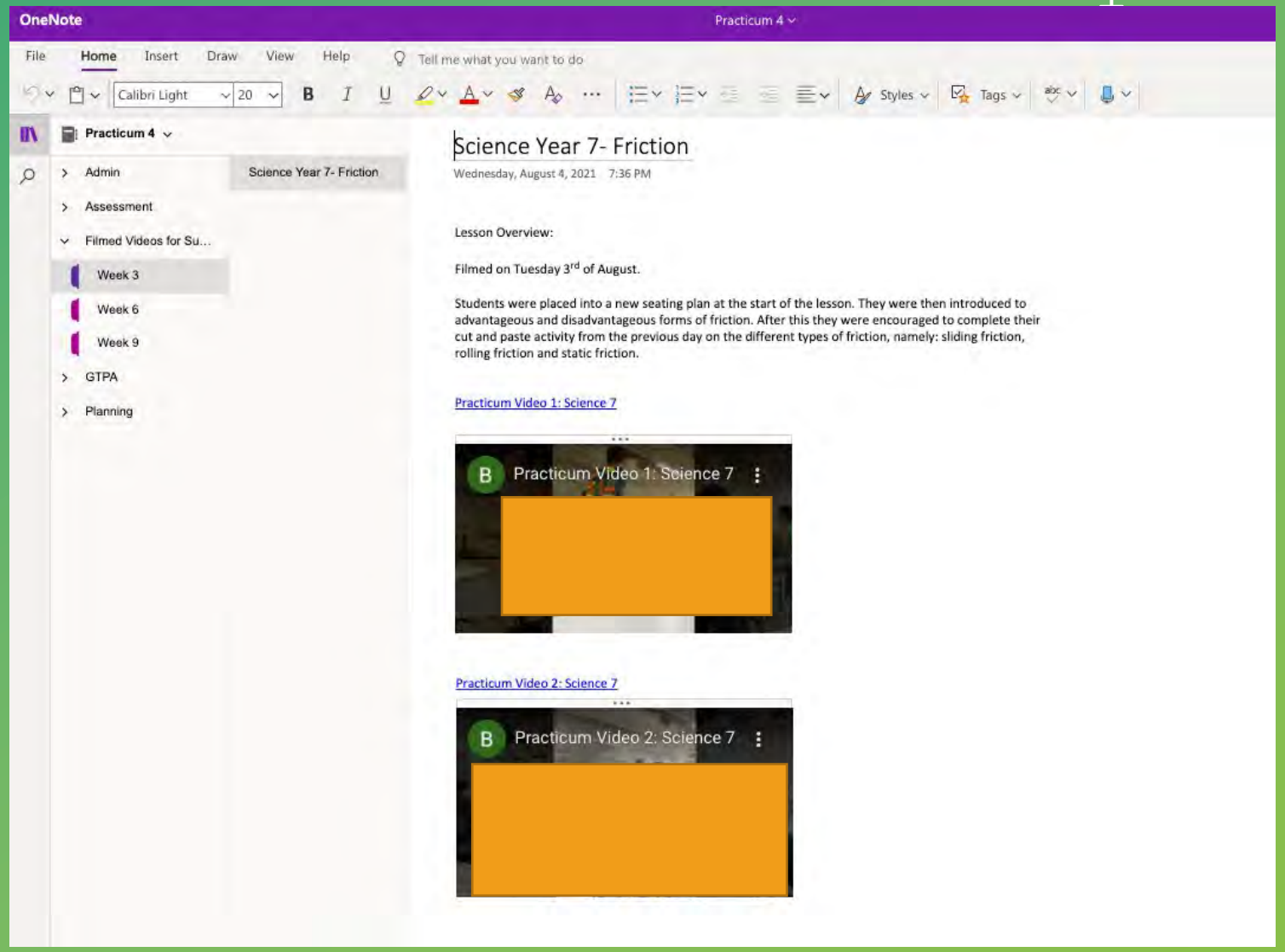
Mentor feedback



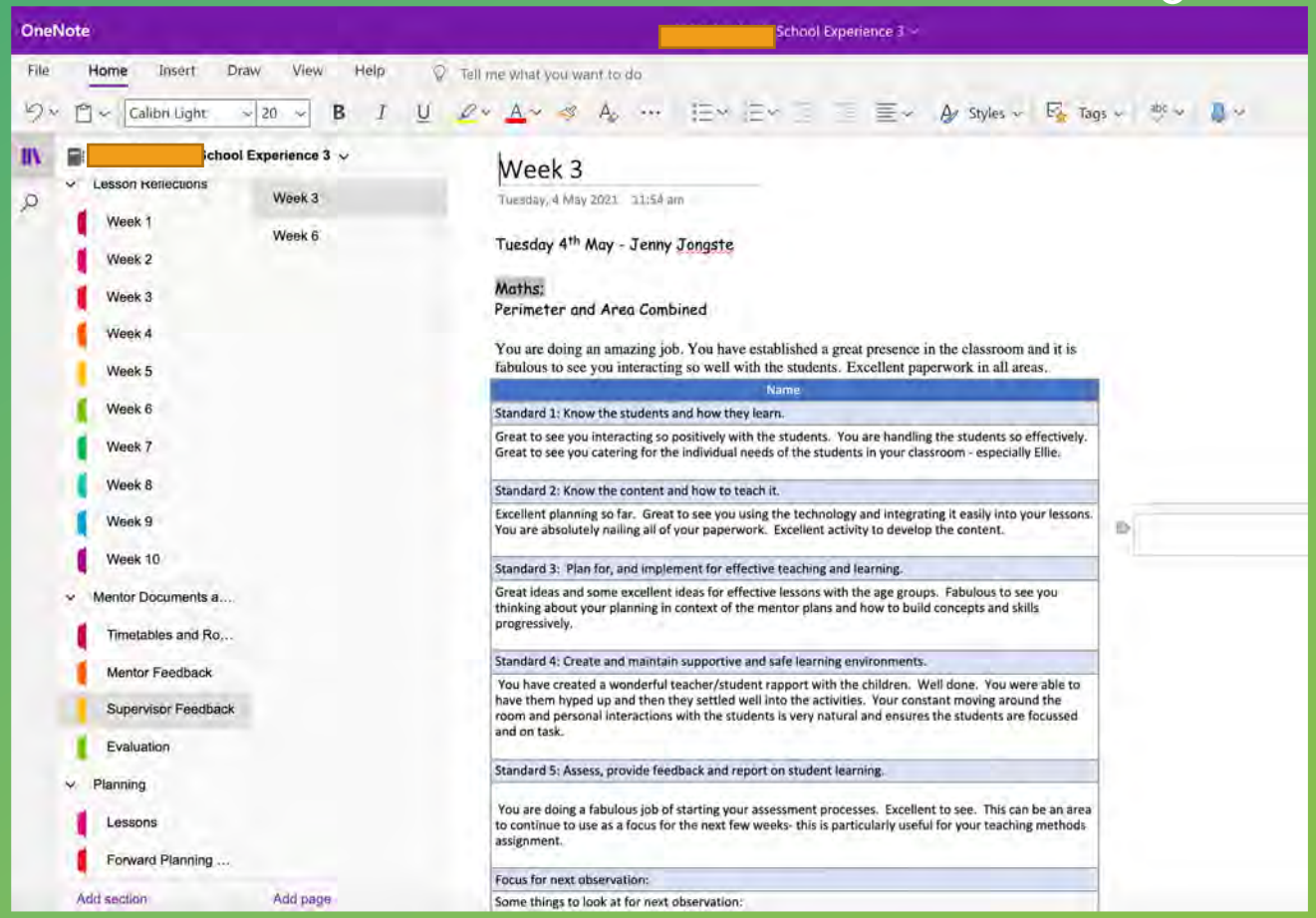
Uni documents



Recorded lessons for supervisor



Supervisor feedback



Issues we had…

- Some PSTs saw it as double handling
- Some PSTs, mentors and supervisors didn't like the digital format
- Syncing issues – mostly resolved now

Next steps

- We continued it this year – it has been a gamechanger
- It is now part of our ongoing PST prac preparation

What did we learn?

We didn’t need a bespoke solution

We could implement a change with minimal training if we used existing software

It only took one prac cycle to become fully implemented

Supporting web documents, and videos combined with face to face embedding sessions created 100% usage from PSTs, Mentors and Supervisors