PREPARING

STUDENTS FOR LABS & PRACTICE

BLENDED LEARNING COMMUNITY

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

BL Community 12.06.2019 Wrap-Up

09:45-10:00	**Settle-in, Morning tea**
10:00-10:05	**A/Prof Yasir Al-Abdeli,** Co-coordinator BL Community, School of Engineering
	Agenda, "**Preparing Students for Labs and Practice", Acknowledgements (Educational Enhancement Unit - UWA, for hosting the event)**
	Dr Elaine Lopes, Associate Director, Capability Development, UWA
	Welcome to the UWA
Preparing Students for Laboratories	
10:05-10:15	**(1) Dr Rina Wong,** School of Medical and Health Sciences, ECU
	Using Virtual Specimens / Microscopy for Laboratory Based Teaching (and 'bringing the lab home')
10:15-10:25	**(2) Dr Dino Spagnoli ,** School of Molecular Sciences , UWA
	Introducing the First Year Laboratory to Undergraduate Chemistry Students with an Interactive 360 Degree Experience
10:25-10:35	**(3) A/Prof Annette Koenders ,** School of Science, ECU
	Encouraging Student Preparation for Laboratory Classes
10:35-10:45	**(4) Tracey McKernan,** School of Molecular and Life Sciences, Curtin
	When Theory Meets Practice - Making the Most of the Virtual Environment for Radiation Therapy Training
10:45-10:55	**(5) A/Prof Yasir Al-Abdeli,** School of Engineering, ECU
	Testing Laboratory Preparation using Blackboard Tests
10:55-11:05	**(6) Dr Kristina Lemson,** School of Science, ECU
	Full STEAM Ahead: Lab Preparation Supporting Visual Literacy in Biology
Preparing Students for Professional Practice	
11:05-11:15	**(7) Dr Jason Bell,** School of Psychological Science, UWA
	Conducting a Virtual Reality Laboratory Experiment for 1000 first year Psychological Science Students
11:15-11:25	**(8) Dr Alexandra Yeung,** School of Molecular and Life Sciences, Curtin
	Using Electronic Laboratory Notebooks (ELNs) for Teaching and Research
11:25-11:35	**(9) Dr Andrew Valentine ,** Faculty of Engineering and Mathematical Sciences, UWA
	Virtual Work Integrated Learning in Engineering
EOI's for the Research Project	
11:35-12:00	**Dr Catherine Moore,** Co-coordinator BL Community
	Open floor discussion and EOI's for the 2nd BL Community multi-disciplinary research project on "effective preparation" (follow-up meeting, TBA).

Slots include Q/A time

Using Virtual Specimens / Microscopy for Laboratory Based Teaching 'bringing the lab home'

Rina Wong[1], Katrina Strampel[2], Stephanie Dowdell[3]

1. School of Medical and Health Sciences, Edith Cowan University
2. BEST Network, University of New South Wales, Sydney
3. Centre for Learning and Teaching, Edith Cowan University

Background

Traditional Modes of Learning:

Out-of-class: **still images** in lecture notes, text book

In-class: **physical blood films** under the microscope (different views of the sample)

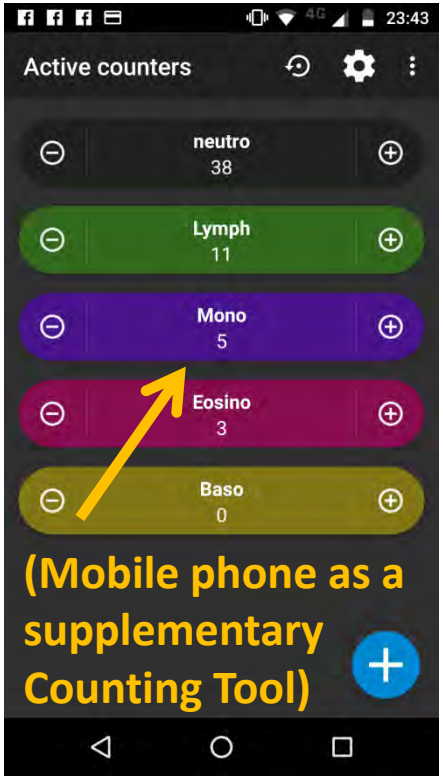
Rare disorders: '**e-slides'** or **physical blood films** are **projected** onto a screen at the front of the lab

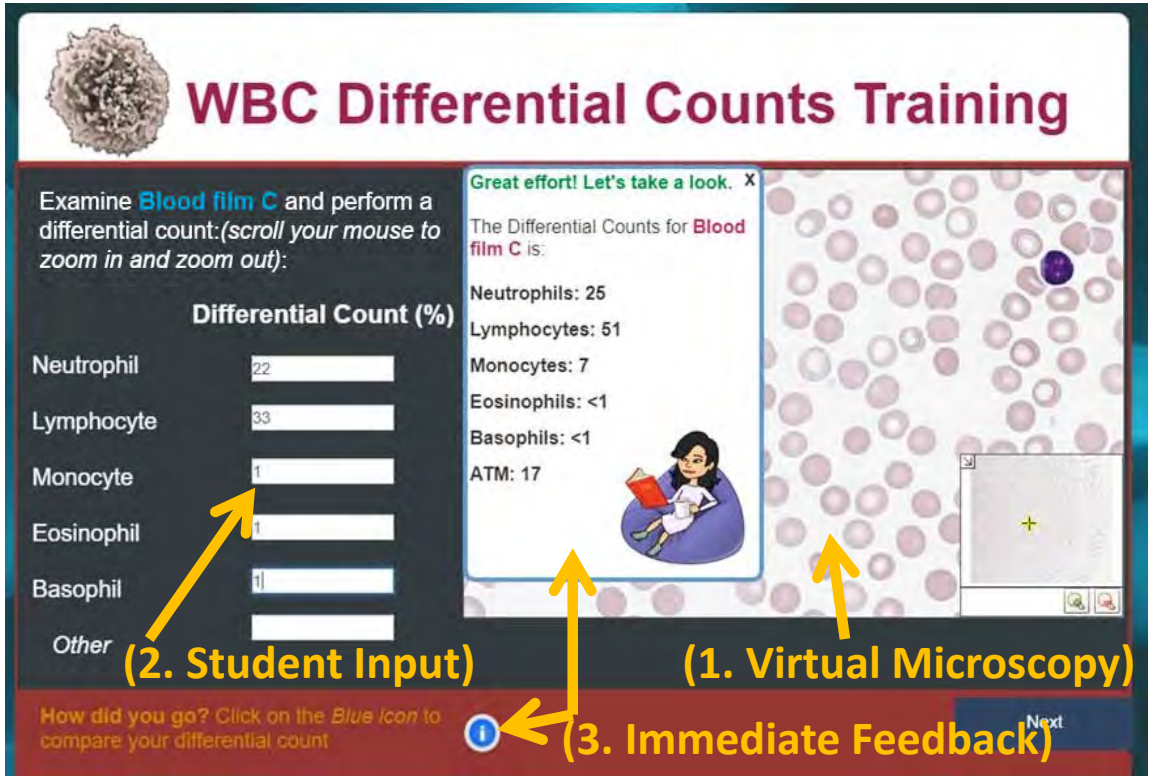
Methodology

Interactive Tutorials with **virtual slide** technology:

- Collaboration with the ***BEST network***, a multi-institution online teaching network
- **SLICE** (BEST network image bank), a sophisticated virtual microscope (online)
- **Smart Sparrow,** develops adaptive learning platforms, respond interactively with students

Home based training





- **SLICE** (BEST network image bank), a sophisticated virtual microscope (online)
- Tutorial for practising WBC differential count

Student Feedback on Interactive Tutorials (Virtual Slides)

- *"Just wanted to quickly feedback on the online white blood cell counter. I thought it was AMAZING! And i finally got a count that was actually within the ranges! I could not believe it! Its so so brilliant to be able to do this at home. I'm really loving it and even showed my son who thought it was really cool… I'm so grateful for your effort because this will hugely improve my confidence in this task"*
- *"I like the cartoons, it looks abit like you!" "I love it."*
- *"I have been struggling abit in class, when I tried your new tutorials, I got it! It just clicked"*

Conclusions

✓1. Provided students with **greater access to haematology resources** at home and in class using virtual specimens

✓2. Pilot trials showed **improvements** in student learning outcome using **interactive virtual** slides compared with **'traditional'** projected slides or glass slides

Introducing the First Year Laboratory to Undergraduate Chemistry Students with an Interactive 360 Degree Experience

Dr Dino Spagnoli
School of Molecular Sciences

Introduction-Laboratory Learning

Laboratories can provide a rich learning environment for students in the sciences

Preparation for the laboratory is a key part of the learning experience

Students come into university with a variety of laboratory experiences

360º Laboratory Tour

https://tinyurl.com/ybqpm3em

THE UNIVERSITY OF WESTERN AUSTRALIA

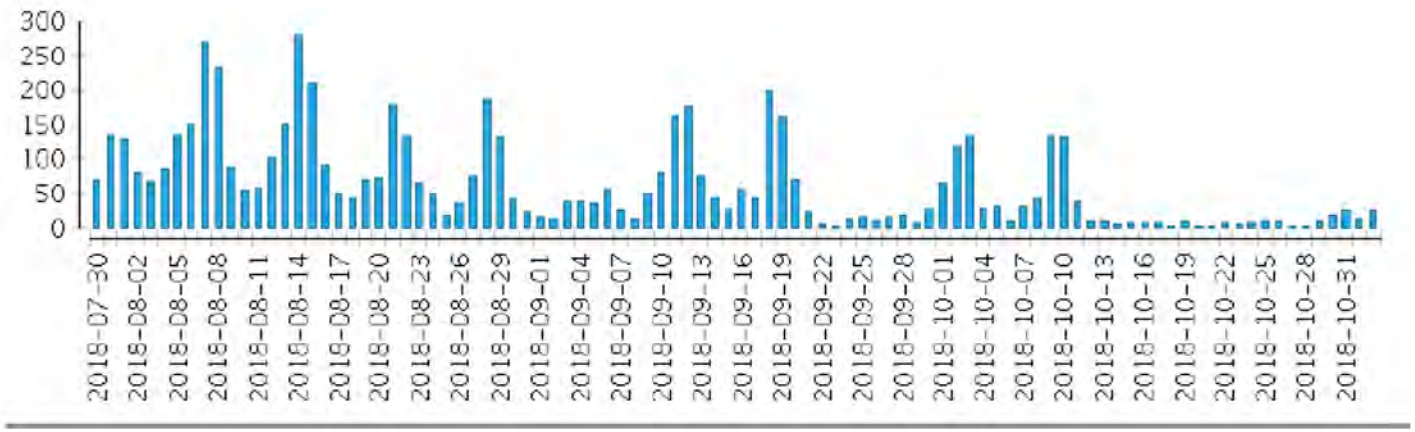
Student Usage

Unit Code	Semester/Year	Number of enrolled students	Number of times tour accessed
CHEM1001	Semester 2/2017	70	1534
CHEM1002	Semester 2/2017	147	2298
CHEM1004	Semester 2/2017	379	7722
CHEM1001	Semester 2/2018	189	1520
CHEM1002	Semester 2/2018	75	761
CHEM1004	Semester 2/2018	372	6027

No assessment task linked to the tour

The usage data does not give us data on the length of time spent in the tour

Student usage-CHEM1004

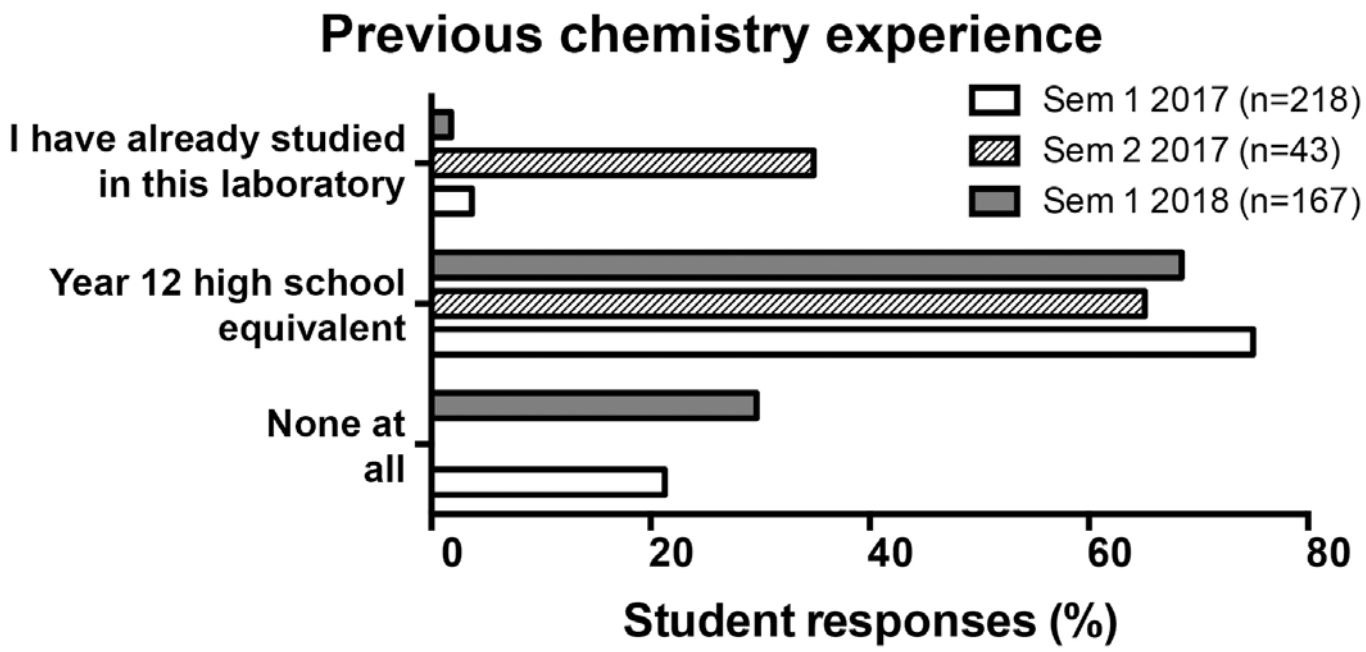


Student Feedback

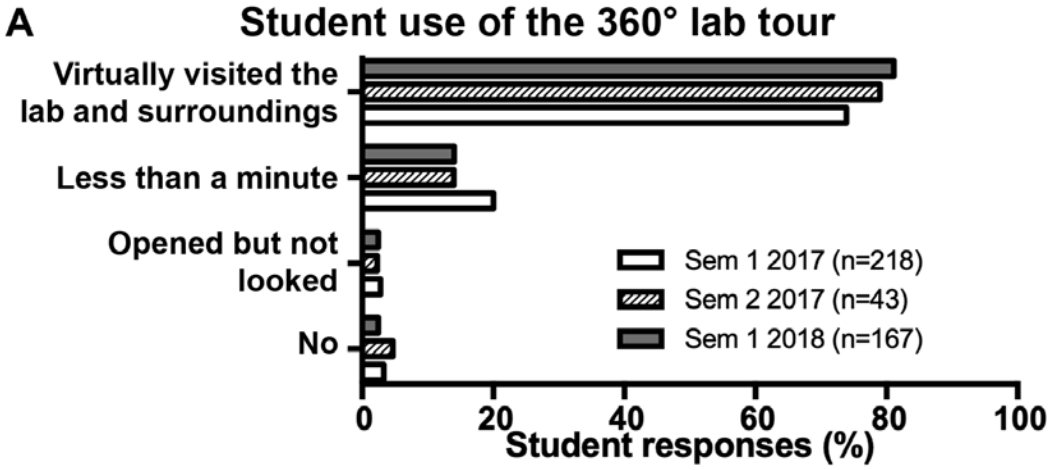
- Over a period of three years we surveyed the students and based on their feedback, improvements were made

- Semester 1 2017, 218 responses
- Semester 2 2017, 43 responses
- Semester 1 2018, 167 responses

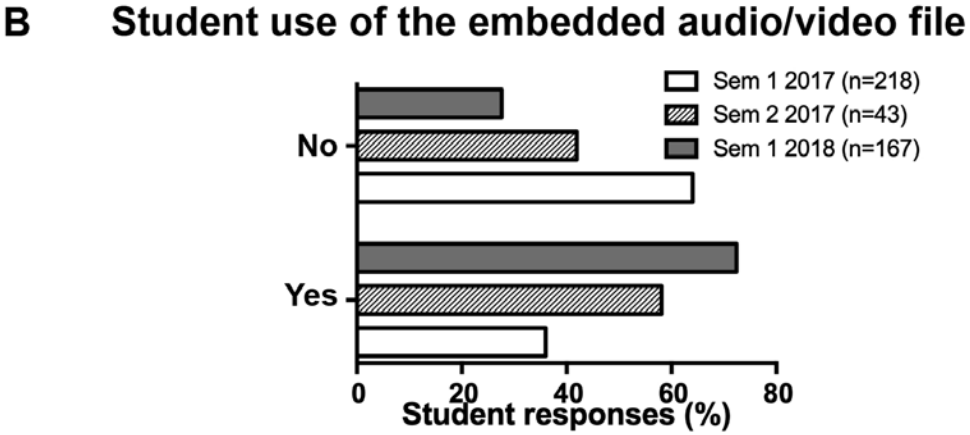
Student Feedback-Previous Experience

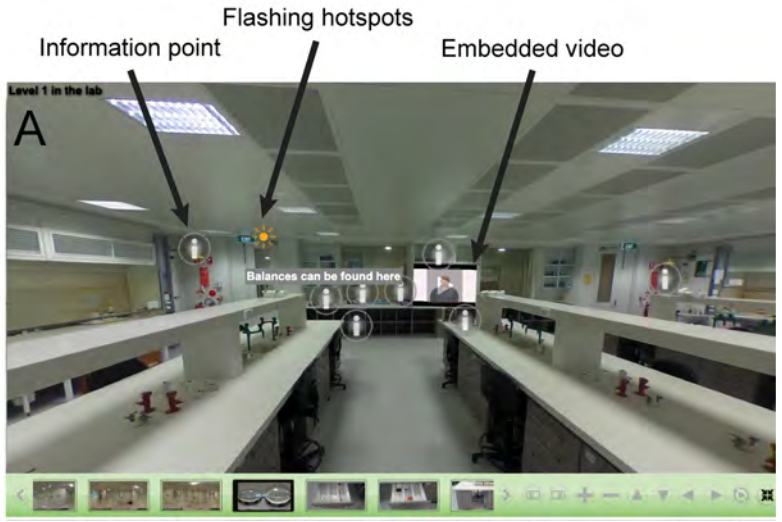


Student Feedback-Usage and Function

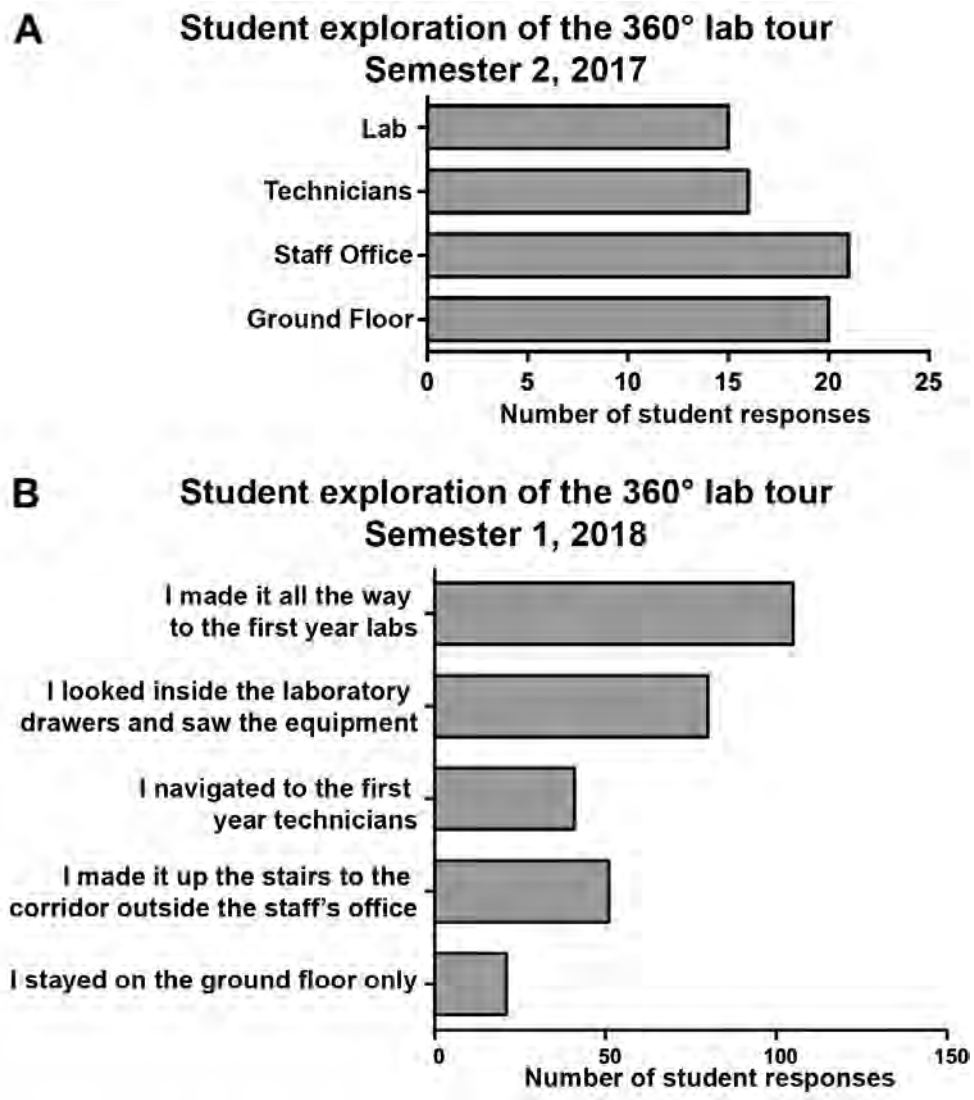


"The notes (information points) on everything were absolutely helpful. Being able to view the lab beforehand eased my nervousness and prepared me for the situation of my first lab."



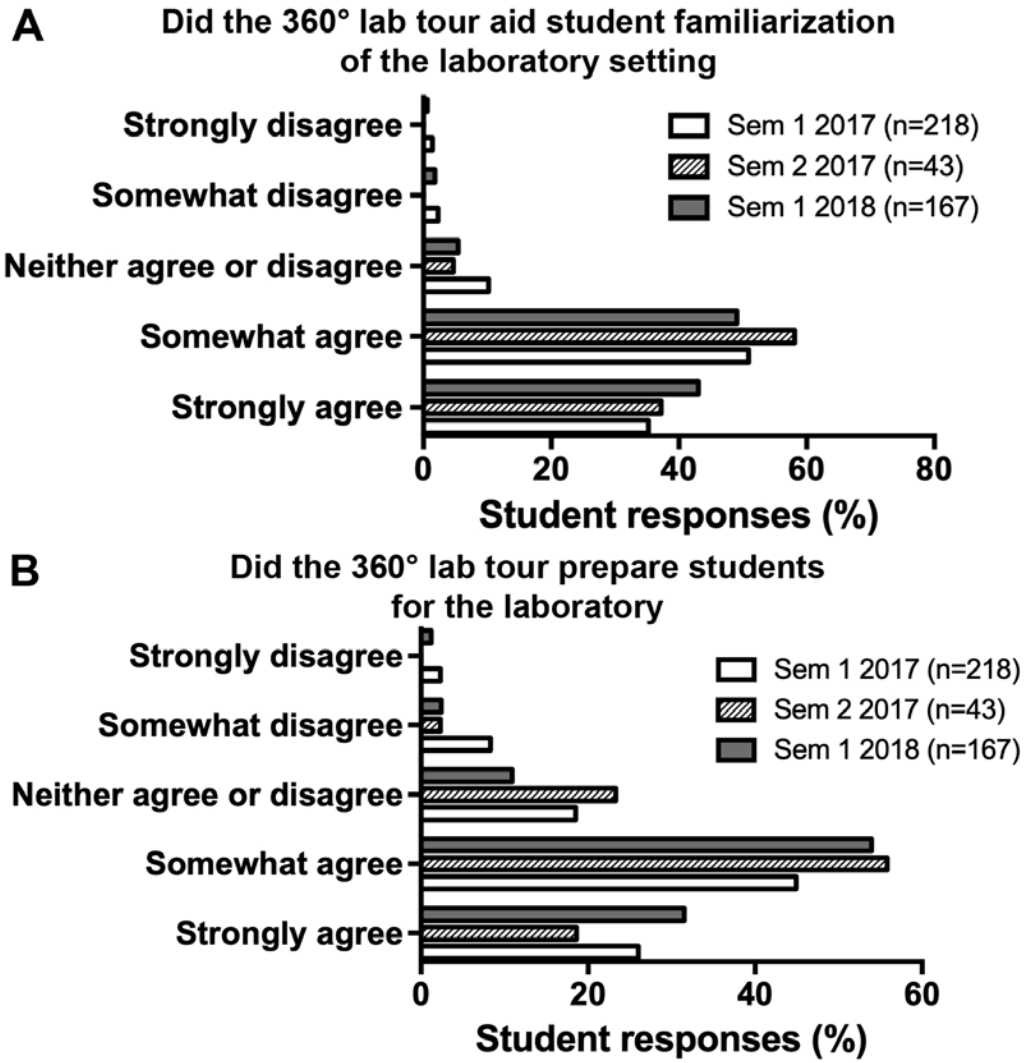


Student Feedback-Exploration



"The 360 degree image and the ability to leave the lab to see the technicians and what was around the lab was very helpful in helping me find my bearings and getting an idea of where everything is relative to each other, which I found was a big help when I finally entered the lab."

Student Feedback-Preparation and Familiarity



"When everyone comes into the lab room it's hard to get you(r) bearings and really look and know where things are so it was nice to be able to do so beforehand so I knew where things were in the room and was slightly more prepared during the really busy lab."

Conclusions

- **The development of the 360º tour has helped students become familiar with the laboratory and aid in their preparation**

Acknowledgements

Centre for Education Futures (now EEU) at UWA in the form of scholarship seed grant, Mobilising the laboratory: Using immersive and interactive technology to improve laboratory preparation

Tracey Frayne and Michelle Bunting-Centre for Education Futures (now EEU)

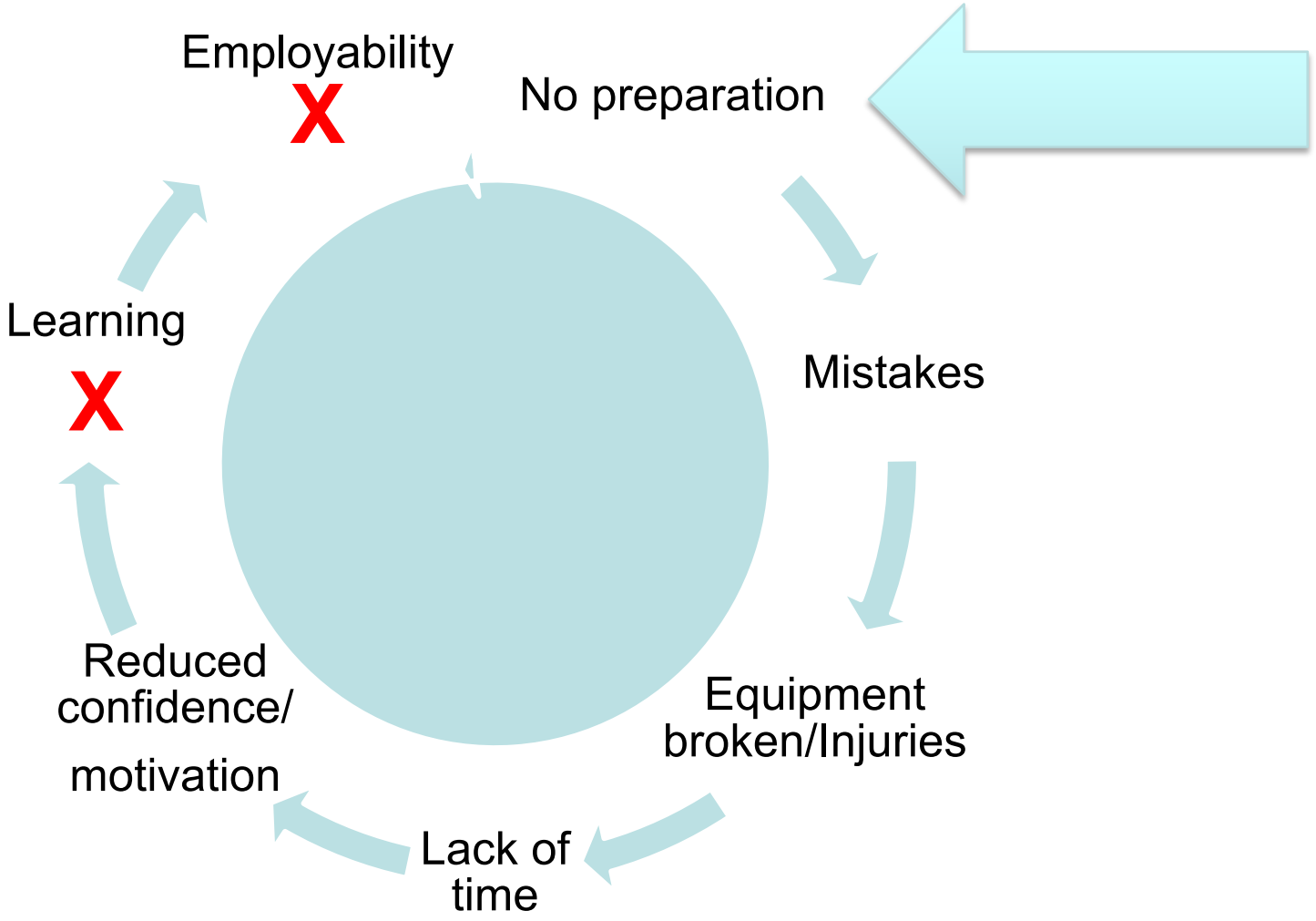
Tristan D. Clemons, Lise Fouche, Cara Rummey, Ryan E. Lopez, Dino Spagnoli- Introducing the First Year Laboratory to Undergraduate Chemistry Students with an Interactive 360 Experience, 2019, Journal of Chemical Education, Article ASAP
http://dx.doi.org/10.1021/acs.jchemed.8b00861

Edith Cowan University
School of Science

Encouraging Student Preparation for Laboratory Classes

A/Prof Annette Koenders

What could possibly go wrong?



Lab journal

Pre-lab

- Prepare protocols and results tables
- Grades for completion before lab

Lab

- Check/correct tables with demonstrator
- Complete activities

Post-lab

- Update portfolio
  - Corrections to protocols
  - Load results

Protocol/results

Model
- Pipetting exercise

Copy
- Written instructions converted to
  - Table, or
  - List of actions

Do
- Errors/omissions become clear
- Refine protocols/results notation
- Reinforces importance of process

Repeat

Results table

- Prepare a results table using Table 2 as an exemplar.
- The results table should have the following columns:
  - Amount of p-nitrophenol (umol)
  - One column each for absorbance at pH 7.0, 7.5, 8.0, 8.5 and 9.0.

Edith Cowan University
School of Science

Standard curve results Absorbance (400nm)

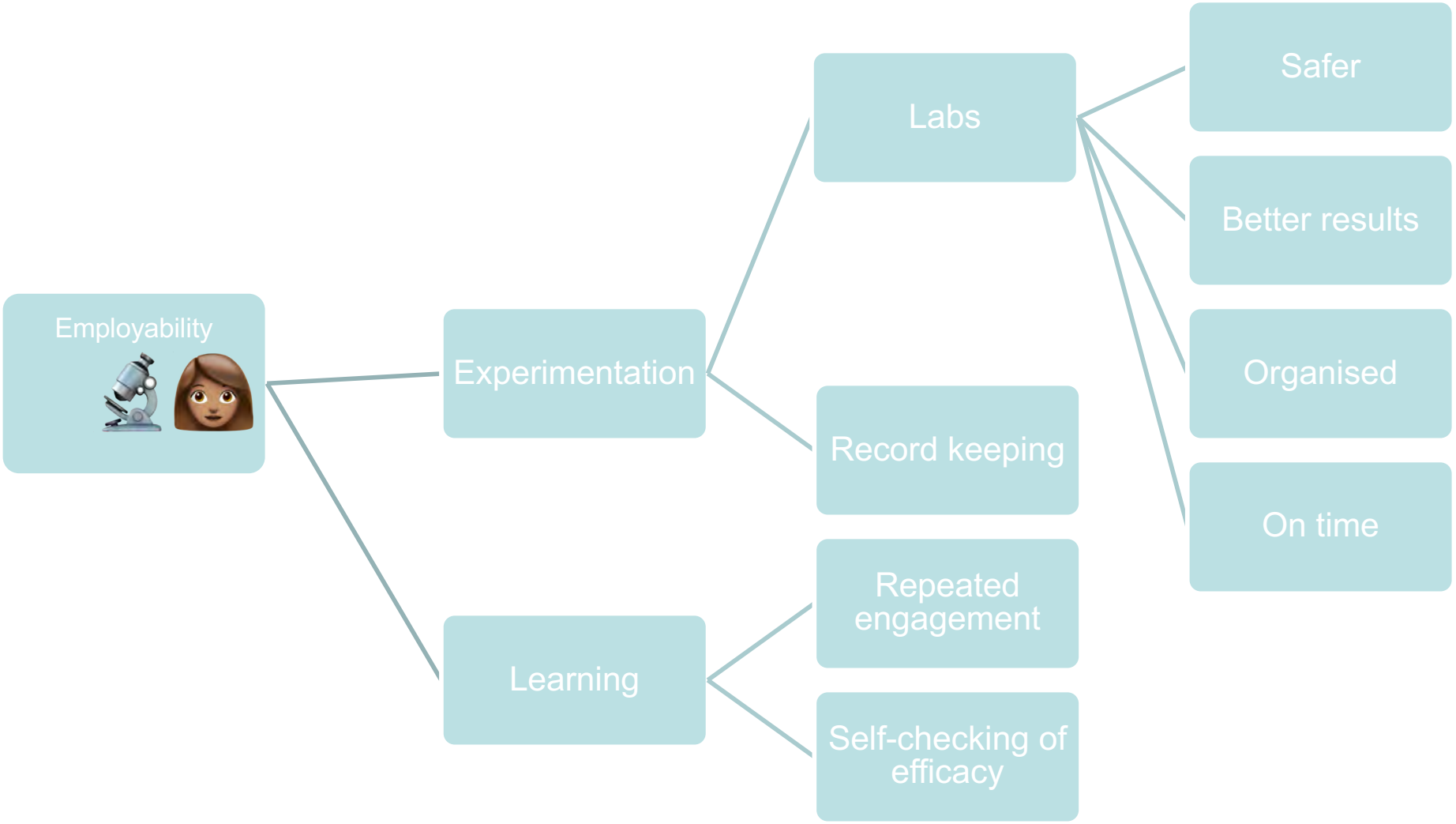
p-nitrophenol (umol)	pH 7.0	pH 7.5	pH 8.0	pH 8.5	pH 9.0
0					
2					
4					
20					
40					
80					
160					

Edith Cowan University
School of Science

Standard curve results Absorbance (400nm)

p-nitrophenol (umol)	pH 7.0	pH 7.5	pH 8.0	pH 8.5	pH 9.0
0	0.000	0.000	0.000	0.000	0.000
2	0.013	0.016	0.000	0.020	0.007
4	0.025	0.027	0.120	0.075	0.016
20	0.056	0.074	0.096	0.205	0.088
40	0.119	0.262	0.181	0.316	0.187
80	0.248	0.413	0.362	0.520	0.374
160	0.474	0.809	0.753	0.900	0.784

Outcomes


Employability
Experimentation
Learning
Labs
Record keeping
Repeated engagement
Self-checking of efficacy
Safer
Better results
Organised
On time

Curtin University

When theory meets practice

Making the most of the Virtual Environment for Radiation Therapy Training

Tuesday, June 18, 2019

https://study.unisa.edu.au/images?img=md/Students%20in%20VERT%20_Virtual%20Environment%20Radiation%20Therapy_%20facility.jpg

Action Research

Ask the students to prepare for class

- Provide workbooks and reference material based on the learning outcomes for the week
- Result- limited prep completed, time spent in class doing the prep work
- Limited use of VERT

Ask the students to prepare for class

- Provide work books and reference material based on the learning outcomes for the week
- Socrative quiz in class
- Result- better preparation, discussion of answers in class
- More use of VERT

Ask the students to prepare for class

- Provide work books and reference material based on the learning outcomes for the week
- Online quiz on Blackboard- to be completed before the class, marked before class
- Result- better preparation, discussion of common points of misunderstanding
- VERT used for most of the class

Ask the students to reflect

- Brief reflection on 3 things that they learned
- Brief reflection about how they interacted in class
- Brief reflection on what they might change for the next class

Outcomes

Students

- Well prepared
- Contribute to class
- Ready to be an active participants
- Thinking about the next class

Tutor

- Finds out about common misunderstandings and can correct
- Able to conduct the class confident in a base level of knowledge
- Able to advance practice/thinking

Does it work?

"This session, I brought along my notes that I typed in preparation for the quiz. by doing this, I had easy access to any information I had blanks in, but I was also able to add information too it that I have missed/may have been changed " (B)

"I prepared for the session by completing the case study to the best of my ability, which helped me to follow the discussion in class and contribute more fully. "(P)

"I also made sure to go through the pre-reading thoroughly in order have a solid foundation of knowledge, so I could then both answer questions in class, and ask questions to clear up any gaps in my knowledge." (A)

"Next time, I would like a go at setting the VERT lasers to the tattoos and performing the moves using the hand pendant. I believe this will give me a better appreciation of the thought process required to initiate a move and how to voice out my decisions to my RT partner. " (S)

References

Frost, J. (2014). A model to motivate students in a flipped instruction information assurance class. *Allied Academies International Conference. Academy of Educational Leadership. Proceedings, 19*(1), 3-7. Retrieved from https://search.proquest.com/docview/1551677518?accountid=10382

Honeycutt, B. (2016). Ready to Flip: Three Ways to Hold Students Accountable for Pre-Class Work. Retrieved from https://www.facultyfocus.com/articles/blended-flipped-learning/ready-to-flip-three-ways-to-hold-students-accountable-for-pre-class-work/

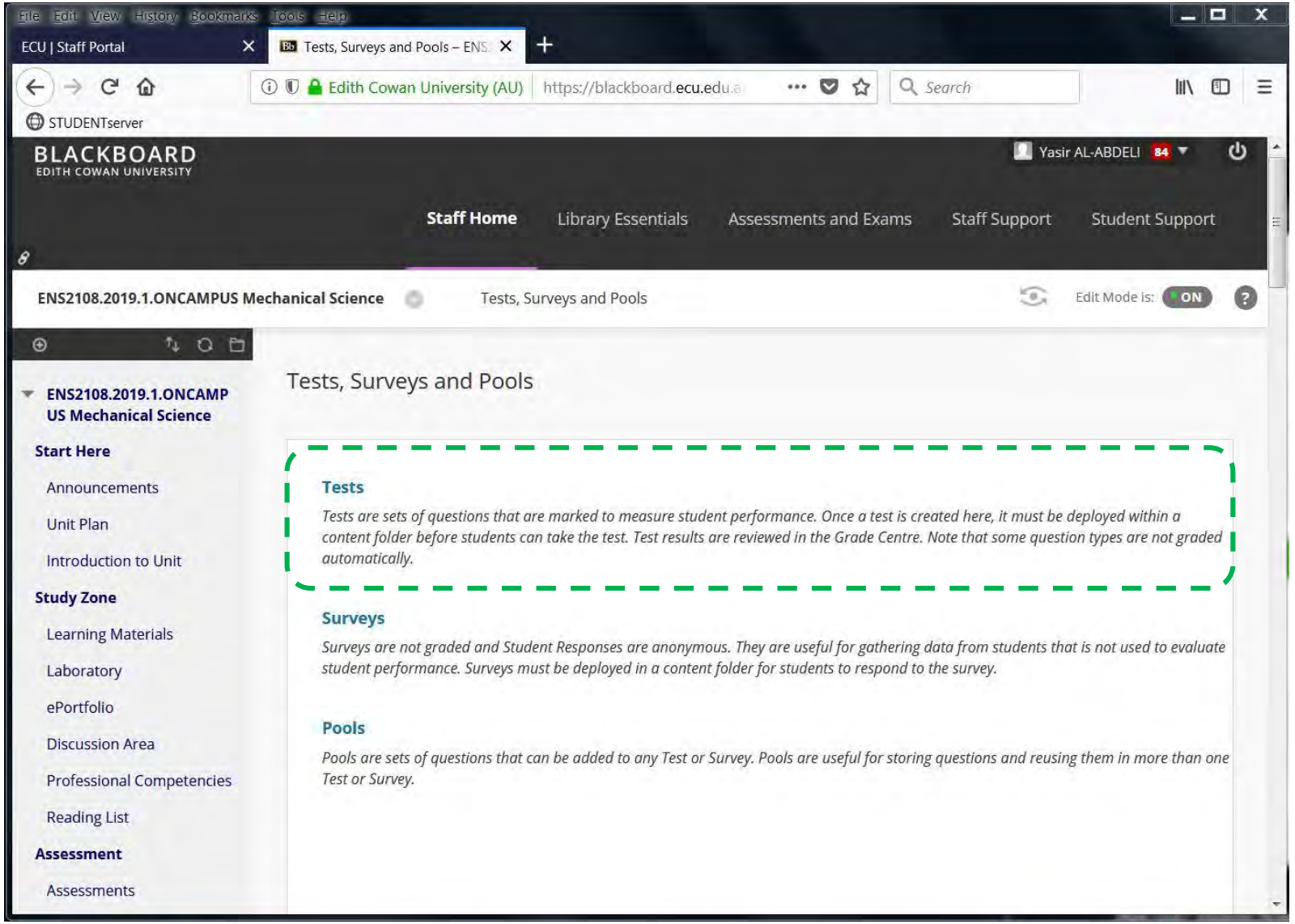
Blended Learning Community presentation

Testing Laboratory Preparation using Blackboard Tests

A/Prof Yasir Al-Abdeli
✉ y.al-abdeli@ecu.edu.au
School of Engineering, ECU

12th June 2019
UWA

Tool: Blackboard Tests



Two Labs: group work, but pre-labs to be done individually, 24-7

Laboratory Work - Prelab TH5: Expansion Processes of a Perfect Gas

Students must gain a full-mark (20 / 20) in the prelab to be eligible to undertake the experiment once they complete the safety inductions.

Prelab scores are only used to ascertain readiness for the lab experiment and do not contribute to the overall unit score of any student.

Under the **My Grades** tab (left panel), the the highest achieved score is shown. You need to make sure you have a full mark here before attending the lab.

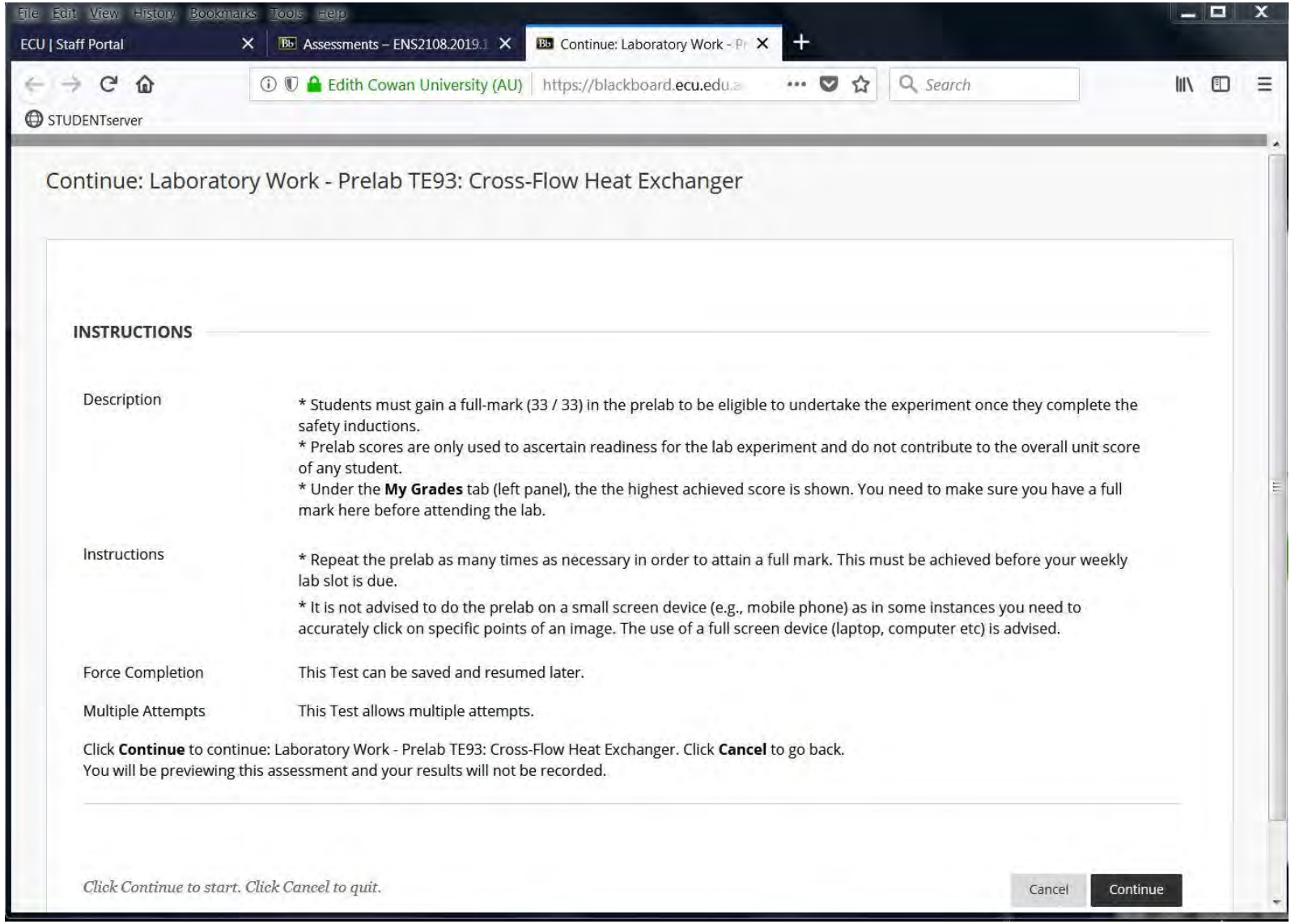
Laboratory Work - Prelab TE93: Cross-Flow Heat Exchanger

Students must gain a full-mark (33 / 33) in the prelab to be eligible to undertake the experiment once they complete the safety inductions.

Prelab scores are only used to ascertain readiness for the lab experiment and do not contribute to the overall unit score of any student.

Under the **My Grades** tab (left panel), the the highest achieved score is shown. You need to make sure you have a full mark here before attending the lab.

Instructions: multiple attempts, no marks to unit total, pass=100%



Question Coverage: expectations

QUESTION 1 — **1 points** — Save Answer

Beyond undertaking the lab safety induction that was done in the lab, students are also expected to (select all that apply):

1. Have the appropriate "dress code" for safety:
   * fully enclosed shoes
   * full-length pants
   * full-length sleeve shirts/tops
   * long hair is secured (to avoid entaglement)
   * bring along their own Personal Protective Equipment PPE unless they are happy to use the PPE provided in the lab

2. Know the particulars of what needs to be done:
   * have read the lab report (template, PDF)
   * ideally, bring along a print out of the lab report
   * familiarised themselves with all the pages in the equipment manuals that have been referred to in the lab report (equipment manuals are on the BB site for this unit)

3. Be ready to access the lab at least five minutes before the start of the lab session to ensure theyare ontime (students who arrive later than the lab start time can expect to miss out on that lab)

4. Expect to do the lab experiment themselves after being given the go-ahead by the lab demonstrator (that's why you need to prepare well)

5. Have the needed stationary and resources:
   * pencils, pens , erasers, sharpners (as applicable)
   * a copy of the text book (as applicable, will be needed to answer some of the questions in the lab reports)

Question Coverage: applying theory (calculations)

QUESTION 3

1 points Save Answer

When calculating the flow velocity in the duct, pressure measurements are done using a pitot tube. To find the flow velocity the following equation is used (see pg 19 of the equipment manual / user guide).

$$V_1 = \sqrt{\frac{2(p_t - p_u)287T_1}{p_A}}$$

When using the above equation, what value should be inserted for P_A (the atmospheric or barometric pressure)?

Tip: see the table on pg14 of the equipment manual / user guide.

Select only 1 option.

- 101325 Pa
- 101.325 kPa
- 100000 kPa
- 101.325 kPa

Question Coverage: Calculations (analysis)

QUESTION 2

1 points Save Answer

The flow accelerates to twice its (upstream) flow speed at which of the following locations?
Select only 1 option.
Watch the movie: TE93_Blockage.mp4

- Within the narrow length of the test section which is occupied by the rods and as the flow approaches rods (in the upstream as well).
- Acorss the entire test section, i.e., within the narrow length of the test section which is occupied by the rods and both in the upstream and downstream.
- Only within the narrow length of the test section which is occupied by the rods.
- Within the narrow length of the test section which is occupied by the rods and when the flow moves out of the rods (in the downstream as well).

Question Coverage: test conditions used

QUESTION 5 **1 points** Save Answer

There is an upstream and downstream end to the test section.
Column 4 is at the upstream end of the test section.
Select only 1 option.
Watch the movie: TE93_Columns.mp4

- True
- False

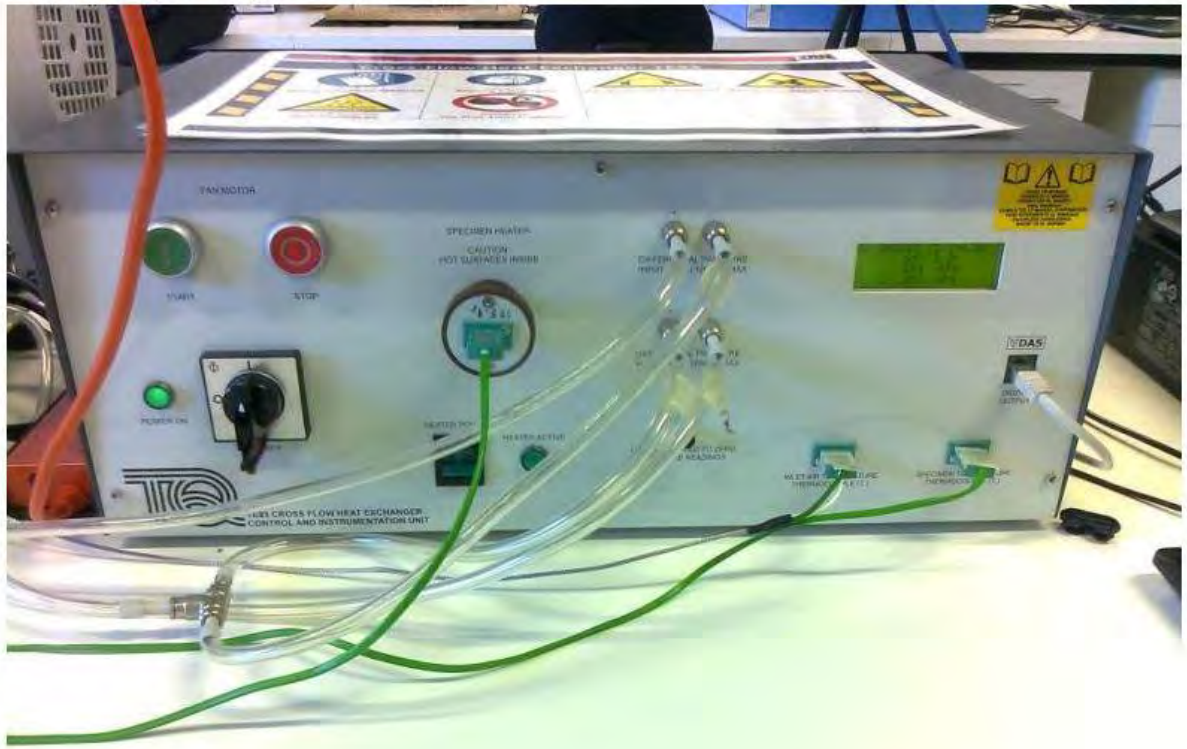
Question Coverage: hardware operation

QUESTION 7

1 points Save Answer

Identify the location of the following in the picture: Fan or electric motor start (ON) button

Click on the image to make your selection.



Selected Coordinates

Clear

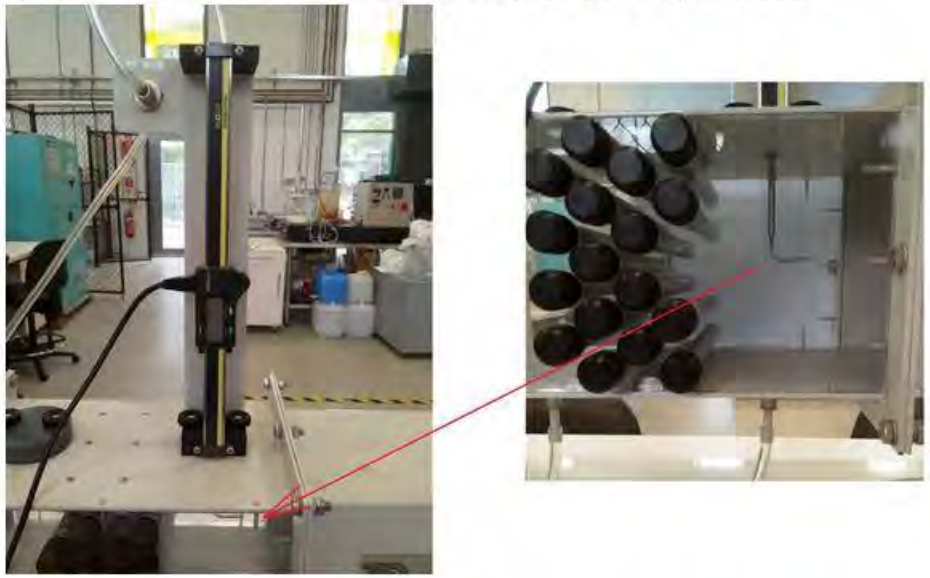
Question Coverage: hardware alignment / placement

QUESTION 19

1 points Save Answer

A pitot tube is connected to a vertical vernier and protrudes into the duct. The pitot tube should be face the incoming flow but also positioned at a certain height or incorrect measurements may arise. The vernier is used to help achieve the correct height placement.

At what height within the duct should the pitot tube be positioned?



1. The pitot tube should be positioned at the very top of the duct (maximum height)
2. The pitot tube should be positioned at the mid-point of the duct (half the height)
3. The pitot tube should be positioned at the very bottom of the duct (minimum height)

Question Coverage: safety

QUESTION 21

1 points Save Answer

Which Personal Protective Equipment (PPE) or safety measure must be used as a consequence of the heated rod used in this experiment?
Watch the movie: TE93_Risks.mp4
Click on the image to make your selection.

Selected Coordinates

Clear

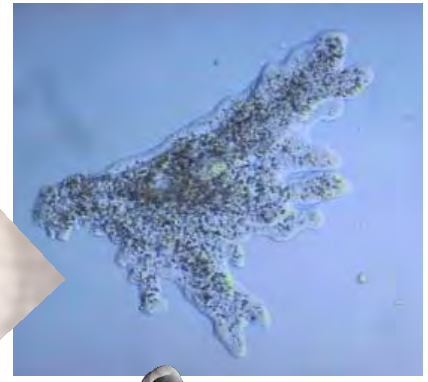
Summary

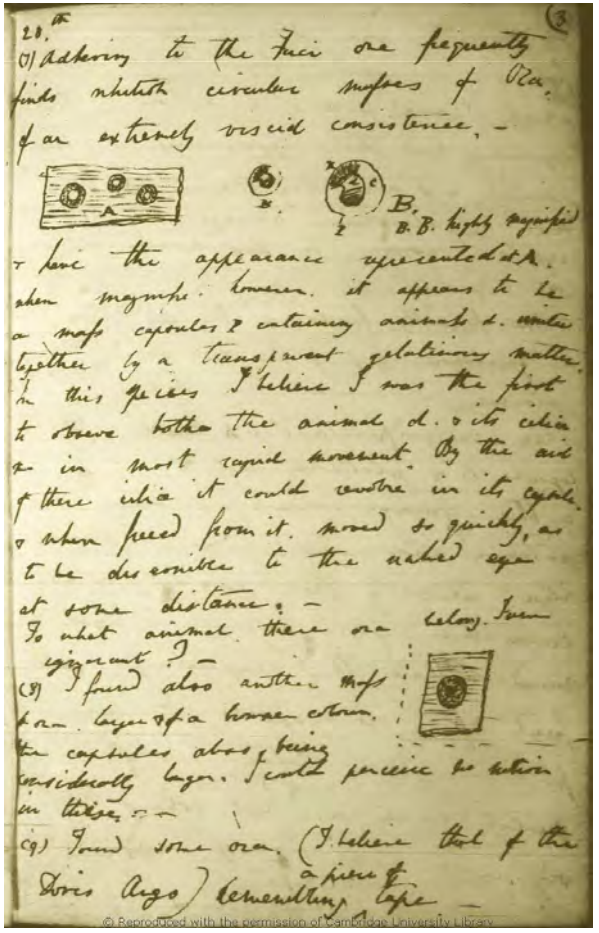
- ❑ Blackboard tests used (integrated into Grade Book)
- ❑ Pre-lab completion an eligibility criteria for doing the labs
- ❑ 100% to be attained in each pre-lab, highest attempt (not last attempt) shown in Grade Book
- ❑ Lab demonstrator checks before admitting students to lab
- ❑ Pre-lab availability is 24-7, but must be completed before attendance
- ❑ Questions formats used: true / false, multiple choice, hot-spots
- ❑ Movies integrated (short clips, made by lecturer on mobile phone)
- ❑ Pre-labs now used over several years, gradually developed
- ❑ Advantages: better use of lab time, better preparation, interactive, “fairer”

Full STEAM Ahead!

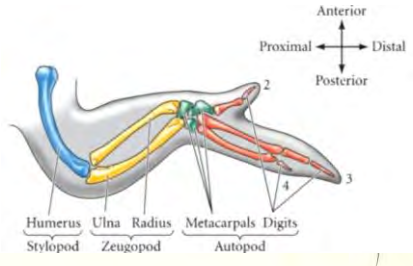
Lab preparation supporting visual literacy in biology

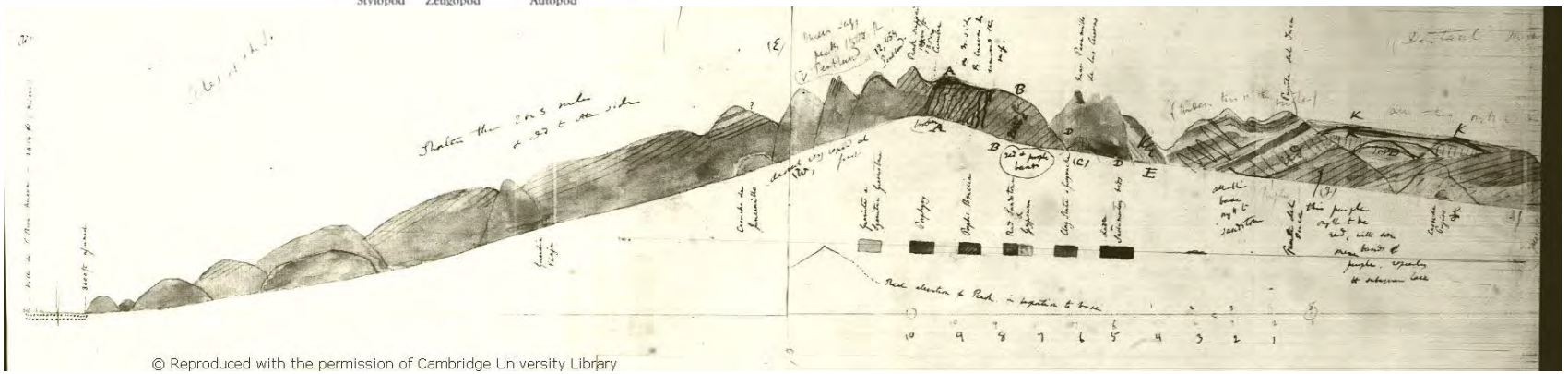
Dr Kristina Lemson
School of Science
Edith Cowan University



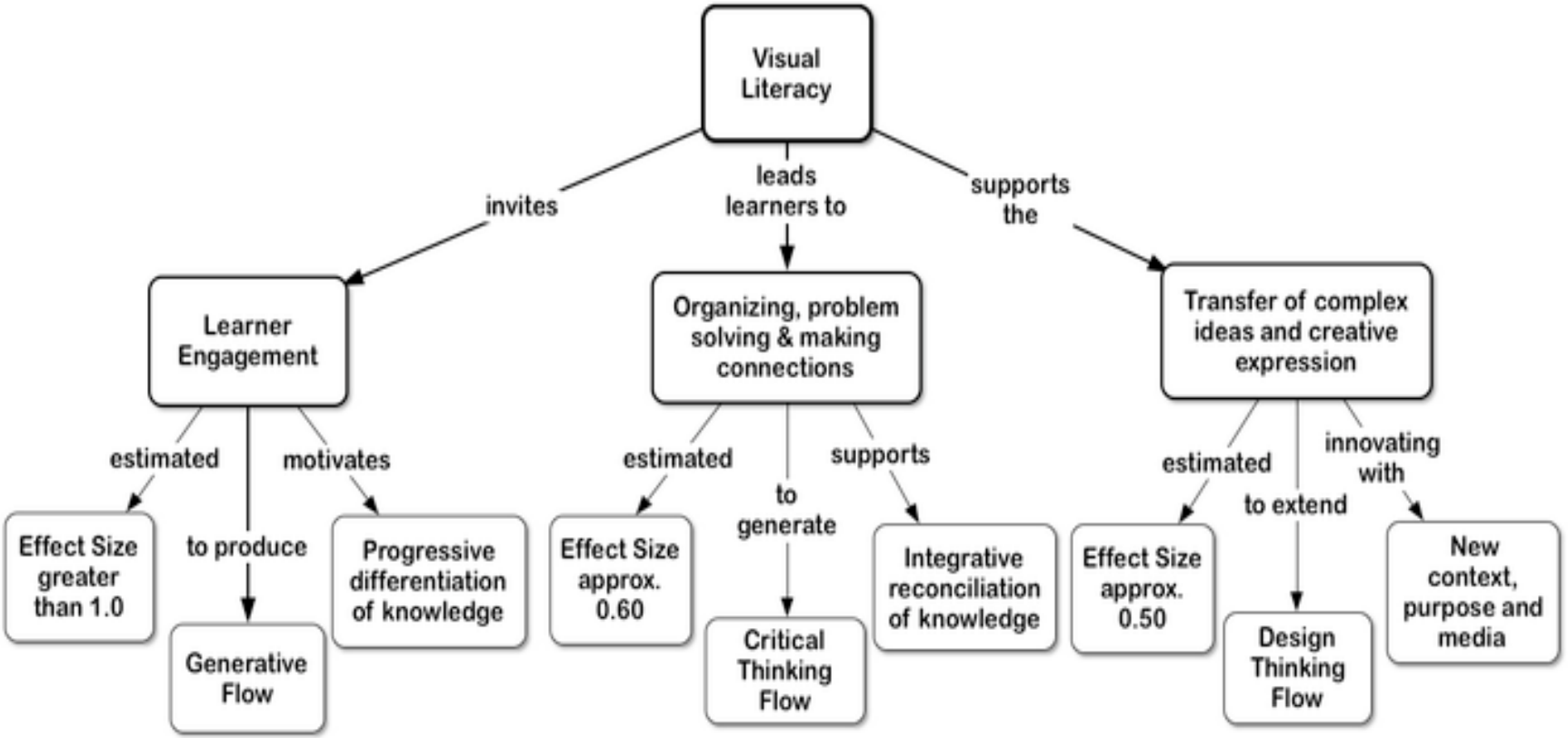


Biology relies on visual data





Visual literacy



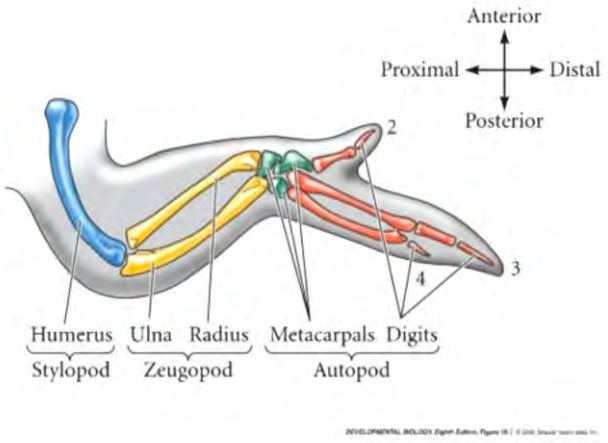
". . .a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media."

Association of College and Research Libraries (2105) **Framework for Information Literacy for Higher Education**

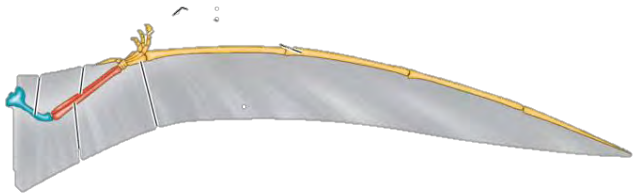
STRUCTURE

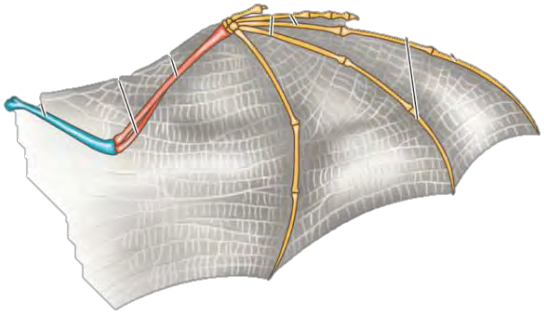
FUNCTION ⟺ ORIGIN

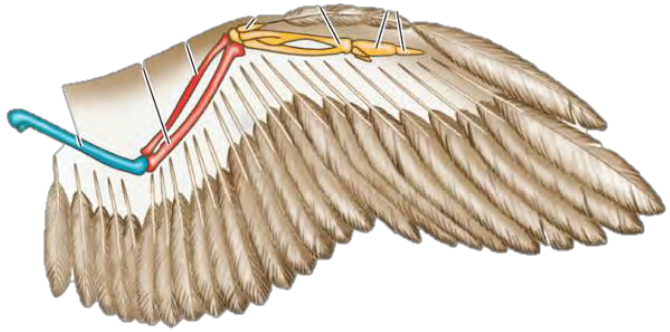
Skeletal Pattern of Wing

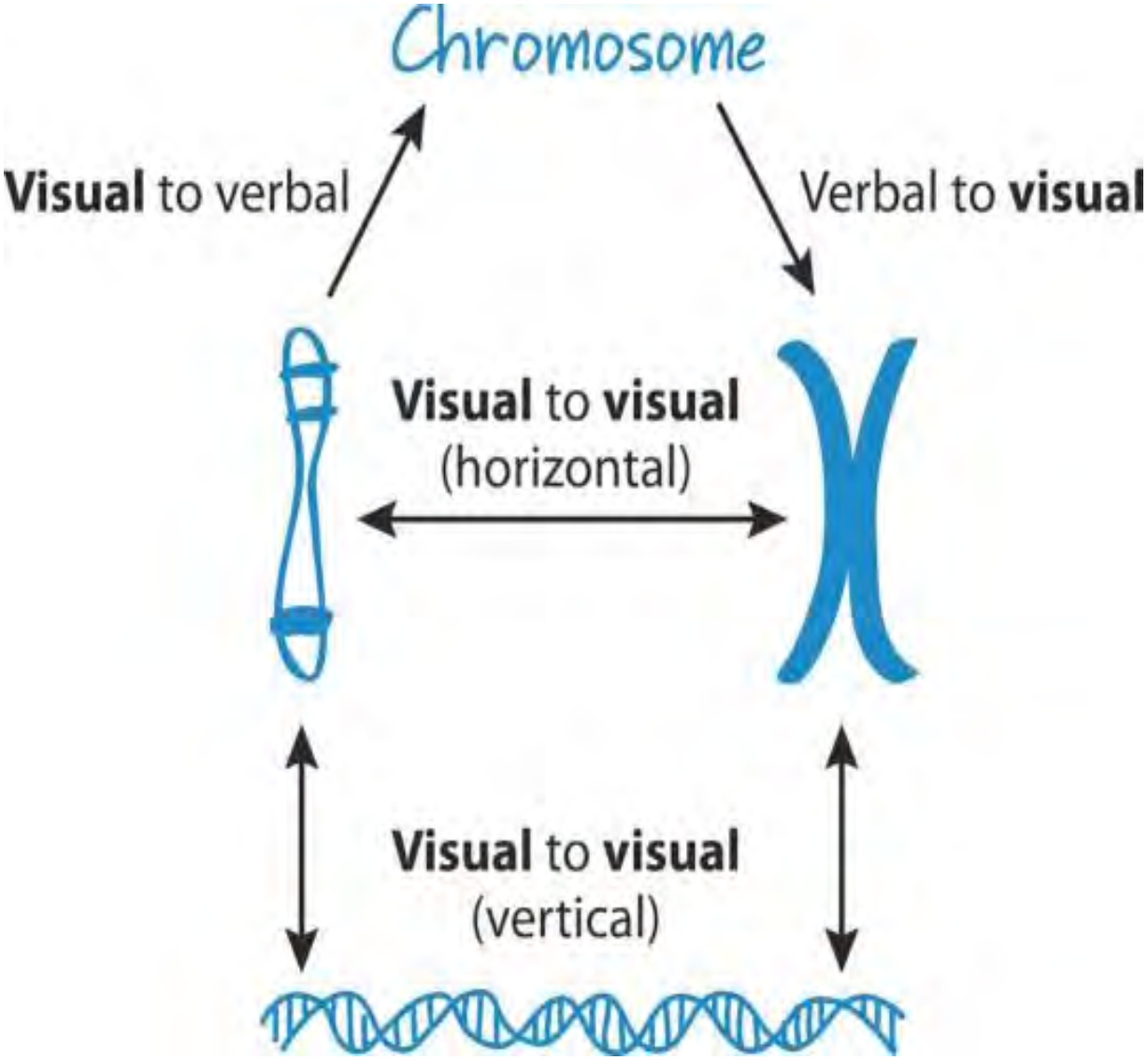


Understanding fundamental evolutionary concepts requires sophisticated visual skills





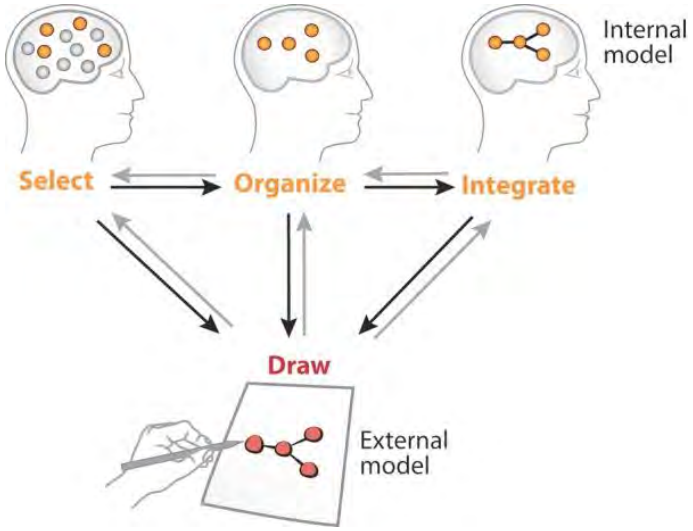


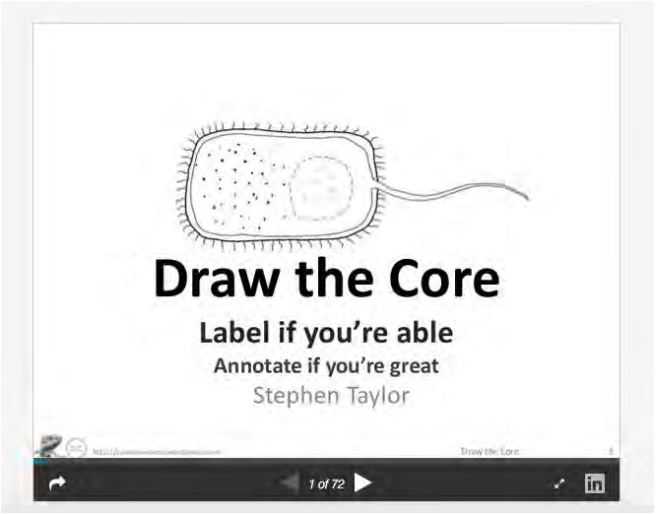

Chromosome
Visual to verbal
Verbal to visual
Visual to visual
(horizontal)
Visual to visual
(vertical)

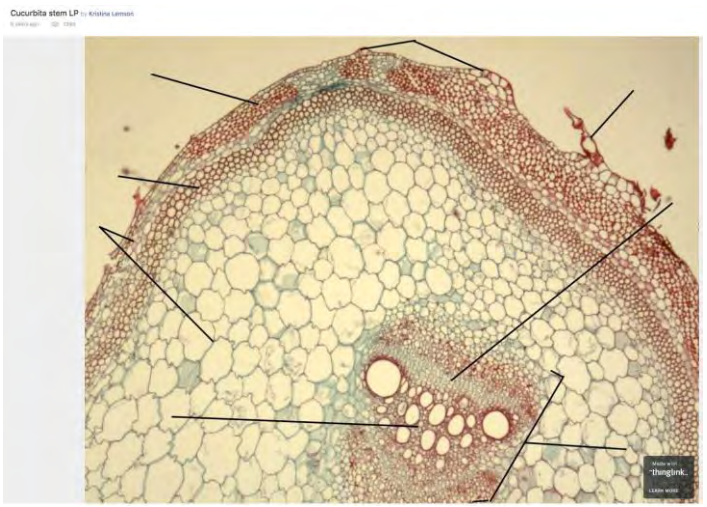
SCI1187 Form and Function in Biology

- Visual Literacy made explicit
- Authentic artifacts
  - Visual models
  - Biological drawings
  - Workflow
- Assessed - low stakes, 'no cost' first attempts
- Supported
  - Preparation tasks
  - Demonstrator driven

Visual models







SCI1187 Form and Function 2019

- Student resistance to production lowered
- Sense of confidence & agency
- Quality improved
- Students organised!

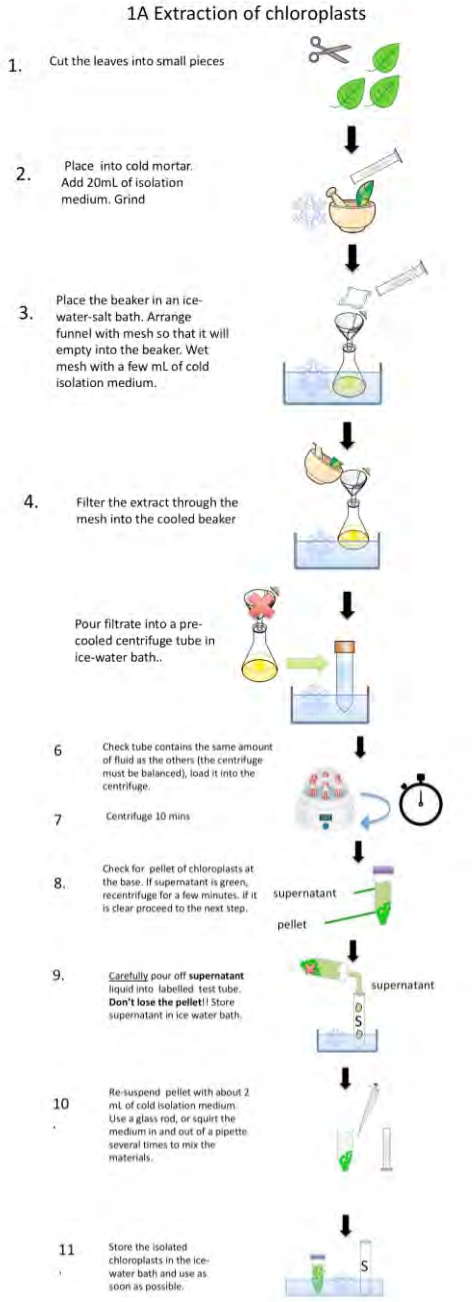
You will need all of the following:

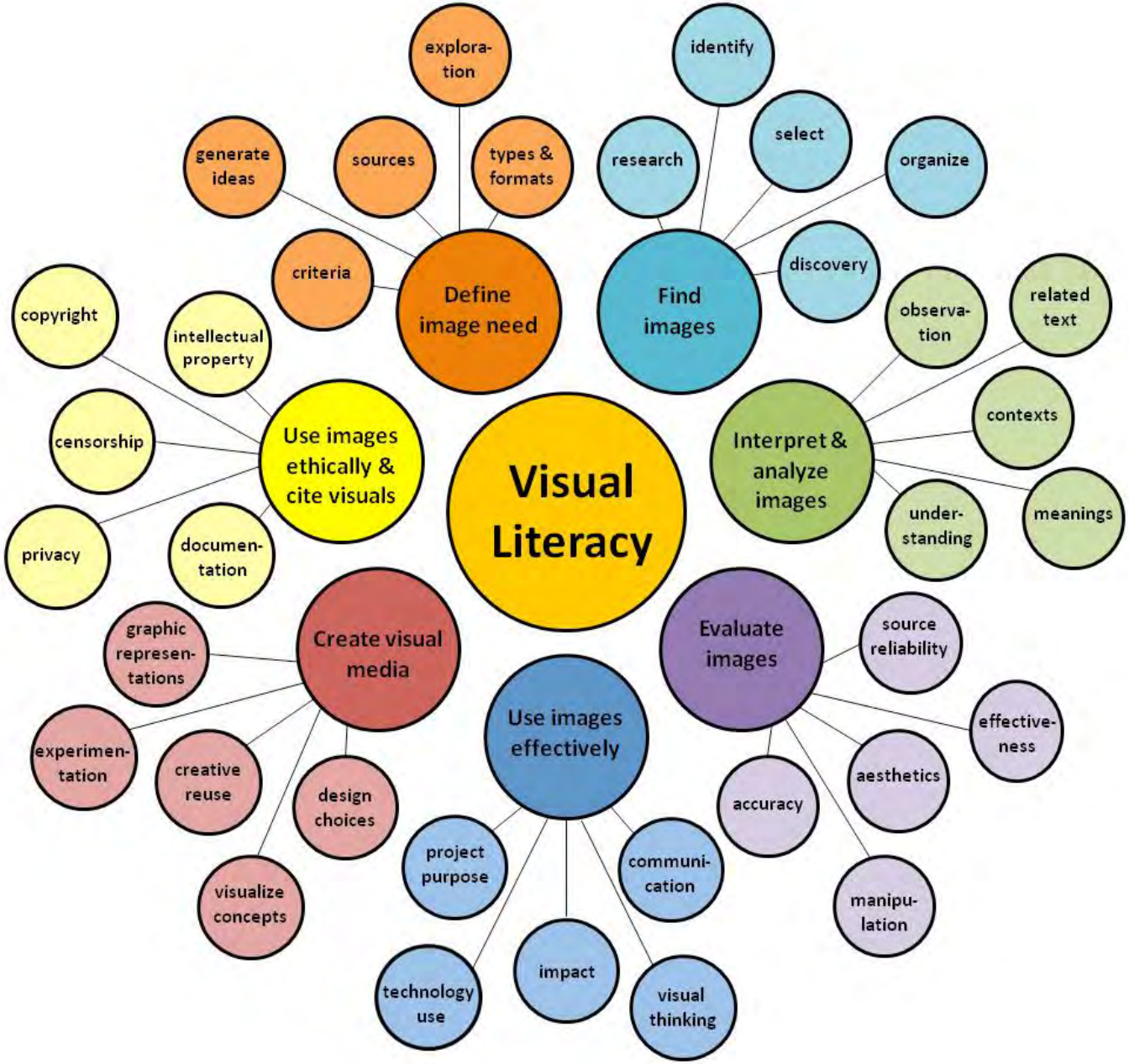
- 3-4 fresh leaves of spinach
- Scissors
- Mortar and pestle – precooled
- 30 mL isolation medium - cold
- Filter funnel fitted with 4 layers of fine mesh
- Small beaker
- Centrifuge tube, cooled.
- Cooled experimental tubes.
- Glass rod and pipette
- Ice-water-salt bath
- DCPIP solution at room temperature

Keep the isolation medium, beaker, and centrifuge tube in the ice-water-salt bath.

Isolation of chloroplasts

1. Use scissors to cut the leaves of spinach into small pieces, discarding the thick midrib stalks. Place the spinach into the cold mortar and add 20mL of isolation medium.
2. Grind the spinach vigorously and rapidly with the pestle. You should have no lumps left.
3. Place the beaker in an ice-water-salt bath, and arrange the funnel with mesh so that it into the beaker. Wet the mesh with a few mL of cold isolation medium.
4. Filter the spinach extract through the mesh into the cooled beaker.
5. Pour the filtrate into a pre-cooled centrifuge tube in the ice-water bath. Gather up the the mesh and wring it tightly so that any remaining extract falls into the beaker. Add filtrate in the centrifuge tube.
6. Check that your tube contains the same amount of fluid as those of the other g centrifuge must be balanced), and load it into the centrifuge.
7. Centrifuge for10 minutes. Label your experimental tubes while the pellet spins down (s
8. Remove the tube from the centrifuge and check for a small pellet of chloroplasts at t





Virtual and Augmented reality in Psychology teaching and research

Jason Bell information session June 12, 2019

Overview of my talk

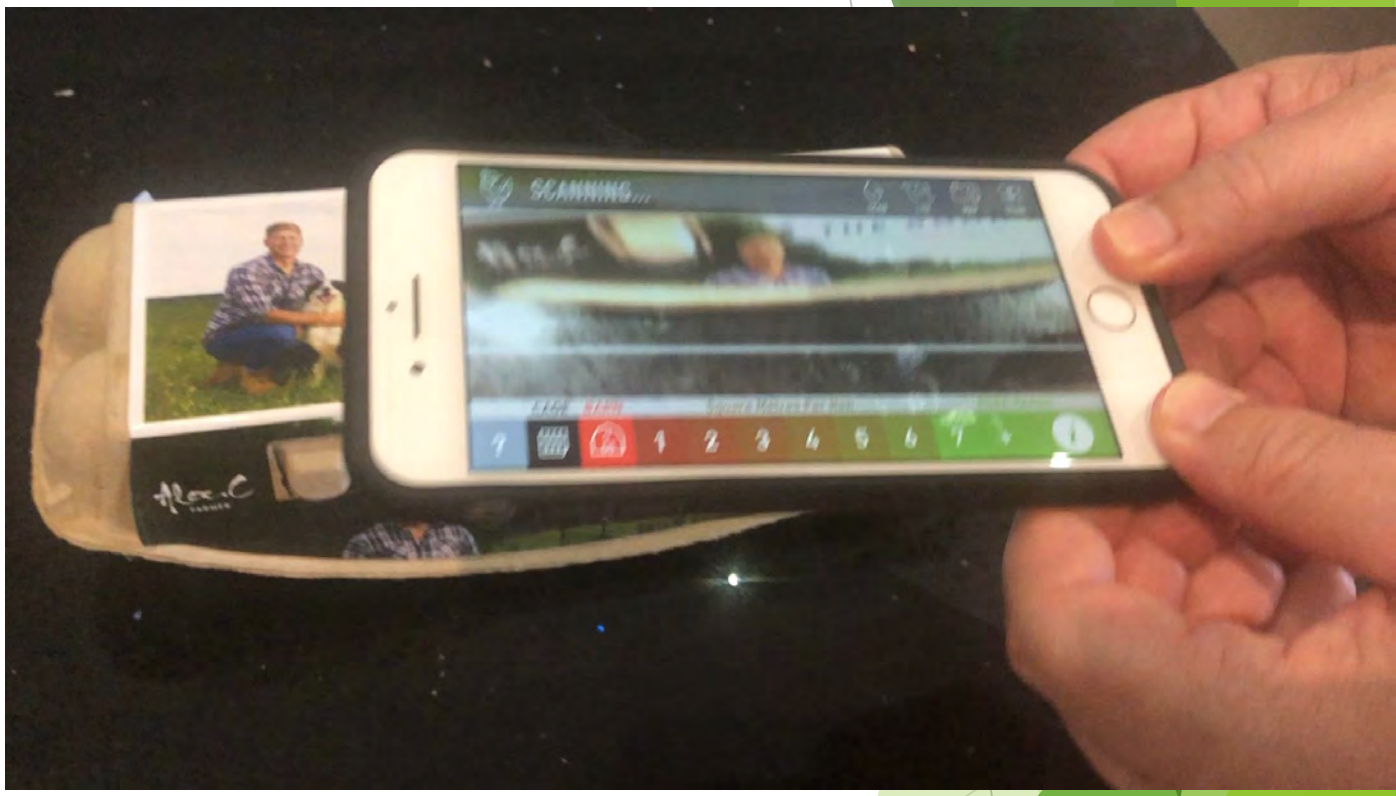
- The Technology
- The teaching philosophy
- Research-led teaching
- World first research showcasing UWA's research strengths

VR

- VR = Virtual reality. Here you are completely immersed into an alternate reality that is entirely constructed and presented within the Head mounted Display unit (HMD)

AR

- AR = Augmented Reality. This is when the real world is being captured by the camera, loaded into the HMD and then synthetic material is supplemented over the top.



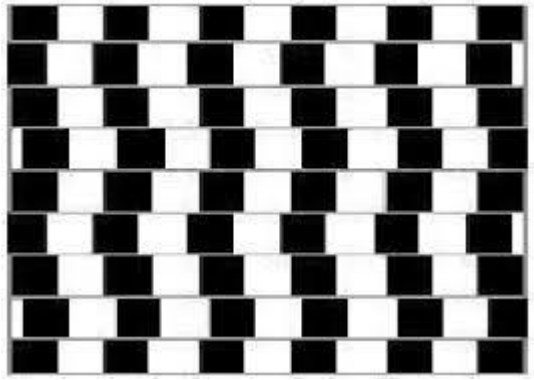
The UWA Faculty of Science has invested in VR technology

- 16 HTC Vive Pros
- Fully portable setup
- Each “VR Kit” is comprised of:
  - 1 x HTC Vive PRO HMD
  - 2 x hand controllers
  - 2 x tripods for the base stations
  - 1 x gaming laptop- you need a great graphics card. Essentially you are running 3 x monitors of the laptop.

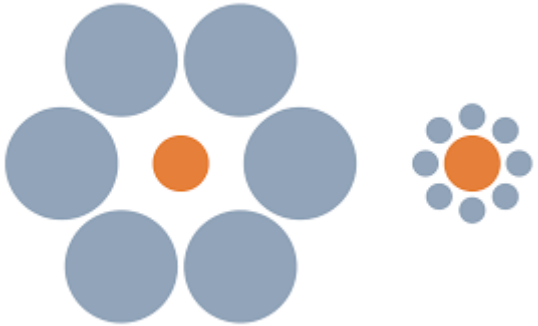
Teaching philosophy

- Psyc1101 has approximately 1000 students, so the labs play a key role in creating that interactive, engaging environment for small group discussion. It's hard to provide this in the lecture setting (esp when they don't all fit in the Octagon).
- We want an active learning experience that facilitates learning core course content.
- I teach perception, and a fundamental principle is that perception is influenced by context
  - See below two basic examples from the text

The Café Wall Illusion



The Ebbinghaus Illusion



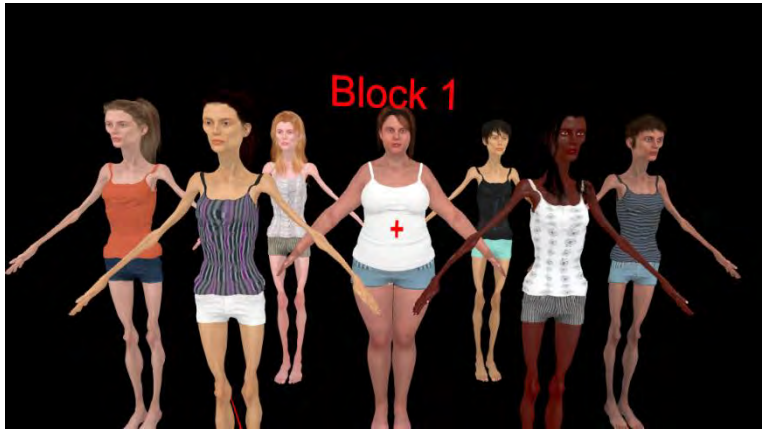
Research-led Teaching

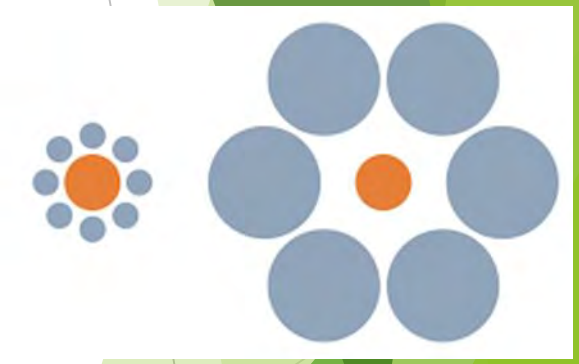
- Students in PSYC1101 carry out an experiment to write up as a lab report
  - Rather than give them something which has worked for 50 years, we want to help them build a brick in the wall of knowledge
  - Working on a ‘world first’ novel project is exciting for them and a great demonstration of a point of difference at a world class research institution
  - The study maps onto my research expertise in perception and perceptual biases
  - In addition, the study we ran is the first study for one of my new PhD students. So a great research/teaching training exercise for Georgia.

- So in their study, we asked whether perception of familiar objects, such as human bodies, is also influenced by context
  - We set up an Ebbinghaus illusion with bodies
  - We are also asking how decision making is altered in virtual environments

UWA VR- a great Academic, Student, IT partnership

Our study: Estimating body size in different contexts





World-first research and its communication

Educational outcome

- 850 students ran through the VR setup and completed the study
  - This included our Albany students. I flew down to run it there
    - equity of experience
  - Students had very positive experiences.
    - They loved it
    - In hindsight I would allow more time to simply ‘experience the VR environment’
  - Results were written up in a lab report (1500 words).
    - Because the research was novel, the traditional lab report hypothesis formation is in tact- no replication
    - Students gained experience using new-age technology.
    - For many it was their first VR experience
    - Many couldn’t resist the star wars light saber simulation…

World-first research and its communication

Research training outcome

- My PhD student Georgia successfully ran her first PhD study.
  - This was a wonderful (but stressful) experience for her to take charge of a laboratory class and exercise, working closely with the unit coordinator.
  - Georgia also helped develop the lab slides and content for the subsequent “lab report” writing class.

Showcasing UWA research excellence *(for students who consented to the use of their data beyond the lab report- ethics obtained)*

- I have submitted and will present the research for presentation at the Asia Pacific Conference on Vision (APCV) in Osaka, Japan, in July 2019
  - World class research on the world stage
  - Showcasing the technology and research strengths of UWA
  - Tackling important problems about perception in VR environments

ELN Workshop
Workshop/Blended Learning Community - 12 June 2019

PDF Version generated by

Alexandra Yeung

on

Jun 13, 2019 @11:29 AM AWST

Table of Contents

Blended Learning Community - 12 June 2019

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

Hello from Alexandra Yeung

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:43 PM AWST

Dr Alexandra Yeung is a lecturer in the Department of Chemistry at Curtin University in Western Australia. She has been using Electronic Laboratory Logbooks (ELLs) or Electronic Laboratory Notebooks (ELNs) in a teaching context and was the first to bring ELL/ELNs into laboratory classrooms at her institution.

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

What is an ELN?

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

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 of ELNs:

- **Research data management and organisation** – you are able to manage and organise all of your research data and information in one place (central HUB).
- **Searchable** – ELNs can be searched by keywords or tags and even by the contents of files.
- **Portability** – the cloud-based platform can be accessed anywhere, anytime from both iOS and Android devices.
- **Sharing** – data can be accessed by your research group and collaborators.
- **Inventory** – samples, reagents and consumables can be kept up-to-date in an easy-to-use visual display.
- **IP protected** – intellectual property is protected with third party data and timestamps.
- **Data security** – data is centrally stored including historical versions of every file, recording the date, time and username kept for audit-ability.
- **Seamless** – files, photos and documents can be moved directly into ELNs and stored.

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

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

brandi-redd-122054-unsplash.jpg(2.2 MB) - download

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

Why use ELN in teaching?

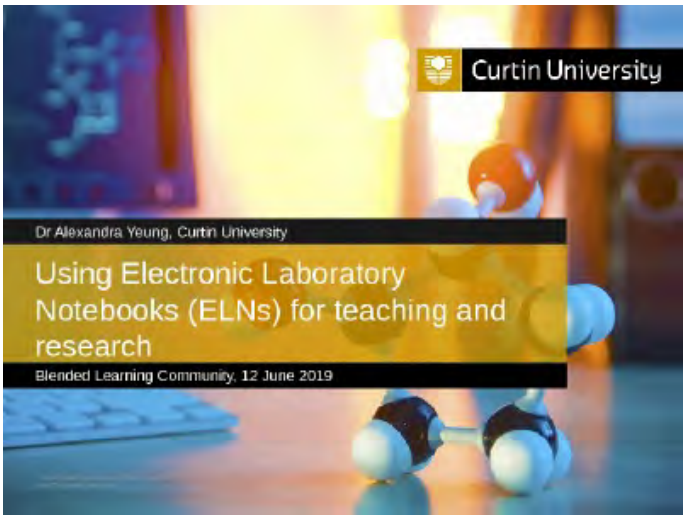
▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

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

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

How I use ELNs in teaching

▪ Alexandra Yeung ▪ Jun 12, 2019 @07:53 AM AWST



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▪ Alexandra Yeung ▪ Jun 11, 2019 @09:34 PM AWST

How to get started?

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

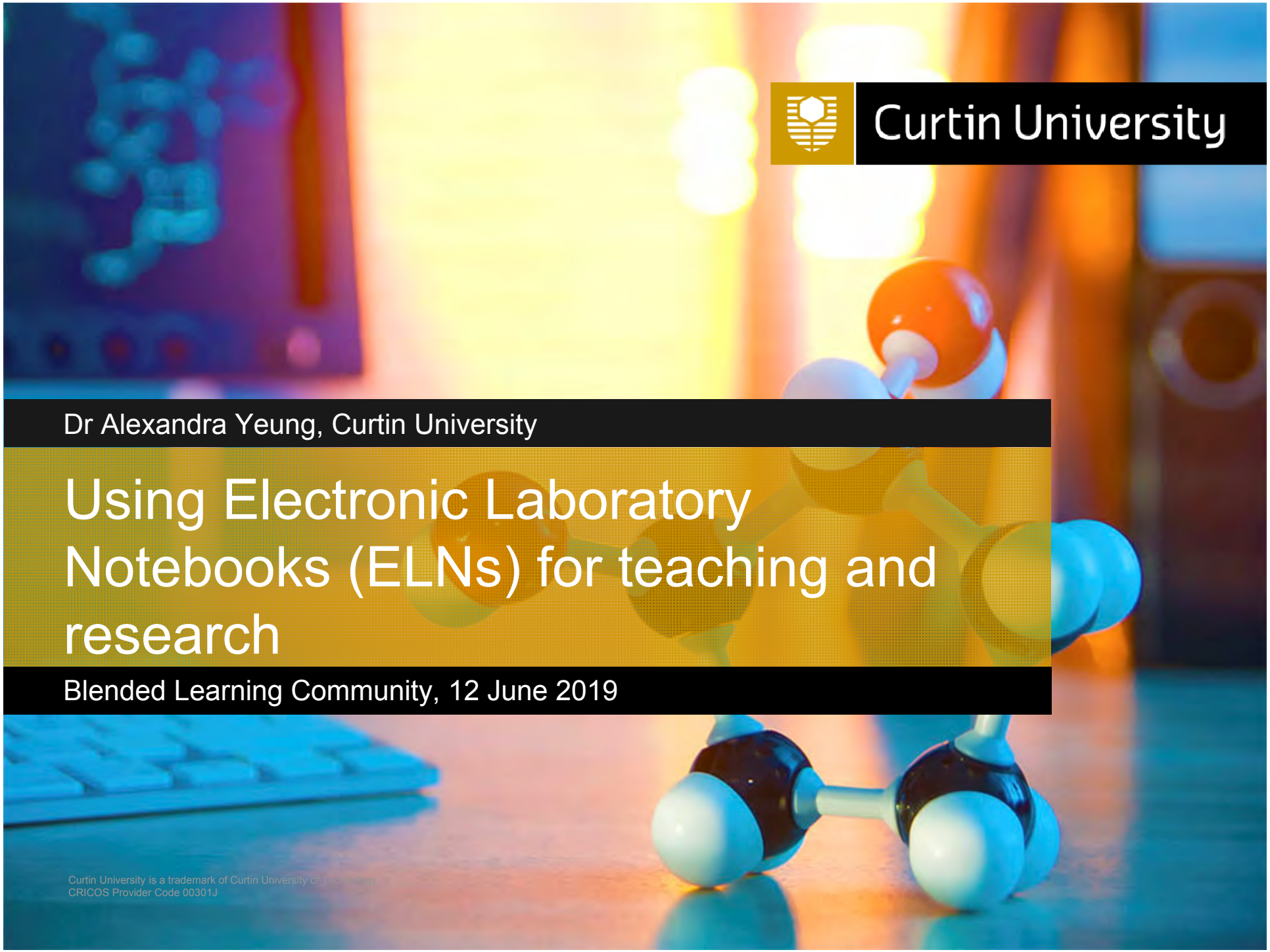
- Start small
- Get staff buy-in
  - Efficiencies in grading and providing feedback
  - Professional skill development
- Get student buy-in
  - Real world skill development
  - Potential for data sharing and collaboration
  - Permanent record of their work (better chance they will collect and read feedback)
- Institutional support – Leverage off the needs of researchers – institution might be more likely to adopt for research before teaching

▪ Alexandra Yeung ▪ Jun 11, 2019 @09:25 PM AWST

Acknowledgements

▪ Alexandra Yeung ▪ Jun 13, 2019 @11:26 AM AWST

- Curtin Teaching Academic Scholarship Seed Grant
- Diana Taylor - FLET
- Department of Chemistry
- Demonstrators
- Technical staff
- Students



Curtin University

Dr Alexandra Yeung, Curtin University

Using Electronic Laboratory Notebooks (ELNs) for teaching and research

Blended Learning Community, 12 June 2019

Pedagogical transformation

Phase 1
- Paper-based laboratory notebook (PLN)
- Introduction of exercise books
- Semester 1, 2015

Phase 2
- Electronic laboratory notebook (ELN)
- Introduction of tablet PC
- Semester 2, 2015

Phase 3
- Rollout across whole unit
- Semester 2, 2019

Implementation

Software

OneNote

labarchives
Chance Favors the Organized Lab

Tablet PCs

- Surface 3
- Lenovo Thinkpad

Maintenance

- Lab technician

Curtin University

labarchives
Chance Favors the Organized Lab

- Two forms – classroom edition (CE) and professional edition (PE)
- CE has the same features as the PE but with specialised instructional features
  - 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

HURDLES

- Cost
- Can be difficult to get started
- Buy-in from colleagues and teaching staff
- Some students take some time to learn how to use it

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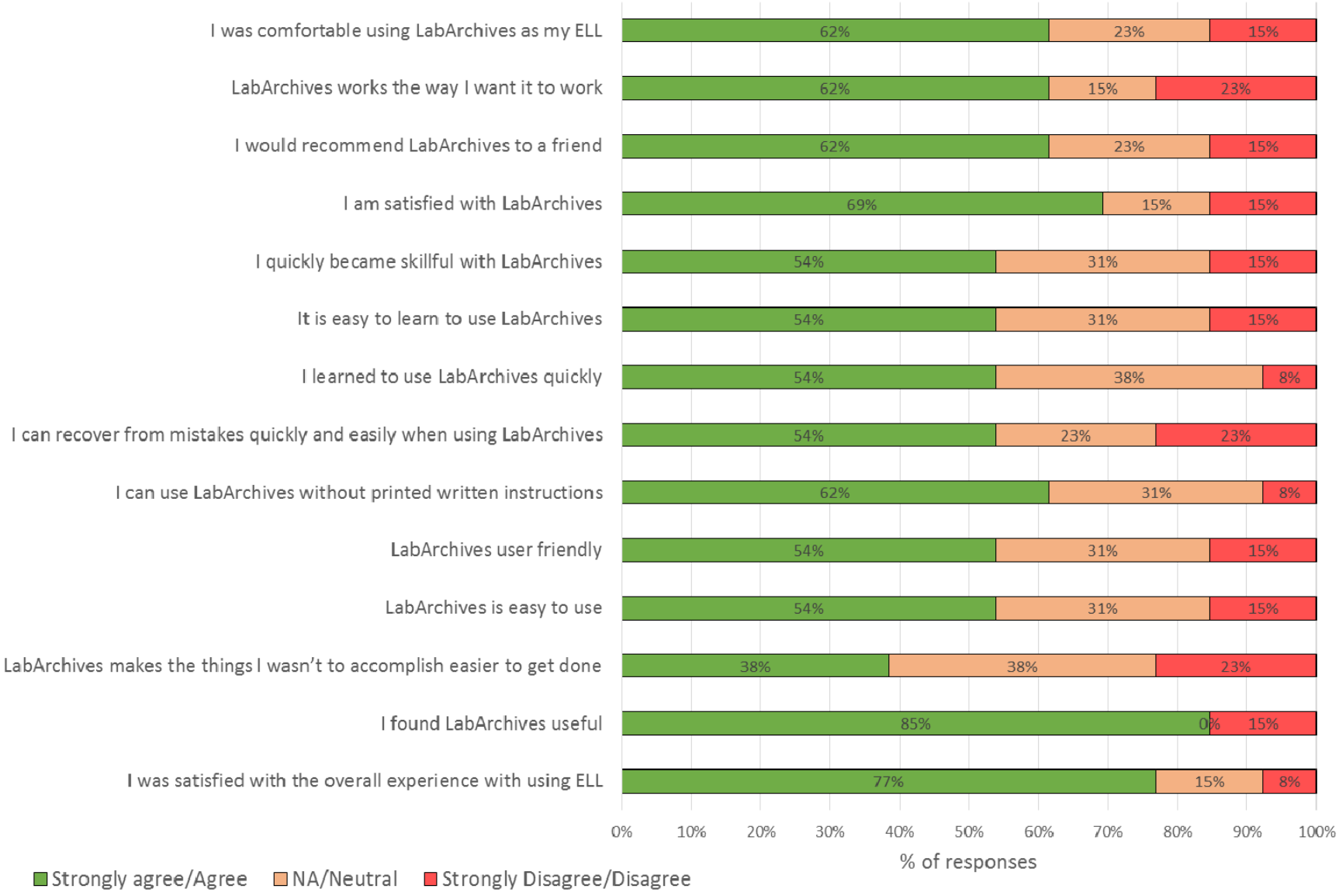
Leaping them…

Curtin University

Preliminary findings – Survey results



Preliminary findings – Survey results

Benefits of ELLs

I like the idea of ELL due to syncing function

Can be edited and expanded on easily. Can add photos

I didn't like the idea of drawing graphs. Having the tablet was much easier to use

Good record keeping and can access anywhere and keep it for future reference

Easier to manage and format. Quicker than writing

Having everything together, not losing anything and being able to access previous experiments

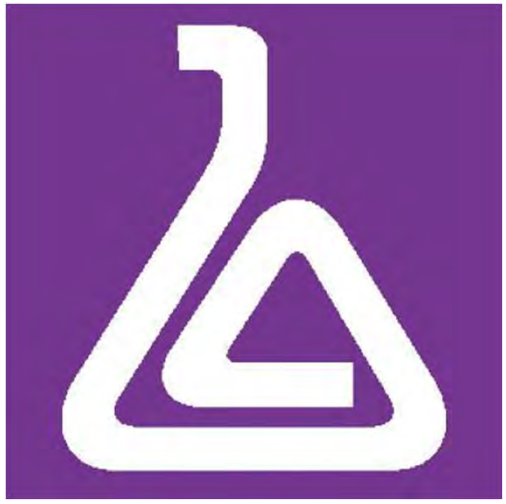
Possible improvements

- Most comments were about the hardware and getting used to that, e.g. using the pens more efficiently

Curtin University

Leaping them…

RESEARCH
AND
TEACHING



Curtin University

VIRTUAL WORK INTEGRATED LEARNING IN ENGINEERING

Andrew Valentine

Sally Male

Ghulam Mubashar Hassan

VWIL PROJECT

- Each module engages students in completing an authentic task from engineering practice.
  - Modules are 1-2 hour in length.

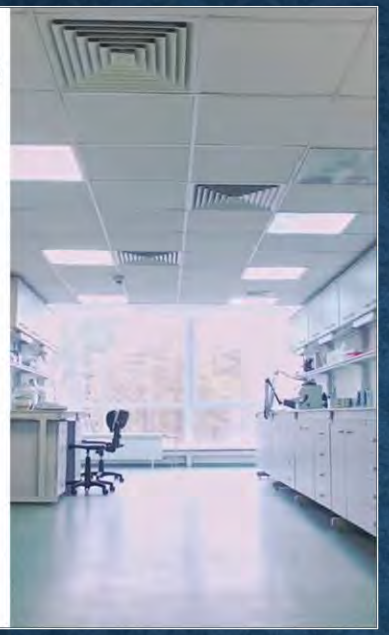
- Some modules engage students in engineering practice activities using simulations/software.

- Modules integrated into courses:
  - Safety in Engineering Design (130 students)
  - Ethics in Engineering (430 students)

- Some of the modules piloted:
  - Presenting at an engineering meeting
  - Performing on-site Job Safety Analysis

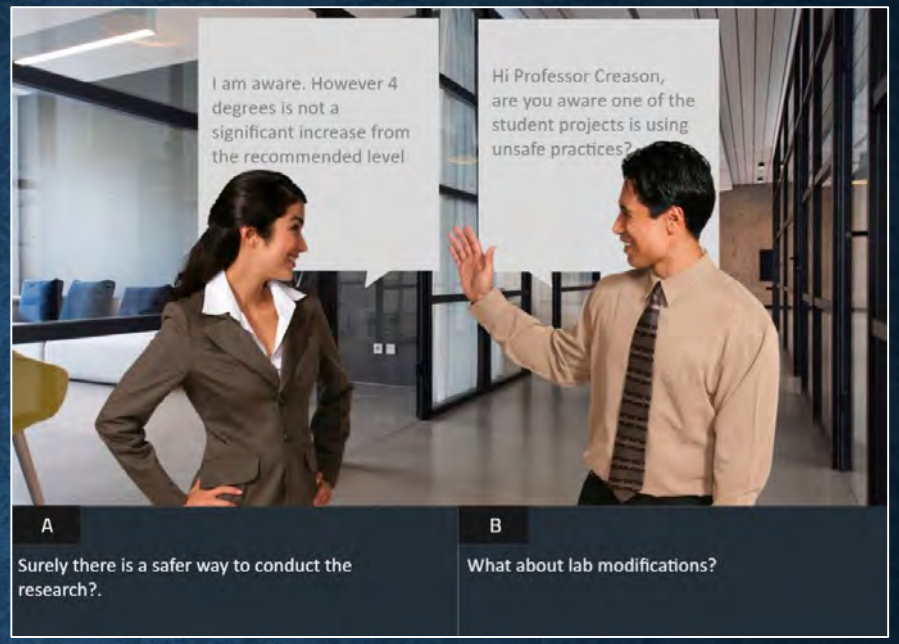
Safety in Engineering Design Module

Hazardous Materials Case



Background

During the seminar, safe uses of many chemicals are discussed, including a lead and arsenic based compound that is being used by a fellow graduate student, Dan, who did not attend the session. Dan is following several safe uses of the compound, but drilling into the solid form and heating above 204 C are specifically mentioned as unacceptable. Dr D states that drilling and heating cause particles to become airborne, which means they can be inhaled by anyone in the area. You know that Dan is drilling and heating the lead compound up in a conventional oven to about 208 C.



You selected not to speak to anyone yet

What Would You do Next?

Talk to Professor Creason again

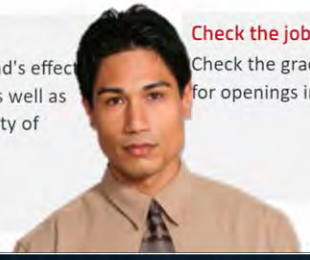
Approach her again when she has cooled down and explain your concerns concretely, using the regulations described in the hazardous material seminar

Say nothing

Professor Creasin has already been informed.
Agree that she is probably correct in stating that 4 degrees Celsius is not much of an increase, and the drilling is irrelevant.

Do more research

Research the lead compound's effect on health and pregnancy, as well as proposed costs and feasibility of altering the experiment.



Check the job board

Check the graduate student job board for openings in a different research lab

Do More Research

Consequences

From your research you find Lead exposure can:

- Impair intellectual development and damage the brain if levels are high enough
- All women should minimise their exposure to lead both before and during pregnancy
- Be harmful if swallowed or breathed in
- Be stored in the bones one in the body
- Causes; abdominal pain, headaches, fatigue and anemia

What will be your decision with this new found information?

Next

Ethics in Engineering Module - Interactive Dilemmas

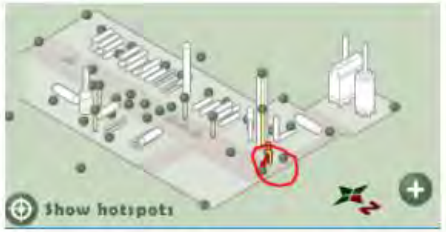
Presenting at an Engineering Meeting

Pan the camera around by clicking and dragging in the desired direction until you find the Kerosene Pump "0804J" Hovering over the pump will highlight it in red and show the following. The motor guarding is the entire housing labeled "**THB -GB**".

Node 30
804J
Kerosene reflux pump

A cross sectional shape of this guarding is shown below where the circle is the motor shaft and the outline the guarding. The guarding is bolted at the bottom to the ground and will need to be unbolted and lifted vertically up. The guarding is heavy and requires proper lifting technique.

The three nodes highlighted in red may be useful in completing your JSA.



Pay attention to possible hazards that could occur in these three nodes. Keep in mind that this plant has highly flammable materials being pumped periodically and uses industrial high voltage equipment.

It may also be beneficial to watch the plant safety video on the home page under "Activities" for a list of PPE used on site. This may be useful for mitigation measures. (Note that the activity for choosing PPE does not function correctly, use this as a visual)

Performing an on-site Job-Safety Analysis