Innovations in Pharmacy Education

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Why are innovations in pharmacy education needed?

Changing pharmacy roles.

Technological advancements – in medicines and dispensing.

Generational change in pharmacy (pre-registration learners).[1]

Changing societal expectations with highly aware patients.

Pandemics.

1. Shorey S, et al. Nurse Educ Pract. 2021 Nov;57:103247.

Why are pharmacy education innovations needed?

Generational change in pharmacy (pre-registration learners).[1]

MILLENNIALS	GEN Z (Born 2000–2010)
• Technology savvy	• Digital natives
• Collaborative learning style	• Independent and value privacy
• Good interpersonal skills	• Poorer interpersonal skills
• Need constructive feedback	• Can manage honest feedback
• Idealistic risk taking	• Entrepreneurial
• Social media connected	• Thrive on social media platforms

What does research suggest?[1]

- Vibrant classrooms and **creativity**
  - story telling, story living, short burst teaching, involvement in current issues relevant to them related to social inclusion etc.

- Providing entrepreneurial opportunities (esp. tech based)

- Flipped classrooms for learning more independently.

- Fostering and providing opportunities for leadership.

- Engagement with preceptors.

- Mindful of student pressures – mental health, warnings around sensitive topics and emotional responsiveness.

1. Shorey S, et al. Nurse Educ Pract. 2021 Nov;57:103247.

B.Pharmacy Program at USyd

- Started in 1960 as a formal accredited BPharm degree.

- In the 1980's **Pharmacy Practice** was added.

- In 1997, the degree was converted to a **4 year degree.**

- Accredited every 5 years often with improvements and revisions e.g. a **new curriculum program initiated in 2008.**

- A **BPharm and Management degree** was offered in 2017.

- Program will change to a **5 year integrated Masters in 2023.**
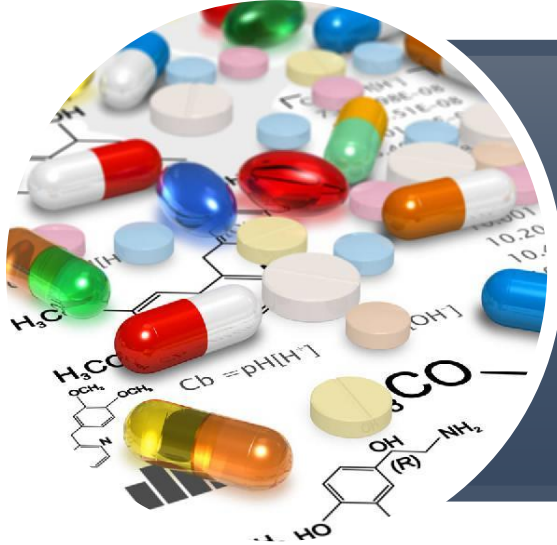
B.Pharmacy (main UG degree at SPS, USyd)

Cognitively funnelled curriculum

Year 4: Public Health Mgmt, Advanced Pharmacotherapeutics, Novel drug technology, Professional Practice/ Honours

Year 3: Integrated clinic therapeutics: body systems

Year 2: Physiology/Pharmacology/Pharm Sci/Pharmacy Practice
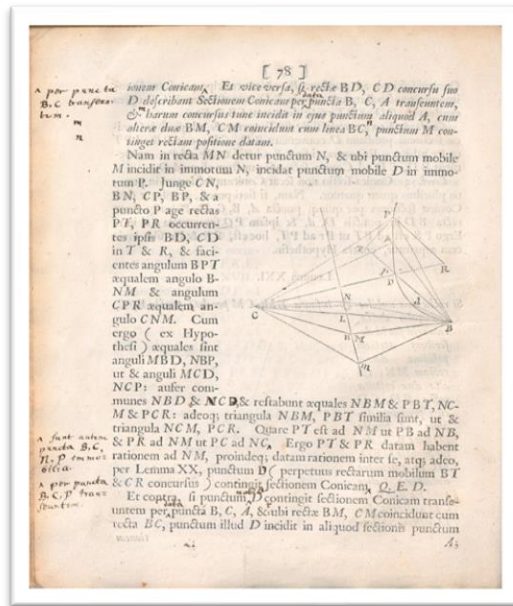
Year 1: Basic Sci, Intro to Pharmacy

B.PHARM YEAR ①

Year 1: Making pharmacy history come alive objects – tell stories!

- Object-based learning[2] facilitates deep learning through interrogating artefacts; Engaging students' sense of *touch, sight* and *smell.*

Isaac Newton's Philosophiae Naturalis Principia Mathematica

Surgeon's spectacles, 1926–43, Macleay Collections, SC1994.31

Newton's disc, 1900–50, manufacturer unknown, Macleay Collections, SC2017.149
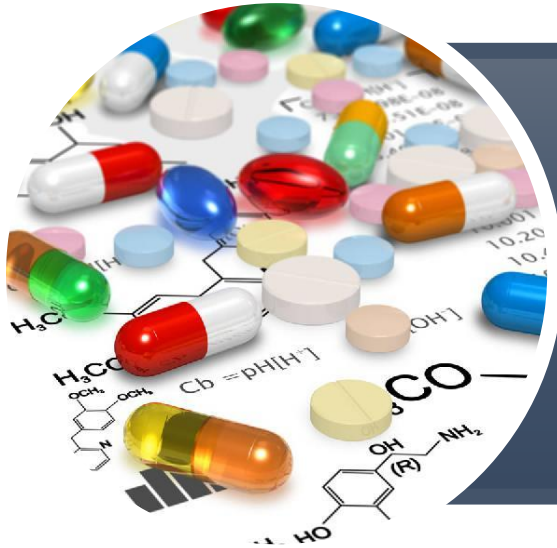
https://www.sydney.edu.au/news-opinion/news/2021/10/22/sydney-rare-book-week--explore-the-treasures-of-the-library.html

PHAR 1811: Which instrument is the most significant for the development of pharmacy?

- Students **interact** with **objects**

- Formulate case in their teams to describe why each instrument is the most significant development for pharmacy.

Dr Janet Cheung
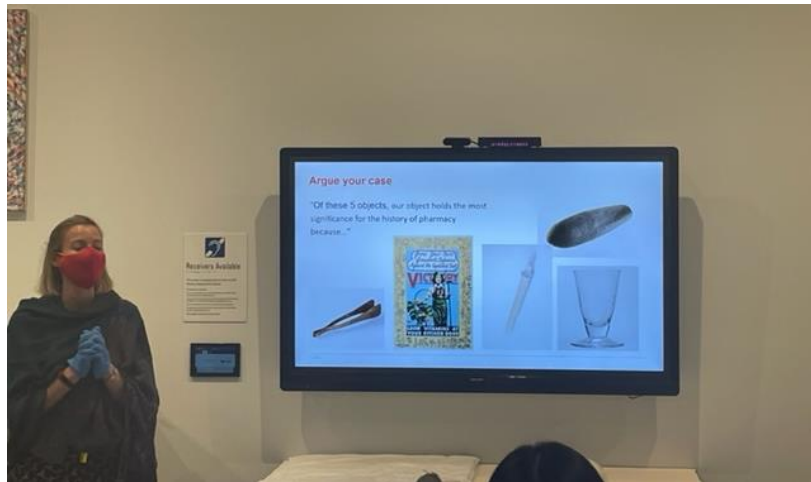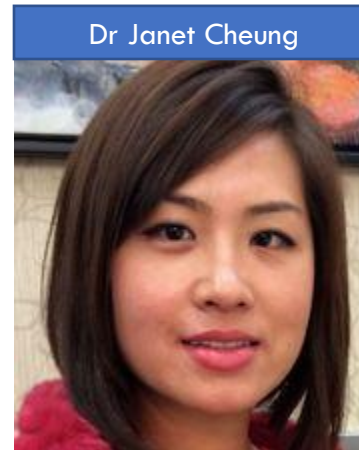
B.PHARM YEAR ❷

Year 2: flipped class rooms, choice and reflection in a pharmacy practice Unit of Study

PHAR 2822 (Semester 2, Year 2) focusses on building *information gathering skills, decision making* (over-the-counter medicines), *understanding evidence-based medicine supply* and counselling. Topics include asthma, rhinitis, eye and ear drop, cold sores, cough and cold treatments etc.

Year 2: the SLEEPWELL Package (Oct 2021)

1. Workshop developed based on student – expressed need.

2. Flipped class-room choice of topics to be discussed.[3]

3. Real life 'patient' snippets.

4. A self assessment about one's own sleep health knowledge -Tutorial prep-work: keeping a sleep diary

5. Post education self-assessment of sleep health knowledge

6. Reflective essay on learning and improving one's own sleep.

SLEEPWELL snippet #1 - Sleep procrastination
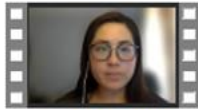
SLEEPWELL snippet #2 - Benzodiazepine alternatives

SLEEPWELL snippet #3 - Medication side effects on sleep

SLEEPWELL snippet #4 - Relentless snoring

SLEEPWELL snippet #5 - Delayed sleep phase syndrome

SLEEPWELL snippet #6 - Insomnia during pregnancy

SLEEPWELL snippet #7 - Sleep and long-distanc...

SLEEPWELL snippet #8 - Acute insomnia and exam stress

SLEEPWELL snippet #9 - CBD (cannabidiol) for sleep issues

SLEEPWELL snippet #10 - Travel and Jet lag

Review this SHORT sleep scenario video and rank the video according to the options below.

Students were given a set of 10 pharmacy 'presentation' scenarios about sleep and could choose which ones they wanted to discussed!!

Very interested	66 respondents	28 %	
Interested	90 respondents	39 %	
Neutral	53 respondents	23 %	
Not that interested	20 respondents	9 %	
Not interested at all	3 respondents	1 %	

+DAY 1 SLEEP LOG
SLEEP
PHAR 2822 SLEEPWELL MODULE

1- What time did you get into bed last night? Click or tap here to enter text.

2- What time did you try to fall asleep? Click or tap here to enter text.

3- Approximately how long did it take you to fall asleep from when you first started trying (in minutes)? Click or tap here to enter text.

4- How many times (if any) did you wake up during the night (excluding your final wake-up)? Click or tap here to enter text.

    4a) Approximately how long did these awakenings last in total (sum of all awakenings in minutes)? Click or tap here to enter text.

    4b) If applicable, what did you do while waiting to get sleepy again/fall back asleep (e.g., lay awake in bed)? Click or tap here to enter text.

5- What time did you wake up in the morning? Click or tap here to enter text.

6- What time did you get out of bed for the day? Click or tap here to enter text.

7- What was the time of the last:

    7a) Caffeinated drink (e.g., tea, coffee or energy drink)? Click or tap here to enter text.

    7b) Food (meal or snack)? Click or tap here to enter text.

    7c) Exercise activity? Click or tap here to enter text.

8- How would you rate the quality of your sleep last night?
Very good ☐
Fairly good ☐
Neither good nor bad ☐
Fairly bad ☐
Very bad ☐

7-day sleep diary

Activity 1:
Evaluating your own sleep-related behaviours

SLEEPWELL

Allocated time: 15 minutes

Discussion guide – Breakout groups

Within each breakout group please examine your own sleep-related behaviours and discuss this with your groupmates (5 minutes). You should focus on three main points:

- **Do you have a regular sleep pattern?** (waking up and sleeping at around the same time every day)

- Do you think your **current sleep schedule is satisfactory?**

- What do you perceive to be **barriers to developing healthy sleep habits?**

- Have you tried any non-pharmacological/pharmacological therapies to help with any sleep issues you've had?

Activity 1:
Evaluating your own sleep-related behaviours

SLEEPWELL

Allocated time: 15 minutes

**Discussion guide – Full tutorial group**

For the next 10 minutes we will discuss:

- Healthy sleep habits

- The barriers that prevent you from developing these healthy sleep habits

- How you can overcome these barriers

- What to do if you cant fix your sleep on your own (next best step)

Student feedback (other results being analysed)

- "You'll be happy to know that I was able to help a patient with better sleep management using the knowledge I learnt from this module. It has definitely improved my counselling and ability to help patients."

IMPLEMENT IN PRACTICE

- "Using sleep diaries to reflect on our own sleep habits and start an interesting discussion regarding barriers to sleep and strategies to improve our sleep was an enjoyable and valuable way to start the module."

DEVELOP HEALTHY HABITS

- "I enjoyed seeing different videos with scenarios to choose and evaluate from."

LOVED THE CHOICE ASPECT

- "Watching the case studies really showed what sleeping disorders could look like."

REALISTIC CASE STUDIES
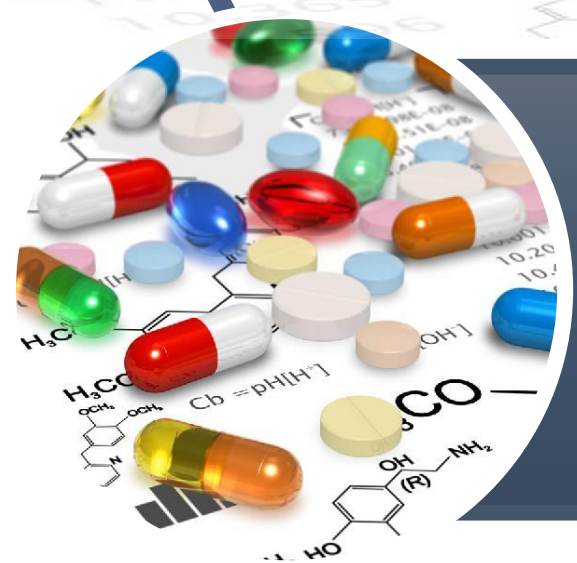
B.PHARM YEAR ④

Year 4: Pharmacotherapeutics (PHAR 4811)

Students learn about pharmacotherapeutic application across different populations.

A method of **process oriented guided inquiry**[4] is used for teaching – where the class is different groups are asked with completing a presentation template on a sub-topic and presenting to the others – who then 'learn' from the presenting group.

Task work is supported by learning resources provided.

http://stvp.stanford.edu/blog/?p=2565
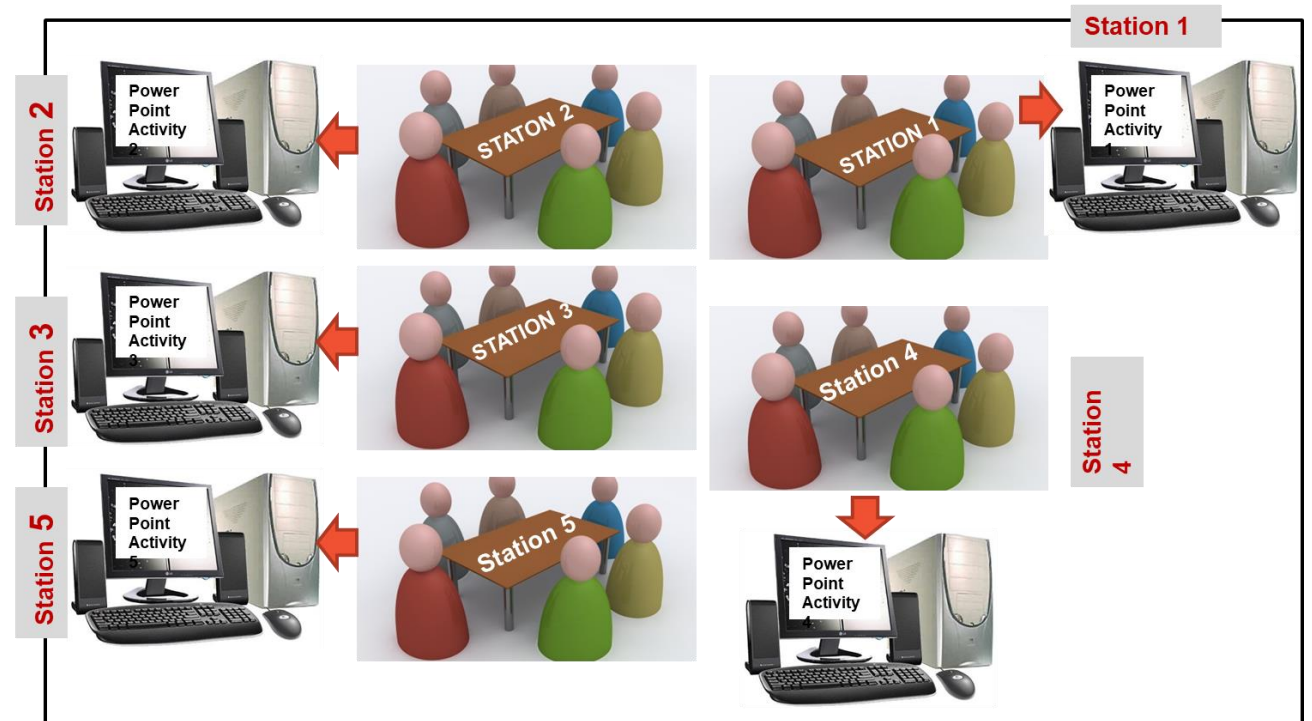
USyd PHAR 4811 graduates able to support patient medicine use + maintain vigilance about medicines use in groups where specialised considerations apply to the use of medicines.

Year 4: Pharmacotherapeutics (PHAR 4811)

TOPICS

1. Introduction workshop
2. Geriatrics 1
3. Geriatrics 2
4. Paediatrics 1
5. Paediatrics 2
6. Drugs in Pregnancy
7. Drugs and Disability
8. Drugs in special cases

ASSESSMENTS

1. Workshop participation
2. Portfolios
3. **Design your own exam**

PHAR 4811: Socially accountable practice & advanced pharmacotherapeutics

Vibrant classrooms: socially accountable practice: disability inclusion workshop

After the end of comprehensive training on disability, learners should be:

- Able to *understand what disability means*

- Be aware of general facts and statistics about the Australian population with respect to disabilities

- Be aware of relevant national policies/schemes wrt to disabilities

- Be skilled in appropriate ways of *communication with and about* people living with a disability

STATION 1: Vision Impairment

STATION 2: Parkinson's Disease

STATION 3: Down Syndrome

STATION 4: Dysphagia

STATION 5: Simulations

PHAR 4811 Disability Awareness Workshops.

PHAR 4811- Disability awareness and inclusion: Vision Disorders
Vision Station Activity Example

Protanopia

Master JF is a 7 year old boy with Cystic Fibrosis. He has to take several medications a day. The specialists have created a regimen such that he only has to take 2 tablets at school. One of these tablets is pale green in colour and has to be taken just before lunch break. The other tablet is a pale beige tablet taken 2 hours after lunch. Your pharmacy recommended a daily medicine pack where JFs mum can pack these 2 tablets for each day of school. JFs mum comes to the pharmacy to see if you can help. JF is apparently having problems distinguishing the 2 tablets.

- **What do you think JFs problem is ?**
- **How can you help?**
- **What proportion of your patients could have this problem?**
- **What suggestions can you provide JF and his Mum to help distinguish the 2 tablets?**

Department of Health, Government of Western Australia. Colour blindness. Available at: http://www.healthywa.wa.gov.au/Healthy-WA/Articles/A_E/Colour-blindness

Vision Australia. Vision tests. 2012. Available at: http://www.visionaustralia.org/eye-health/assessing-vision-loss/vision-tests

PHAR 4811- Disability awareness and inclusion:

Simulations

PHAR 4811- Disability awareness and inclusion:

- What were some of the feelings you experienced in attempting the tasks?

- What did you learn about being a person with a disability?

- How do you feel you changed in your thinking about people with disability changed?

- How do you think this learning it will change your practice?

This Photo by Unknown Author is licensed under CC BY

Year 4: Pharmacotherapeutics (PHAR 4811)

Flipped exams

- **Create MCQs** from your assigned workshop activity (3-5 per group)

- Showcase in workshop and highlight why your chose to 'test' that concept

- **Corrected MCQs** – placed in **Exam Bank** available for practice

- In term exam drawn from these

DESIGN IT YOURSELF EXAM

The 'flipped exam' model

Conventional exams emphasise **rote learning**. They

- inculcate a fear of failure

- increase anxiety

- undercut interest

- reduce intrinsic motivation

- heighten competitiveness and

- depress creativity.[5-9]

Flipped models are a **constructivist paradigm**, and allow allows students to actually focus on the **'process of learning'** rather the **'correct answer'**.[5-9]

Students **perform better** in flipped versus conventional exams

RESEARCH

Evaluation of a Flipped Examination Model Implemented in a Final-Year Undergraduate Pharmacotherapeutics Course

Maya Saba, PhD,[a] Iriny Metry, MPharm,[a] Cherie Lucas, PhD,[b] Bandana Saini, PhD[a]

[a] The University of Sydney, Camperdown, New South Wales, Australia
[b] Graduate School of Health, University of Technology Sydney, Ultimo, New South Wales, Australia

Objective. To assess final-year pharmacy students' performance on and evaluate their experience with a "flipped examination" vs a traditional examination for an advanced clinical pharmacy course.

Methods. Students devised multiple-choice questions for the flipped examination. The Biggs revised 2-factor Study Process Questionnaire was administered before and after the examination to assess any possible changes in the students' perceptions of their level of engagement in the learning process. Focus group discussions also were conducted to further gauge the students' feedback and insights into the flipped examination experience.

Results. Changes in mean total study process scores at the deep and surface levels of learning were significant. The flipped examination experience was enjoyable, facilitated a less-stressful learning environment, and improved the students' learning satisfaction, knowledge, and assessment grades.

Conclusion. The flipped examination model is an innovative instructional approach that can bring about significant educational gains if designed well pedagogically.

Keywords: assessment, flipped exam, pharmacy, pharmacy education, students

DESIGN IT YOURSELF EXAM

The 'flipped exam' model

Biggs revised 2-factor Study Process Questionnaire (R-SPQ-2F), compared pre- and post-exam (n =216)[10]

Areas of Assessment	Pre-examination Scores, Mean (SD)	Post-examination Scores, Mean (SD)
Total study process perception score (20 items)	2.8 (0.4)	3.1 (0.5)[a]
Total Deep Approach score (10 items)	3.0 (0.6)	3.2 (0.6)[a]
Total Surface Approach score (10 items)	2.7 (0.7)	2.9 (0.8)[a]

[a] $p<.001$

The mean total Pharmacotherapy grade on the flipped examination administered in 2016 was **87%** (range, 80%-91%) while the mean total grade on the traditional examination administered in 2015 was 80% (range 56.4%-91%).[b]

The 'flipped exam' model[b]

"I think, theoretically speaking, the flipped exam allows you to kind of explore areas. Say you were asked to write your own question on pediatrics, this kind of lets you look at **different resources** and look at **different areas**. Whereas, when the lecturers were going to give us an exam on pediatrics, it's within this circle only. Like, it confines whatever they teach us." (S7FG1)

That was the first time we were put into the shoes of our lecturers and our tutors, which was good. When you see questions in exams, you don't realize how difficult it is to write them. From like a simple question, **you have to think about all the aspects of whatever you just learned,** so I think it was a really good experience." (S1FG3)

Year 4: Pharmacy Management (PHAR 4814)

Problem-solving skills, life-skills and developing productive mindsets!

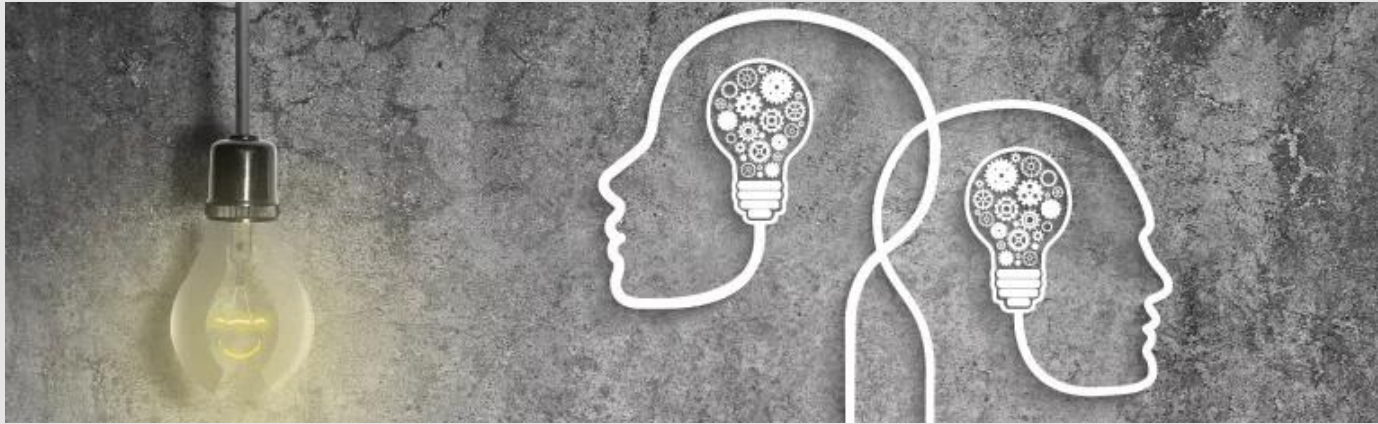Finance and Accounting

Human Resource Mgmt

Marketing

Strategic Mgmt

Leadership

Entrepreneurship

- More than 80% of graduates will work in, manage and eventually own community pharmacy businesses.

- HR management helps in ones's own employment as well as when employing others

- Entrepreneurship is an important skill for all pharmacy sectors

PHAR 4814_Problem-solving skills, developing mindsets!

- **Effective Problem Solving**
  - Structured and Un-Structured Problem Solving
  - Models of Problem Solving
  - Problem Solving Techniques

- **Making Better Decisions**
  - Errors and Shortcuts in Decision Making
  - The Role of Emotion in Judgement & Decision making
  - Balancing Stress
  - Rules of Thumb or Heuristics
  - Making Better Decisions

Brainstorming
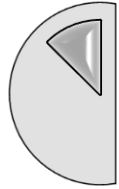
Standard case

Use **classical brainstorming** - accept all ideas, non-critical and go for quantity
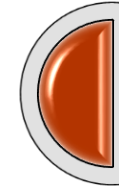
Need innovative ideas?

Use **wildest idea technique** - Come up with fantasy or dream-like solutions and brainstorm to find a realistic solution

Need more time for reflection?

Use **Stop-Go brainstorming** - have rest periods to gather thoughts and peruse ideas
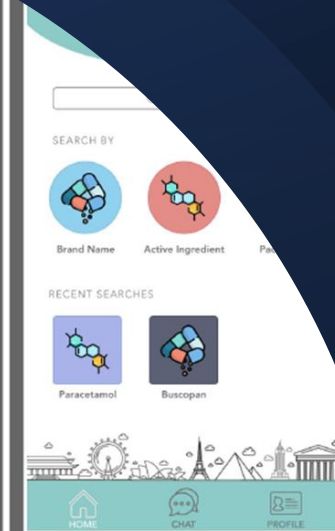
Need to stimulate thought?

Use **reverse brainstorming** - instead of asking, "how can I solve the problem?", ask "how could I cause the problem?"

Problem solving and entrepreneurship

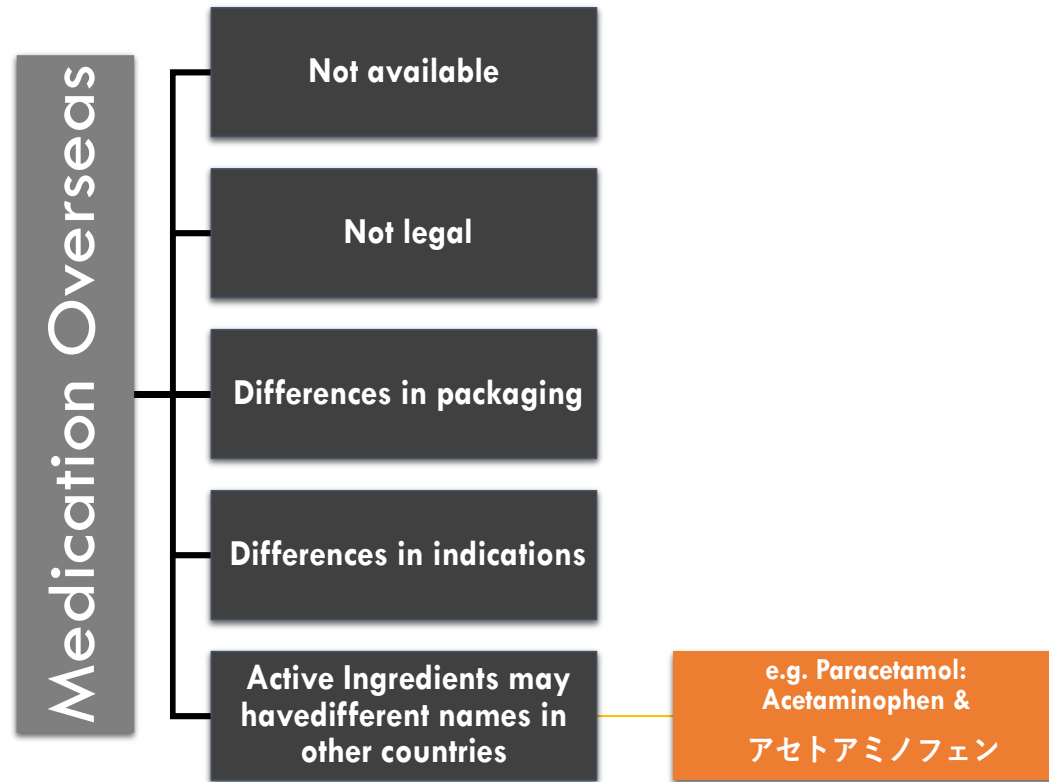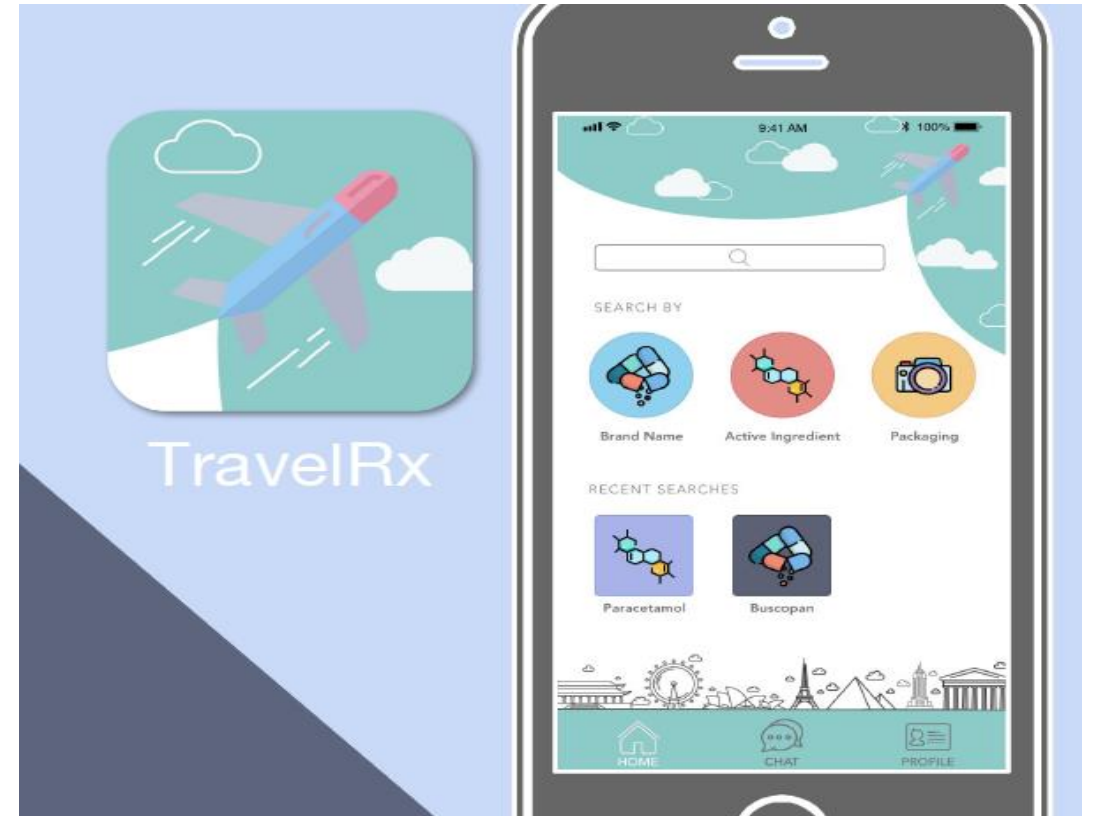Students identify key problems and 'create' innovative solutions.

Problem: Aussie travelers finding medicines overseas

Medication Overseas

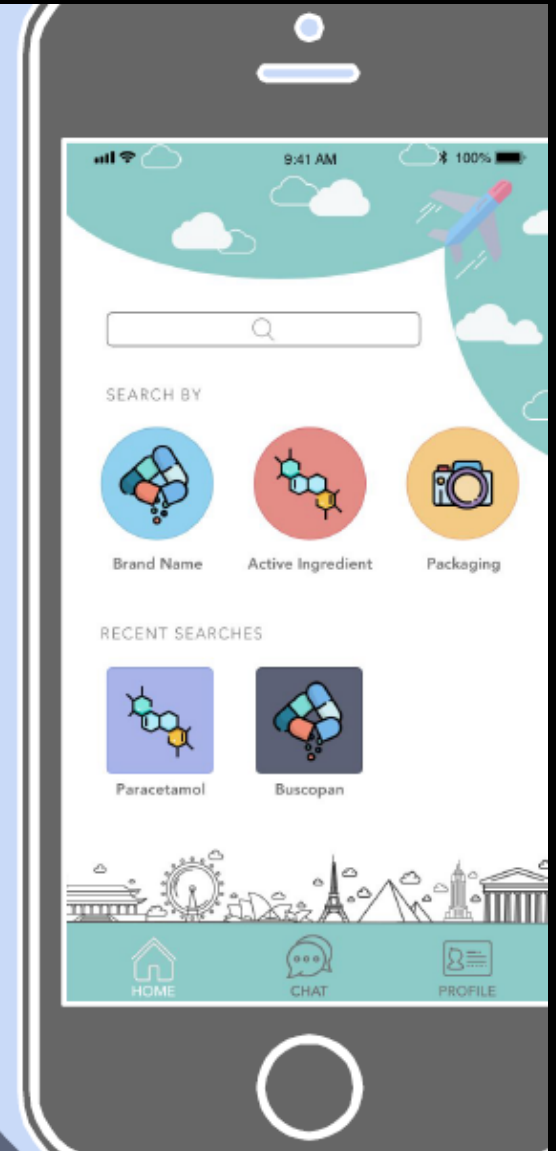- Not available
- Not legal
- Differences in packaging
- Differences in indications
- Active Ingredients may have different names in other countries
  - e.g. Paracetamol: Acetaminophen & アセトアミノフェン

Solution: an app!

TravelRx

SEARCH BY
- Brand Name
- Active Ingredient
- Packaging

RECENT SEARCHES
- Paracetamol
- Buscopan

HOME   CHAT   PROFILE

Other innovations

- Interprofessional collaboration – problem solving
- Competency based learning
- Technological creep in – eg MyDispense Program
- Vaccination training
- Mental Health First Aid Training for all final year students
- Consumers educating students about mental health issues
- Pharmacy graduate leaders program

CONCLUSION

A vibrant, refreshing approach is needed to enrich the learning of pharmacy students. A variety of different approaches are used to achieve this at SPS, USyd. In collegial sharing, perhaps a compendia of innovative approaches in Pharmacy can be compiled for all pharmacy educators globally.

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10. Biggs J, Kember D, Leung DY. The revised two-factor study process questionnaire: R-SPQ-2F. *Br J Educ Psychol*. 2001;71(1):133–149.

Graphic references

- Title page graphic sources from: https://img3.exportersindia.com/product_images/bc-full/dir_146/4375999/pharma-education-training-1483530603-2671553.jpeg

- Books with pestle/mortar:https: //d2s3n99uw51hng.cloudfront.net/static/CPC%20favicon%20510x510.png

- Books spilling from dispensing bottle: https://uwaterloo.ca/pharmacy/sites/ca.pharmacy/files/uploads/images/pharmacy-educatiion.png

- Funnel image :https://i.ebayimg.com/thumbs/images/g/8h4AAOSwR9pbKf6H/s-l200.jpg

- Corrective specs: https://images.immediate.co.uk/production/volatile/sites/4/2020/07/GettyImages-622303970-ab43cc4.jpg?quality=90&resize=768,574:

- Brain and Light Bulb: https://www.ideahub.org/collaborations/big-ideas-to-solve-big-public-health-problems/

- Design it yourself f:https://images.squarespace-cdn.com/content/v1/5d40e8942d44520001a90635/1587472021032-3MKFX85KBKEAPWZ31P90/Design+It+Yourself+Icons_Download+Checklist.png?format=1500w

- Do it yourself computer screen and desk :https://www.business2community.com/wp-content/uploads/2016/07/Design-It-Yourself-Blog-Feature_4.png.png