



# **Evaluating Faculty Facilitator Performance in Interprofessional Education: Utility of the Interprofessional Lean Facilitator Assessment Scale (ILFAS)**

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## COI/Disclaimer

Authors have no conflicts of interest to disclose

# Overview



**Problem:** While well-trained faculty are essential, there is a dearth of validated instruments to evaluate facilitator performance which fosters interprofessional education (IPE) and Interprofessional Collaborative Practice (IPCP).



**Aim:** Evaluate the utility of the Interprofessional Lean Facilitator Assessment Scale (ILFAS) for assessing facilitator performance.



**Hypothesis:** ILFAS could successfully distinguish between more and less experienced faculty facilitators of IPCP case review sessions.

# ILFAS Development



Measures both technical and ‘soft’ skills in clinical setting



Developed using methodologies/principles from

Lean/Shingo  
Interprofessional collaborative practice  
Metacognition research  
Bloom’s Taxonomy of Learning Domains



Initial face validity by expert panelists



Analysis

Inter-rater agreement facilitator performance (92%)  
Discrepancies in the agreement statistics  
Face and content validity established  
Usability through primary stakeholder post-pilot feedback; tool revision



Comprehensive in assessing of facilitator knowledge, skills, abilities, and may be useful in the discrimination between facilitators of different skill levels

# Interprofessional Facilitator Performance Assessment Scale (IFPAS)

## Rubric Structure with Example Behavioral Anchors Items

### 3 Domains; 17 Items

- Enabling (n=5)
- Improving (n=8)
- Aligning (n=4)

### Signaling questions for concrete facilitator behaviors observable by third-party evaluators

- Within each domain
  - “Facilitator encourages team huddle”
- Specific to particular event(s)
  - “Facilitator encourages students to utilize the SBAR communication framework during four transitions of care”

| IFPAS Items                                                                                                                                     | Examples of Concrete Behaviors                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enabling</b>                                                                                                                                 |                                                                                                                                                                                                 |
| 1. Facilitator is able to clearly explain the purpose and benefits of IPECP*                                                                    | The facilitator explains how each member of the interprofessional team is an important part of delivering quality care.                                                                         |
| 2. Facilitator establishes the IEEI method to establish a culture of collaboration and engagement                                               | The facilitator establishes the opening dialogue, inclusive of the meeting purpose, sets the tone for enthusiasm and motivation, explains the benefits, and allows for immediate participation. |
| 3. Facilitator is able to instruct and guide participants through IPECP activities*                                                             | The facilitator asks students to read portions of the case, then ask each profession to respond to questions.                                                                                   |
| 4. Facilitator empowers students to utilize the BEFAST PSA                                                                                      | Describe population health improvement strategy.                                                                                                                                                |
| 5. Facilitator displays a positive attitude during IPECP session(s). (e.g., willingness to listen, participate, value contributions, advocate)* | The facilitator responds positively when a student explains their patient care approach from the perspective of their professional focus.                                                       |
| <b>Improving</b>                                                                                                                                |                                                                                                                                                                                                 |
| 6. Facilitator encourages team members to learn collaboratively about each other's roles and responsibilities during the session*               | The facilitator directs students from each profession to contribute to the formulation of a patient care plan. (cuing a different profession).                                                  |

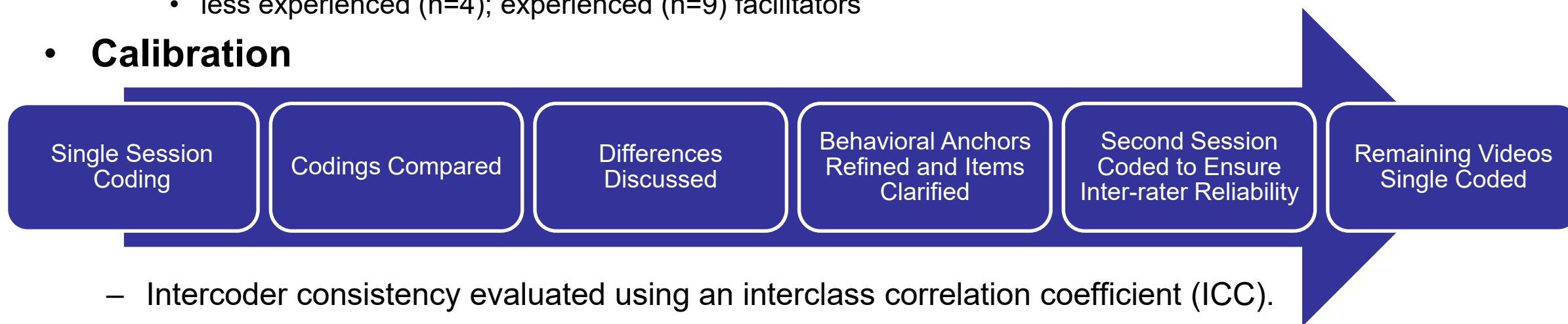
# METHODS

# Data Collection and Coding

- **Sample**

- Intentional sample of n=13 90-minute video recordings of interprofessional case review sessions
  - less experienced (n=4); experienced (n=9) facilitators

- **Calibration**



- Intercoder consistency evaluated using an interclass correlation coefficient (ICC).

- **Blinding**

- Coders blinded to facilitator experience level, outside of training videos

- **Coding**

- NVivo (version 25): IFPAS behavior and time enacting that behavior

- Data downloaded for analysis

# Statistical Analysis

## Descriptive

- Mean and standard deviation of time spent in each behavior for all coded IFPAS behaviors

## Data Reduction and Group Identification

- K-means clustering analysis: identify the optimal number of clusters of facilitators based on time spent different IFPAS behaviors
- If IFPAS was successful: cluster membership should reflect facilitator experience

## Hypothesis Testing

- Independent t-tests used to test for a difference in average years facilitating between clusters

## Discriminant Analysis

- Identify set of behaviors that most strongly define or separate those facilitator clusters
  - i.e., more from less experienced facilitators
- Identify key behaviors differentiating clusters

## Software

- All analyses were carried out in R (version 4.4.2)

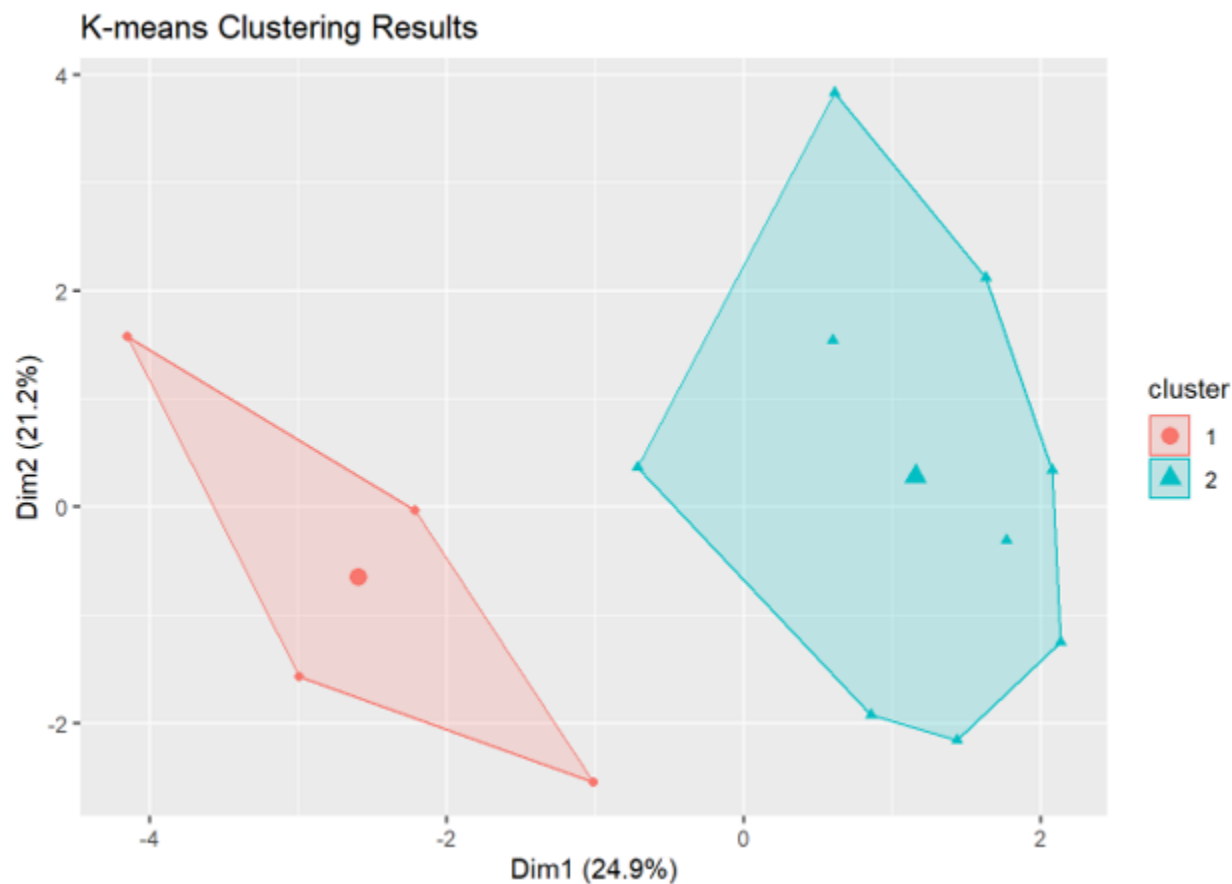


# RESULTS

**Average time  
spent in each  
behavior was  
computed across  
all sessions and  
facilitators**

| IFPAS Items                                                                                                                                     | Mean (SD) Minutes    |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>All Enabling Behaviors</b>                                                                                                                   | <b>24.29 (32.90)</b> |
| 1. Facilitator is able to clearly explain the purpose and benefits of IPECP*                                                                    | 2.36 (3.46)          |
| 2. Facilitator establishes the IEEI method to establish culture of collaboration and engagement                                                 | 4.75 (8.63)          |
| 3. Facilitator is able to instruct and guide participants through IPECP activities*                                                             | 17.73 (32.17)        |
| 4. Facilitator empowers students to utilize the BEFAST PSA                                                                                      | 0.70 (2.53)          |
| 5. Facilitator displays a positive attitude during IPECP session(s). (e.g., willingness to listen, participate, value contributions, advocate)* | 6.85 (7.33)          |
| <b>All Improving Behaviors</b>                                                                                                                  | <b>59.51 (38.18)</b> |
| 6. Facilitator encourages team members to learn collaboratively about each other's roles and responsibilities during the session*               | 9.29 (10.30)         |
| 7. Facilitator observes team behavior and provides feedback to manage team dynamics as needed*                                                  | 8.39 (13.38)         |
| 8. Facilitator stimulates and encourages respectful interprofessional collaborative communication*                                              | 2.03 (3.60)          |
| 9. Facilitator encourages Socratic method for questions that come up and they are not the subject matter expert                                 | 12.24 (18.26)        |
| 10. Facilitator encourages students to utilize the SBAR communication framework during four transitions of care                                 | 7.24 (7.42)          |
| 11. Facilitator encourages team huddle                                                                                                          | 0.85 (2.52)          |
| 12. Facilitator does not control group consensus or outcomes*                                                                                   | 47.61 (33.16)        |
| 13. Facilitator encourages interprofessional collaboration with student standardized patient                                                    | 17.27 (26.33)        |
| <b>All Aligning Behaviors</b>                                                                                                                   | <b>21.55 (33.44)</b> |
| 14. Facilitator acts as a role-model when practicing IPECP skills and competencies*                                                             | 16.73 (30.49)        |
| 15. Facilitator ensures consistent alignment in all IPECP activities in order to meet organization-wide strategic goals and objectives*         | 1.97 (2.76)          |
| 16. Facilitator provides debriefing at the conclusion of all activities, explaining purpose and practical application*                          | 5.17 (6.50)          |
| 17. Facilitator accomplishes all IPECP instructional objectives as scheduled*                                                                   | 8.64 (26.64)         |

# Clusters Mapped to Facilitator Experience Level



| Facilitator      | School/Program/Department                                  | CVA Year | Years Experience | cluster | Mean (SD) years    |
|------------------|------------------------------------------------------------|----------|------------------|---------|--------------------|
| 1                | School of Dental Medicine                                  | 2021     | 2                | 1       |                    |
| 2                | School of Nursing                                          | 2020     | 2                | 1       |                    |
| 3                | School of Dental Medicine                                  | 2021     | 2                | 1       |                    |
| 4                | School of Social Work                                      | 2020     | 3                | 1       |                    |
| <b>Cluster 1</b> |                                                            |          |                  |         | <b>2.25 (0.50)</b> |
| 5                | Physician Assistant Program                                | 2020     | 4                | 2       |                    |
| 6                | Department of Nutritional Sciences                         | 2021     | 4                | 2       |                    |
| 7                | Physician Assistant Program                                | 2020     | 4                | 2       |                    |
| 8                | Department of Rehabilitation and Movement Science          | 2020     | 3                | 2       |                    |
| 9                | School of Nursing                                          | 2021     | 3                | 2       |                    |
| 10a*             | School of Nursing                                          | 2021     | 6                | 2       |                    |
| 10b              | School of Nursing                                          | 2020     | 5                | 2       |                    |
| 11               | Occupational Therapy Assistant Program                     | 2020     | 4                | 2       |                    |
| 12               | Department of Clinical and Preventive Nutritional Sciences | 2021     | 6                | 2       |                    |
| <b>Cluster 2</b> |                                                            |          |                  |         | <b>4.33 (1.12)</b> |

\*Two case review sessions facilitated by facilitator 10 (in different years) were analyzed.

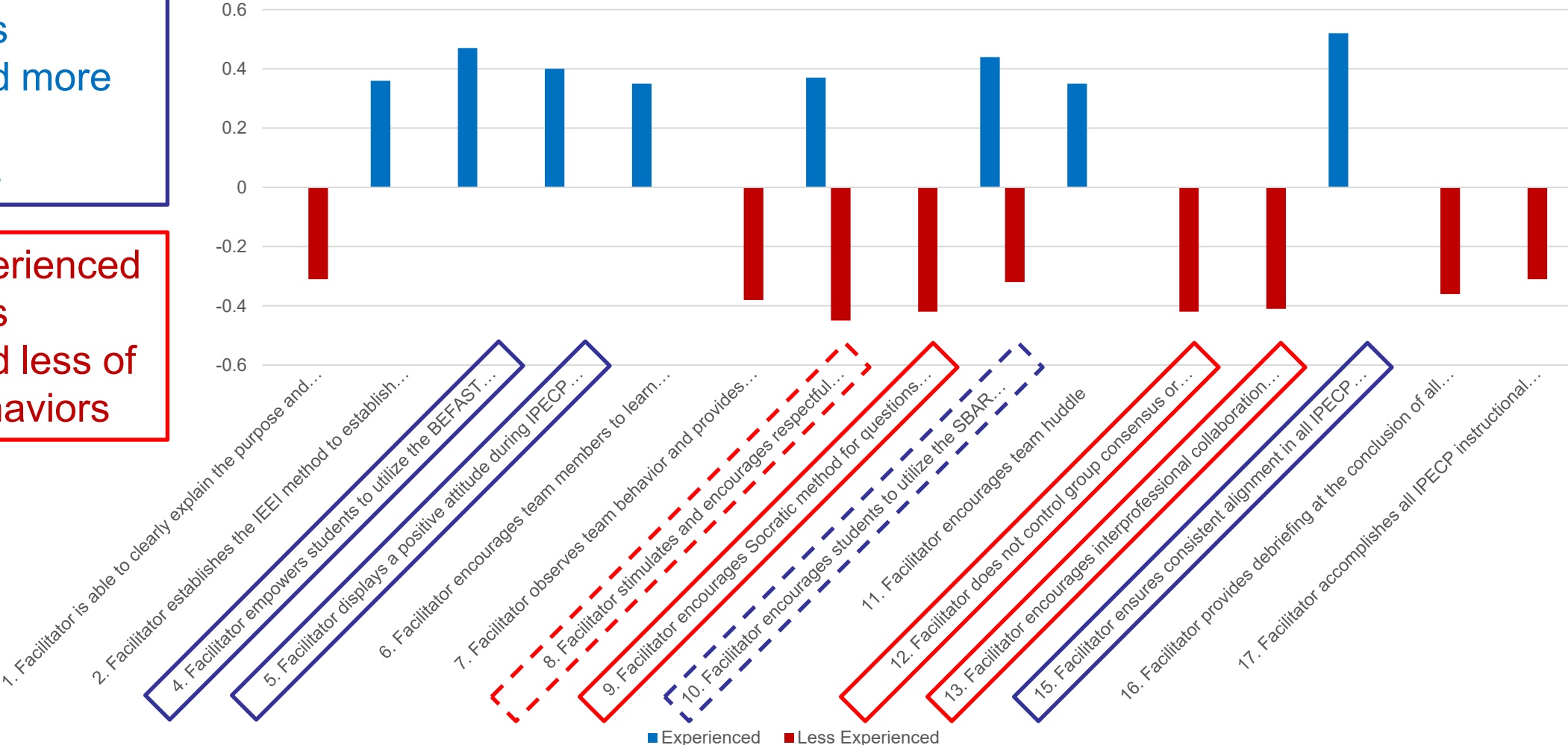
Difference in years of experience between the two clusters was significant ( $p=0.005$ )

# Experience of Facilitators Perform Different Behaviors

Standardized Discriminant Loadings of IFPAS Behaviors: Experienced versus Less Experienced Facilitators

Experienced  
facilitators  
performed more  
of these  
behaviors

Less experienced  
facilitators  
performed less of  
these behaviors



# CONCLUSION

# IFPAS Tool Hypothesis Supported

1

Successfully discriminated experienced from less-experienced facilitators

2

Able to identify specific facilitator behaviors associated with facilitator experience

3

Can provide information to train new facilitators in a more focused manner

- i.e., identify behaviors that would typically be problematic for targeted training



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# Utilising AI (SimConverse) to Enhance MPharm Drug History Teaching in a UK School of Pharmacy

**Aisha Akhtar**

Lecturer in Pharmacy Practice

Pharmacy Education Symposium

2026



# Outline

- Background
- What was the problem?
- SimConverse
- A possible solution
- Reflections
- Thinking about the future

# Background

- Drug history taking and medicines reconciliation – core competencies for a pharmacist
- Introduced in Year 2 of the MPharm at UoR
- Previously taught via lecture and workshop (role-play)

# What was the problem?

- Benefits of role-play: participation and inclusion
- The issues:
  - Volunteering information too early / easily
  - Unable to portray patient characteristics / personalities
  - Reduced authenticity
  - Reduced clinical complexity

Other areas to focus on:

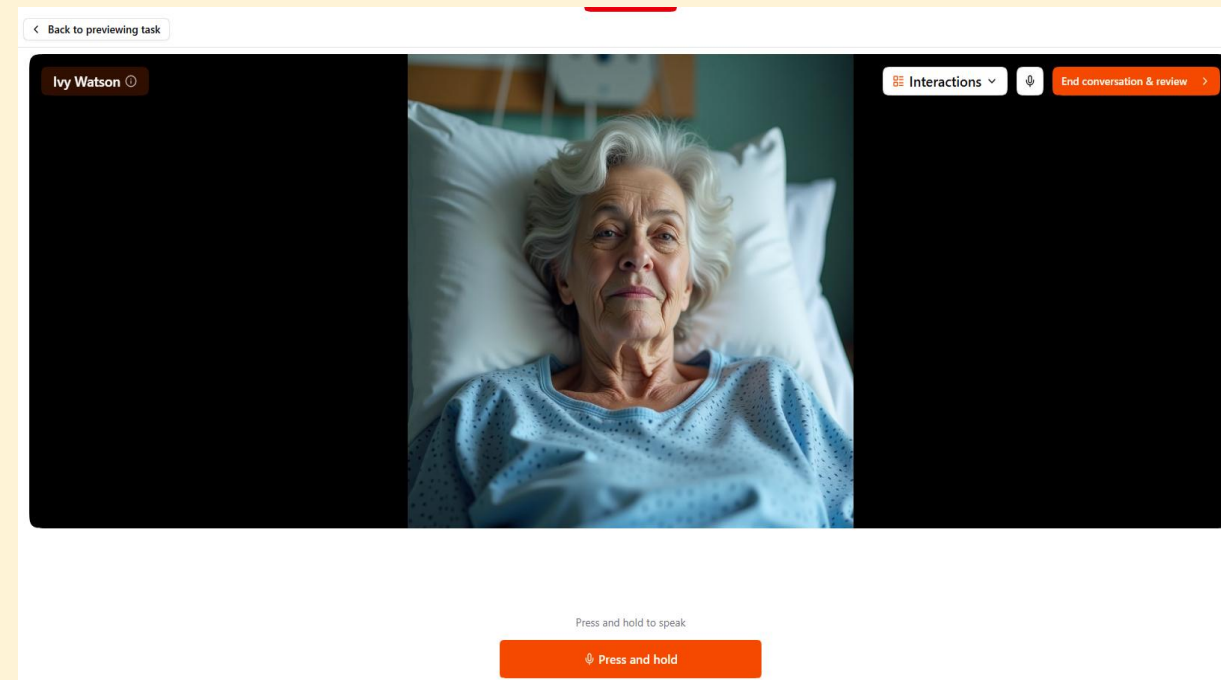
- Low confidence on placements
- OSCE feedback

# So what was the aim?

- Increase authenticity
- Increase clinical complexity
- Increase student confidence ahead of placements
- Better prepare students for OSCEs

# SimConverse

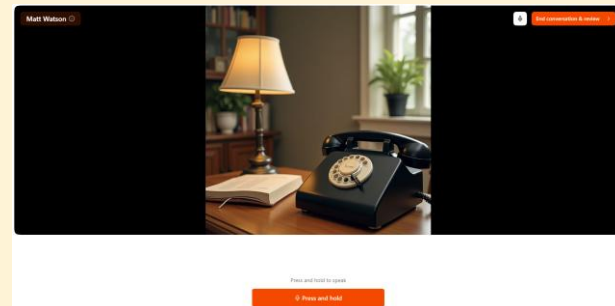
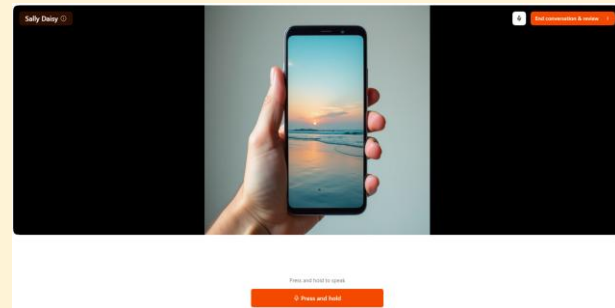
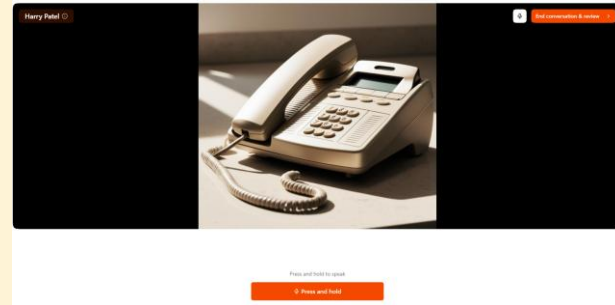
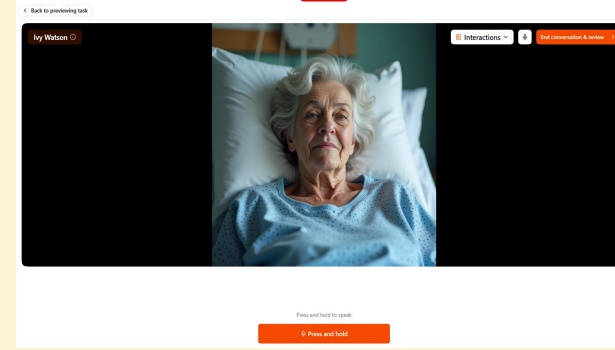
- Generative AI-powered simulation platform
- Students interact with AI characters to undertake consultations
- Already being used in Year 1 to consolidate learning (post-lecture or workshop tasks)
- Had not yet been used as the sole form of teaching...



# A possible solution...

Created 4 AI characters based on case studies seen in practice:

1. **The patient:** elderly, pleasantly confused, cannot recall her medications
2. **A community pharmacist:** very busy, does not have time for a long conversation
3. **A GP surgery receptionist:** on hold for a very long time, warfarin dosing and monitoring
4. **A next of kin:** can verify most information



# How did it look?

- Theory followed by simulation
- 3 iterations of ~ 50 students
- Individually or in pairs
- Task
- Marked against a rubric similar to OSCEs
- Time
- Staff input

| ACTIVITY                            |         |                                                                                                   |
|-------------------------------------|---------|---------------------------------------------------------------------------------------------------|
| Drug History Simulation: Ivy Watson |         |                                                                                                   |
| DUE DATE                            | COHORT  |                                                                                                   |
| Jun 11, 6:28pm                      | Preview |                                                                                                   |
| 1                                   | 🕒       | Pre-Brief                                                                                         |
| 2                                   | 🗣️      | Talk with Ivy                                                                                     |
| 3                                   | 👁️      | Reflection: write a couple of words to describe your thoughts on the task you have just completed |
| 4                                   | 🗣️      | Phone call with community pharmacist                                                              |
| 5                                   | 👁️      | Reflection: write a couple of words to describe your thoughts on the task you have just completed |
| 6                                   | 🗣️      | Phone call with GP surgery receptionist                                                           |
| 7                                   | 👁️      | Reflection: write a couple of words to describe your thoughts on the task you have just completed |
| 8                                   | 🗣️      | Phone call with Ivy's Husband, Matt                                                               |
| 9                                   | 👁️      | Reflection: write a couple of words to describe your thoughts on the task you have just completed |
| 10                                  | 🕒       | Post-learning Task                                                                                |

Building a drug history from a confused patient

■ 2 / 4 sections

☰ 2 of 4 sections passed · Pass: ≥3/4 sections

▼

✔

Conducted a high quality introduction

Pass: ≥4/5 items

■

■

■

■

■

4/5

✔

Introduced themselves by name

The clinician clearly introduced themselves as "Aisha" and identified their role as a pharmacist in their opening statement. The patient's response confirms successful acknowledgment of the introduction.

✔

Introduced themselves by role

The clinician clearly introduced themselves as "Aisha" and identified their role as "one of the pharmacists" at the beginning of the conversation. While they didn't specify the ward location, the professional role was unambiguously stated.

✔

Confirmed the name of the patient

The clinician directly addressed the patient by name "Hi Ivy" at the start of the conversation, and the patient confirmed this name in their response. This meets the basic patient identification requirement.

✖

Confirmed the patient's identify

The clinician failed to ask for any form of patient identification (date of birth or address) before proceeding with the medication review. This is a critical safety requirement to ensure the correct patient is being consulted about their medications.

✔

Explained the reason for the conversation

The clinician clearly explained their purpose by stating they needed to update medication records during hospital admission and verify pre-admission medications. This explanation was direct and understandable, allowing the patient to engage appropriately in the medication review process.

▼

✖

Enquired about the patients medication

Pass: ≥4/7 items

■

■

■

■

■

■

■

1/7

✔

Do they know what medication they take

The clinician directly asked "what medications do you remember taking?" which explicitly prompted the patient to identify their medications. The patient provided detailed responses about multiple medications, and the clinician followed up appropriately to assess their knowledge further.

✖

Asked patient about medical history

The clinician did not ask Ivy about her medical conditions or diagnoses. While they discussed medications and Ivy mentioned warfarin was for her heart, the clinician never explicitly asked about her medical conditions or explored the connection between medications and underlying health issues.

✖

Asked if patient takes OTC medications

The clinician did not ask about over-the-counter medications at any point in the conversation. While they gathered information about prescription medications, they missed this important aspect of medication reconciliation that could reveal additional treatments or supplements affecting the patient's care.

✖

Asks patient about other medications

The clinician failed to systematically inquire about all medication routes of administration. While the patient volunteered information about their inhaler (Fostair), the clinician did not specifically ask about creams, ointments, drops, patches, or injections, which are important routes that could be clinically relevant to the patient's condition.

| Patient name: Ivy Watson |                            |                 |                                                              |        |       | Prior to Admission Medications List |                     |                  |      |      |                                                                                                                                                    |  |  |  |  |  |  |
|--------------------------|----------------------------|-----------------|--------------------------------------------------------------|--------|-------|-------------------------------------|---------------------|------------------|------|------|----------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| NHS number:              |                            |                 |                                                              |        |       |                                     |                     |                  |      |      |                                                                                                                                                    |  |  |  |  |  |  |
| DoB: 12/02/1952          |                            |                 |                                                              |        |       |                                     |                     |                  |      |      |                                                                                                                                                    |  |  |  |  |  |  |
| Allergies: NKDA          |                            |                 |                                                              |        |       |                                     |                     |                  |      |      |                                                                                                                                                    |  |  |  |  |  |  |
| Drug name                | Strength                   | Form            | Dose                                                         | Freq   | Route | Duration                            | Indication          | Source/s         | PODW | PODH | Notes                                                                                                                                              |  |  |  |  |  |  |
| Amoxicillin              | 500mg                      | capsule         | 1g                                                           | TDS    | po    | 4 doses left to complete            | Chest infection     | GP, Husband      | N    | Y    | Prescribed by GP 01/10/25. Has 4 doses left to complete                                                                                            |  |  |  |  |  |  |
| Simvastatin              | 20mg                       | tablet          | 20mg                                                         | ON     | po    | Ongoing                             | High cholesterol    | GP, husband      | N    | Y    | Takes in the morning as opposed to at night as sleeps early                                                                                        |  |  |  |  |  |  |
| Warfarin                 | 1mg, 3mg and 0.5mg tablets | tablet          | Mon, Wed and Fri: 4mg<br><br>Tues, Thurs, Sat and Sun: 4.5mg | OD     | po    | Ongoing                             | Atrial fibrillation | GP               | N    | Y    | Last INR 1.8 on 30/9/25. Dose increased by nurses due to current infection. Target INR 2-3. Monitored by GP Surgery. Next blood test due next week |  |  |  |  |  |  |
| Latanoprost              | 0.005%                     | Eye drops       | One drop BE                                                  | ON     | top   | Ongoing                             | Glaucoma            | GP, Ivy, husband | N    | Y    |                                                                                                                                                    |  |  |  |  |  |  |
| Cetirizine               | 10mg                       | tablet          | 10mg                                                         | OD PRN | po    | Only in summer months               | Hayfever            | GP, husband      | N    | Y    |                                                                                                                                                    |  |  |  |  |  |  |
| Gaviscon Advance         |                            | Chewable tablet |                                                              | PRN    | po    | Short term                          | Reflux              | GP, husband      | N    | Y    | Prescribed on 1/10/25                                                                                                                              |  |  |  |  |  |  |
|                          |                            |                 |                                                              |        |       |                                     |                     |                  |      |      |                                                                                                                                                    |  |  |  |  |  |  |
| Fostair                  | 100/6 micrograms           | Inhaler         | 1 puff BD and 1 puff PRN. MART therapy                       |        | INH   |                                     | Asthma              | GP, husband      | N    | N    | Husband confirmed patient has not taken this for a year as did not understand how to use. Counselling required on discharge if restarted           |  |  |  |  |  |  |
| Amlodipine               | 5mg                        | Tablet          | 5mg                                                          | OD     | PO    |                                     | Hypertension        | GP, husband      | N    | Y    | Husband confirmed patient has not taken this for a year as blood pressure seems to be in range. Doctors to review and monitor BP.                  |  |  |  |  |  |  |



# Reflections

## Positives:

- New style
- Enjoyed complexity and unpredictability
- Felt less embarrassed
- Felt like a 'real' person

## Difficulties faced:

- Volume
- What to ask/ what to say
- AI characters - too unpredictable..?
- Time taken to generate new content / fine-tune prompts

# Thinking about the future

- A larger clinical space
  - Helpful phrases / questions
  - Starter activity
- 
- Overall: an innovative approach to drug history teaching, focused on increased authenticity and clinical complexity
- 
- Link with placement
    - Structure, confidence, questioning techniques
  - Link with OSCE outcomes

**Any Questions?**

# Digital Literacy in Undergraduate Pharmacy Education

Clare Tolley, MRCPharm, Ph.D., PGCert, FHEA, FFCI

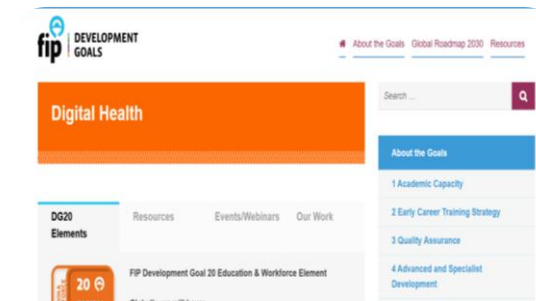
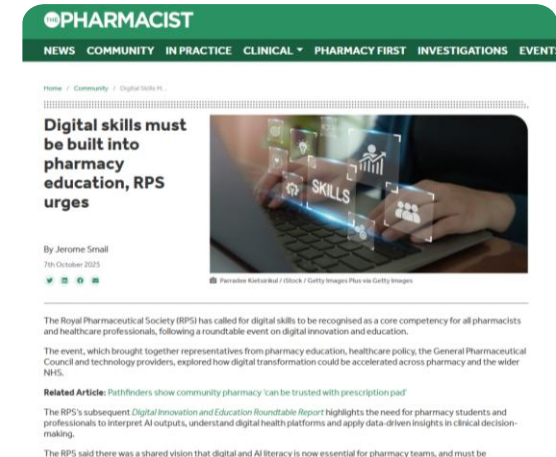
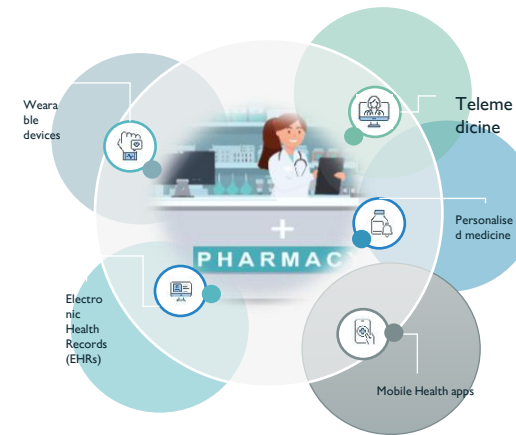
Newcastle University

# Background

Digital literacy “those capabilities that fit someone for living, learning, working, participating and thriving in a digital society”  
Health Education England (HEE)

International Pharmaceutical Federation Digital Health Development Goals Framework: Education & Workforce, Practice and Science

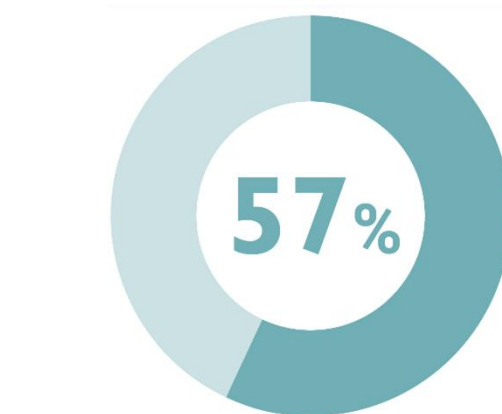
UK's NHS 10 Year Plan: digitally enabled care, aiming to transform how health services are delivered through the widespread use of digital technologies, data integration, and innovation to improve patient outcomes, safety, and system efficiency



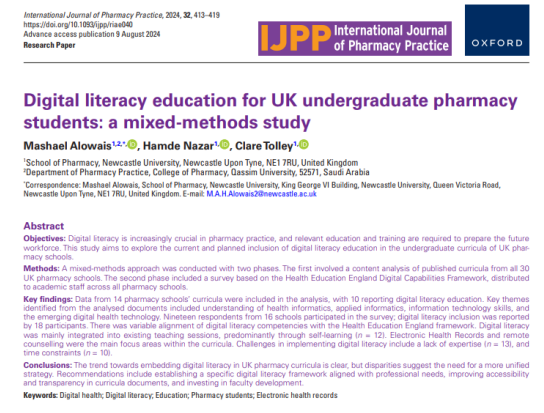
# Digital Evolution vs. Educational Adaptation



Initiatives: Health England Education (HEE) digital capability for pharmacy, GPhC standards.



International Pharmaceutical Federation (FIP) reveals: 57% of surveyed pharmacy schools worldwide do not offer digital health education



Alowais et al. (2024) found 10/14 SoP that participated included digital literacy competencies. Disparities in coverage of competencies and approaches

Health Education England. Digital Capabilities for the Pharmacy Workforce.

The Accreditation Council for Pharmacy Education. Accreditation Standards and Key Elements for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree.

Mantel-Teeuwisse AK, Meilanti S, Khatri B, et al. Digital Health in Pharmacy Education: Preparedness and Responsiveness of Pharmacy Programmes. *Education Sciences*. 2021;11(6):296.

Mashael Alowais, Hamde Nazar, Clare Tolley, Digital literacy education for UK undergraduate pharmacy students: a mixed-methods study, *International Journal of Pharmacy Practice*, Volume 32, Issue 5, October 2024, Pages 413–419, <https://doi.org/10.1093/ijpp/riae040>

# Digital Literacy in UG Education: what's out there already?



## Faculty of Clinical Informatics Core Competency Framework

|                                   |                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------------------|
| Sponsor                           | Faculty of Clinical Informatics                                                                 |
| Funder                            | Faculty of Clinical Informatics                                                                 |
| Principle Investigator and Author | Professor Georgina Moulton<br>University of Manchester and HORIZON                              |
| Co-authors                        | Dr Alan Hassey<br>Faculty of Clinical Informatics<br>Dr Alan Davies<br>University of Manchester |



[www.hee.nhs.uk](http://www.hee.nhs.uk)

We work with partners to plan, recruit, educate and train the health workforce.



Schools of Pharmacy  
Digital Community of Practice:  
Indicative Curriculum (in  
development!)

## **PhD project aim:**

**“To investigate the current landscape for preparing ‘digitally ready’ undergraduate pharmacy students and to develop a digital competency framework for undergraduate pharmacy education.”**

**Dr Mashael Alowais**

Supervised by:

Dr Clare Tolley

Prof Hamde Nazar

Dr Tejal Shah



# Overview



## Review

### Digital literacy in undergraduate pharmacy education: a scoping review

Mashaal Alowaisi <sup>1,2</sup>, Georgina Rudez<sup>1</sup>, Victoria Bess<sup>1</sup>, Hamde Nazar <sup>1</sup>,  
Tajal Shah, PhD<sup>3</sup>, Clare Tolley <sup>4</sup>, PhD<sup>1</sup>

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<sup>2</sup>College of Pharmacy, Qassim University, Umla, 51321, Saudi Arabia  
<sup>3</sup>Correspondence: Mashaal Alowaisi, School of Pharmacy, Newcastle University, King George VI Building, Newcastle University, Queen Victoria Road, Newcastle Upon Tyne, NE1 7RU, United Kingdom. E-mail: [M.A.A.Alowaisi@newcastle.ac.uk](mailto:M.A.A.Alowaisi@newcastle.ac.uk)

<sup>4</sup>Corresponding author: Mashaal Alowaisi, MSc, ScD, PhD, FRPhS, United Kingdom. E-mail: [M.A.A.Alowaisi@newcastle.ac.uk](mailto:M.A.A.Alowaisi@newcastle.ac.uk)

**Abstract**

**Objectives:** Conduct a scoping review to identify existing approaches to digital literacy education in pharmacy schools worldwide.

**Materials and methods:** Following the JBI approach, multiple databases (Scopus, Medline, and CINAHL) were searched. Any discrepancies were identified and resolved through discussion.

**Results:** Our analysis revealed 37 peer-reviewed articles. The majority of studies (25/37) were conducted in the United Kingdom.

**Conclusion and conclusion:** This scoping review identified existing approaches to digital literacy education in pharmacy schools worldwide.

**Key words:** digital health, digital literacy, education.

Identified existing approaches to digital literacy teaching and training in pharmacy education worldwide.

## Scoping Review

### Digital literacy education for UK undergraduate pharmacy students: a mixed-methods study

Mashaal Alowaisi <sup>1,2</sup>, Hamde Nazar <sup>1</sup>, Clare Tolley <sup>1</sup>

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## Abstract

**Objectives:** Digital literacy is increasingly crucial in pharmacy practice, and relevant education and training are required to prepare the future workforce. This study aims to explore the current and planned inclusion of digital literacy education in the undergraduate curricula of UK pharmacy schools.

A questionnaire was used to survey pharmacy schools about their current curricula and future plans.

## Surveying pharmacy schools

Based on the previous findings, a digital competency framework for undergraduate pharmacy students was developed.

## Framework Development

## Content Analysis

Analysis of MPharm curricula to determine the digital competencies offered in UK pharmacy schools.

## Stakeholder Interviews

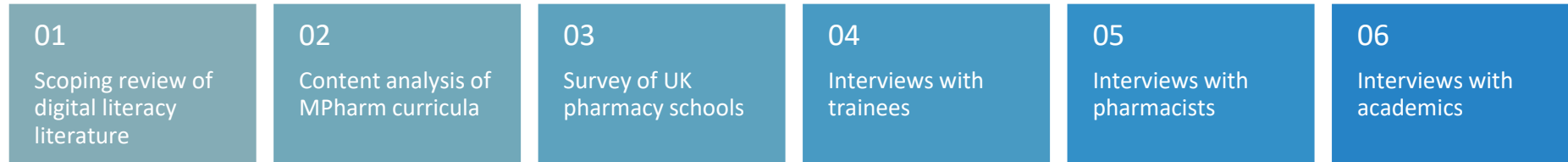
Semi-structured interviews were conducted with academics, pharmacists, and trainees to gain insights into the training provided and to gather more information about the essential digital competencies needed.

## Consensus Validation

The framework refined using an adapted Nominal Group Technique.

The digital literacy framework for UG pharmacy schools

# Framework development



1. Synthesised findings informed the **initial list of digital competencies** for undergraduate pharmacy students



| Domain                        | Skills                                                                                                                        | Trainees | Pharmacists | Academics | Scoping review | Curricula content analysis | The Survey |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------|-------------|-----------|----------------|----------------------------|------------|
| Digital health                |                                                                                                                               |          |             |           |                |                            |            |
| Purpose and Functions of DHTs | Understand the purpose and functions of DHTs in healthcare.                                                                   | ✓        | ✓           | ✓         | ✓              |                            |            |
|                               | Understand the application of DHT principles in clinical practice.                                                            | ✓        |             |           | ✓              |                            |            |
|                               | Recognise commonly used digital health systems in various pharmacy settings (e.g., GP, hospital systems, community pharmacy). | ✓        | ✓           | ✓         | ✓              |                            |            |
|                               | Recognise the digital remote monitoring role in patient care (e.g. wearable health devices and mobile health apps)            |          |             | ✓         | ✓              |                            |            |
|                               | Understand the benefits and limitations of DHTs in practice.                                                                  | ✓        | ✓           | ✓         | ✓              | ✓                          |            |
|                               | Critically assess the reliability of DHTs (e.g. <u>mhealth</u> ) before recommending them to patients.                        |          |             | ✓         | ✓              |                            |            |

# Framework development

## 2. Drafted framework developed



- Refined through three iterative rounds with the supervisory team (pharmacy academics, clinical informatician).
- Each round involved refinement of structure, language, and alignment.
- Mapped to Bloom's Taxonomy.
- Aligned with the HEE Digital Capability Framework for Pharmacy Workforce.

# Consensus Development Method

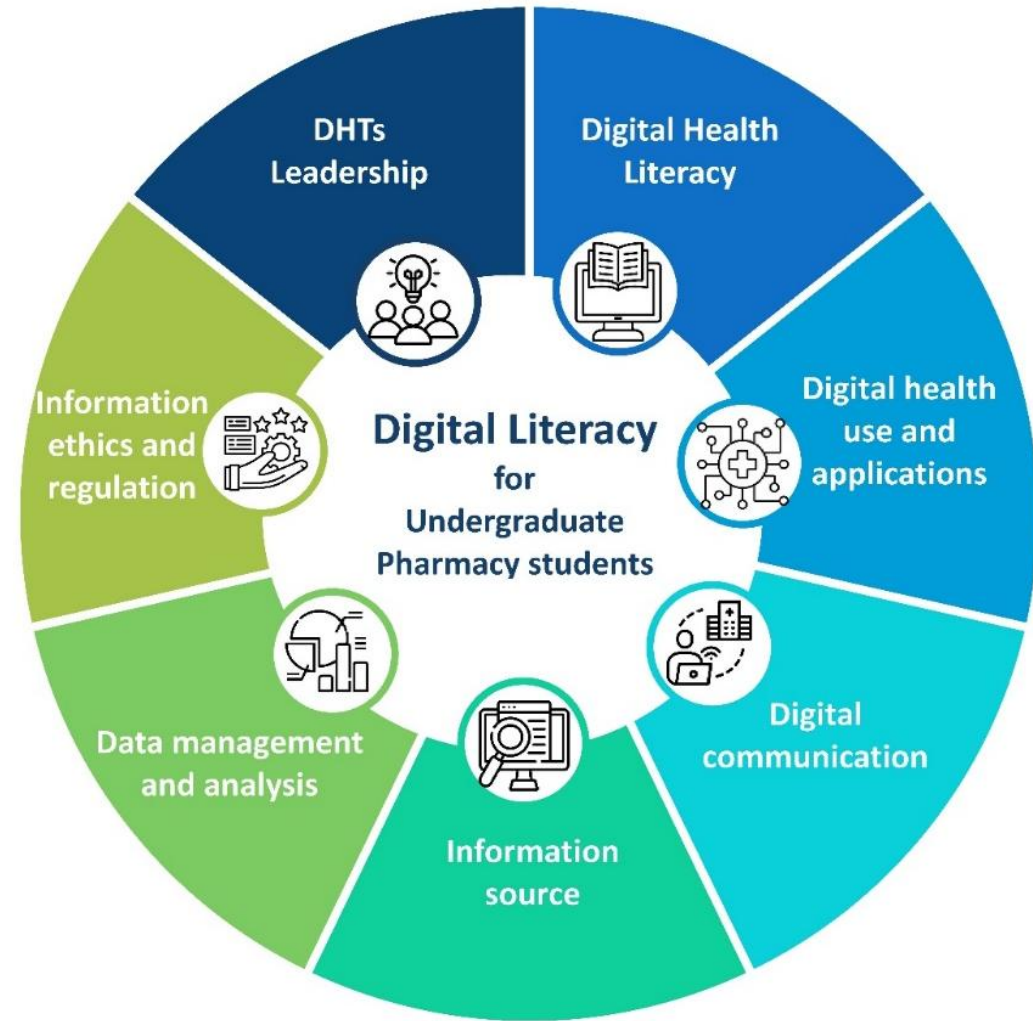
- An adapted Nominal Group Technique (NGT) to review and validate the drafted framework with **9 pharmacy academics** from a pharmacy school in the United Kingdom.
- 55 learning outcomes across 7 domains reviewed
- Results:

| NGT's Stage       | Number of Outcomes (N=55) | Level of Agreement          |
|-------------------|---------------------------|-----------------------------|
| Individual rating | 29                        | Strong agreement (80–100%)  |
|                   | 20                        | Moderate agreement (60–79%) |
|                   | 6                         | Low agreement (40–59%)      |
| Group Discussion  | 19                        | reached consensus           |
| Final consensus   | 48                        | reached agreement           |
|                   | 7                         | did not reach consensus     |

# The Digital literacy framework

---

- 7 domains, each representing a broad area of competence
- Within each domain, the learning outcomes define what students should be able to know and do.
- These outcomes are classified into three levels, according to Bloom's Taxonomy.



# The Digital Literacy Framework for Undergraduate pharmacy education

| 1 Digital health literacy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Basic</b> <ul style="list-style-type: none"> <li>Describe the purpose and functions of digital health in healthcare.</li> <li>Explain the application of digital health principles in practise.</li> <li>Discuss the benefits and limitations of digital health in practise.</li> <li>Explain the role of digital health in pharmacogenetics and personalised medicine.</li> <li>Explain coding concepts and their applications in healthcare.</li> </ul>                                                                                                                   | <b>Intermediate</b> <ul style="list-style-type: none"> <li>Demonstrate foundational digital literacy skills (e.g., device operation, internet connectivity, web navigation).</li> <li>Use Microsoft Office (e.g., Word, Excel, PowerPoint) to create reports and present data.</li> <li>Use DHTs for one's own personal and professional development needs.</li> <li>Actively promote digital health literacy for peers or patients.</li> <li>Build and use digital identities appropriately.</li> </ul> | <b>Advanced</b> <ul style="list-style-type: none"> <li>Design teaching and learning resources using a wide range of digital tools and emerging technologies.</li> </ul>                                                                                        |
| 2 Digital health technologies (DHTs) use and applications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                |
| <b>Basic</b> <ul style="list-style-type: none"> <li>Identify commonly used DHTs in various pharmacy settings.</li> <li>Explain the role of factors such as human, system, and environmental factors in designing and implementing digital health systems.</li> <li>Discuss usability and security issues associated with DHTs (e.g., EHRs (Electronic Health Records) and CDSS (Clinical Decision Support Systems) dispensing systems, mobile health apps, wearable devices).</li> <li>Discuss the potential applications of AI and AI-based systems in healthcare.</li> </ul> | <b>Intermediate</b> <ul style="list-style-type: none"> <li>Use DHTs to perform clinical activities (e.g., digital searching, dispensing).</li> <li>Critique and analyse advances in DHTs (e.g., the use of robots in dispensing) for research, development, and quality of care improvement activities.</li> <li>Analyse and interpret CDSS alerts.</li> <li>Analyse the potential advantages, limitations and issues of using AI and AI-based systems in healthcare.</li> </ul>                         | <b>Advanced</b> <ul style="list-style-type: none"> <li>Evaluate design and usability issues associated with DHTs.</li> <li>Evaluate the reliability and effectiveness of DHTs.</li> <li>Formulate clinical decisions informed by outputs from DHTs.</li> </ul> |

### 3 Digital communication skills

#### Basic

- Understand the importance of communication skills to improve patient care in digital settings.
- Recognise the wide range of digital tools used for digital communication (e.g., Microsoft Teams, Zoom, NHS Near Me, online pharmacy).
- Understand the roles and regulations involved in digital communication.

#### Intermediate

- Demonstrate non-verbal communication strategies in remote interactions (e.g., to convey empathy)
- Communicate effectively with patients and other HCPs using DHTs.
- Support patients in using remote consultation (e.g., addressing digital inequity).

#### Advanced

- Justify and explain the outputs from DHTs to patients or HCPs.

### 4 Information source

#### Basic

- Understand digital health taxonomies, vocabularies and coding languages (e.g., The Systematised Nomenclature of Medicine, SNOMED)
- Describe the concept of interoperability and its impact on patient care.

#### Intermediate

- Apply appropriate search strategies to locate online information.
- Use online resources (e.g., British National Formulary, Summary of product characteristics) or AI appropriately and securely.
- Use digital health taxonomies, vocabularies and coding languages (e.g., SNOMED) appropriately in clinical documentation.

#### Advanced

- Critically evaluate online sources for credibility and reliability.
- Evaluate information for accuracy and reliability.
- Formulate decisions guided by online resources.





## 5 Data management and analysis

### Basic

- Explain data management principles (e.g., secure data handling, storage, archiving and secure data environment)
- Describe statistical concepts and methodologies.

### Intermediate

- Use data analysis tools (e.g. SPSS, Microsoft Excel, Power BI) to manage datasets.
- Apply statistical methods to analyse patient data.
- Analyse and interpret the patient data from the clinical system.

### Advanced

- Formulate decisions informed by outputs of statistical analysis.
- Guide others in implementing data management principles (e.g. secure data handling, storage, and archiving)

## 6 Information ethics and regulation

### Basic

- Describe ethical aspects such as patient confidentiality, data security, and informed patient consent.
- Recognise the legal frameworks for data protection and the importance of complying with them (e.g., General Data Protection Regulation (GDPR)).
- Describe risk assessment and management, and the importance of compliance with its standards to minimise risks to patient safety.
- Describe the principles of clinical governance in digital health systems. (e.g., defining who owns, accesses, and controls data and the role of standard operating procedures (SOPs)).

### Intermediate

- Comply with the organisation's legal requirements to meet regulatory frameworks (e.g., GDPR).

### Advanced

- Formulate decisions that address ethical concerns related to DHTs through the analysis of the relevant legal framework.
- Evaluate how clinical risk standards (e.g. DCB 0129 and DCB 0160) help reduce risks to patient safety.



## 7 DHTs Leadership

### Basic

- Explain the importance of leadership skills in promoting the adoption of DHTs (e.g., engagement strategies with decision-makers).

### Intermediate

- Apply collaborative strategies with healthcare professionals (HCPs) and peers to use DHTs effectively.
- Apply strategies to support patients and HCPs in the use of DHTs.

### Advanced

- Adopt, design and develop digital solutions to enhance patient care.

# Thank you!

**Credit to:**

Mashael Alowais

Dr. Hamde Nazar

Dr. Tejal Shah

Georgina Rudd

Victoria Besa



# Part 1: BUILDING AN ACADEMIC AI ECOSYSTEM – AN AGENTIC AI ROADMAP

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Building institutional AI capability across governance, education,  
research, practice and operations

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**Ralph Altieri** • **Khalid Mansour** • **David Bain**

University of Colorado Anschutz Skaggs School of Pharmacy and Pharmaceutical Sciences  
(CUSSPPS) USA

**Rebecca Roubin**

University of Sydney Pharmacy School Sydney, Australia

AI STRATEGY

GOVERNANCE

EDUCATION

RESEARCH

PRACTICE

OPERATIONS

AGENTIC AI

ROAD MAP

---

Monash University Pharmacy  
Education Symposium 2026  
5-8 July 2026 Prato, Italy

# The Core Message

**We are building an AI ecosystem — not just deploying tools.**

## Governance-First

Council, stewards, policy, CoPs, accountable expansion — not fragmented experimentation.

## Education

Faculty, staff, student development  
Formal courses, AI tutor platforms, informal discovery series, L&Ls.

## Research Integration

AI is embedded in scientific discovery, not as a separate operational stack.

## Clinical Practice

Improving efficiency and effectiveness in patient care with UC Health and CU Medicine.

## Operations

Improving efficiency and effectiveness in school operations.

## Entrepreneurship

Faculty and staff development, applying AI innovations in Pharmacy.

# Governance and Operating Model

## AI Council

Strategic oversight, institutional alignment (with campus ISS, DBMI), prioritization, and disciplined AI expansion across all school programs.

## Steward Layer

Domain experts and builders who create best practices, evaluate tools, advance thinking, and operationalize AI at the faculty and staff level.

## AI Governance

Safe use policy, accountability frameworks, ethical review, and structured approval processes for new AI deployments.

## Communities of Practice

Distributed adoption model connecting faculty, staff, and emerging AI builders across departments and programs.

# Shared Capacity AI Roadmap: Phases 1 - 4

PHASE 1

Active

## Foundation

Council, governance, stewards, communities of practice, AI literacy, and baseline training.

PHASE 2

Active

## Practical Value

Lunch-and-learns, faculty enablement, discovery series, domain-specific agents, learner support, reusable design patterns.

PHASE 3

Active

## Institutional AI

Common standards, evaluation frameworks, cross-school deployment, safety and ethical AI protocols, and governed reuse.

PHASE 4

ACTIVE

## Agentic AI

Adaptive tutors, course-scale orchestration, research assistants, and translational AI ecosystems.

# What We Have Already Built

01

## AI Governance Infrastructure

AI Council, steward layer, and communities of practice — a full operating model, not just a policy document.

02

## ML & Deep Learning Courses

Introduction to Machine Learning, Deep Learning & Generative AI — formal curriculum deployed for graduate students.

03

## Lunch-and-Learn Series '26

Practical AI applications in healthcare — structured, accessible, and focused on real use cases without requiring AI fundamentals for faculty, staff, students.

04

## Agentic AI NAPLEX Tutor

License exam  
Readiness Platform for P1-P4/APPE pathways. Domain-specific, pedagogy-aware, purpose-built.

05

## Cogniti.ai Proof of Concept

Three deployed agents demonstrating educational agent design, deployment patterns, and practical institutional value.

06

## Control Room ML Platform

Clinical risk prediction and research platform with governed benchmarking, calibration, explainability, and uncertainty quantification.

# Cogniti.ai — Proof of Concept

## Designed, Deployed, and Evaluated Three Agents Embedded in Cogniti.ai

A structured evaluation of how Cogniti.ai performs as an instructional platform — testing agent design patterns, deployment in an institutional context, and practical value for learners.

### What We Learned

How educational agents are configured, deployed, and governed in an academic environment.

### What We Validated

The advantage of using an agent driven system (Cogniti) vs a fenced general GPT and their respective value.

### What This Enables

An evaluation framework for what an agentic platform should deliver as an AI tutor going forward.



# Part 2: Integration of AI for Learning

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*Monash PES26 · Embedding Digital Literacy and AI in Pharmacy and Pharmaceutical Sciences Education*

Ralph Altieri · Khalid Mansour · David Bain | CUSSPPS, University of Colorado Anschutz, USA  
Rebecca Roubin | The University of Sydney School of Pharmacy, Australia

# What is Cogniti?

A SECURE TEACHING & LEARNING AI PLATFORM | UNIVERSITY OF SYDNEY

Cogniti is a purpose-built AI platform designed for higher education, enabling institutions to deploy AI in a governed, pedagogically sound way.

Unlike general-purpose AI tools, Cogniti was built with pharmacy and health sciences education in mind – balancing innovation with institutional accountability.



## **Institutionally Governed**

Aligned with privacy, ethics & academic integrity policies



## **Faculty-Controlled Agents**

Course-specific AI agents with curated learning materials



## **Full Oversight & Visibility**

Educators monitor AI-student interactions and content referenced

# Assessment FOR Learning

STUDENT SELF-LEARNING WITH FACULTY MONITORING

*Cogniti repositions AI as a learning partner, not just a shortcut.*

01



## Personalised Dialogue

Students interact with course-specific AI agents built around curated pharmacy content — asking questions, exploring cases, testing understanding.

02



## Active Faculty Monitoring

Educators track student engagement patterns, question topics, and interaction quality in real time — intervening where needed.

03



## Iterative Self-Assessment

Students receive immediate, evidence-based feedback prompting reflection and deeper engagement with the material.

# Assessment OF Learning

PREDICTIVE ANALYTICS · MASTERY CLASSIFICATION · EARLY INTERVENTION

*Cogniti's analytics engine turns interaction data into actionable intelligence for educators.*



## Mastery Classification

Algorithms analyse interaction depth and accuracy to classify whether a student has genuinely mastered core competencies.



## Learning Gap Detection

Patterns in student questions and errors pinpoint specific knowledge gaps before they compound into larger misunderstandings.



## At-Risk Student Identification

Early signals – declining engagement, repeated errors, avoidance of certain topics – flag students needing support.



## Outcome Prediction & Intervention

Predictive models inform outcome forecasting, enabling targeted early intervention to improve graduation readiness.

# Implementation in Practice

UNIVERSITY OF SYDNEY SCHOOL OF PHARMACY and CUSSPPS

## Univ. of Sydney — SUSoP

- Cogniti deployed widely across the full pharmacy curriculum
- Faculty design agents aligned to specific unit learning outcomes
- Students engage with AI tutors tailored to course content
- Analytics used to monitor cohort-level competency progression
- Established evidence base informing the CUSSPPS adoption

## Univ. of Colorado - CUSSPPS

- Cogniti adopted within AI governance framework (AI Strategic Council oversight)
- Applied to a graduate-level Machine Learning course
- Faculty & staff professional development via credentialed Lunch & Learn series
- Scaling AI across education, research, practice and administrative mission areas
- Potential to serve as a model for evidence-based, governed AI adoption in US pharmacy education

# Digital Literacy by Design

EMBEDDING AI COMPETENCE AS A GRADUATE ATTRIBUTE | FACULTY & STUDENT PARALLEL TRACKS

*Cogniti is not just a tool — it is a vehicle for building AI literacy in both students and faculty.*

## FOR FACULTY — The Agent Design Workflow

1 Define LOs

2 Curate Content

3 Build Agent

4 Monitor &  
Iterate

Builds AI pedagogical competence and confidence in every participating faculty member — by design.

## FOR STUDENTS — From AI Consumer to Critical Practitioner

1 Engage

2 Evaluate

3 Apply

4 Reflect

Students engage with AI critically — evaluating outputs, applying knowledge, and reflecting on AI's role in clinical practice.

## Curriculum-Embedded

AI literacy woven into pharmacy units via Cogniti assessment tasks — part of the curriculum, not an add-on.

## Faculty-Credentialed

Credentialed Lunch & Learn series builds institutional AI capacity in faculty and staff across mission areas.

## Graduate-Ready

Graduates leave with documented AI competence for AI-permeated clinical and research environments.

## KEY TAKEAWAYS

# Embedding AI Purposefully in Pharmacy Education



Governance first — AI in health professions education must be institutionally governed, not left to individual tool adoption



Faculty remain central — Cogniti amplifies educator expertise; it does not replace the faculty-student relationship



Data-driven, not data-drowned — predictive analytics surface actionable insight for early intervention and outcome improvement



Digital literacy is a graduate attribute — AI competence must be developed in students and staff as part of the curriculum

# Preparing Future Pharmacists as Antimicrobial Stewards

**Emily Black, Jenny Curran, Bryan Fumerton**

*Dalhousie University, College of Pharmacy*

*Halifax, Canada*



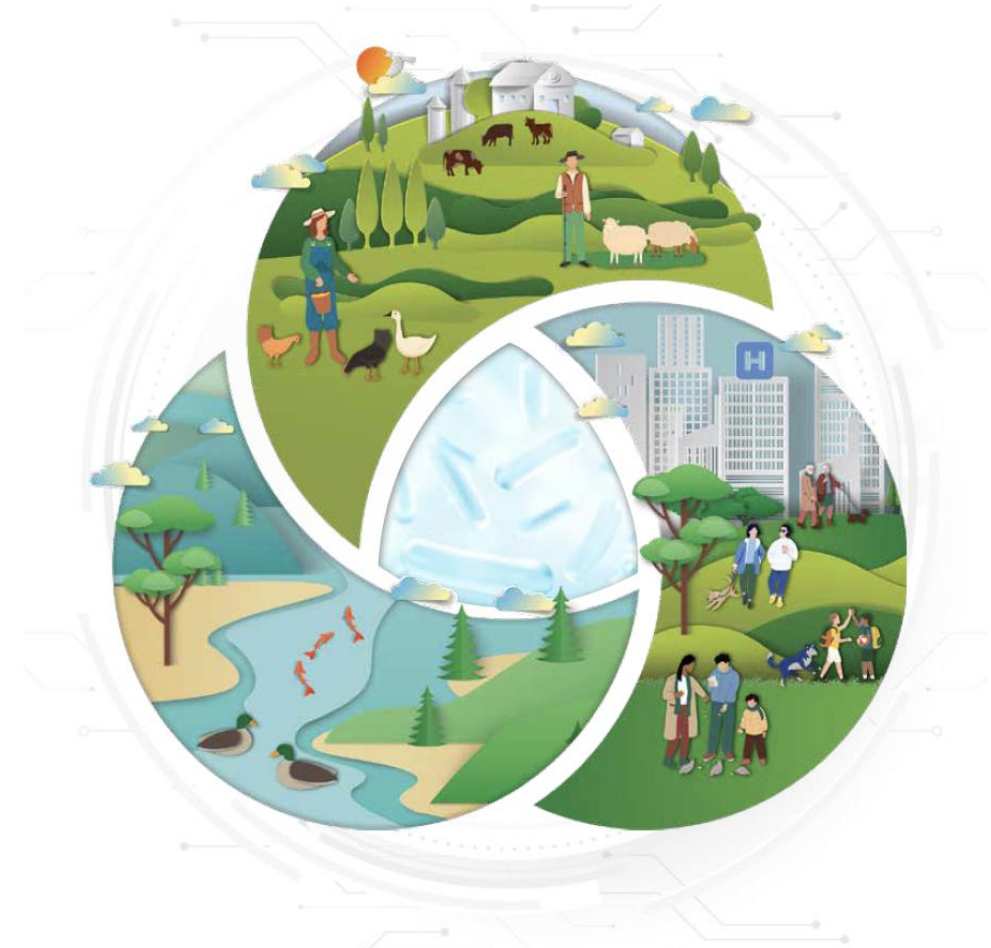
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# Background

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- Antimicrobial resistance (AMR) is one of the top global health threats
- Pharmacists play a lead role in antimicrobial stewardship (AMS) initiatives
  - Pharmacists in Canada are increasingly prescribing antibiotics for common infections
- An elective course in antimicrobial resistance and stewardship was developed for 3<sup>rd</sup> year PharmD students at Dalhousie University in Canada
  - PHAR3003.03: Antimicrobial Resistance, Antimicrobial Stewardship and Advanced Infectious Diseases



**Pan-Canadian Action Plan  
on Antimicrobial Resistance**



# Course Description

- The goal of this course was to prepare students to engage in AMS initiatives and promote appropriate antimicrobial use in community and hospital settings.
  - Learning outcomes modified from the World Health Organization's "Health Workers' Education and Training on Antimicrobial Resistance" curricula guide."
-

# Course Description

- 3 credit hour elective
- Max class size: 20 students
- Mix of didactic and interactive sessions, student presentations, and a panel discussion
  - Advanced therapeutics and critical appraisal skills
  - Principals of AMS
  - Implementation science
  - Health promotion

| Week           | Day 1                                                            | Day 2                                                                               |
|----------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Week 1</b>  |                                                                  | Course introduction; AMR and AMU in Canada and internationally                      |
| <b>Week 2</b>  | Critically appraising use of AI in infectious diseases           | Introduction to AMS, Hospital AMS Initiatives Part 1 (iv to po, allergy assessment) |
| <b>Week 3</b>  | Hospital AMS, Part 2 (audit and feedback, formulary restriction) | Patient Case 1 (Intraabdominal infections: IV to po conversion)                     |
| <b>Week 4</b>  | Developing AMS interventions and programs                        | Bugs and Drugs; Diagnostic stewardship                                              |
| <b>Week 5</b>  | AMS expert panel discussion (Opportunities and challenges)       | AI assignment student presentations                                                 |
| <b>Week 6</b>  | AMS in special populations: Part 1 – Long term care              | Quiz #1 (open-book)                                                                 |
| <b>Week 7</b>  | Community-based AMS (patient education, health promotion)        | Patient case 2: Osteomyelitis/OPAT                                                  |
| <b>Week 8</b>  | AMS in special populations: Part 2 - Pediatrics                  | Patient Case 3: Pediatric case (allergy assessments)                                |
| <b>Week 9</b>  | AMS in special populations: Part 3 – Critical Care               | Patient Case 4: Critical Care                                                       |
| <b>Week 10</b> | AMS in special populations: Part 4 – Immunocompromised hosts     | Patient Case 5: MDR infections                                                      |
| <b>Week 11</b> | Final presentations                                              | Final presentations                                                                 |
| <b>Week 12</b> | Final presentations                                              |                                                                                     |



# Assessments

- Designed to apply knowledge acquired throughout the course
- Incorporate real-world challenges
- Embed peer teaching

Individual quizzes

Group AI assignment

Major course assignment

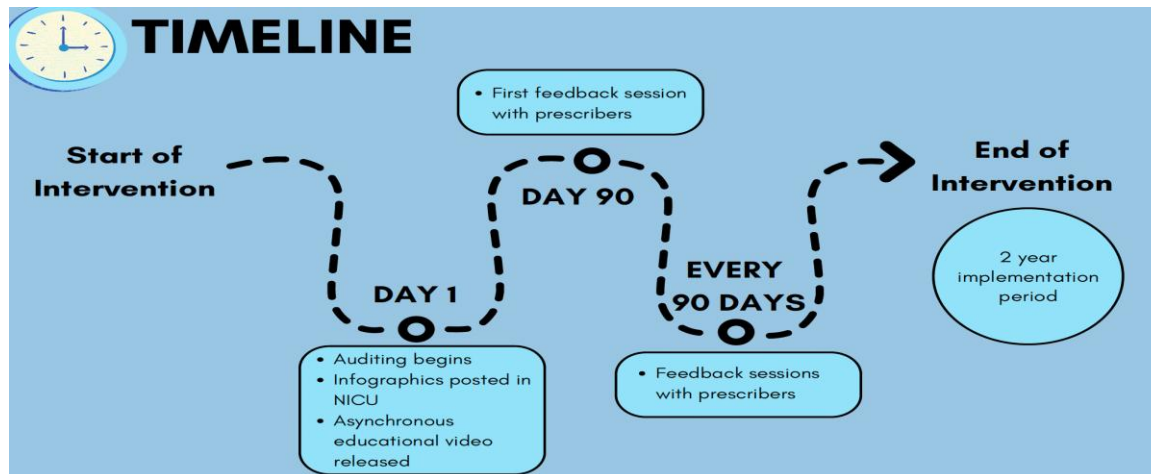
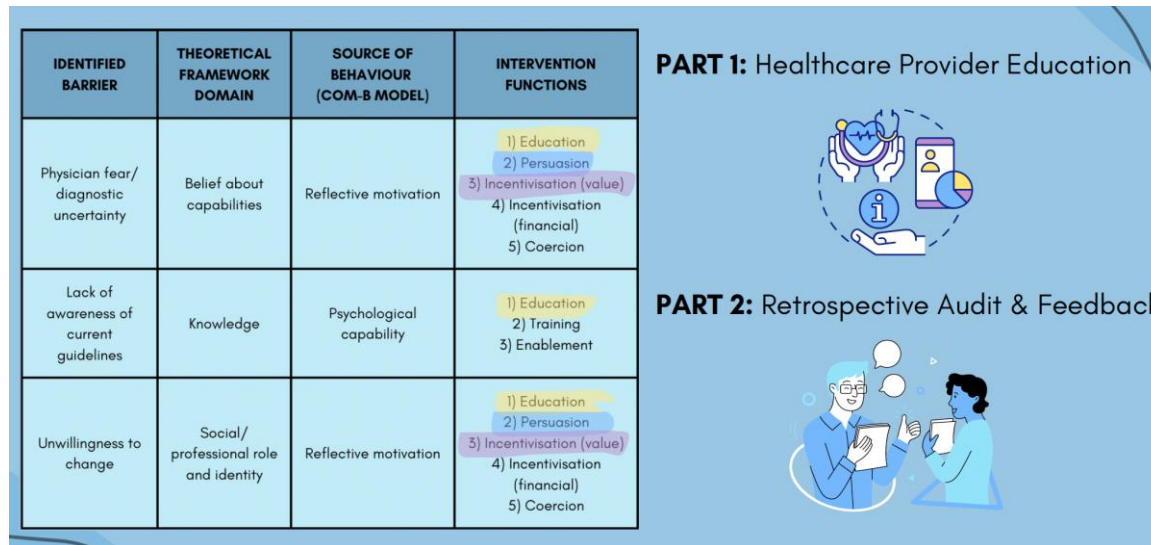
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# Major Course Assignment

- Designed to apply knowledge and skills developed throughout the course
- Completed in groups of 2-3
- Groups assigned a "mentor" to identify a local AMR challenge and design an AMS intervention
  - Clinician with experience providing direct patient care to patients with infections
- Assignment completed in 3 Parts
  - Part 1: Identifying a Challenge
  - Part 2: Patient or healthcare provider educational material
  - Part 3: Final project presentation
- Evaluated by the course coordinators using predefined rubrics
- Qualitative feedback from mentors

# Sample Student Work

Identified Challenge: Overuse of vancomycin empirically for infants in the NICU with late onset sepsis

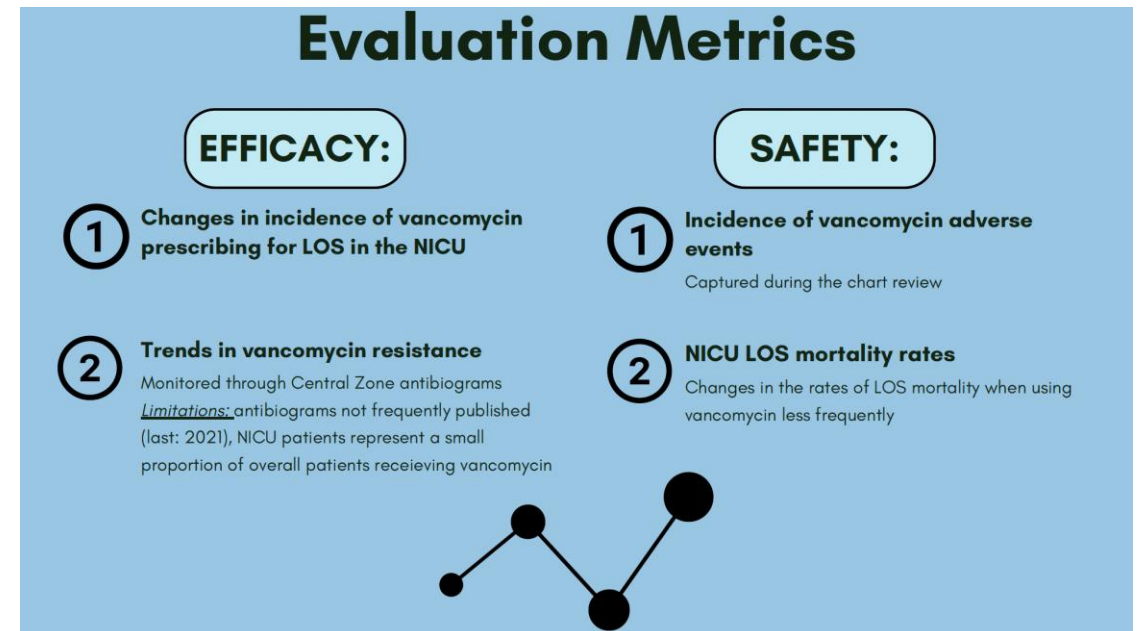
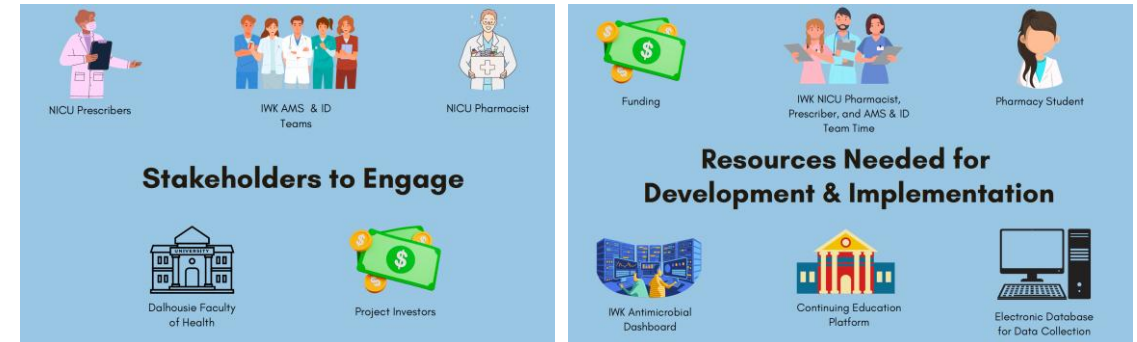




# Sample Student Work

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- Enriched learning by engagement with clinicians to identify locally relevant challenges
- Considered evidence-based, theory informed solutions that were practical to implement in the setting



# Course Feedback

- Students felt the course:
  - Increased their ability to think critically
  - Used fair assessment methods
- Mentors agreed that the course prepare students to engage in AMS initiatives that promote appropriate AMU

*"I liked the mini cases because I felt they not only helped me learn the material better ... but also influenced my decision when it came to picking an antibiotic in our infectious diseases cases." (student)*

*"I liked the major project! It was a great way to get us thinking about AMS." (student)*

*"I was very impressed with the end result, and our team is moving forward with the recommended intervention. It was a very large ROI for the amount of time spent." (mentor)*



## Conclusion

- This course prepared future pharmacists to identify and address AMR related challenges in practice
- The final course assessment is also mutually beneficial to clinicians

## Next Steps

- Assess the course and alignment of the ID curriculum using the newly published WHO “**Antimicrobial resistance curriculum assessment tool for pharmacy education**” published in April 2026
  - <https://www.who.int/publications/i/item/9789240122000>

# Acknowledgments and References

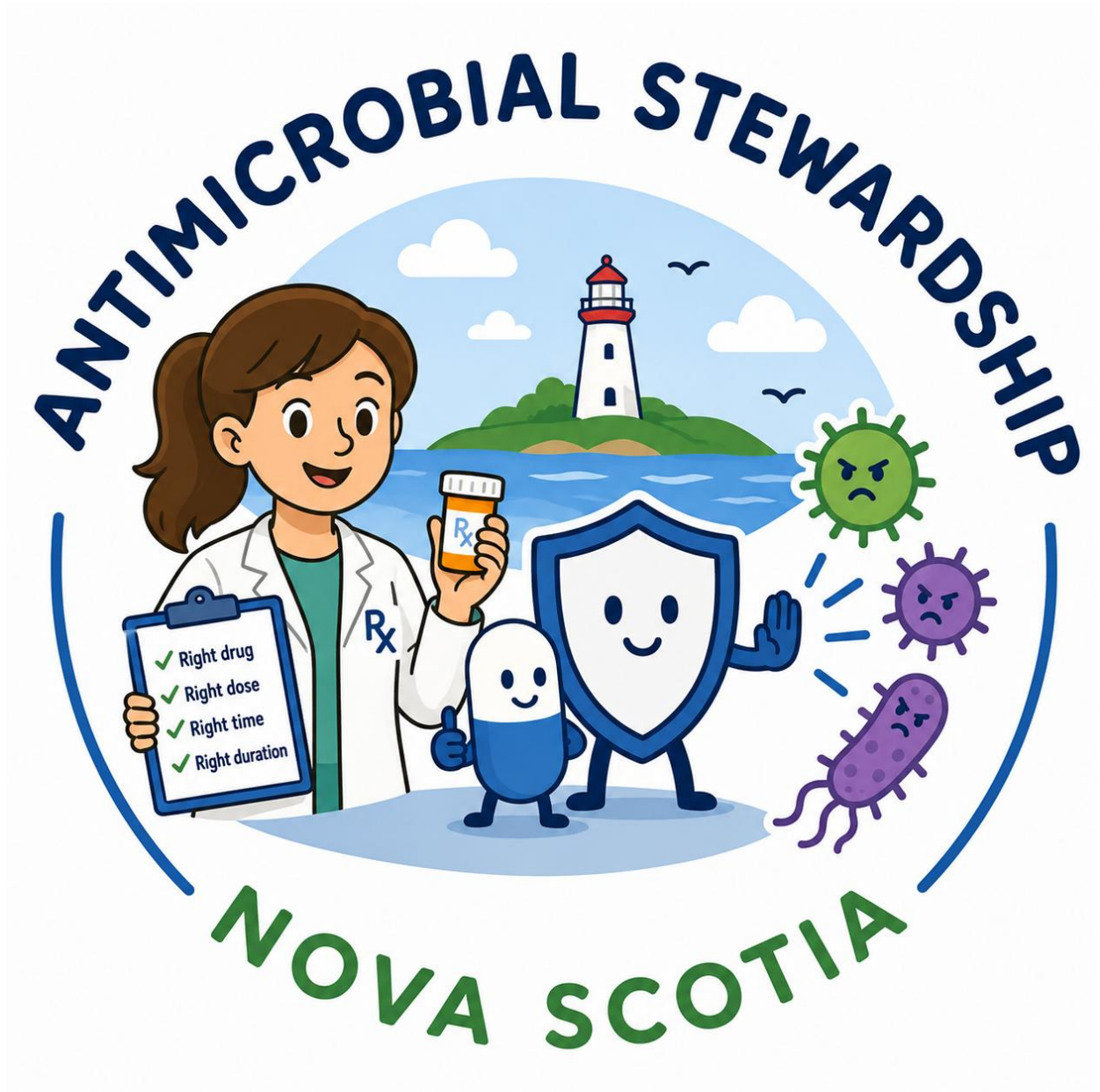
Authors of this presentation would like to thank:

- Madison Bell and Jennifer Morris (former PharmD students) who gave permission for use of their elective assignment as a sample of student work
- Mentors at NS Health and IWK Health for their contributions to this course

## Reference:

World Health Organization. (2018). *Competency framework for health workers' education and training on antimicrobial resistance*. World Health Organization.  
<https://apps.who.int/iris/handle/10665/272766>

Questions?



# Identifying and prioritizing social/administrative science topics for pharmacy curricula

**Jordan R Covvey, PharmD, PhD, BCPS** (Duquesne University)

**Kate Rotzenberg, PharmD, MBA, MEd, BCPS** (University of Wisconsin-Madison)

**Nicole M. Sifontis, PharmD, MPH, FCCP, BCPS** (Temple University)

United States

# General background

- Social and administrative sciences (SAS)
  - Sometimes called pharmacy administration or social pharmacy
  - Sits at the intersection of practice and science, broadly focused on the *“beliefs, values, and behaviors that people display in relation to medicine use and society at the individual and organizational levels”*
- May include areas such as health outcomes/services research, pharmacoeconomics, pharmacoepidemiology, pharmaceutical policy, and pharmaceutical management
  - Draws from fields of health/social psychology, biostatistics, economics, and public health
- Remains loosely defined without clear prioritization of the knowledge and skills that pharmacists need in today’s health care environment

# Research background

- ACCP Pharmacotherapy Didactic Curriculum Toolkit has served as a resource/guide for US curricular priorities for clinical topic areas
  - Publications in 2009, 2016, 2019, and 2024

|               |                                                                                                                                                                              |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tier 1</b> | Students should receive education on this topic to provide care upon graduation                                                                                              |
| <b>Tier 2</b> | Students should receive education on this topic but additional knowledge or skills are required after graduation to prepare them for practice                                |
| <b>Tier 3</b> | Students may not receive education on this topic but rather they will be expected to obtain required knowledge post-graduation to provide care if required in their practice |

- No similar guidance exists for SAS within pharmacy curricula
- Objective was to identify a consensus among pharmacy educators regarding relevant SAS topic areas and their priorities within pharmacy curricula



# Methods

- Modified Delphi process
  - Structured iterative rounds of questionnaires, feedback, and revision to identify a consensus among experts
  - SAS faculty members from AACP used as the sampling frame
- Began with literature review of relevant resources
  - CAPE, COEPA, ACPE standards, NAPLEX competencies, IPEC competencies, APTR framework, AHRQ

| Round | Goals                                                    |                                                                |
|-------|----------------------------------------------------------|----------------------------------------------------------------|
| 1     | Gather initial impressions on list developed by the team |                                                                |
| 2     | Revised list of topics with detailed definitions         | Respondents rate the importance of each topic (5-point Likert) |
| 3     | Revised list of topics/definitions placed into tiers     | Respondents asked for their level of agreement or revisions    |
| 4     | Revised/consolidated list of topics/definitions in tiers | Respondents asked for their level of agreement                 |

# Results

- A total of 147, 140, 139, and 111 respondents in rounds 1-4, respectively
- After four rounds, 76 domains across 11 domains remained and were prioritized
  - 35 (46%) in tier 1
  - 28 (37%) in tier 2
  - 13 (17%) in tier 3
- Topics were fairly equitable in distribution across the final domains
- Structural and societal factors (6/8; 75%), pharmacy laws and regulations (4/7; 57%), professionalism (5/7; 71%), communication (4/5; 80%) proportionally had the most topics in tier 1

| Final domains                               |
|---------------------------------------------|
| Healthcare systems (n=9)                    |
| Structural and societal factors (n=8)       |
| Public health (n=7)                         |
| Social/behavioral aspects of practice (n=5) |
| Research design and structure (n=7)         |
| Medication safety (n=9)                     |
| Pharmacy management and business (n=8)      |
| Pharmacy laws and regulations (n=7)         |
| Professionalism (n=7)                       |
| Communication (n=5)                         |
| Digital health and informatics (n=4)        |



| Domain                                         | Tier 1                                                                                                                         | Tier 2                                                                                                                              | Tier 3                                                             |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>Healthcare systems</b>                      | Healthcare delivery systems<br>Pharmacist roles/practice settings<br>Transitions of care<br>Medication access/affordability    | Reimbursement models<br>Private/government health insurance<br>Healthcare policy/reform<br>Pharmacoeconomics                        | World healthcare systems                                           |
| <b>Structural/<br/>societal factors</b>        | Social determinants of health<br>Cultural humility<br>Health equity/disparities<br>Health literacy<br>Whole person care<br>DEI | Structural factors/competency<br>Structural humility                                                                                |                                                                    |
| <b>Public health</b>                           | Health promotion                                                                                                               | Population-based care<br>Harm reduction<br>Epi/pharmacoepidemiology<br>Public health entities                                       | Emergency<br>preparedness/response<br>Environmental health/impacts |
| <b>Sociobehavioral<br/>aspects of practice</b> | Behavioral change<br>Medication adherence                                                                                      | Models of health/disease                                                                                                            | Health theories and models<br>Grief, death, and dying              |
| <b>Research<br/>design/structure</b>           | Literature evaluation<br>Evidence-based medicine                                                                               | Research design/methodology<br>Biostatistics<br>Research ethics<br>Drug approval process                                            | Implementation science                                             |
| <b>Medication safety</b>                       | Medication use systems<br>Medication errors<br>ADE/ADRs<br>CQI                                                                 | Regulatory and quality compliance<br>REMS<br>Just Culture<br>High Reliability and Culture of Safety<br>Medication storage and waste |                                                                    |

| Domain                                  | Tier 1                                                                                                                                  | Tier 2                                                                 | Tier 3                                                                                                      |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Pharmacy management and business</b> | Conflict management<br>Time management                                                                                                  | Pharmacist service advancement and management                          | Organizational finance<br>Inventory management<br>HR management<br>Entrepreneurship/innovation<br>Marketing |
| <b>Pharmacy laws and regulations</b>    | Controlled Substances Act<br>Food, Drug, and Cosmetic Act<br>HIPAA<br>State-specific statutes/regulations                               | Fraud and abuse<br>Malpractice                                         | Contract law                                                                                                |
| <b>Professionalism</b>                  | Interprofessional collaboration<br>Healthcare ethics<br>Self-awareness<br>Professional development<br>Professional and patient advocacy | Leadership                                                             | History of pharmacy/healthcare                                                                              |
| <b>Communication</b>                    | Prof/interprof communication<br>Patient communication<br>Motivational interviewing<br>Written communication                             | Presentation skills                                                    |                                                                                                             |
| <b>Digital health/ informatics</b>      | Health information technology                                                                                                           | Telehealth/telemedicine<br>Mobile health tech/solutions<br>Informatics |                                                                                                             |

# Discussion

- Framework provides both consistency and flexibility
  - Tier 1 delivers stability across programs nationally
  - Depth of coverage for tier 2 topics can be aligned with the institution's areas of expertise and the demand of learners
  - Tier 3 available for evolving needs within healthcare
- Application of the toolkit to education/practice has nuance
  - Some tier 3 topics are ACPE-required curricular areas
  - Rankings unlikely to remain static in changing healthcare landscape
- Ongoing work is focusing on opinions from outside of academia
  - Do practicing pharmacists in different settings agree?

# Questions?

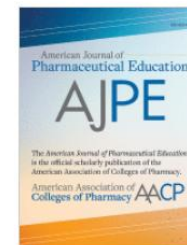
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## A Modified Delphi Process to Achieve Consensus on Social/Administrative Science Topics in Pharmacy Curricula

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