AI Pharmacist Models in Interprofessional Practice and Education

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Learning Outcomes

After this session, participants will be able to:

- Discuss the role of AI pharmacist models in enhancing interprofessional collaboration and medication safety.
- Analyze real-world applications of AI in optimizing therapeutic decision-making and personalized treatment plans.
- Discuss challenges and solutions for integrating AI tools into IPE/IPP frameworks.
- Explore future innovations and emerging trends in AI-driven healthcare practices.

The Urgent Need for AI in Collaboration

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- 1 in 10 patients experience harm during treatment; 50% preventable (WHO, 2024).
- Medication-related harm remains among the leading contributors.
- Root cause is often communication breakdown, not lack of knowledge.
- 60%+ of hospital adverse events in the U.S. involve poor communication (Joint Commission).

That is where AI can support us

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Why AI?

AI improves how information is shared, structured, and interpreted

AI tools function as:

- Communication amplifiers

- Data-synthesis engines

- Consistency enforcers

Not replacements for clinical reasoning, but enhancers of team-based decision quality.

IPE and IPP: Bridging Learning and Practice

- **Interprofessional Education (IPE)**
  Students learn *with, from, and about* each other to prepare for collaboration.
    - students learn together before entering practice

- **Interprofessional Practice (IPP)**
  Real-world application of those skills in clinical care.
    - where interprofessional collaboration affects patient outcomes

- Evidence: IPE/IPP improves teamwork, clarity of roles, clinical outcomes.
    - AI can strengthen both IPE and IPP

AI-Enabled IPE: Data-Driven Team Learning

AI strengthens IPE by:
- Creating data-rich, contextualized scenarios.
- Supporting cross-professional simulations of patient care.
- Enabling students to practice communication and decision-making before entering practice.

Examples:
- AI-based IPE simulation (Nurse Educ Today, 2023)-(AI + VR → better communication/role clarity)
- AI to teach interprofessional roles (JACCP, 2025)- (image-based AI role training → reduces stereotypes)

AI-based IPE simulation

Fig. 1. A, Communication with AI doctor using interprofessional communication strategies (i.e. ISBAR mnemonics, checkback, CUS, two-challenge and call-out.); B, self-directed debrief.

AI-enabled Virtual Reality Simulation (VRS)

- **Used** to assess nursing students' communication with an AI medical doctor.
- Process
  - Nurse communicates his/her concerns to AI doctor using ***ISBAR (Introduction-Situation-Background-Assessment-Recommendation) tool*** during morning rounds
  - AI Doctor acknowledges the nurse's concerns about patient care
  - Nurse verifies Dr.'s treatment plan using ***check-back strategy***
  - Nurse applies CUS (**C**oncern, **U**ncomfortable, **S**afety) to communicate safety concerns
  - Nurse-Dr communicate treatment plan using *call-out strategy*
- Participants showed significant improvement in
  - communication knowledge
  - interprofessional communication self-efficacy

Demonstrates that AI not only supports decision-making but also serves as a scalable educational partner in IPE.

Liaw SY, Tan JZ, Lim S, Zhou W, Yap J, Ratan R, Ooi SL, Wong SJ, Seah B, Chua WL. Artificial intelligence in virtual reality simulation for interprofessional communication training: Mixed method study. Nurse Educ Today. 2023 Mar;122:105718. doi: 10.1016/j.nedt.2023.105718.

RESEARCH REPORT

Advances in Clinical Pharmacy Education & Training

Implementation of an AI activity to teach interprofessional roles and responsibilities

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ABSTRACT

Introduction: Interprofessional education (IPE) is a core component for preparing health care professionals for collaborative practice. Leveraging technology to support IPE can enhance active team-based learning. At the University of Texas at Austin (UT Austin), a longitudinal IPE course fosters team-based learning through modules aligned with the Interprofessional Education Collaborative (IPEC) core competencies. In the Fall of 2024, an artificial intelligence (AI)-generated image activity was introduced to enhance the roles and responsibilities module, replacing an Interprofessional Pictionary activity.

Objective: This IPE activity aimed to assess the impact of incorporating an AI-generated image activity on student perceptions of learning outcomes related to IPEC Core Competency #2, roles and responsibilities, compared to a historical cohort who completed the same module using a conventional Interprofessional Pictionary activity

AI-Based Interprofessional Role Training

- Design
  - In a longitudinal IPE course, an AI image-generation activity replacing traditional drawing-based activities such as Interprofessional Pictionary (a role-guessing activity using hand-drawn images).
  - 36 interprofessional teams (pharmacy, nursing, medicine, social work) used AI to create images reflecting professional roles, stereotypes, and biases.
  - Guided image analysis facilitated discussion on perceptions and their impact on collaboration and patient care.
- **AI-based role training significantly improves understanding of professional responsibilities and promotes collaborative behaviors even before clinical exposure.**

AI-Enabled IPE: Data-Driven Team Learning

Pharmacists function as:
- Medication Safety Sentinel
  - constantly scanning for risks, identifying potential medication errors early, and intervening to protect patients.
- Therapeutic Optimizer
- Communication Bridge Builder
- Adherence Champion

Perfect alignment with AI augmentation- areas where AI models like PharmaSeek could be particularly effective.
AI systems augment—not replace—these competencies.
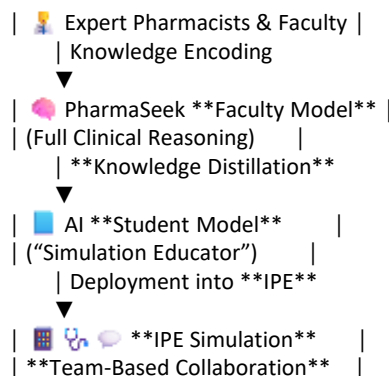(References: AJHSP 2025; J Card Fail 2021; Schlosser-Hupf 2024)

PharmaSeek for IPE

- 1.4B-parameter AI pharmacist model
- Simulates expert pharmacist reasoning
- Generates transparent, evidence-linked recommendations
- Utilizes expert routing (pharmacology, pathology, therapeutics)
- Designed to support case-based simulation for medical, nursing, and pharmacy students (future application)
- Intended to enhance team-based learning and collaborative decision-making

Transforms clinical reasoning into an interactive learning experience — shifting from passive to dynamic engagement.

Knowledge Distillation Pipeline: From Expert to AI Educator

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- **PharmaSeek Faculty Model**
  - Encodes clinical reasoning based on real pharmacist decisions
  - Integrates textbook logic and real patient prescription data
- **Knowledge Distillation**
  - Compresses clinical logic into a lightweight, efficient model
- **AI Student Model**
  - Designed to function as a simulation educator in future AI-powered IPE
  - Supports reasoning during virtual case-based scenarios
- **Planned deployment model for IPE**
  - Enables team-based problem-solving
  - Delivers real-time AI decision support
  - Scalable virtual educator reinforcing communication and collaboration

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| 🧑 Expert Pharmacists & Faculty |
  | Knowledge Encoding
            ▼
| 🐷 PharmaSeek **Faculty Model** |
| (Full Clinical Reasoning)       |
     | **Knowledge Distillation**
            ▼
| 🟦 AI **Student Model**          |
| ("Simulation Educator")          |
     | Deployment into **IPE**
            ▼
| 🧮 🐱 💬 **IPE Simulation**       |
| **Team-Based Collaboration**     |
```

AI as a virtual educator, scalable beyond one-on-one teaching

PharmaSeek in IPP: Clinical Support

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PharmaSeek is designed to support team-based clinical practice through:

- **Integrating multisource knowledge** (Q&A logs, clinical guidelines, real-world cases from pharmacists, physicians, nurses)
- **Providing evidence-based recommendations** (dose optimization, safety checks, drug–drug interaction alerts)
- **Learning from expert feedback** via post-teacher model refinement and outcome-based validation
- **Improving continuously through optimization** minimizing prediction error using real clinical results
- **Facilitating shared decision-making** enhancing interdisciplinary communication and treatment alignment

Outcome: *Safer prescribing, enhanced teamwork, and more reliable decision-making*
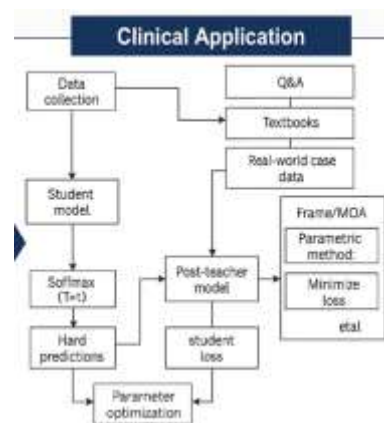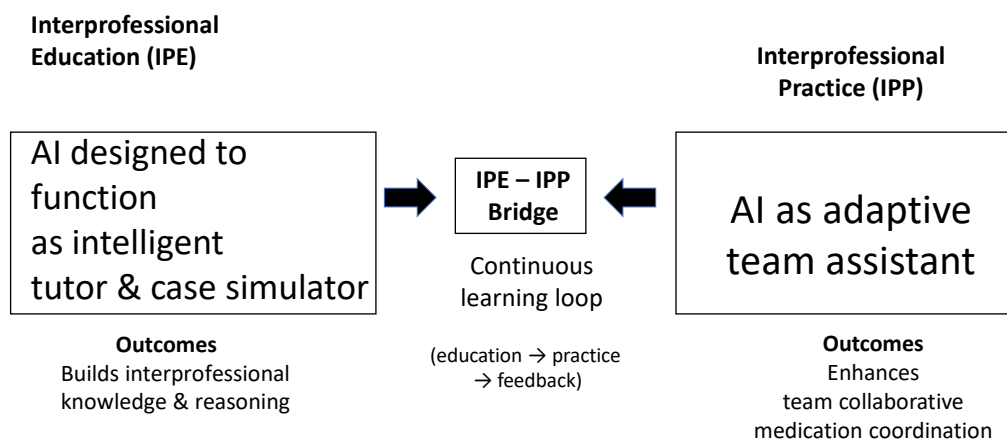

PharmaSeek AI acts as a **collaborative clinical assistant** to pharmacists, physicians, and nurses in shared decision-making.

Educational Application

- Virtual Interprofessional Cases
  - Designed to provide AI-guided feedback in future simulation-based learning
- AI-Assisted Debriefing (planned model)
  - Real-time analytics quantify teamwork, communication balance, and clinical reasoning quality
  - Supports structured reflection and performance improvement
- Role clarity & collaborative problem-solving
  - Builds role clarity and collaborative problem-solving skills
  - Strengthens readiness for interprofessional team practice

It quantifies communication—something humans fail to do consistently
(Conceptual application, not yet implemented)

PharmaSeek in IPE and IPP

Interprofessional Education (IPE)

Interprofessional Practice (IPP)

AI designed to function as intelligent tutor & case simulator

IPE – IPP Bridge

Continuous learning loop

AI as adaptive team assistant

Outcomes
Builds interprofessional knowledge & reasoning

(education → practice → feedback)

Outcomes
Enhances team collaborative medication coordination

Quantifies teamwork and communication dynamics — critical competencies for real clinical collaboration

Governance, Ethics & Safety

When integrating AI into clinical decision support or education, strong governance is essential to ensure safety, accountability, and professional responsibility.

- **Transparency**
  - AI must clearly explain its recommendations and underlying evidence. Hidden decision logic is unacceptable in patient care.
- **Oversight**
  - AI may suggest, but final decisions must always be made by pharmacists or other qualified clinicians.
- **Regulatory compliance**
  - AI used in healthcare is classified as high-risk and must be supervised by humans.
  - FDA (2025 draft): Defines expectations for lifecycle management, transparency, and human oversight of AI-enabled medical software.
  - EU AI Act: High-risk AI (diagnosis, monitoring, treatment) must meet strict standards for transparency, human control, and safety.

  We don't delegate responsibility to AI — we extend our reach *with* AI.

Implementation Challenges

- AI literacy & training needs among students and faculty
- Trust & role concerns
- Integration into curriculum
  - Technical
  - Pedagogical
  - Need for clear governance & approval processes
- **Solution:**
  Pilot testing → Co-design between faculty and clinicians → Early implementation in simulation labs → Gradual integration into practice

Future Directions

- Full integration of AI into both clinical training and clinical decision support
- Curricula
  - Introduce AI from the earliest stages of education to develop clinical reasoning while learning to supervise AI safely
- Clinical practice
  - Implement AI-enabled continuous safety monitoring — not to replace pharmacists, but to detect risks earlier and improve team coordination

Future Directions

- IPP (Interprofessional Practice)
  - AI will evolve from a simulation educator to a real-time collaborative assistant, supporting multidisciplinary decision-making
- Our ultimate aim
  - Train healthcare professionals to work with AI, not compete against it
- Those best prepared for the future
  - Teams who know how to lead AI, rather than those trying to outperform it

Real-World Evidence of AI in Clinical Decision Support

- **AI-CDSS for Antimicrobial Stewardship — Zhejiang University Hospital (China)**
  - AI-driven decision support system (aCDSS) developed using *machine learning + clinical guidelines + real patient data*
  - Provides real-time infection diagnosis & antimicrobial recommendations
  - Improves antibiotic prescribing accuracy & reduces resistance risk
  - Over ¥200 million RMB (~€25M) saved annually in drug expenses
  - Enhanced clinician decision quality, even with specialist shortages
  - Currently deployed in dozens of hospitals nationwide
- Demonstrates that AI can deliver expert-level clinical reasoning at scale.
  - PharmaSeek aims to bring this capability to pharmacy-led interprofessional education and future clinical practice.

Final Takeaways

- *AI augments, not replaces, pharmacists.*
  - AI enhances our clinical reasoning and efficiency, but decision-making and accountability remain firmly human-led.
- *PharmaSeek makes expert pharmacist knowledge scalable—across both education and clinical practice*
  - It transforms years of specialist insight into accessible, real-time support for students and clinicians.
- *Our ultimate goal is smarter, safer, and more connected care*
  - Meaningful AI integration strengthens not only clinical decisions but also communication, teamwork, and ultimately, patient outcomes.

Thanks for listening!