Building Branched-Outcome Virtual Patients into Your Curriculum

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Session Objectives

• Outline virtual patient (VP) pedagogy and alignment with educational outcomes and accreditation standards

• Discuss design methods and development principles

• Build a VP using a branched-outcome decision-making model

• Assess criteria for integration and composition of branched-outcome VP within the curriculum
Pharmacy Education "Landscape"

• Center for the Advancement of Pharmaceutical Education (CAPE) Outcomes
  – [Provide “patient-centered” pharmaceutical care…based upon sound therapeutic principles and evidence-based data…]

• Accreditation Council for Pharmacy Education (ACPE) Standards
  – […]develop “innovative” course methods through the application of computer and other instructional technologies…promoting active learning strategies]
Educational Technologies

- Computer Aided instruction (CAI)
  - On-line tutorials
  - Audience Response Systems

- Virtual Patients (VP)
  - Linear
  - Branching

- Human Patient Simulation (HPS)
  - Mannequin
  - Models
Virtual Patients

Evolution of case based learning
VP Pedagogy

- Critical thinking
- Development of Knowledge and Skills
- Professional Responsibility
- Self-directed learning
  - “life-long” learning
Pitt School of Pharmacy

• Goal
  – Augment student learning of course objectives

• Curricular integration
  – Advanced Pharmaceutical Care II (APCII)
    • Spring semester of 3rd professional year
    • Pharmaceutical care to critically ill and patients with kidney disease
PharmaCAL

Welcome to PharmaCAL, a web-based computer-assisted learning program with branched decision points in patient cases in the Advanced Pharmaceutical Care II course.

This means that each answer you choose in the patient case will lead you down a very different path. Please log onto the site using your Pitt user ID and password. Start the modules in order and do not press the back arrow on the browser (this will cause the website to malfunction, which was planned). You are not being graded on your performance, but all of the information presented in PharmaCAL is fair game for tests, quizzes, and cases in this class. At the end of each module, you will see a screen with feedback for each question and answer that you were presented with in the cases. This feedback will also be e-mailed to you. Use it to help you learn in this course; you may see it again.

Login Security Check

Username
Password

Submit Query

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PharmaCAL
Issenberg Principles

• Formative feedback
• Repetition opportunities
• Curricular Integration
• Clinical variation

• Controlled environment
• Individualized Learning
• Defined outcomes
• Simulator fidelity

Student Satisfaction

Useful feedback
Further incorporated
Acceptable teaching tool
Allowed application
Stimulated interest
Easy to use
Enjoyed

Benedict N, Schonder K. *AJPE*. 2011; 75 (2) Article 21
## Student Learning

### Student Responses to Pre-test, Post-test, and Examination Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre</th>
<th>Post</th>
<th>Exam</th>
<th>Pre vs. Post</th>
<th>Pre vs. Exam</th>
<th>Post vs. Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the best laboratory parameter to use to assess anemia? (n=139)</td>
<td>61.9</td>
<td>82.0</td>
<td>95.0</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>What is the cause of anemia associated with CKD? (n=142)</td>
<td>33.8</td>
<td>41.5</td>
<td>86.6</td>
<td>0.09</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>What is the goal Hgb level for anemia associated with CKD? (n=142)</td>
<td>26.1</td>
<td>74.6</td>
<td>97.2</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>What is the goal for iron studies? (n=140)</td>
<td>30.0</td>
<td>59.3</td>
<td>97.9</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>When should you recheck the Hgb after starting erythropoietin replacement? (n=142)</td>
<td>55.6</td>
<td>85.2</td>
<td>100</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

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Advantages

• Student Satisfaction
  - Digital natives
  - Anytime-anywhere learning
  - Repetition

• Standardization of learning

• Safe learning environments

• Individualized experiences
Limitations

• Faculty time commitments
  - 25 – 50 hrs
  - Case design and programming, case editing

• Cost and technical support

• Reduced physical interactions

• Fidelity
vpSim

What is vpSim?

vpSim is an online virtual patient simulation application for medical education, training, and assessment.

What is a virtual patient?

Virtual patients are computer simulations of clinical encounters where the learner plays the role of a healthcare provider by interacting with an on-screen patient. Typically this includes interviewing, examining, ordering diagnostic tests, making a diagnosis and prescribing therapy.

Who should use vpSim?

Medical education can use vpSim to:

Log in to vpSim

Email: [input field]
Password: [input field]

Remember me on this computer: [checkbox]
Log in

Forget your password

View vpSim public cases...

Who is using vpSim?

St. George's University of London
vpSim is used to replace paper-PBL cases for
Audience Application

- Building Branched-Outcome Decision-Making Virtual Patients
  - www.vpsim.pitt.edu
Curricular Integration

Curricular Parity
Curricular Integration

“When you’re a hammer, everything looks like a nail”
Curricular Integration

“Hoping for the best”
Curricular Integration

• Setting Goals
  - Audience
  - Purpose
  - Deadlines and Timeframes

• Resource Awareness
  - Time
  - Money
  - Administrative support
  - Faculty support
  - Tech support

• Alternate teaching methods
  - Lecture
  - Low-tech trainer
  - HPS
  - Standardized Patients
Curricular Composition

• **VP Objective**
  - Practice simulations
    • Supplement student learning
  - Teaching simulations
    • Replace methods to develop foundational knowledge/skills
  - Assessment simulations
    • Low stakes vs High stakes
    • Case validity

• **Learning Path Structure**
  - Learning Objective vs “Real-life” design
Future Strategies

• “Teaching” VP cases

• “Assessment” VP cases
  – Quiz, progression assessments
  – Case validation
Conclusions

• VP pedagogy align with educational outcomes and accreditation standards

• Evidenced based design; unique development

• Curricular integration requires:
  - Goal setting
  - Consideration of alternate teaching & learning methods
  - Resource awareness

• Curricular composition requires:
  - Simulation objectives (practice, teaching, assessment)
  - Learning path objectives (course learning objective vs “real-life”)
Questions

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