Build a Simulation Lab & Develop a Scaffolded, Acute Care Practicum Course

Erin Clark, MA, CCC-SLP
Ramy Shaaban, MD, MS
Lori Lombard, PhD, CCC-SLP

Indiana University of Pennsylvania

Disclosures

The authors have no relevant financial or non-financial relationships to disclose.

Building the Lab
(on a budget)

Lori Lombard, PhD CCC-SLP

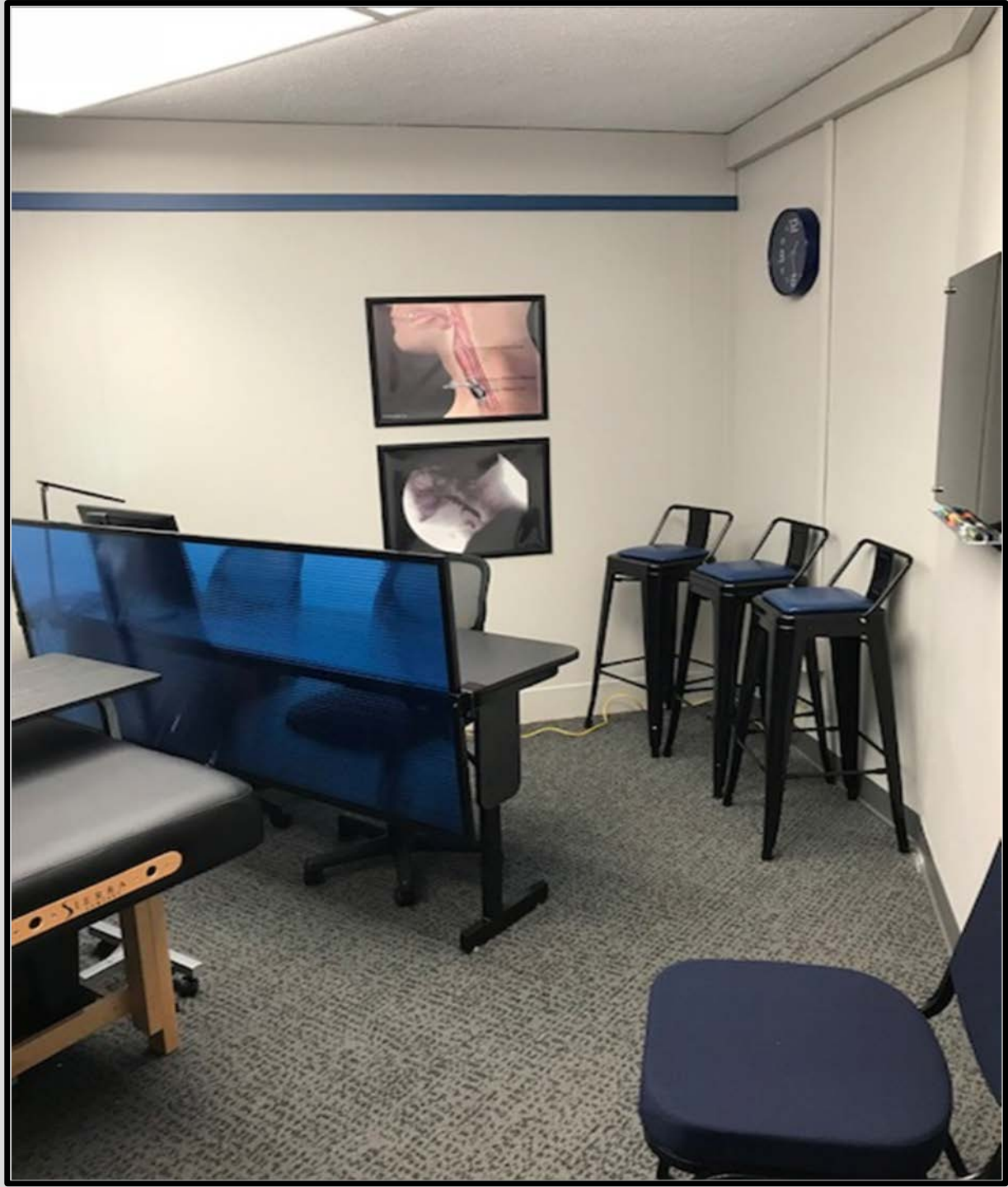
Indiana University of Pennsylvania

Best Practices in Healthcare Simulations – eBook

Task Force of CAPCSD

- *"The word 'simulation' brings to mind thoughts of expensive simulation centers filled with life-like manikins and a technology team worthy of a space launch. What is important to realize is that simulations are 'a technique—not a technology—to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner'* (Gaba, 2004, p. i2)."

- **Our budget: $8,900**




Hawk Hospital

Expensive
$80,000

Laerdal

Bargain
$1,441

Laerdal

Hill-Rom

Expensive
$16,120

Bargain
$587

SierraComfort

National Business Furniture

Expensive
$939

Bargain
$66

Techni Mobili

Penn Jersey X-Ray

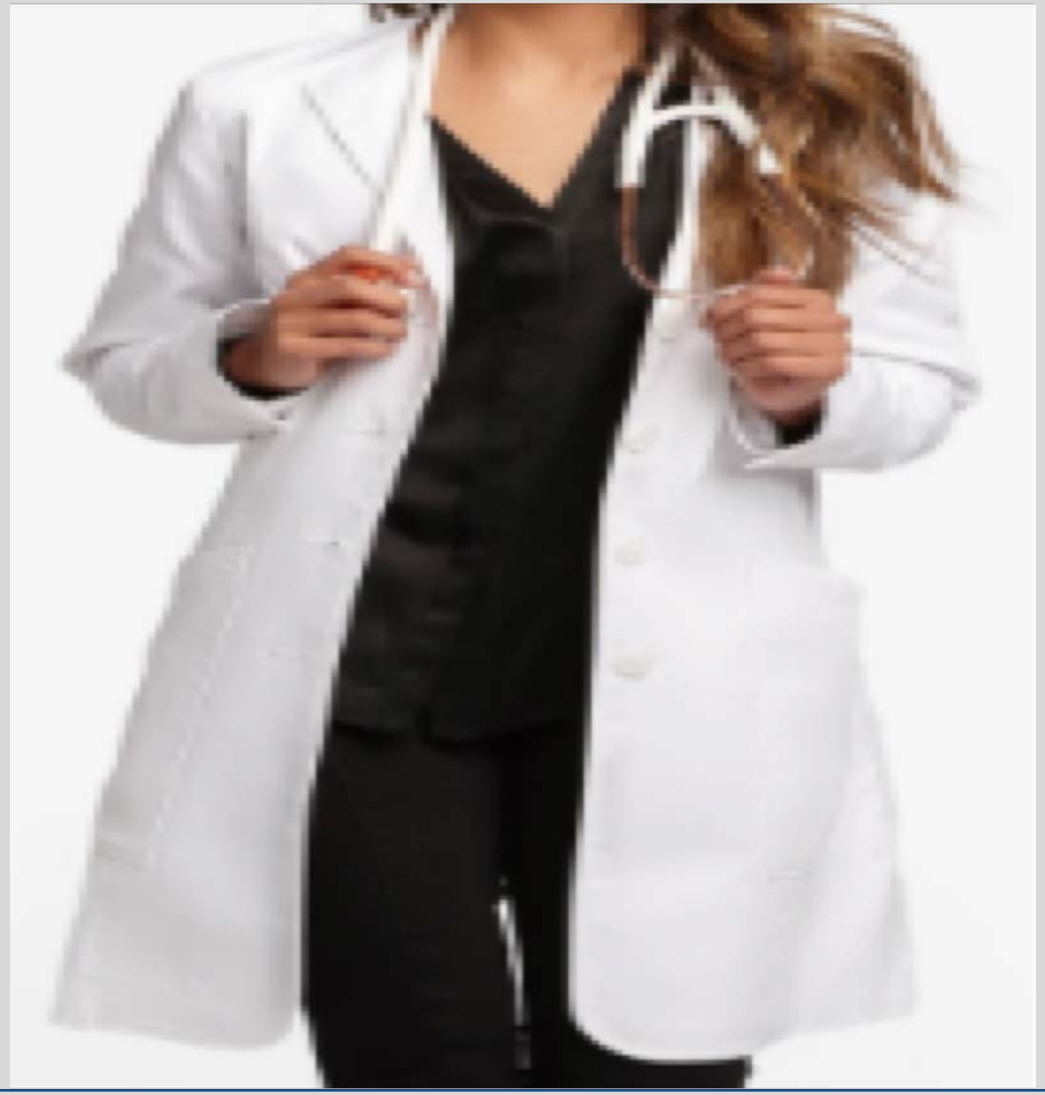
Expensive

$186

Bargain

Free

Burkhart Roentgen, Inc



WearFigs

Expensive
$138

Bargain
$20

Adar

Sony

Bargain
$450

Vizio

Expensive
$1,000

Bargain
$73

Bose

Expensive
$250

JBL


65
98%
4.5
20

Pentax Medical

Expensive
$6,795

Bargain
$18

Shekar

National Business Furniture

Expensive
$1,100

Bargain
$66

CoAvus

Laerdal

Expensive
$590

Bargain
$190

DME Supply

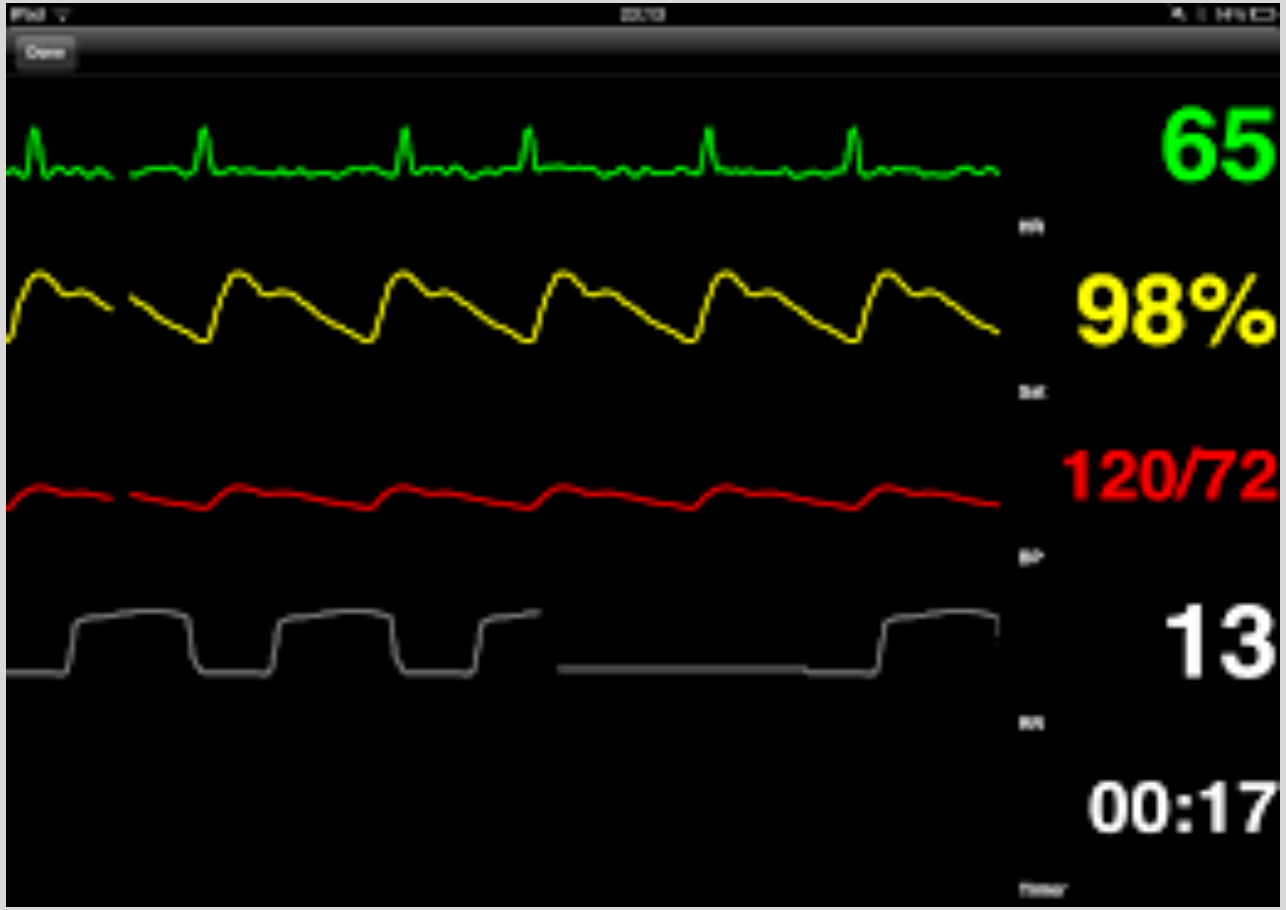
Expensive
$542

Bargain
$85

Foremost Equipment

Expensive
$6,058

Bargain
$23



SimMon (Apple Application)


Nitrile Gloves

Kwickscreen

Expensive
$2,800

Bargain
$85

Wallmonkeys

ModoMed

Expensive
$170

Bargain
$22

UFRIDAY

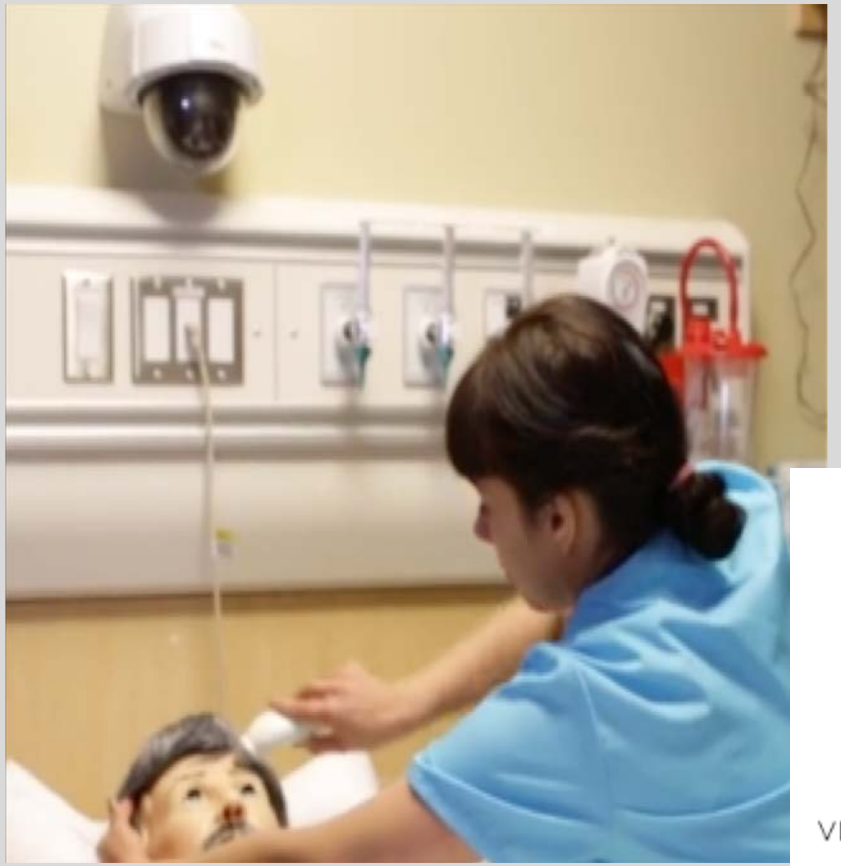
Expensive
$496

Bargain
$90

KoolMoore

Gridmann


Welcome to Hawk Hospital
THIS ROOM IS:
DAVIS 261



VALT

VIDEO AUDIO LEARNING TOOL

ipivs

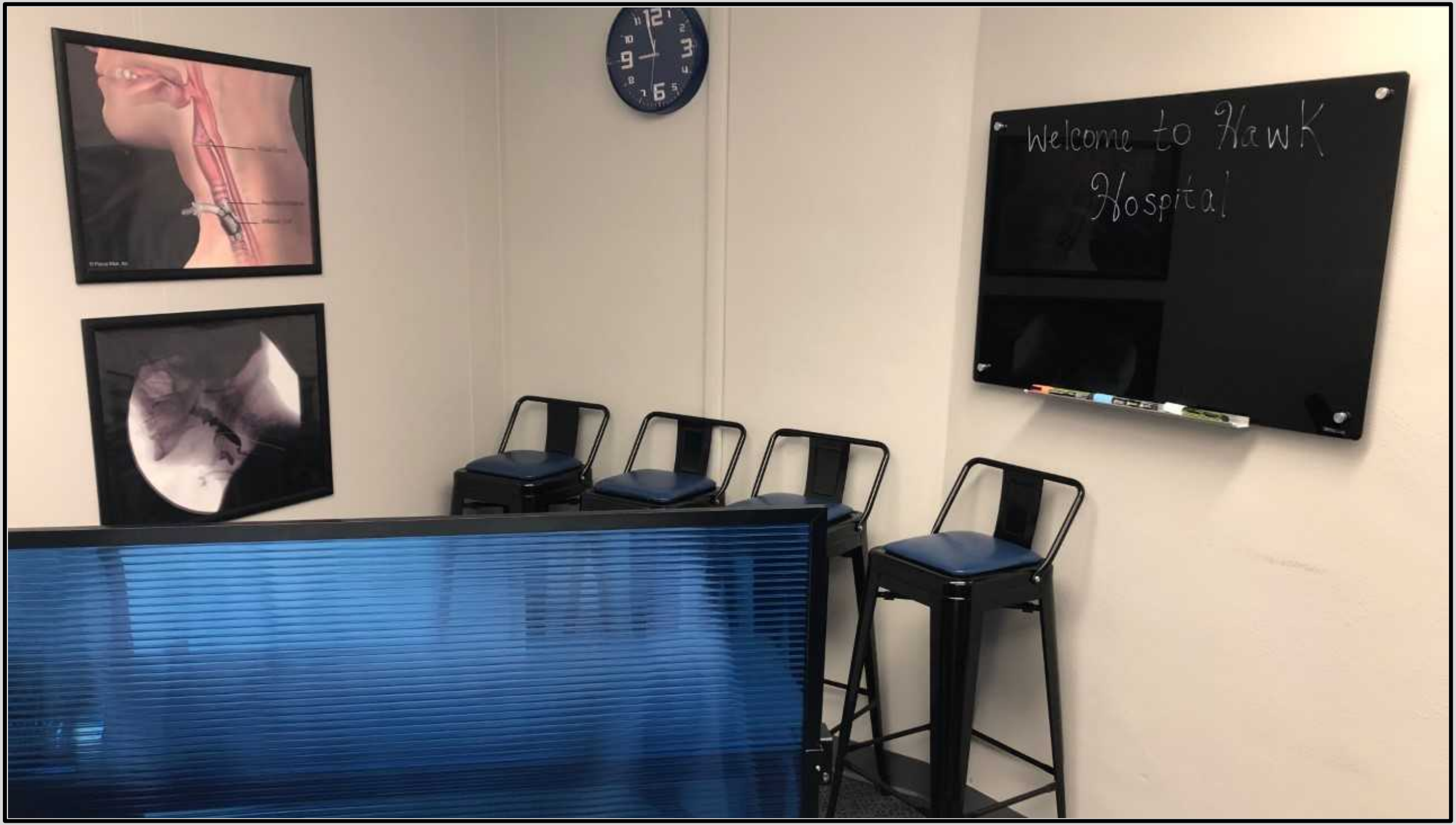
Expensive

$1,695

Bargain

$285

Google


Welcome to HawK
Hospital

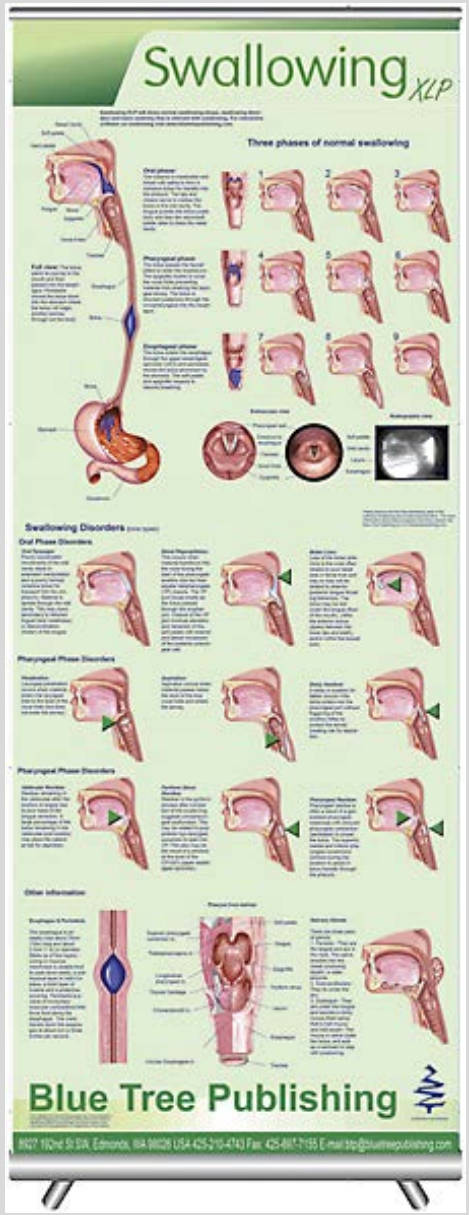
SimScreen

Expensive
$1,695

Bargain
$285

OBEX

Expensive
$37



Blue Tree Publishing

Passy Muir

Bargain
Free


Expensive Lab:
$147,000.00


Hawk Hospital
Bargain Lab:
$8,900

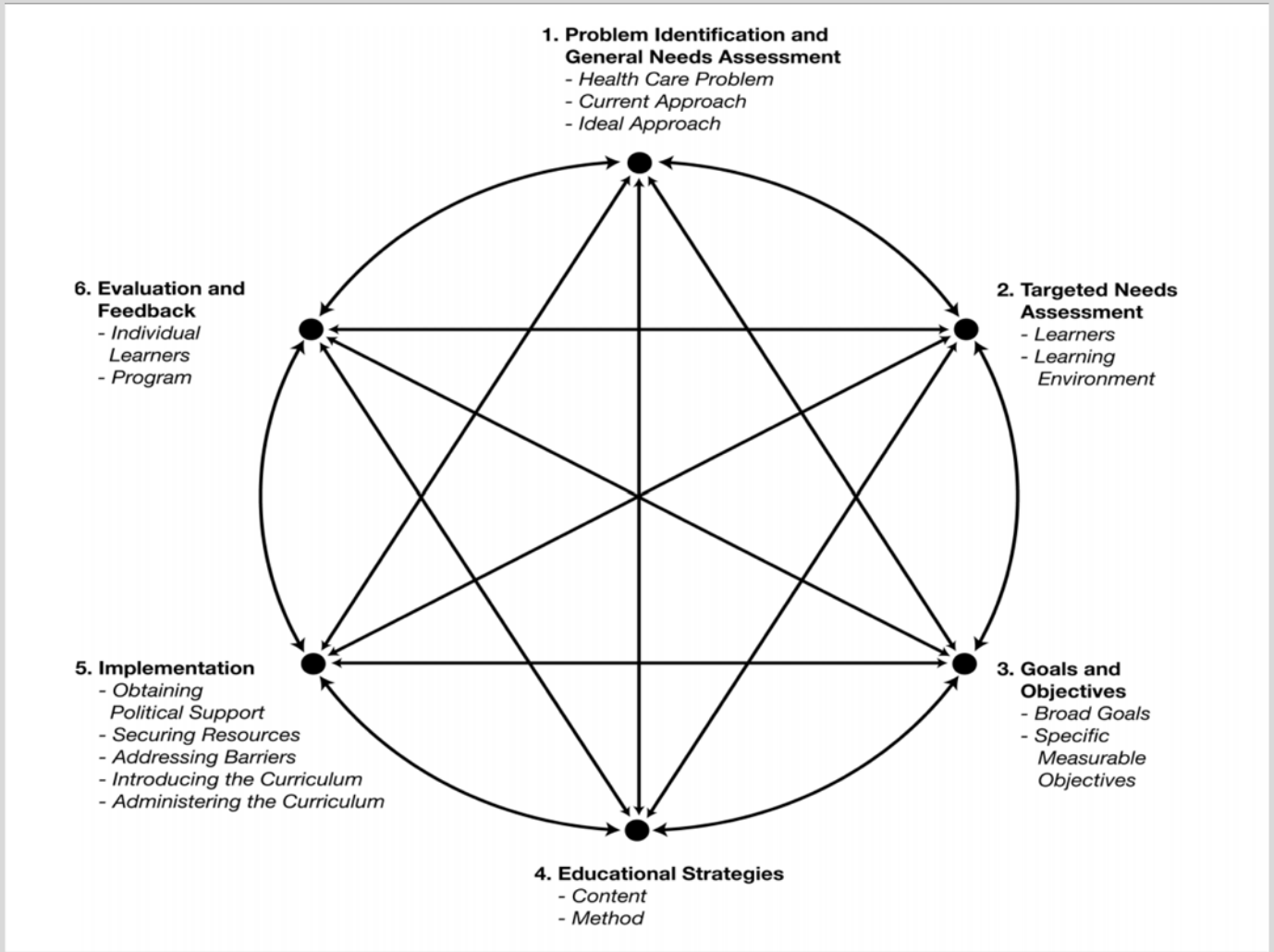
Piloting a Scaffolded, Acute Care, Clinical Practicum Course

Erin Clark, MS CCC-SLP

Indiana University of Pennsylvania

Framework for Curriculum Development:

- Kern's six steps in curriculum development



(Kern, 2014)

Outline:

- Task Trainers
- Asynchronous Simulations
  - Debriefing
- Synchronous/Live Simulations
  - Debriefing

- Resources Utilized
  - MBSImP
  - Electronic Medical Records
    - Excel
    - EHRGo
  - Medical Terminology Textbook

- Looking Ahead to the Future
  - Articulate360
  - 2D Simulations
  - 3D Simulations

Task Trainers:

- Purpose:
  - To practice a specific skill in isolation
- Rational:
  - Low-tech or no-tech task trainers remain at the very core of clinical skills and procedure instruction

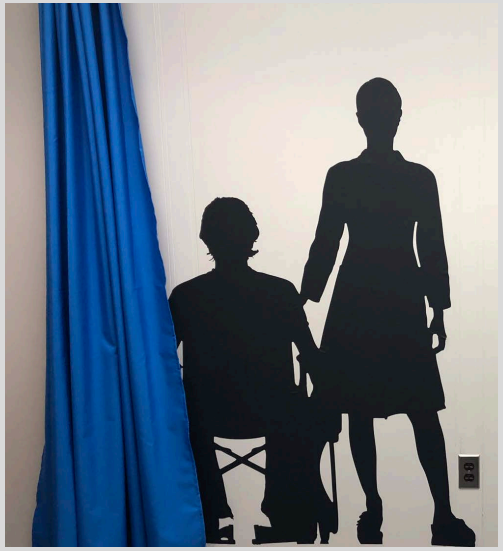
Task Trainers (Continued):

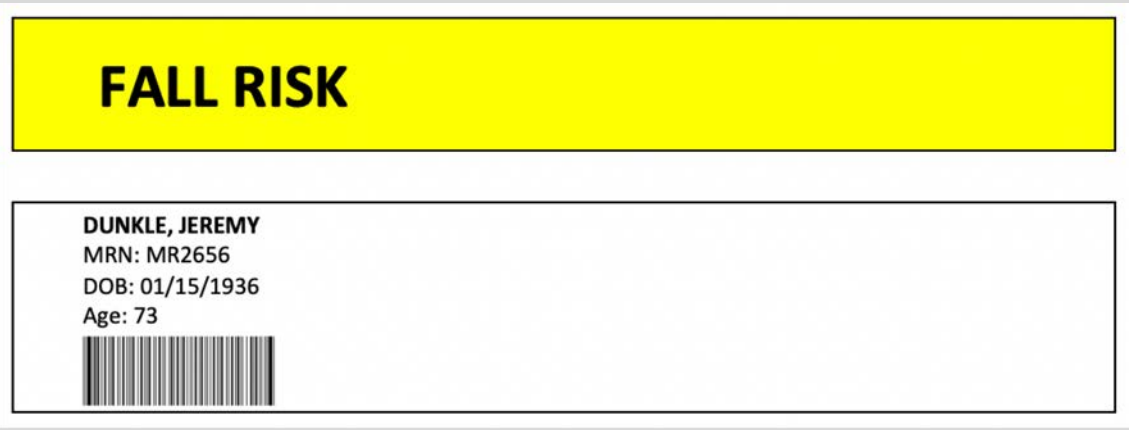
- Task Trainers:
  - Order Review
  - Interprofessional (Nursing) Communication
  - Hand hygiene
  - Donning and doffing personal protective equipment (PPE)

Hawk Hospital 570 South Eleventh Street Indiana, PA 15705	**PHYSICIAN ORDER**
Patient: DUNKLE, JEREMY 123 Hallow Lane Indiana, PA 15701 (724) 384-5878 MRN: MR2656 DOB: 01/15/1936:	Physician: CLARK, ERIN 570 South Eleventh Street Indiana, PA 15705 Telephone: (724) 357-5684 Fax: (724) 357-2486 NPI: 123456789
Order Date: 04/10/2019	Order Number: 1458697
Precautions: ISOLATION	
Order: Clinical Swallowing Evaluation Delegate Diet Consistency Recommendations to Speech. Develop Plan of Care.	

Task Trainers (Continued):

- Task Trainers:
  - Patient privacy
  - Two-patient identifiers
  - AIDET® patient communication framework





General Course Outline:

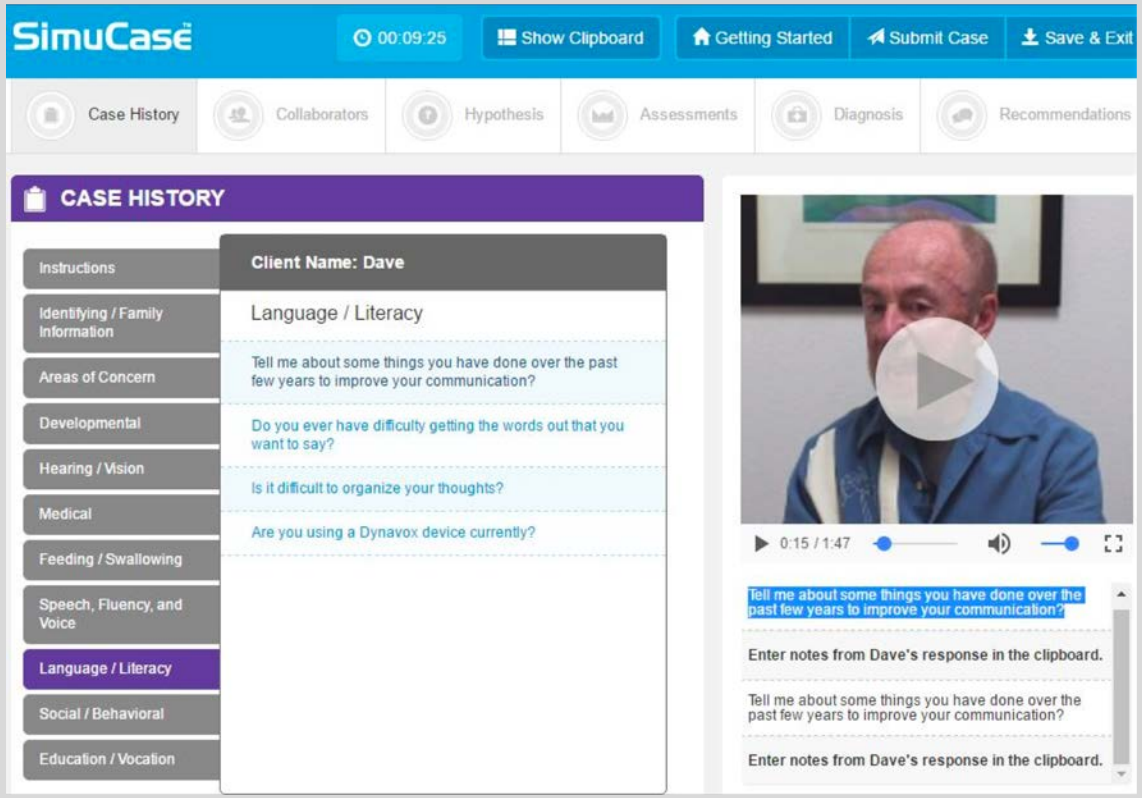
Week	Topic/Activity	Case Study
1	Chart Reviews and Medical Abbreviations	
2	Personal Protective Equipment and Two-Patient Identifiers	
3	Cranial Nerve-Focused Oral Mechanism Examination	
4	Clinical Swallowing Evaluation (CSE)	Case Study 1: Possible aspiration pneumonia Case Study 2: CSE post extubation
5	Clinical Swallowing Evaluation (CSE)	Case Study 3: CSE with Neurogenic (CVA) patient
6	Clinical Swallowing Evaluation (CSE)	Case Study 4: CSE with Neurogenic (PD) patient
7	Modified Barium Swallow Study (MBSS)	Case Study 3: MBSS with Neurogenic (CVA) patient
8	Modified Barium Swallow Study (MBSS)	Case Study 4: MBSS with Neurogenic (PD) patient
9	Speaking Valve Assessment	Case Study 5: Respiratory failure with tracheostomy placement

General Course Outline (Continued):

Week	Topic/Activity	Case Study
10	Clinical Swallowing Evaluation (CSE)	Case Study 5: Respiratory failure with tracheostomy placement
11	Modified Barium Swallow Study (MBSS)	Case Study 5: Respiratory failure with tracheostomy placement
12	CAPCSD CONFERENCE – NO CLASS	
13	Dysphagia Intervention/Management	Case Study 6: Stable medical condition with expectation for improvement Case Study 7: Degenerative medical condition with expectation for decline
14	Guest Lecture: Dr. Johanna Boothby	Cross-Training Simulation in Nursing Lab
15	Communicating Recommendations	Case Study 6: Stable medical condition with expectation for improvement Case Study 7: Degenerative medical condition with expectation for decline

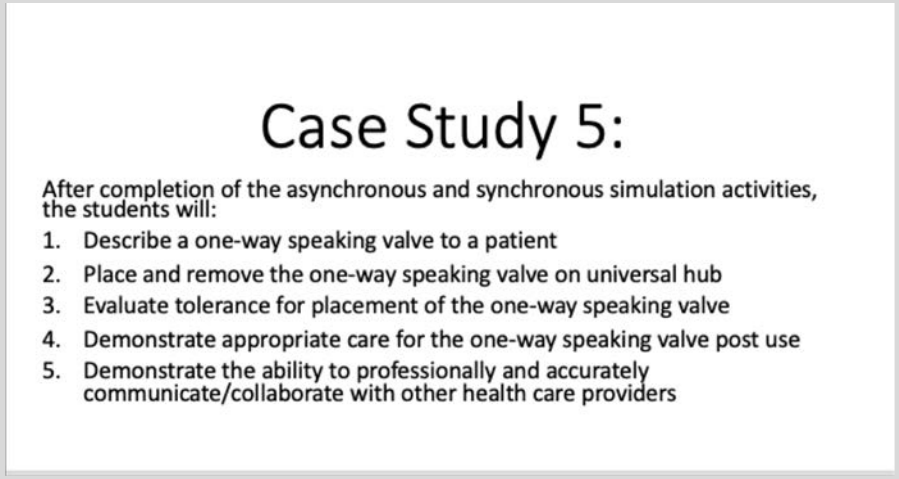
Asynchronous, Computer-Based Simulations:

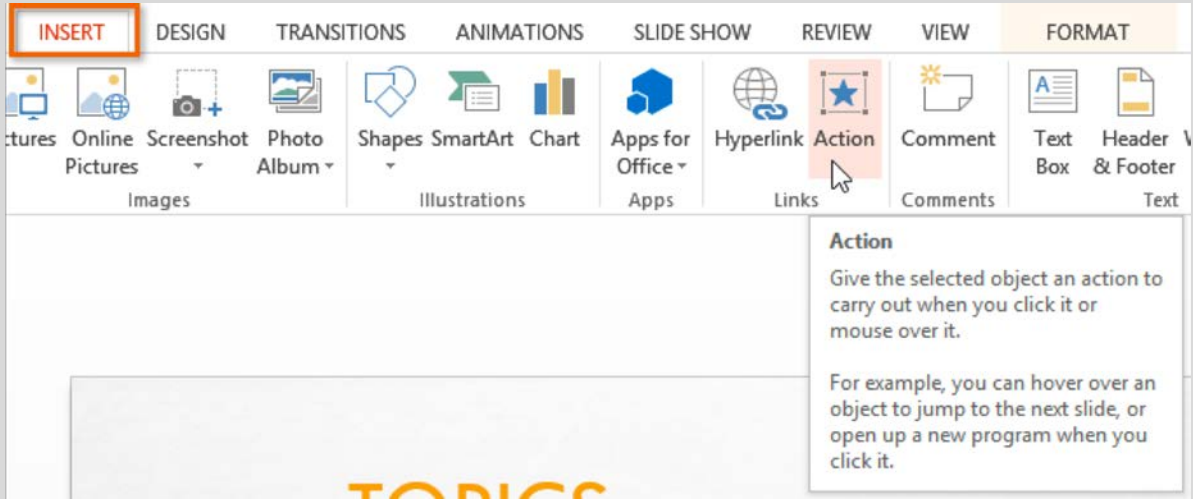
- Computer-based simulations:
  - Build a bridge between knowledge and skill
  - Providing opportunities to apply academic knowledge to clinical decision-making in a “low-stakes” environment
- These experiences are essential in the training of skilled clinicians with critical thinking abilities (Task Force of the Council of Academic Programs in Communication Sciences and Disorders, 2018)



Asynchronous, Computer-Based Simulations (Continued):

- Prior to each synchronous simulation, students independently completed an asynchronous, computer-based simulation through PowerPoint
  - The PowerPoint included:
    - Student learning objectives for the asynchronous and synchronous simulations
    - Interactive “buttons” that allowed students to
      - Engage in critical thinking and decision making
      - Receive feedback on each of their decisions





(EXAMPLE)
Case Study 4 – Case History Information:

- The patient, Jeremy Dunkle, is a 73-year-old male who presented to the ED via EMS post a fall at home. The patient is known to this facility secondary to a history of repeated falls at home. The patient complained of left hip and thigh pain. Per the radiologist's report, X-rays completed in the ED confirmed a left displaced femoral neck fracture of the left hip. The patient was admitted to the hospital and underwent an open reduction internal fixation (ORIF) of the left hip. The patient's past medical history is significant for arthritis, osteoporosis, urinary tract infections, spinal stenosis, frequent falls, and Parkinson's disease. The patient lives at home with and is the primary caretake for his wife who is questionable for early dementia. The patient has two sons, both of whom live out of state. You have been consulted to complete a bedside dysphagia evaluation.

(EXAMPLE)
Case Study 4 – Mining the Case History:

- What details of case history and current admission information are significant with respect to a possible dysphagia diagnosis?

A. History of urinary tract infections

B. History of Parkinson's Disease

C. Recent extubation following ORIF procedure

D. Both B. and C.

(EXAMPLE)
Case Study 4 – Mining the Case History (Continued):

- That is incorrect.
  - While UTIs may impact the patient's cognition, this has the potential to create fluctuating symptoms and therefore, does not have significant implications for a possible underlying dysphagia diagnosis.

Try Again

(EXAMPLE)
Case Study 4 – Mining the Case History (Continued):

- That is partially correct.
  - Patient's with PD are likely to experience dysphagia at some point during the progression of the disease. While this diagnosis is important, there is additional information that has the potential to impact the clinical swallowing evaluation.

Try Again

(EXAMPLE)
Case Study 4 – Mining the Case History (Continued):

- That is partially correct.
  - A history of intubation/extubation does have clinical significance when assessing dysphagia. However, consider that both the intubation and extubation for this patient were routine and the duration of intubation was relatively short. As a result, this information by itself is only a piece of the information from the case history that requires consideration.

Try Again

(EXAMPLE)
Case Study 4 – Mining the Case History (Continued):

- That's correct!
  - The patient's history of PD, as well as his recent intubation/extubation have possible implications for a history of dysphagia or current cause/exacerbation of dysphagia symptoms, respectively.

Continue

Asynchronous, Computer-Based Simulations (Continued):

- The PowerPoint also included:
  - Prompts to
    - Identify factors from the patient's case history that may account for and/or support current findings
    - Draft a summary of findings for
      - » Patients and their families
      - » Physicians and nurses
    - Provide their clinical rational for
      - » Appropriate rehabilitative or compensatory interventions
      - » Diet consistency recommendations
      - » Referrals for additional testing or consultations

Case Study 3 – Clinical Swallow Examination:

- Based on your findings during the clinical bedside examination, is an instrumental evaluation warranted?

YES

NO

MAYBE

Case Study 3 – Clinical Swallow Examination:

- You selected that ”YES” an instrumental evaluation was warranted. Justify your clinical rationale below:

Continue

Asynchronous, Computer-Based Simulation Debriefing:

- Advocacy – Inquiry Model:
  (Decker, 2009, Jeffries, 2010 as cited in Johnson & Cynthia 2011)
  - Statement of observation followed by probing questions
  - Facilitated by faculty supervisor

Asynchronous, Computer-Based Simulation Debriefing:

- In keeping with the Advocacy-Inquiry model of debriefing, we modified a resource provided by one of our collaborators, Dr. Pao Ying Hsiao that focuses the reflective questions on various cognitive, technical, and behavioral aspects of the simulation
- Prompts were specific to each case scenario

Threads	Focus	Debriefing Prompt
Opening	Overview	Can someone give us a quick overview of the patient's profile and an overview of their clinical decision making throughout the simulation and their rational?
Cognitive		
Identification of contributing factors	Situational Awareness	Describe some contributing factors that we should consider in this case.
Technical		
Documentation	Decision Making	What needs to be documented and why?
Closing	Reflection	What did you learn from this case study?

Synchronous/Live Simulations:

- Utilizing the patient profile from the asynchronous, computer-based simulation, the students completed the same task multiple times during a class
  - Similar patient responses
  - Divergent patient responses

Synchronous/Live Simulation Debriefing:

- The model for the synchronous debriefing paralleled that of the asynchronous debriefing with modification of questions as indicated by the task
- Prompts were specific to each case scenario

Threads	Focus	Debriefing Prompt
Opening	Overview	Can someone give us a quick summary of what happened?
Cognitive		
Understanding the Clinical Presentation	Situational Awareness	What did you recognize about this patient's clinical presentation?
Technical		
Assessment	Decision Making	What is being assessed and why?
Patient Safety	Patient Education	Does the patient understand the recommendations and the risks of aspiration?
Behavioral	Communication	Did you get the necessary information? Did you provide the necessary information?
Closing	Reflection	What could we do differently/better next time?

Evaluation:

- Consistent with Holmboe, Edgar, and Hamstra's work on competency-based education and assessment (2016) and in keeping with American Speech-Language- Hearing Association's Knowledge and Skills Assessment (ASHA's KASA), students are assessed in specific skills areas based on competency
- All skills are assessed during a final, individual simulation

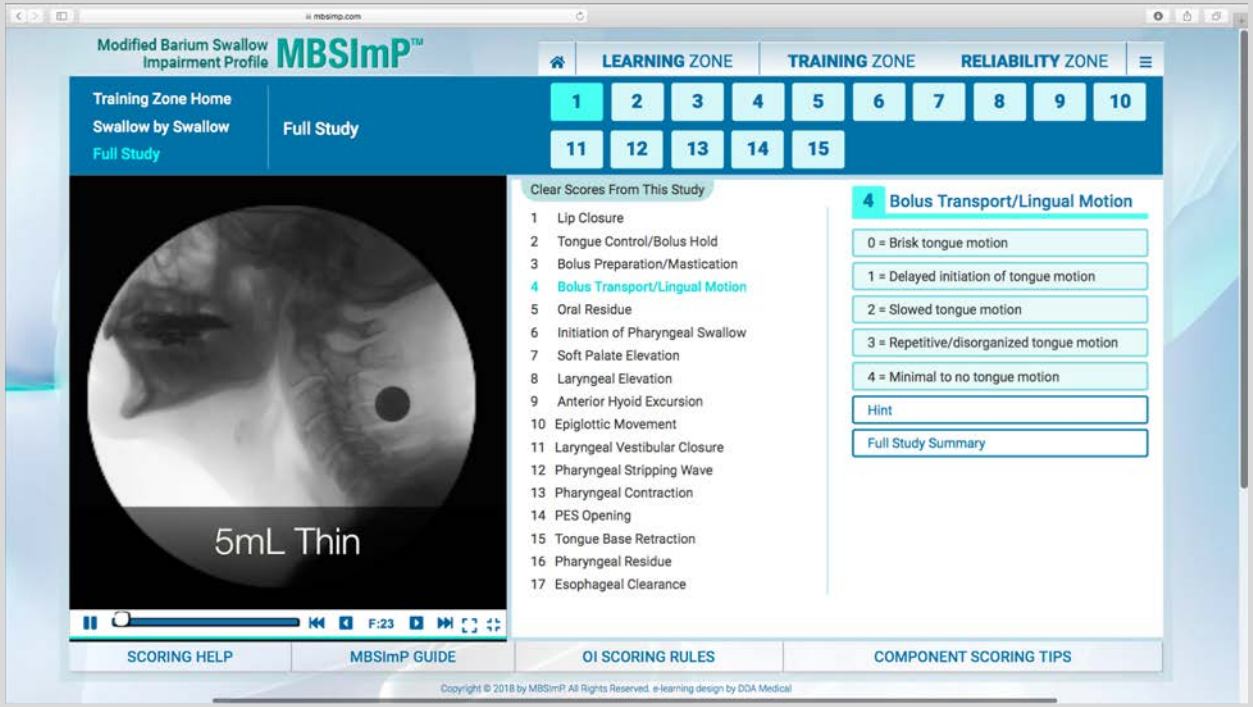
Novice/Intermediate Level	Advanced Level
5=Superior performance. Demonstrated independence with initial guidance. 4=Performed well. Needed general and some specific direction. 3=Performed satisfactorily. Needed specific direction. 2=Below average performance. Needed extensive specific direction. Remediation required. 1=Unacceptable performance. Unable to change performance despite specific direction. Remediation required.	5= Superior performance. Demonstrated independence and initiative 4=Performed well. Needed general direction. 3=Performed satisfactorily. Needed general and some specific direction 2=Below average performance. Needed specific direction. Remediation required. 1=Unacceptable performance. Unable to change performance despite specific direction. Remediation required.
Novice = first clinic Intermediate = second clinic	Advanced = third and fourth clinics and full-time internships

Evaluation (Continued):

KASA - IV D. Demonstrate the ability to…	Competency on Practicum Grading Form
Conduct assessments and evaluations consistent with age, sex, and sociocultural status	Shows sensitivity and respect for individuals from different backgrounds (including differences in age, ability/disability status, racial/ethnic background, religion, SES, sexual orientation/gender identity).
	Demonstrates respect for “patient’s” rights to make decisions regarding their care through communication of options and associated risks.
Collect case history information and integrate information from patient’s family and other professionals	Demonstrates effective chart review/extracted pertinent information from electronic medical record (EMR).
	Demonstrates synthesis of information extracted from the electronic medical record (EMR) to document a concise history and physical.
Selects and administers appropriate evaluation procedures	Selects and administers appropriate evaluation procedures, such as behavioral observations, non-standardized and standardized tests, and instrumental procedures.
Interpret, integrate, and synthesize information to develop diagnoses and make appropriate recommendations	Interprets, integrates, and synthesizes all information to develop a diagnosis and make appropriate recommendations for intervention.
Refer patients for appropriate serves	Refers patients for appropriate services following completion of the evaluation.

Resources:

- MBSImP
  - Per the website:
    - MBSImP provides a standardized protocol to profile physiologic impairment of swallowing function and to communicate MBS study results in a manner that is accurate, specific, consistent, and objective
  - Allows students to administer consistencies and evaluate the study in real-time



Resources (Continued):

- Electronic Medical Records
  - Excel
  - EHRGo
    - https://web21.ehrgo.com/home/index

NO PHOTO AVAILABLE	Patient: SMITH, BARRY	DOB: 09/23/1951	Age: 67 Sex: M
	Location: HAWK HOSPITAL	Admit Date: 02/17/2019 10:45	MR#: MR64895
	NKA, FULL CODE, FALL RISK, ASPIRATION RISK		

Patient Information		
Suffix:		
First Name: Barry	Last Name: Smith	Middle Name or Initial: Wayne
Alias or Non-Legal Name:	Sex: Male	Date of Birth: 09/23/1951
Medical Record Number: MR64895	SSN: 123-45-6789	Marital Status: Married
Current Gender Identity: Male	Patient Race/Ethnicity: Caucasian	Primary Language: English
Street Address: 4310 Walnut Road		Apartment #:
City: Indiana	State/Province: PA	
Zip/Postal Code: 15701	Home Phone: (724) 357-5684	Cell Phone: (724) 388-4214
Employment Status: Retired	Employer: N/A	Work Phone: N/A

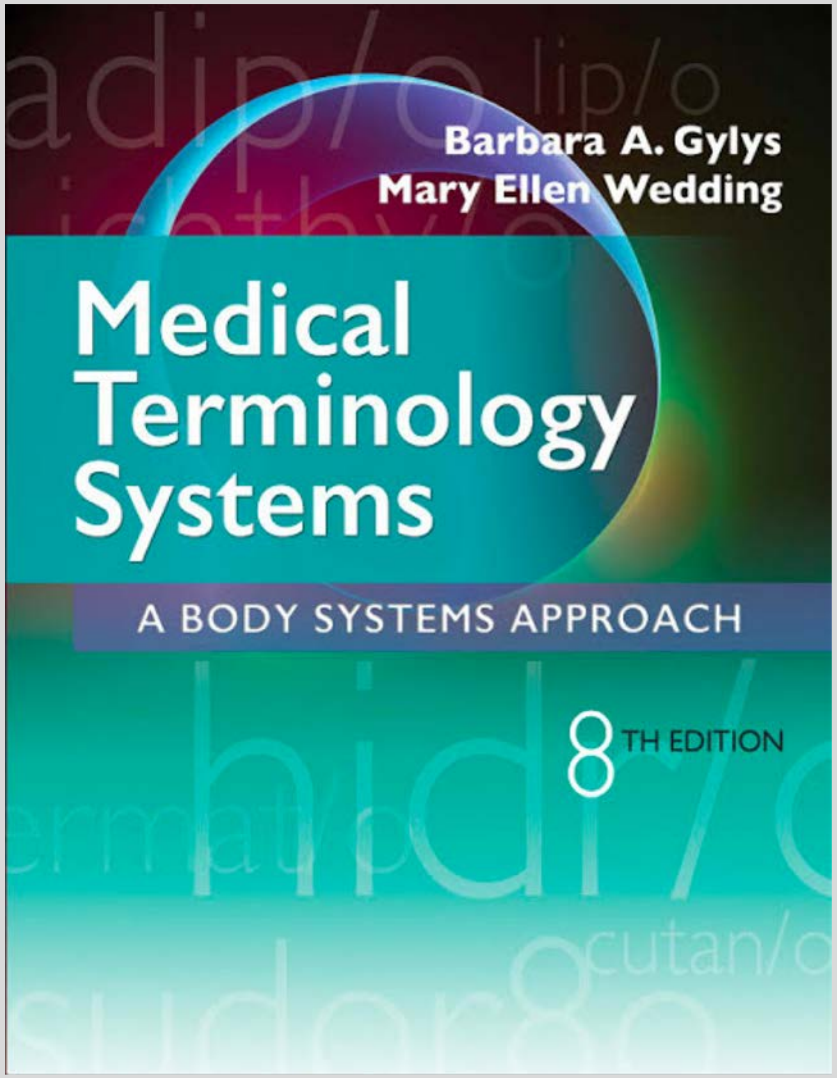
Emergency Contact		
First Name: Wanda	Last Name: Smith	Relationship to Patient: Spouse
Street Address: 4310 Walnut Road		Apartment #:
City: Indiana	State/Province: PA	
Zip/Postal Code: 15701	Home Phone: (724) 357-5684	Cell Phone: (724) 388-4214

Parent or Guardian Information		
First Name:	Last Name:	
Street Address:		
City:	State/Province:	Apartment #:
Zip/Postal Code:	Home Phone:	Cell Phone:

Demographic Information | Insurance | Encounters | Alerts | Problems | Orders | Radiology | Nursing Documentation | History and Physical

Resources (Continued):

- Textbook
  - Medical Terminology Systems: A Body Systems Approach – Eighth Edition



Looking Ahead to the Future – From Pilot to Phase-In:

- Ongoing development and refinement of simulated case studies
- Development and implementation of an Objective Structured Clinical Examination (OSCE) where appropriate
- Conduct evaluation and obtain feedback regarding the course
  - Step 6 (Kern, 2014)

Looking Ahead to the Future:

- There are many platforms available that could be used for the asynchronous simulation
  - Articulate360
    - Articulate 360 is a user-friendly platform for the development of authentic, scenario-based learning experiences
    - Storyline 360 and Rise 360 are two components of the platform that include stock photos, templates, characters, videos, and icons for scenario development
    - https://articulate.com/360
    - https://www.youtube.com/watch?v=pms5gbGB6h8
  - 2D Simulations
  - 3D Simulations

Developing Computer-Based Simulations

Ramy Shaaban, MD, MS

Indiana University of Pennsylvania

What is virtual clinical simulation?

- Computer programs that provide virtual, clinical cases for students
- Advantages:
  - Available anytime, anywhere
  - Rare clinical cases can be included
  - Enhance clinical reasoning skills

IUP Speech-Language Pathology
Virtual Clinical Simulation

- Two forms of online simulations are being designed:
  - 2D simulations
  - 3D simulations

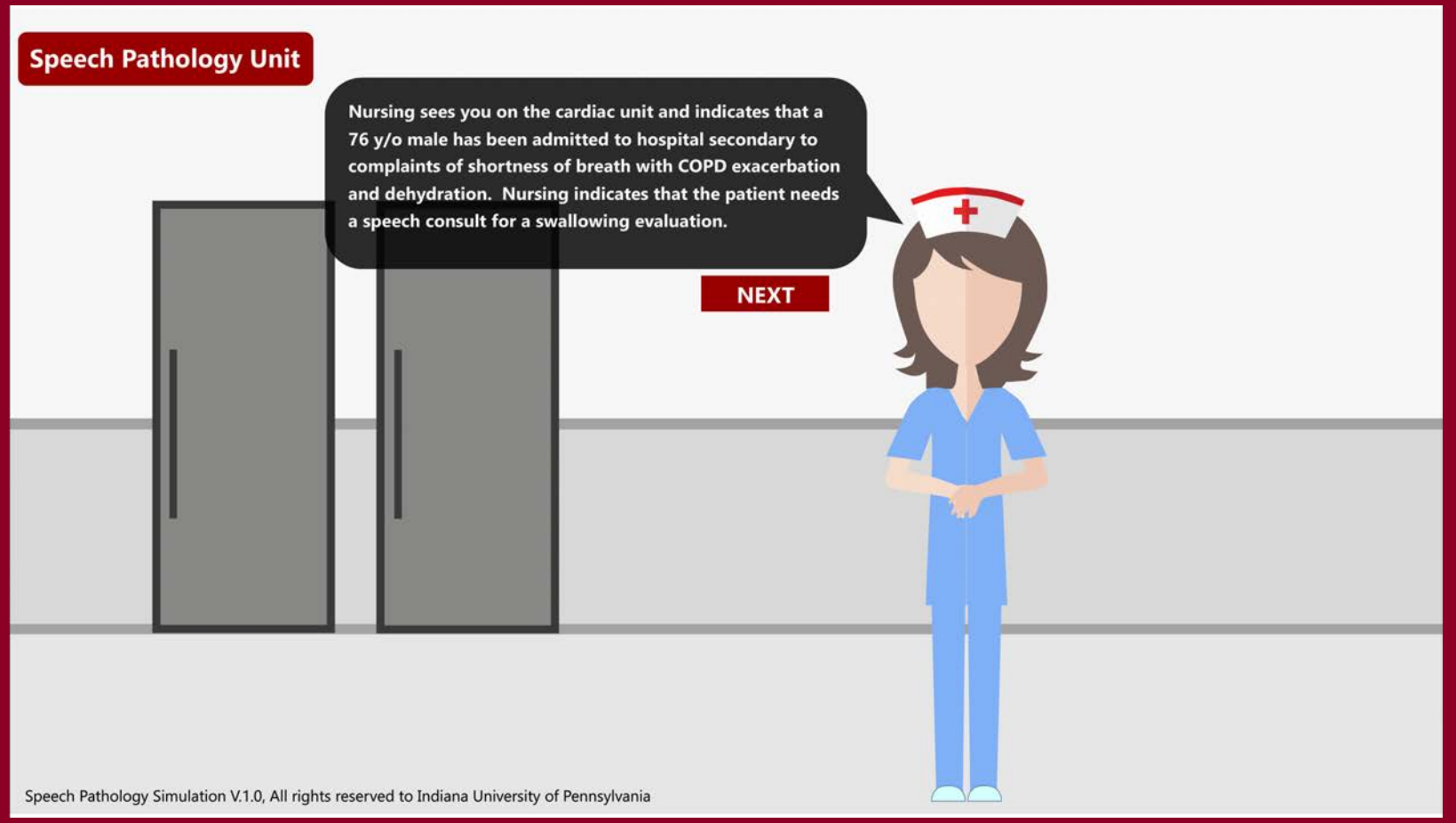
2D Online, Clinical Simulations

- Using Adobe Animate (formerly Adobe Flash), we developed an online simulation for speech-language pathology clinical cases
- The 2D program has an embedded, detailed grading system, this grading system is able to do the following:
  - Grade students performance in each clinical step
    - History taking
    - Examination
    - Investigation
    - Diagnosis
    - Treatment
  - Enhance clinical reasoning skills through interactive communication between the student and a virtual computer assistant
  - Simulate clinical examination, allowing students to memorize examination procedures and techniques in an efficient way

Process of Creating an Online, Clinical Simulation

1. Instructional design process:
   - Conversion of a written clinical scenario into a story board
2. Design process:
   - Creation of illustrations and animations needed to follow the story board
3. Compiling process:
   - Combination of all designed graphics and animations to build a complete virtual case
4. Gamification process:
   - Construction of the grading system of the virtual case to include the interactions and automatic feedback
5. Evaluation process:
   - Evaluation of our virtual case by Subject Matter Experts (SMEs) and students
   - Editing of the virtual case from the feedback received

2D Simulation Screenshots:



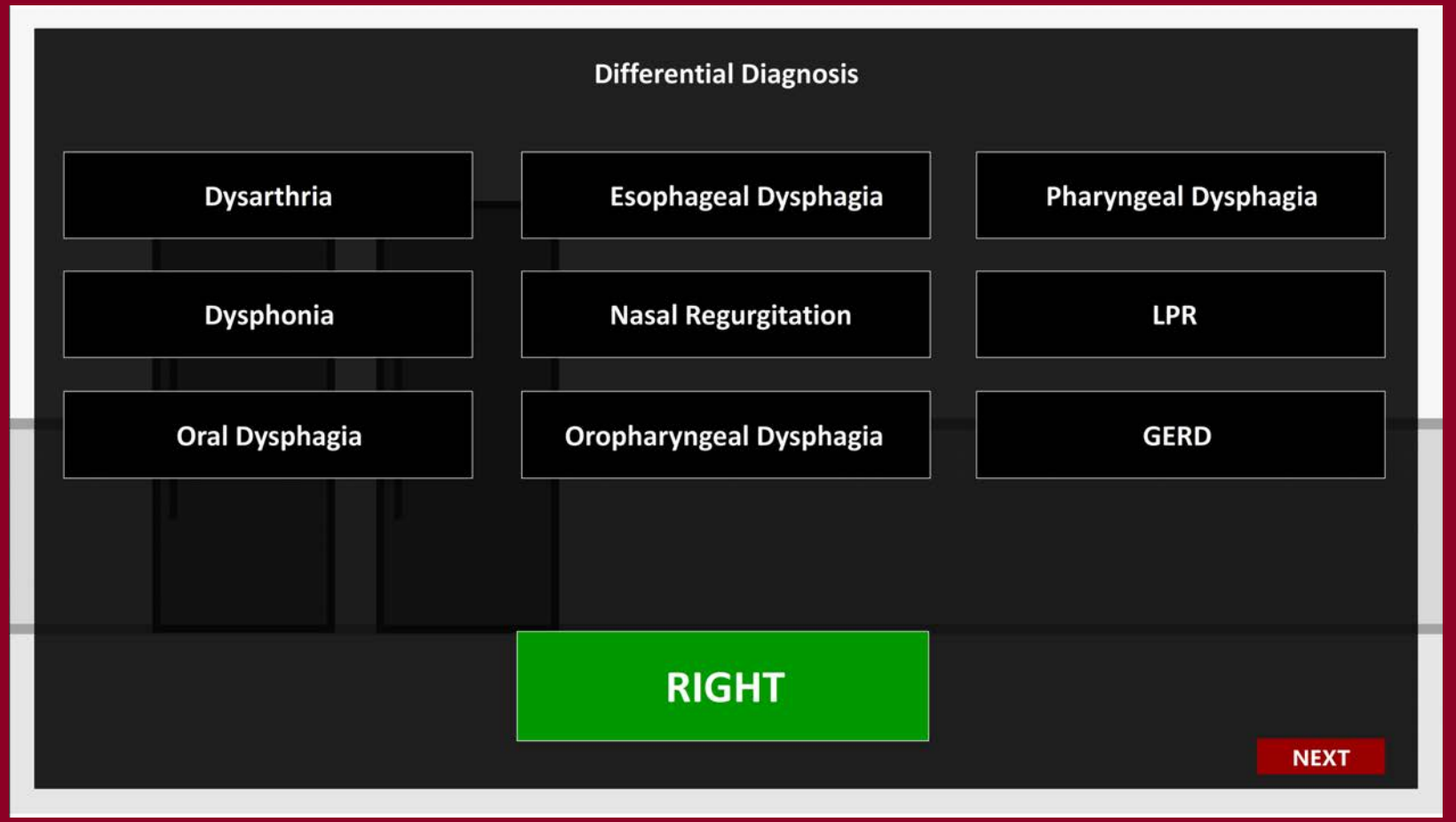
2D Simulation Screenshots:

2D Simulation Screenshots:

2D Simulation Screenshots:

2D Simulation Screenshots:

2D Simulation Screenshots:



3D Clinical Simulations

- Using Unity3D, the famous game engine, we developed a 3D clinical simulation in the form of a videogame
- In this simulation, students are able to go into a 3D virtual clinic
  - Engage in tasks that they would experience in a typical clinical environment
- Gamifications, badges, scores, and other forms of competition are included in the program to encourage students to master the targeted, clinical skills

References:

Curtin, L. B., Finn, L. A., Czosnowski, Q. A., Whitman, C. B., & Cawley, M. J. (2011). Computer-based Simulation Training to Improve Learning Outcomes in Mannequin-based Simulation Exercises. *American Journal of Pharmaceutical Education, 75*(6), 113.

Holmboe, E., Edgar, L., & Hamstra, S. (2016). *The Milestones Guidebook* [PDF file]. Retrieved from https://www.acgme.org/Portals/0/MilestonesGuidebook.pdf.

Jeffries, P. R. (2005). A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. Nursing Education Perspectives, 26(2), 96-103.

Johnson, P. Cynthia, R. (2011). *Debriefing after Simulation: Guidelines for Faculty and Students*. Retrieved from Sophia, the St. Catherine University repository website: https://sophia.stkate.edu/ma_nursing/14.

Kern, D. (2014) *Curriculum Development An Essential Educational Skill, A Public Trust, A Form of Scholarship, An Opportunity for Organizational Change* [PDF file]. Retrieved from https://dnnyqetna.blob.core.windows.net/portals/15/Six-Step%20Approach%20to%20Curriculum%20Development.pdf?sr=b&si=DNNFileManagerPolicy&sig=9sAOUX/lzfZQsN6QKLOpWJ46YLRuXmQwOghR7ptxnFw=.

Pugh, D. & Smee, S. (2013). *Guidelines for the Development of Objective Structure Clinical Evaluation (OSCE) Cases* [PDF file]. Retrieved from https://mcc.ca/media/OSCE-Booklet-2014.pdf.

Task Force of the Council of Academic Programs in Communication Sciences and Disorders. (2018). *Best Practices in Healthcare Simulations: Communication Sciences and Disorders*. Retrieved from http://www.capcsd.org/wp-content/uploads/2018/05/Simulation-Guide-Published-May-18-2018.pdf