

Innovators in Education

Faculty and student collaborators
advancing e-learning, assessment,
and scholarship

Volume 5

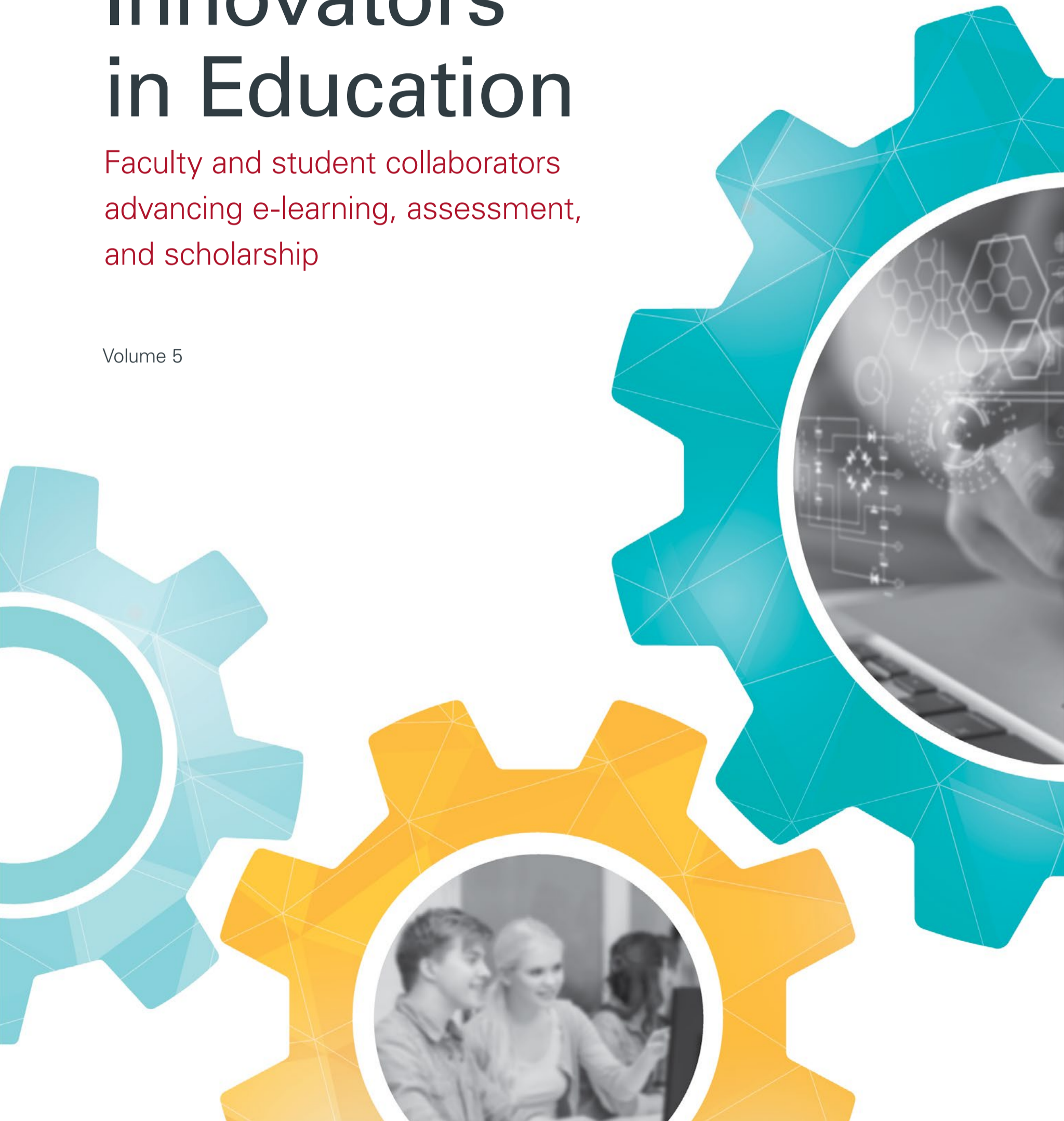
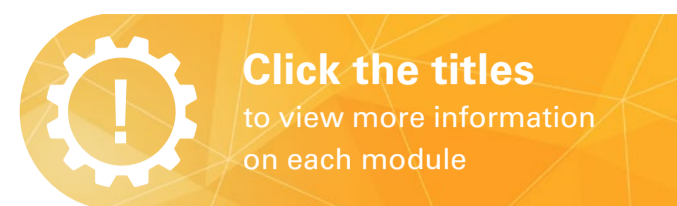


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The E-Learning Program is proud to present the latest innovators in education. The cohort featured in this booklet is a true representation of how content can be paired with interactivity to increase learner engagement and retention.

One of the key factors of their success is due to the collaborative partnership between the faculty and student developers. Faculty led the projects with the commitment to incorporate the e-modules into their courses and consult with students to generate creative ideas. In turn, students offered creative engagement and e-learning development skills. Further, there is faculty and student representation from all colleges and multiple campuses.

New to this cohort is the strong focus on assessment and scholarship. Faculty collaborated with Drs. Beth Beam and Ron Shope from the Interprofessional Academy of Educators and Dr. Kendra Schmid from the UNMC Department of Biostatistics to establish a path for educational research and scholarship, ensuring they have support as they study the e-learning intervention, and a means to evaluate their impact and advance scholarship across UNMC.

I want to express my gratitude and appreciation for all the hard work that went into the creation of these e-learning projects, and I hope you enjoy learning about how our faculty and students are taking an active role in advancing e-learning, assessment, and scholarship at UNMC.



E-Learning Leadership External Advisory Board



Brad Fenwick, DVM, PhD

Senior Vice President for Global Strategic Alliances at Elsevier

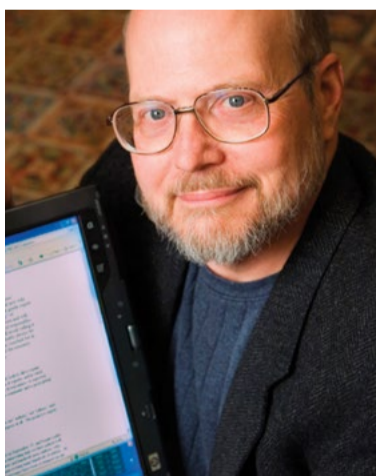
Dr. Brad Fenwick is a Professor of Pathobiology and Microbiology and holds a Doctor of Veterinary Medicine and Masters of Pathology from Kansas State University and PhD in Comparative Pathology from UC Davis where he completed his residency and is distinguished alumnus. He is a Fellow with the American Council on Education, a Fellow with the American Association for the Advancement of Science, a Jefferson Science Fellow, and Senior Science Advisor to the US Department of State and USAID. Dr. Fenwick has held many senior administrative positions, including Graduate Dean, Vice President, Vice Chancellor, and Federal Chief Scientist.



Nicholas Lorenzo, MD, MHCM, CPE

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Dr. Nicholas Lorenzo is a subspecialty and fellowship-trained, board-certified neurologist. He is a serial healthcare, healthcare publishing, and healthcare technology entrepreneur. Dr. Lorenzo has served as the Co-Founder and Chief Publishing Officer of eMedicine (acquired by WebMD), the Founder and CEO of Pearlsreview (acquired by Gannett), and he was a Senior Founding Contributor to Boston Medical Publishing (acquired by McGraw-Hill). eMedicine and Pearlsreview, even today, are two of the largest and most extensive electronic/online healthcare education and publishing systems in the world. Currently, Dr. Lorenzo is the Founder and CEO of PHLT Consultants, and he also serves as the Chief Medical Officer of MeMD, an Arizona-based company, that provides telemedicine services across the US.



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Ray Schroeder is Associate Vice Chancellor for Online Learning at the University of Illinois Springfield and Director of the Center for Online Leadership and Strategy at the University Continuing and Professional Education Association (UPCEA). He is an inaugural Sloan Consortium Fellow and recipient of the consortium's highest Individual award — the A. Frank Mayadas Leadership Award. He received the 2011 University of Illinois Distinguished Service Award.

“So, you say your pain is an 11...”

An E-Module on Pain Assessment and Management

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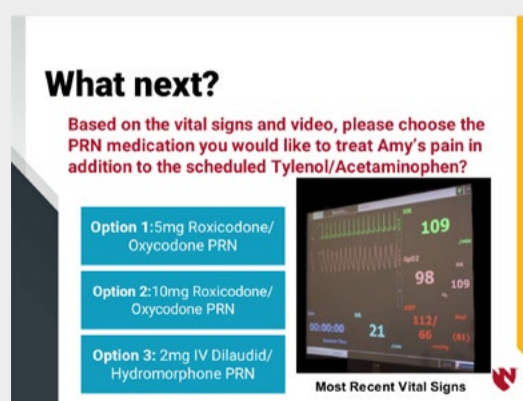
The opioid epidemic has become a constant presence in the news, as more lives are being taken every day by prescription drug misuse. Research shows addiction can start during hospitalization with the first exposure to narcotics for acute pain. As healthcare providers, we are presented with a unique opportunity to help frame patients’ understanding of acute pain and its management, thereby reducing the future misuse of opioids.

Healthcare professionals are able to better manage pain when provided education that targets knowledge and attitudes towards acute pain assessment and management. This module helps build on learners’ current knowledge while also providing insights into appropriate opioid use in the acute care setting. Research shows that using case studies as a learning tool allows the learner to be actively engaged. Case studies are also a great tool in developing skills such as problem solving, analytical thinking, decision making in complex situations, and promoting retention and application of course material.

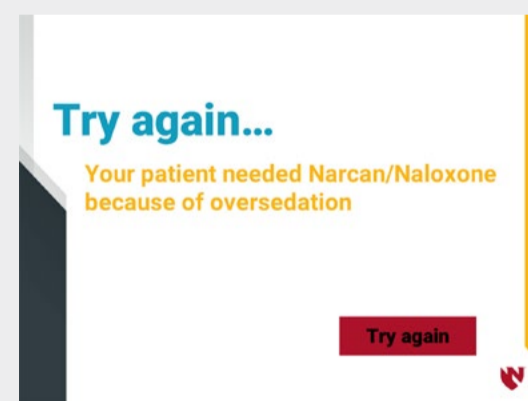
“So, you say your pain is an 11...” can be used supplemental to course work on acute pain assessment and management. Utilizing a numeric pain rating scale, the learner works through an interactive case study to properly assess and manage a patient’s pain using pharmacological and non-pharmacological interventions. The module demonstrates a standardized pain assessment for the learner and allows for evidence-based management techniques based on recent guidelines. Additionally, it allows for a safe learning environment for learners to understand the adverse effects of the misuse of opioids and what to do when incorrect choices are made.



Learners will watch short videos to gain information about the case study, dependent on choices made throughout the module.



Multiple choice options throughout the module vary the outcomes of the case study.



If the learner makes incorrect or dangerous choices, they are allowed to follow through to see what adverse outcomes could happen.



Complex Diabetes Cases in Primary Care

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Pharmacy students are very involved in drug therapy for patients with Type 1 and Type 2 diabetes. They are often looked to for drug therapy recommendations and active management of these patients. The Diabetes Management for Pharmacists elective is taught to third-year pharmacy students every year who wish to gain more expertise in this area. Feedback from past students was that they would like more experience managing complex diabetes patients. Live patient-case scenarios are very time and labor intensive to build. E-modules built off of complex patient cases could be an opportunity for students to develop their critical thinking skills in an efficient manner.

These e-modules simulate patient interview scenarios to help students think through patient assessment and the best drug therapy recommendations for a complex Type 1 diabetes patient and a complex geriatric Type 2 diabetes patient.

The modules contain options for students to ask the patients questions, assessment questions throughout, and the ability for students to see how their choices affect patient outcomes. The baseline knowledge is taught in a lecture/discussion format in the course and the e-modules are designed as a complement to apply this material. The goal is to track student decisions in the case and present those analytics to the students during the course to discuss different approaches the students took.

Using Susie's typical breakfast and the provided resources, calculate how much meal time insulin she would require.

Typical Breakfast: 2 eggs scrambled, 1 packet of oatmeal, 8 oz of orange juice

Food Labels

Rx


Lantus Solostar
16 units at bedtime

Novolog Flextouch
1:15 with breakfast and lunch;
1:10 with supper; CF 1:50 over 150

Units

This slide allows students to combine their skills of reading food labels to calculate carbohydrate intake and insulin required for this meal in a Type 1 diabetes patient. Students can click on the blue "Food Labels" button to pull up the food labels for all of the items listed in the typical breakfast for this patient.

Select the area where insulin injections are absorbed the slowest.



This slide allows students to click on various parts of the body to gain information about which injection sites for insulin have the slowest or most rapid absorption. This allows them to be able to adequately counsel patients about insulin injection technique.



Cyto-Histo Morphologic Correlations of Glandular Lesions of the Female Genital Tract

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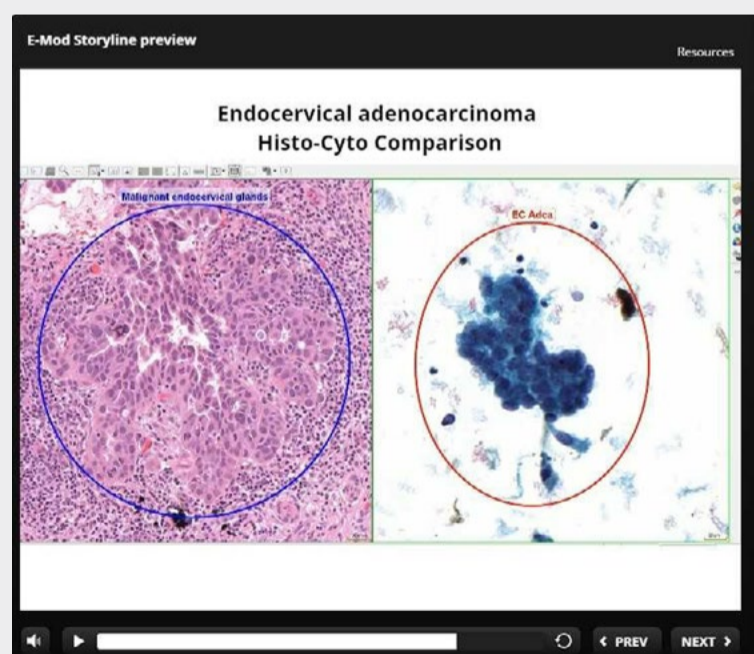
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UNMC's cytotechnology program has been recognized as a leader in cytotechnology education as well as distance education. Nationally, there are discussions about moving the entry-level education to a master's degree (UNMC currently offers a post-baccalaureate certificate). One of the proposed changes in the standards and guidelines for a master's level curriculum is that the students would be able to microscopically identify, discriminate, and explain the significance of glandular abnormalities of the female genital tract in the context of a given patient in a histologic specimen. In order for UNMC's program to continue to pave the way for other cytotechnology programs, the proposed curriculum enhancements will need to be added.

The goal of this e-module is the improvement of the cytotechnology students' and pathology residents' understanding of the morphologic correlation of histologic specimens to cytologic specimens. This module consists of recorded virtual microscopy microscope sessions of both cytologic and histologic interpretations of various diagnostic criteria. It is designed to encourage critical thinking and understanding of morphologic criteria used for interpretation by using self-assessment questions that will be tied to the objectives of the e-module.

This online e-module will elevate the content of our curriculum and benefit the online curriculum for our distance-learning students as well as the UNMC campus students.



This portion of the e-module is a video that shows the comparison of the histology and cytology of Endocervical adenocarcinoma (histology on the left and cytology on the right).



This is an example of an assessment question in the e-module. The individual will need to select an area on the picture that represents Endocervical adenocarcinoma.



Suturing 101

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Suturing is a basic skill usually taught in the third year of medical school and students need to learn how to suture in a safe environment before performing on humans. A tremendous amount of practice is dedicated to grasping this basic skill, as many different suturing styles exist — and they each require mastery of different techniques. The problem for students is remembering and mastering the different techniques with limited practice, as facilities and instructors are not typically available at all times.

This e-module provides suturing instruction that is immensely beneficial to students. It provides students with an interactive suturing demonstration that is reusable and available at any given time. Comparing it against the traditional teaching methods, such as video demonstration, in novice and more experienced medical students will assess this module's effectiveness.

The aim of this module is ultimately to improve the ability of medical students to perform basic suturing skills in the operating room. The module can be implemented into the clinical curriculum for students who will be able to apply the skills they learn immediately.

Feedback from students regarding the e-module includes:

- “This would have saved me major embarrassment the first time I was asked to suture in the OR.” – Charlie Treinen, M3
- “I think this will be incredibly helpful, especially for students trying to go into surgical specialties.” – Matthew Dorwart, M2
- “I needed this a year ago!” – Brent Moravec, M3



Primer on the Mental Status Exam

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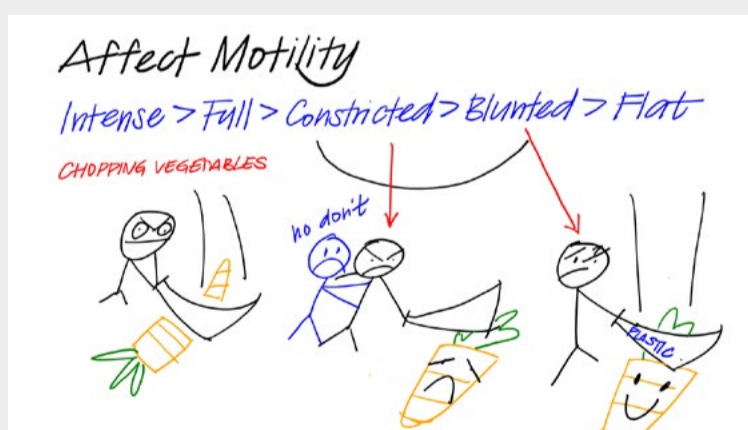
Faculty Development &

College of Medicine

The psychiatric mental status exam is an integral component of the psychiatric interview and assessment. It is a vital skill that is introduced to all medical students with expected competency by the end of their required psychiatry clerkship, with mastery beginning with careful observation and skillful communication of its findings.

The mental status exam is uniquely challenging in that it is conducted concurrently with the patient interview and comes with its own vocabulary and format. As such, preclinical and early clinical learners may initially feel underprepared or overwhelmed. In the spirit of “repetitio est mater studiorum” (repetition is the mother of learning), this module provides a learning resource for students to increase their familiarity with the relevant vocabulary by rapid-fire word recall and practice their observation and documentation skills through pre-recorded simulated patient encounters and note-writing exercises. Memory aids for the structure and content of the mental status exam are also provided with use of live-drawing animations and mnemonics.

The module is broken into separate, accessible sections, facilitating easy revisiting for review of specific content. It is designed for use by health professions students after completion of an introductory lecture on the mental status exam, as preparation for their clinical rotations in psychiatry.



Live drawings and mnemonics aid in recall of the mental status exam structure and content.



Simulated patient encounters provide practice for observation skills and documentation of exam findings.



Common Infectious Diseases in the Pediatric Clinic

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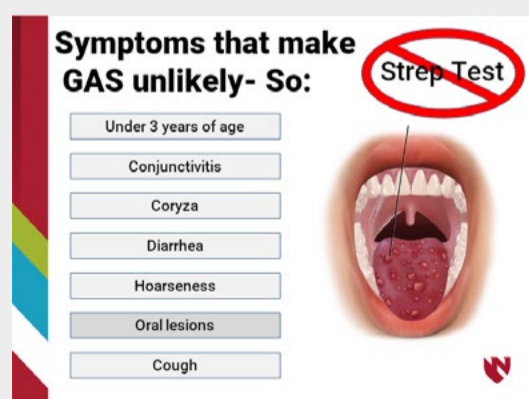
College of Medicine

This e-module focuses on the sequelae, treatments, and characteristics of infectious diseases commonly seen in the pediatric clinic. By using interactive drag-and-drop features, pictures, questions, and humor, this module will help students better retain important concepts both in the clinic and on their standardized exams.

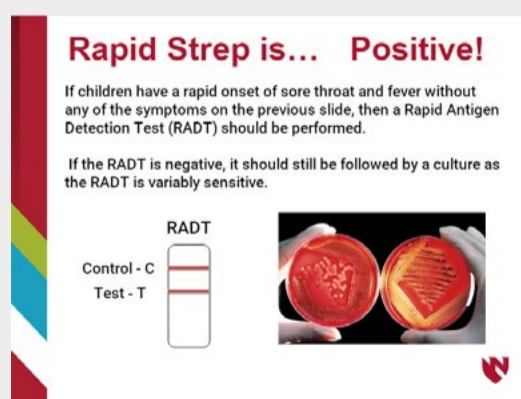
Medical students will be given this module during their third-year pediatrics clerkship to reinforce knowledge. A pre- and post- knowledge-based quiz will be completed so that project designers can determine if the module improves knowledge, and there will be an option for students to give feedback on their opinion of the module.

Medical students often face a challenge of duality — information learned during clinic doesn't always translate to standardized tests, and information stressed on standardized exams doesn't always cover the most common questions in clinic. By approaching this module from both sides, we hope learners will be able to concentrate on high-yield topics for both situations.

Articulate Storyline was used to create this module as it allows for familiar navigation, user interaction, and ability to insert questions throughout.



Bold photos throughout the module reinforce important pedantic facts.



Students will learn information that is important for both clinic and standardized exams.



Fun and humorous pictures are used throughout the module to help students remember important clinical concepts.



Pediatric Malnutrition: An E-Learning Module for the Pediatric Clerkship

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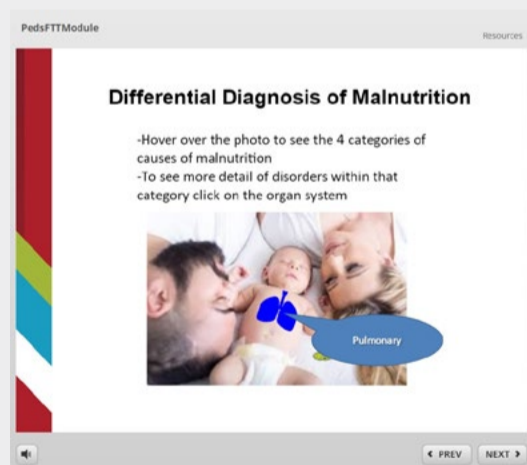
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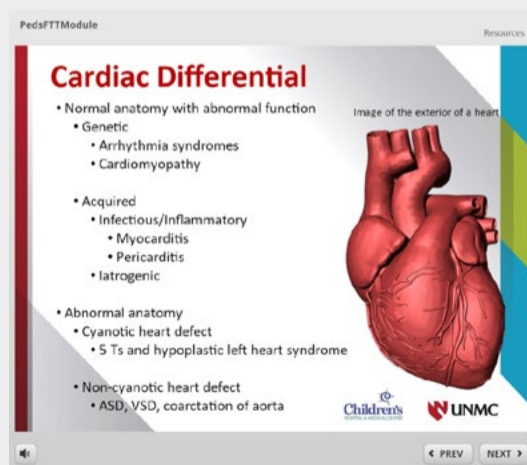
The focus of this module is to allow third-year medical students to become familiar with one of the most common reasons for pediatric hospital admissions: malnutrition (failure to thrive). The module walks students through the common causes of malnutrition, with the focus being on a general understanding of these causes and the common areas they can be grouped into. It prepares learners to have a more in-depth discussion on the wards with their residents and attendings in which they apply this knowledge to case presentations in small groups. Learners will be able to develop a thorough differential diagnosis of malnutrition in addition to understanding an initial medical work up for this condition and how each test/symptom/sign helps one move through the differential. Therefore, this project will promote improved retention of material by allowing students to both review it independently and apply it practically in a group setting.

Ideally, this project serves as a pre-learning exercise in which students attain basic knowledge in their own time that is then expanded on during the teaching time on the rotation. Learners will be assessed with a quiz that they will take after partaking in a practical, sit-down session with an attending in which they apply their knowledge. This post-intervention quiz will be used to demonstrate retention of knowledge and application of skills learned.

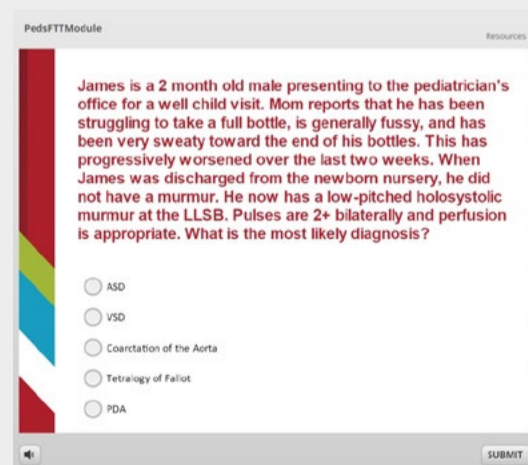
The project responds to contemporary learners by providing an interactive, self-directed learning environment. The module incorporates several different learning modalities, including interactive sections and self-assessment questions to test knowledge.



Learners navigate through each organ system at their discretion. This way, the learner is in control of what they want to learn next.



Each organ system leads students through the common differential diagnoses that may cause poor weight gain. In addition, each section shows learners the pertinent physical exam findings and questions to ask while taking a history.



At the end of each section, learners are prompted with a question that pertains to a key point. This helps learners solidify and reinforce their knowledge.



Geriatric Pharmacology Review

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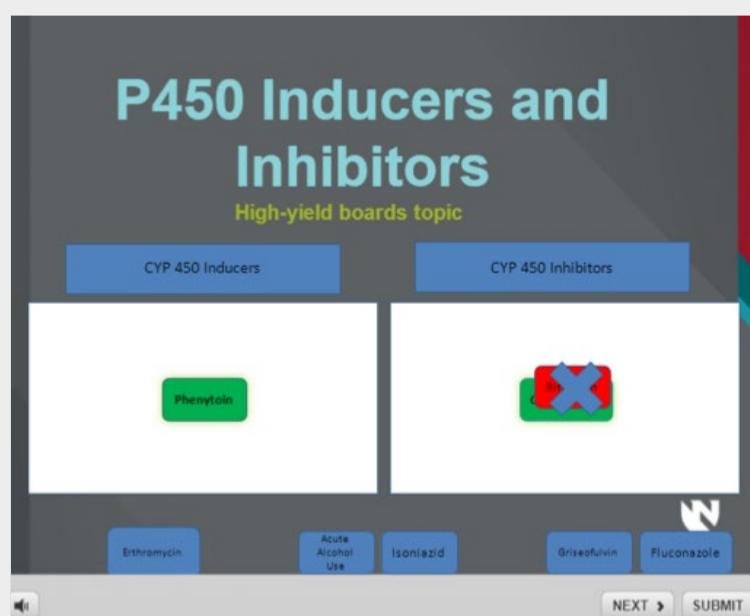
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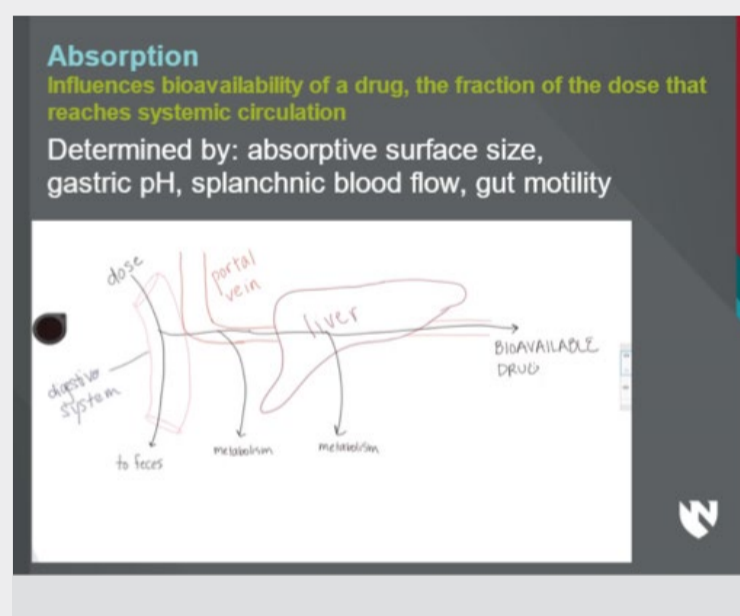
Older patients often have complex medical needs, for which they often receive equally complex medication regimens. Due to age-related changes in physiology, older patients often respond differently to medications than younger patients do. In geriatrics, geriatricians work closely with geriatric pharmacists as an interdisciplinary team to optimize medication management in this special population of patients.

The goal of this interactive e-module is to reinforce fundamental pharmacology concepts as well as review the unique aspects of aging physiology and medication management in older adults. This module is designed to be implemented during the Geriatric Synthesis Block of the new College of Medicine pre-clerkship curriculum. It will provide medical students with an opportunity to review basic pharmacology knowledge prior to taking the USMLE Step 1 exam while reinforcing important concepts they will utilize while learning to manage geriatric patients on their upcoming clinical clerkships. It may also serve as a useful review for pharmacy students.

This module uses animations to demonstrate how age-related changes in physiology affect the pharmacokinetics and pharmacodynamics of medications taken by the elderly. Interactive questions allow learners to review important properties of commonly used drugs, such as metabolism and side effects, while highlighting special considerations for their use among the elderly. This module also identifies which drugs may be potentially inappropriate for use in the elderly due to increased risk of adverse events and offers guidelines for developing an approach to medication management in the geriatric population. Learners can also apply what they learn to an example of a clinical scenario for self-assessment.



Learners can review important aspects of drug metabolism with interactive self-assessment activities throughout the module.



Animations help learners visualize how age-related changes in physiology influence pharmacokinetics and pharmacodynamics in geriatric patients.



Calculus Is Hard; Treating It Doesn't Have to Be

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Periodontal treatment planning is a complex, multifaceted, and important aspect of comprehensive patient care. Dental students need a strong comprehension of the didactic information and critical thinking skills to format a sequential periodontal treatment plan that is accepted and chosen by the patient. Specifically, the difference between oral prophylaxis vs. scaling and root planing.

Periodontal treatment planning is a topic that has permeated many of the dental courses throughout the curriculum. This e-module helps define core concepts, elucidates when to administer a specific type of periodontal treatment plan, and has the potential to help support students in their transition to clinical settings.

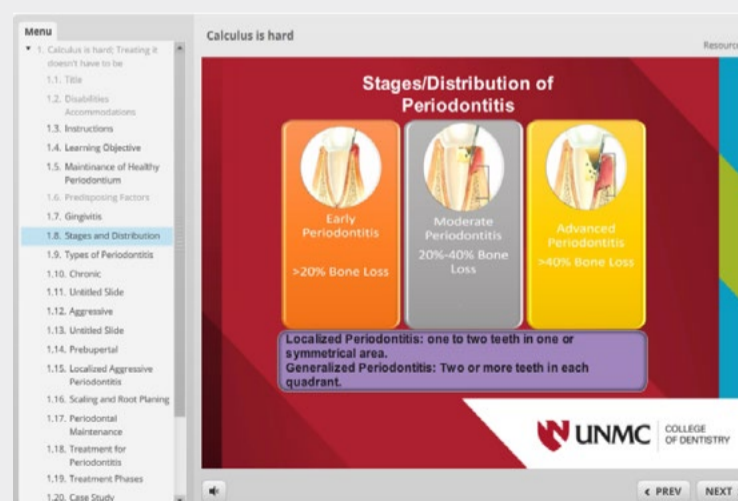
The e-module contains patient-centered, case-based interactive videos, audio recordings, animations, dental radiographs, clinical pictures, and fundamental charts necessary for student engagement and interactivity. The videos not only expand the breadth of periodontal treatment planning but also demonstrate to the student proper interprofessional skills and effective dissemination of clinical information between the dental student-faculty and dental student-patient.

Performance and retention of information is assessed by both a pre-test and a post-test. The tests focus on the periodontal treatment planning aspect. Questions have radiographs and/or clinical pictures in addition to the various materials presented in the e-module.

This e-module will supplement the periodontal therapy course given during the first semester of sophomore year as well as the periodontology course given during the summer of freshman year.



This slide discusses important characteristics of a healthy oral cavity. It informs the learner what a healthy oral cavity should be like.



This slide discusses the important stages of periodontitis and their distribution.



Radiographic Diagnosis of Dental Caries

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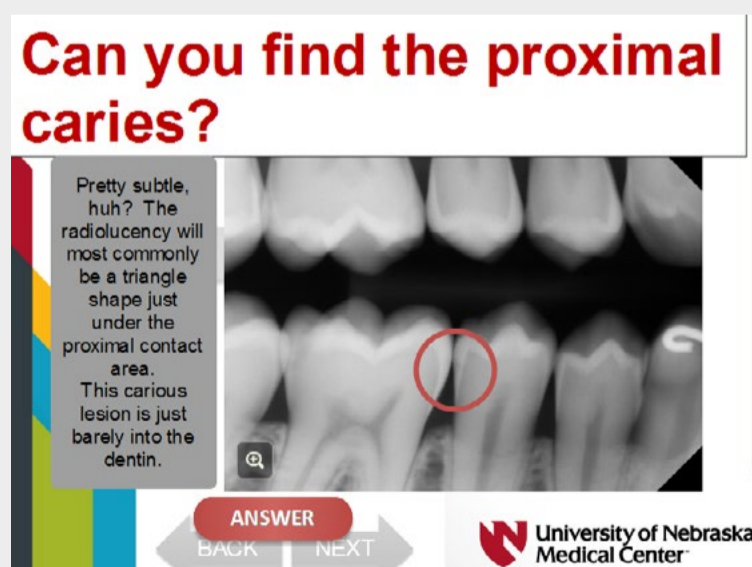
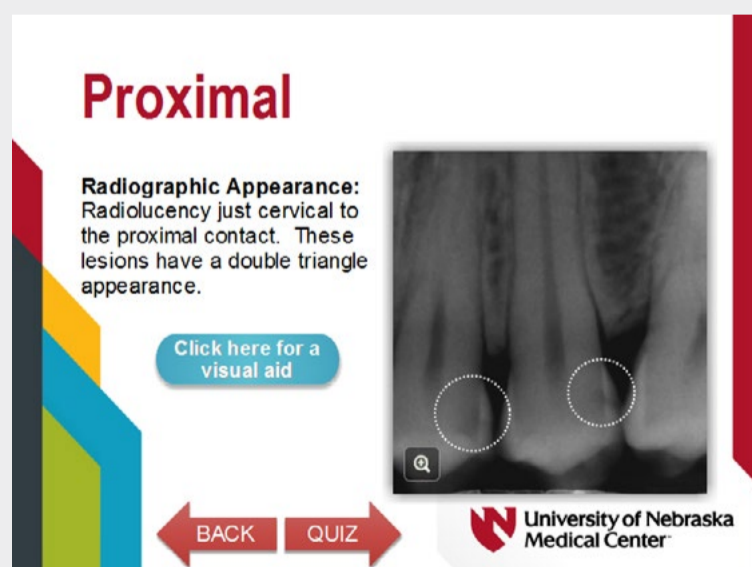
Class of 2020

Being able to detect dental caries on radiographs is an essential skill needed for providing comprehensive dental treatment. It is the most important learning objective of the dental radiology course for the D2 class. Certain types of dental caries are difficult to visualize intraorally, and therefore, the diagnosis needs to be made based solely on the radiographs. Due to the limited lecture time, the students are introduced to only a small number of radiographic examples of caries.

The module contains the most common types of dental caries. The type of dental caries is discussed and a radiographic example is shown. An interactive quiz then follows (drag and drop, click on the correct radiograph, etc.), which gives the students immediate feedback and additional radiographic examples. This allows the students to go back and review the topic if they got the answer wrong or move forward to the next type of dental caries if they got the answer right. After all types of dental caries are discussed, a final quiz incorporating many of the key points will serve as a comprehensive review with additional radiographic examples.

By providing numerous radiographic examples of caries that are of different types and severity, the module is designed to educate and improve the diagnostic skill of the students.

This module will serve as a supplemental learning tool for the OB 562 Radiographic Interpretation starting in the spring of 2019. All students will be mandated to complete this e-learning module as part of the course requirement.



Activation of the Incident Command System (ICS)

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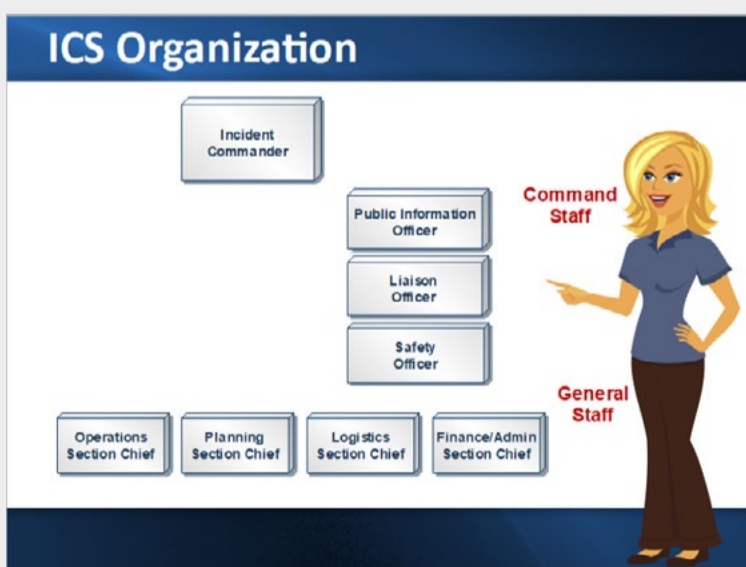
The activation of the Emergency Incident Command System (ICS) involves multiple entities working together to achieve a productive and successful response across multiple entities (local, state, federal, tribal, etc.) The goal of this e-module is to assist the learner in better understanding the roles and responsibilities in the activation and implementation of the ICS.

Better retention of course assignments is accomplished through visualization and interactive knowledge checks regarding the basic premise of ICS roles and responsibilities and multi-level responses; this also leads to a strengthened understanding of the course material.

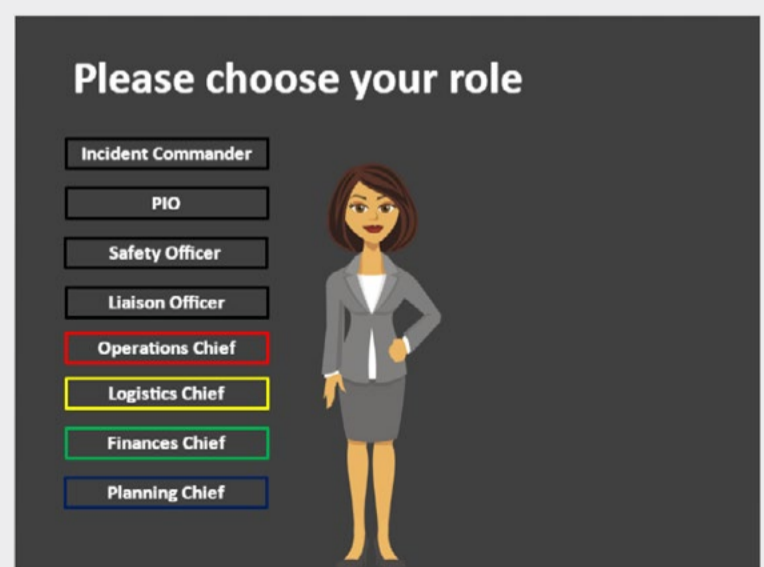
By utilizing this e-module to enhance basic comprehension, the learner is able to actively participate in classroom dialogue and confidently complete assignments.

Through interactive knowledge checks and a final certificate of completion, instructors can assess the effectiveness of this ICS module (in conjunction with the IS-800 FEMA course) on improving the understanding of the learner.

The ICS module utilizes clear, casual language and engaging visualizations to enhance the understanding of an ICS activation, the roles fulfilled during an activation and responsibilities to be fulfilled during an emergency. The ICS is used to organize both near-term and long-term field-level operations for a broad spectrum of emergencies including small to complex incidents, both natural and manmade. By completing this module, healthcare professionals: achieve a basic, but essential, understanding on how the ICS is activated, obtain knowledge on who will be activated to complete specific tasks during an emergency response, and discover how each role carries out its responsibilities.



The organization of the ICS involves various roles depending on the magnitude of the disaster. Here are a few of the initial roles activated during a response.



This shows the first individual to be activated during an emergency response, the Incident Commander. As students hover over the various roles, an avatar appears and provides information on their role in the ICS.



Cyto-Histo Morphologic Correlations of Squamous Lesions of the Female Genital Tract

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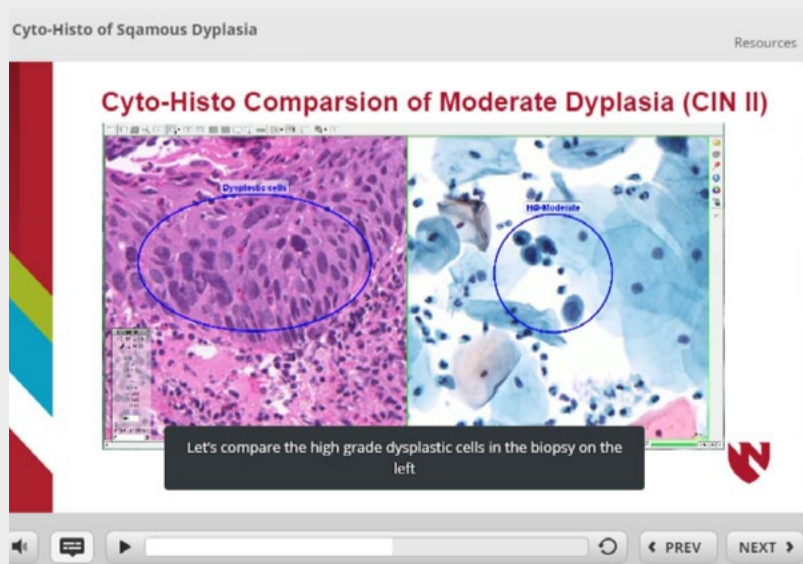
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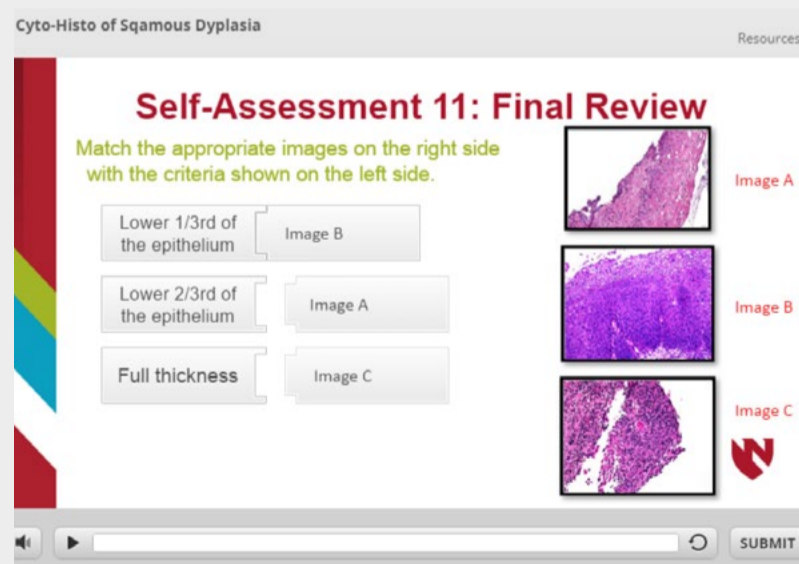
UNMC's cytotechnology program has been recognized as a leader in cytotechnology education as well as distance education. Nationally, there are discussions about moving the entry-level education to a master's degree (UNMC currently offers a post-baccalaureate certificate). One of the proposed changes in the standards and guidelines for a master's level curriculum is that the students would be able to microscopically identify, discriminate and explain the significance of squamous abnormalities of the female genital tract in the context of a given patient in a histologic specimen. In order for UNMC's program to continue to pave the way for other cytotechnology programs, the proposed curriculum enhancements will need to be added.

The goal of this e-module is the improvement of the cytotechnology students' and pathology residents' understanding of the morphologic correlation of histologic specimens to cytologic specimens. This module consists of recorded virtual microscopy microscope sessions of both cytologic and histologic interpretations of various diagnostic criteria. It is designed to encourage critical thinking and understanding of morphologic criteria used for interpretation by using self-assessment questions that will be tied to the objectives of the e-module.

This online e-module will elevate the content of our curriculum and benefit the online curriculum for our distance-learning students as well as the UNMC campus students.



The left side of the video shows a histologic section of the ectocervix with moderately dysplastic cells compared to the moderately dysplastic cells seen on the Pap test to the right.



This is an example of the self-assessment part of the e-module. At the end of the e-module, the user is asked to use information learned and match the image (on the right) with the diagnostic criteria (on the left). To increase user engagement, the Drag-and-Drop Question Type feature was used.



Alterations in Fluid Balance and Filtration and Resulting Edema Formation

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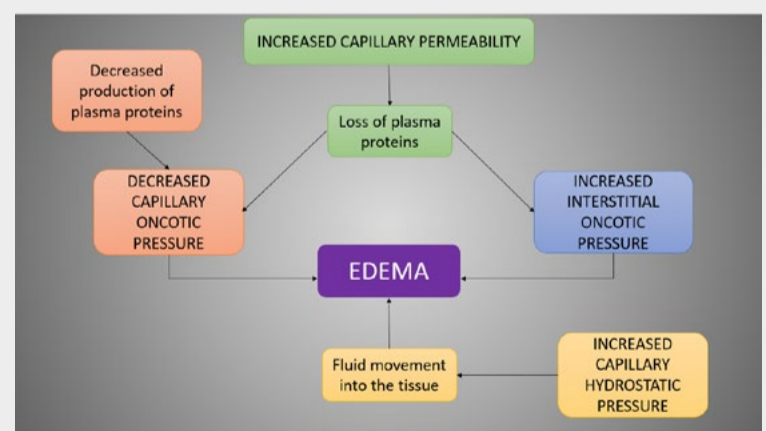
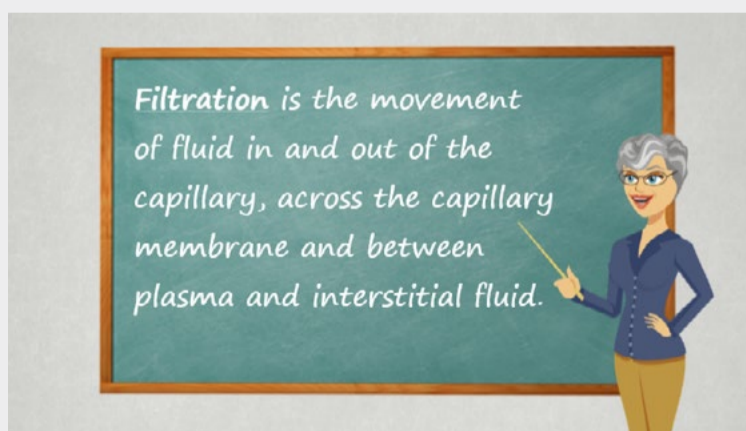
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Fluid movement and filtration involves the understanding of several “pressures” or “forces” within the body. It tends to be difficult to visualize how these forces work and what changes in fluid volume status happen when these forces are altered in the various compartments. This topic was chosen because the learning and understanding of it can be enhanced greatly using an interactive visual experience that could occur in a learner-centered, active environment. Today’s contemporary learner learns best when they are engaged in visualization.

This e-learning module will be used following classroom material, to greatly facilitate better retention and application of the concepts. It uses Articulate Storyline, which includes animation and greatly enhances the visualization of the concepts and engages the learner. Embedded interactive quiz questions ensure mastery of the concepts.



Immunodefenders

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Immunology is a scientific basis that underlies many of the other medical disciplines covered in the first and second years of medical school. The details are multiple and minute, and rote memorization is boring. This module, the first installment in a series, is intended to help M1 and M2 students develop a knowledge foundation of an important topic in immunology that is frequently tested both in class and on standardized tests: antibodies.

We present Immunodefenders, a video game representing the conflict between the body and the bug. Our module features an antibody archer versus the pathogen in a multi-question, multi-choice showdown intended to make rote memorization a bit more... memorable.



US Healthcare System & Healthcare Reform for the Health Professions Student

Faculty Project Director:

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Project Members:

Ashley Hamernik

Christopher Spurgin
E-Learning Program



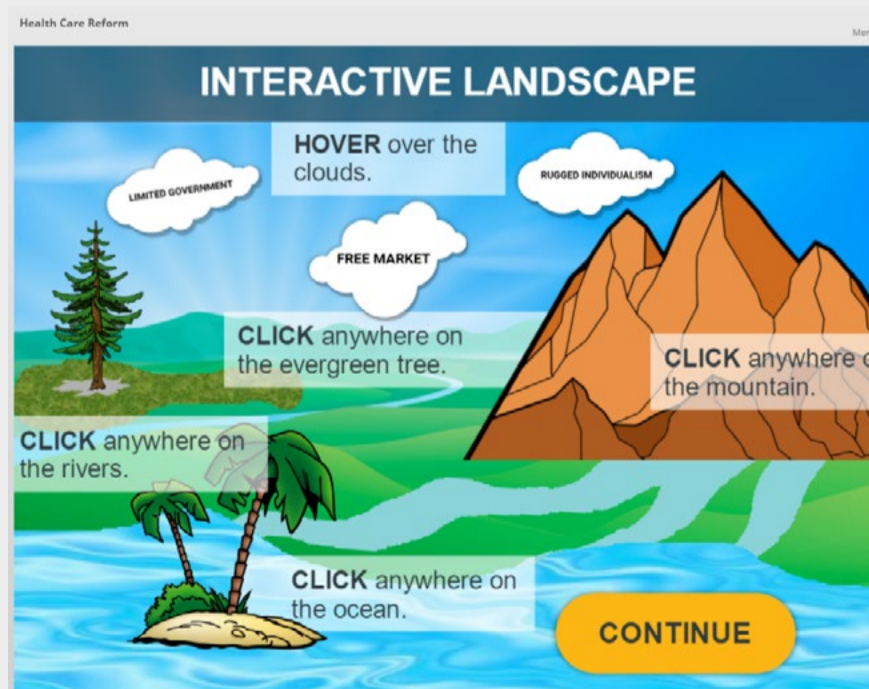
This e-learning project is a curricular collaboration between the E-Learning Program and the College of Allied Health Professions.

It is part of a series of modules and the first ever to be developed by a UNMC Dean.

The US healthcare system is not really one system, so much as a network of subsystems, policies, providers, and payers. It is complicated and ever changing. Health professions education curricula generally focus on providing students with the knowledge and competencies to assume roles as providers of healthcare, but far less content about the system in which this care is provided.

This e-learning module presents a simple conceptual model — the “Healthcare Landscape” — for understanding of the complexities of the US healthcare system, its various components, and the relationship between these components. It then uses the model to examine major historical healthcare reforms that have occurred over the past 80 years, with a focus on exploring how health policy reforms have intentionally or unintentionally affected the components, and how one reform often leads to the next. An organized and logical methodology for understanding and evaluating future healthcare reform efforts emerges as the incremental nature of healthcare policy reform is surveyed across the decades.

This complete overview of the US healthcare system and healthcare reform can be completed in approximately 15 minutes.



The module uses an interactive conceptual model — the “Healthcare Landscape” — to assist learners in understanding the U.S. healthcare system and healthcare reform.

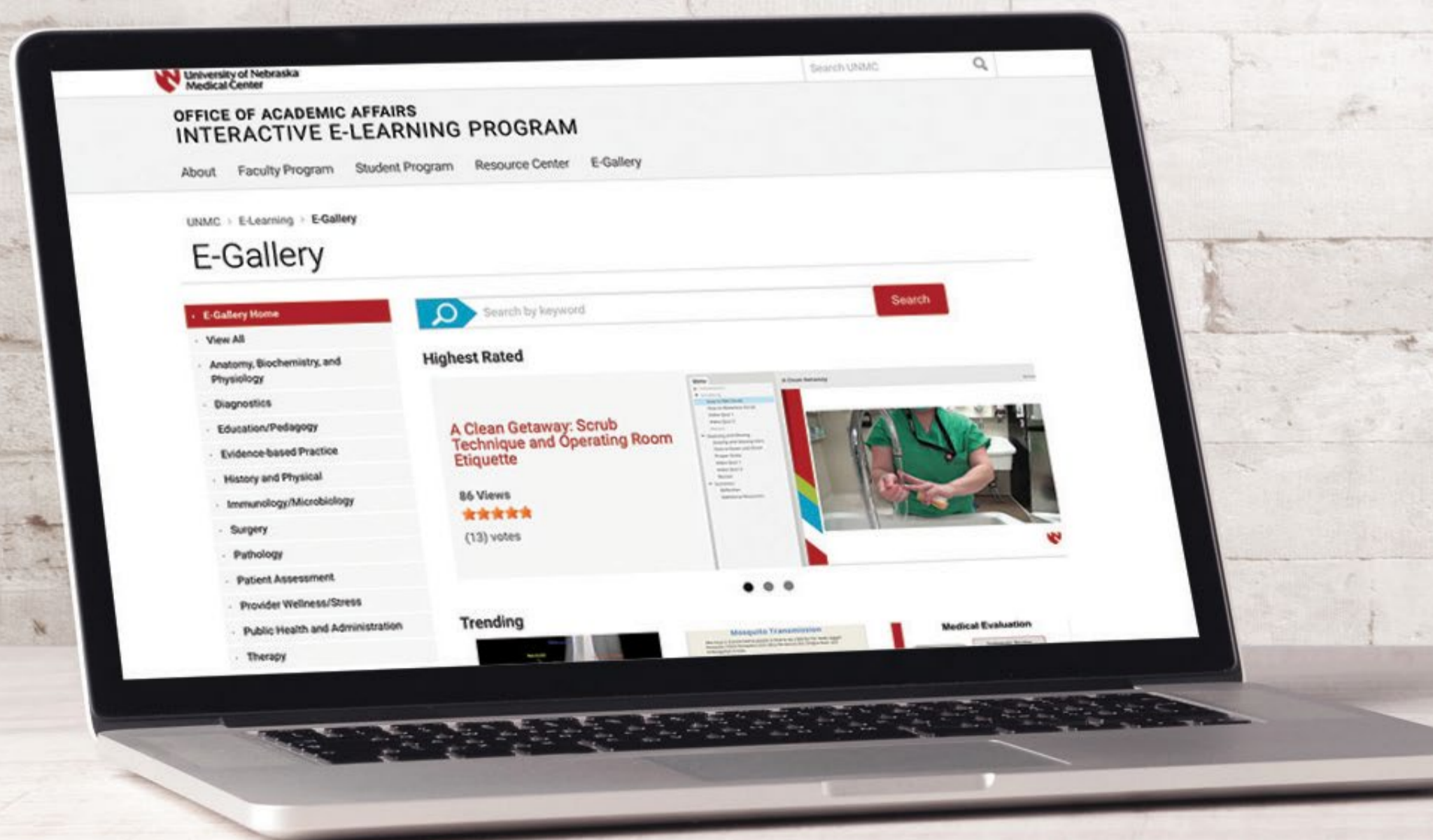


The E-Gallery

Access Modules Anytime, Anywhere

UNMC faculty, students, and staff can access e-learning modules on the E-Gallery. This online resource houses all the modules created through the E-Learning Program and is available irrespective of your location in Nebraska or around the world.

unmc.edu/egallery





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