

Innovators in Education

Creating the next wave of breakthrough e-learning

Volume 2



A Note from the Steering Committee Chair



**H. Dele Davies, MD,
MS, MHCM**
Vice Chancellor,
Academic Affairs

At UNMC, we continually strive to find innovative ways to maintain and build upon the excellence in education for which our university is known. That is why we are excited to showcase the next wave of breakthrough e-learning projects, which were completed by both faculty and students.

We view the production of these interactive e-learning modules as an important part of mastery and competency-based learning that will transform the future of health sciences education — and secure UNMC's foothold as a leader in our field.

The group of awardees and their projects that are highlighted in this booklet build upon the earlier successes from our first round of awardees last year. They are among the early adopters of e-learning and are setting the stage for innovative education at UNMC.

The faculty who developed these projects recognized the need to adapt their teaching for today's technologically advanced students who prefer a more interactive learning experience. The faculty embraced this opportunity as a way to increase learning and retention for their students.

Students were also invited to create modules, as they bring a unique perspective to the teaching arena. These students recognized areas for enhancement in existing curricula and created innovative ways to make the learning experience easier for their fellow students. It is also important to recognize the faculty who advised the students throughout the development process. By combining their expertise with the students' drive and creativity, some truly remarkable teaching tools were created.

I want to express my gratitude and appreciation for all the hard work that went into the creation of all the e-learning projects, and I hope you enjoy learning about them as much as I did.

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SHAPING THE FUTURE
OF EDUCATION

E-Learning External Advisory Board



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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 U.S. 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

Founder, CEO and Chief Medical Officer of PHLT Consultants
Chief Medical Officer at MeMD Inc.



Dr. Nicholas Lorenzo is a subspecialty and fellowship-trained, board-certified neurologist. He is a serial health care, health care publishing and health care 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 health care 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, a Scottsdale, Arizona based company, that provides telemedicine services across the US.



Ray Schroeder

Associate Vice Chancellor for Online Learning at the University of Illinois Springfield

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.

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Associate Dean for Academic Affairs and Professor, College of Pharmacy

“ Education in the light of present-day knowledge and need calls for some spirited and creative innovations both in the substance and the purpose of current pedagogy. ”

~ Anne Sullivan
(American Teacher)

Faculty E-Learning Projects

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Endodontic Immunology

An introduction of classic to current evidence of endotoxins

Project Director: Fahd Alsalleeh, BDS, MS, PhD, College of Dentistry

Project Members: Thomas Petro, PhD, College of Dentistry
J. Bruce Bavitz, DMD, College of Dentistry

Endodontic disease is essentially an inflammatory response of microbial etiology primarily caused by bacteria. Endotoxin can induce and perpetuate inflammatory response in dental pulp. A large amount of information from basic science perspective has been generated to understand the pathogenicity. However, a simplified version and putting what we know so far in a clinical perspective is lacking, making this one of the most difficult topics to understand by dental students and postgraduate residents.

This project helps learners understand the basic knowledge and put it in a clinical scenario. Basic information, relevant molecular pathways, and literatures discussing the topic were presented together in a simplified format. Sketches, minimal text and clinical cases were included. The game show component helps viewers recall information.

Furthermore, the project leaves many questions unanswered that will be addressed in future projects or classroom activities. For example, "LPS may cause dental pain" was mentioned; however, the mechanism was not discussed.

To view this e-module, visit www.endodonticresource.com. Data will be obtained from the site-wide statistics. A hashtag will be created and shared to mark the e-module and make it more easily found in a Twitter search. Comments from other Tweets marked with this e-module will be reviewed. Residents at UNMC will be required to view the link and submit a survey.

Albert Einstein said:

"Imagination is more important than knowledge."

This project will help learners and health providers to achieve it.

Structured like the TV show "Jeopardy!", the e-module's game show component is unique to help viewers recall information.



Range of Motion Examination of the Cervical Spine

Project Director: Betsy J. Becker, PT, DPT, CLT-LANA, School of Allied Health Professions

Project Members: Developed in collaboration with the University of Nebraska-Omaha Information Technology Outreach

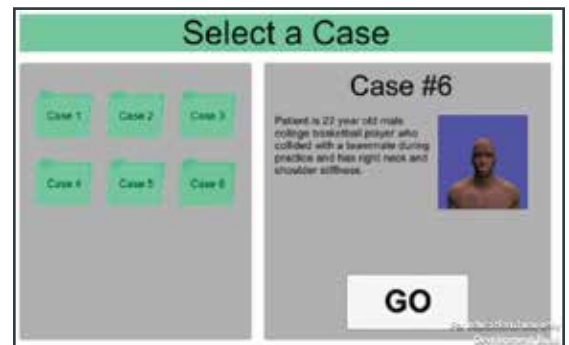
Student Reviewer: Marisa Johnson, SPT, School of Allied Health Professions

On-demand e-learning modules (available anytime and anywhere) move direct instruction to the individual learning space while the group learning space becomes a dynamic and interactive environment where students apply concepts with an emphasis on higher-order thinking. The topic of this interactive e-learning module is the examination procedure of Range of Motion (ROM) of the cervical spine.

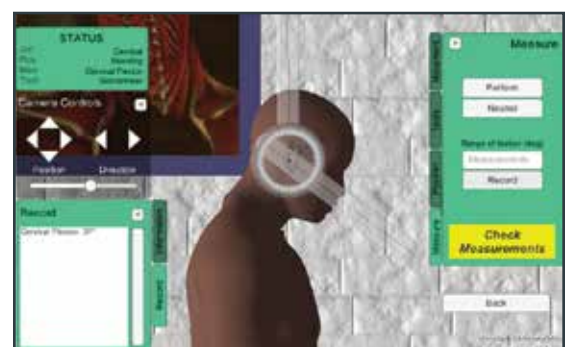
ROM is a fundamental skill for a Doctor of Physical Therapy student to determine a patient's functional mobility, assess limitations in movement, and direct treatment of health conditions related to biomechanical impairments. Following the standard procedure is important to ensure reliability of the measurement as well as accurate communication among health care providers.

This is a highly interactive module about ROM of the cervical spine. The learner interacts with a 3-D anatomically correct model of a patient, including positioning the patient for the correct ROM movement, placing the virtual measurement tool (goniometer or inclinometer), documenting the result(s) in the medical record, then checking for accuracy. The learner is exposed to several different patient cases with differing movement limitations.

This high-tech digitalization of the multi-axis joints of the cervical spine and measurement tools can engage the learner when studying this skill prior to class or lab, serve as a refresher during a clinical experience or be utilized as a resource for a practicing health care professional.



This example shows how the learner selects a patient case to begin the examination procedure.



This example shows alignment of the tool (goniometer) and recording the measurement for the medical record.

Range of Motion Examination of the Shoulder

Project Director: Betsy J. Becker, PT, DPT, CLT-LANA, School of Allied Health Professions

Peer Reviewers: Cody Sasek, MPAS, PA-C, School of Allied Health Professions
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Student Contributors: Emily Kindvall, SPT, School of Allied Health Professions
Marisa Johnson, SPT, School of Allied Health Professions
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On-demand e-learning modules (available anytime and anywhere) move direct instruction to the individual learning space while the group learning space becomes a dynamic and interactive environment where students apply concepts with an emphasis on higher-order thinking. The topic of this interactive e-learning module is the examination procedure of Range of Motion (ROM) of the shoulder.



This example shows the learning matrix where students select the pace and content.



This example shows a question that appears to estimate the range of motion during a functional task.

ROM is a fundamental skill for a Doctor of Physical Therapy student to determine a patient's functional mobility, assess limitations in movement, and direct treatment of health conditions related to biomechanical impairments. Following the standard procedure is important to ensure reliability of the measurement as well as accurate communication among health care providers.

The module includes a learning matrix where the learner decides the pace and order of content delivered. Choices include video clips of appropriate professional patient-clinician interactions with an explanation about each step in the procedure, patient actors performing functional tasks (e.g. combing hair, reaching in a cupboard) with "freeze frames" where the learner estimates the range of motion and point-and-click pictures for alignment of the measurement tool. Study questions are incorporated throughout to self-check understanding. Any portion can be reviewed as often as necessary, allowing learner flexibility and convenience to achieve mastery.

When the module is implemented in the course, there can be an emphasis during lab time on collaboration and active learning with higher-order thinking using case-based application, role playing and peer- and self-assessment to practice psychomotor and affective skills. Faculty will provide guidance either with an individual learner, in small groups or in a large group based on the needs for a learner-centered learning environment.

Trauma Evaluation, Resuscitation and Management

Project Director: Charity Evans, MD, MHCM, College of Medicine

Project Member: Walt Hamilton, MEd, College of Medicine

Trauma is the leading cause of death for patients less than the age of 35. Trauma accounts for 10% of all deaths in all ages. This means the evaluation and basic resuscitation of a trauma patient is a necessary and basic skill for all physicians, regardless of specialty.

During school, third-year medical students spend eight weeks on a general surgery service. Currently, medical students have a two-hour lecture on trauma evaluation, resuscitation and management. This lecture is didactic in nature, and provides the learner with information about the definition of trauma, advanced trauma life support, basic resuscitation, and how to care for specific traumatic injuries. This format is passive, and does not require the learner to think critically.

We created eight online modules that teach the basics of trauma evaluation, including:

- Primary, secondary and tertiary surveys of advanced trauma life support
- Types of airways and indications for each
- Cervical spine precautions
- Adjunct studies
- Patient resuscitation after trauma
- Management of traumatic injuries

Using a blended classroom, students first review the online modules, and then are challenged to manage five trauma cases in small groups. Time spent viewing modules is tracked in Blackboard. Students are assessed for knowledge retention during the small group activities. Student satisfaction is surveyed at the end of the surgery clerkship.

The modules include PowerPoint lectures with voiceover, interactions, videos of procedures, self-evaluative quizzes, and end-of-module summaries. The live lecture was recorded, including video and audio, by an audio engineer. The audio and video clips were then imported, and Articulate Storyline was used to produce the modules.



Students are taught the radiographic signs of aortic rupture in the module. This interaction requires the student to identify the abnormality on the CXR using a hotspots.

Data:

At the end of the clerkship, students are asked to rate their level of knowledge, understanding and confidence after having viewed the trauma modules and participated in the trauma small groups.

Using a scale of 1 to 5 (1 = low, 5 = high), the first four groups of 3rd year medical students in 2014/2015 provided these ratings (averaged):

- Knowledge = 4.295
- Understanding = 4.16
- Confidence = 4.06

Open Wide: Extra/Intraoral Dental Screening Examination You Can't Find It Unless You Look for It

Project Director: Mary Lynn Froeschle, DDS, MBA, College of Dentistry

Project Members: Joan Sivers, DDS, College of Dentistry
 Gwen Hlava, RDH, MS, College of Dentistry
 Nagamani Narayana, DDS, MS, College of Dentistry
 Sheela Premaraj, DDS, PhD, College of Dentistry
 Myhanh Phan-Rinne, DDS, College of Dentistry
 Bongok Kim, DMD, MS, College of Dentistry
 Julie Marshall, DDS, MS, College of Dentistry

This project was chosen to emphasize the structure and order of a soft tissue examination. It encourages dental and dental hygiene students to reflect on previous material prior to their clinical experiences. It serves as a review of selected didactic and preclinical courses and their clinical application.



The Extraoral Exam is the first e-module. Students can view the demonstration in its entirety or select a specific section such as the mentalis muscle, which is highlighted in yellow.



The Intraoral Exam is the second module. Students are able to review the quiz information at any time.

The project contributes to interprofessional education (IPE) as it demonstrates to nondental health care providers the dental screening process and identifies normal tissue from common or serious pathological conditions often found during oral screening examinations. It enables nondental health care providers to feel more comfortable performing screening examinations.

This e-module promotes better retention and application of course material as the fundamental elements of a clinical extra- and intraoral dental screening examination are available to students as they need to use the information in the clinic. A video demonstration applies information to clinical patient care regarding lymph nodes, muscles of mastication, temporomandibular joint, anatomical structures, common oral conditions, occlusal schemes and a differential diagnosis for common or serious pathological conditions as students are ready to use it.

The students view peers performing the tasks and can emulate and extrapolate the experience. The students are able to assess their clinical experience against the standard to improve and refine their clinical skills. Brief questions with immediate feedback follow each clinical video to reinforce pertinent skills.

The project is used in preclinical courses with an emphasis on transitioning into clinic. Students are able to access the information whenever it is needed using readily available technology.

Community Leadership Development Course

For undergraduate students in RHOP, KHOP or PHEAST

Project Director: Brandon Grimm, PhD, MPH, College of Public Health

Project Members: Patrik Johansson, MD, MPH, College of Public Health
Katie Brandert, MPH, CHES, College of Public Health

This e-module is one of six that makes up a 16-week undergraduate Community Leadership Development Course for students in the Rural Health Opportunities Program (RHOP), Kearney Health Opportunities Program (KHOP), or Public Health Early Admissions Student Track (PHEAST).

The project was chosen because it is imperative students begin to build their leadership capacity. Traditional leadership development programs include multiday residential retreats. While this type of training is relevant, it's inconvenient for students. Allowing students to learn at their pace and providing examples and suggestions about how to implement into practice is much more efficient. Finally, health care is rapidly changing and the workforce is retiring at record numbers. Educators need to assure graduates across the entire health system are prepared to take on immediate leadership roles to promote and protect the population's health.

Using the types of modalities found in the Community Leadership Development Course promotes better retention and application of the material because each of the e-modules requires students to engage actively in the learning process.

In traditional face-to-face classes, there is not a lot of time to put the principles into practice because the majority of class time is devoted to the lecture.

As part of the Community Leadership Development Course, each student is immersed in service learning. Throughout the service learning project, the students are encouraged to implement the leadership skills and practices. Each e-module also includes a number of real-time evaluation tools, advice from leaders in the state, current literature, and a discussion board.

Additionally, the entire course will be evaluated when finished at the end of the semester. Feedback and results from the evaluations will allow the instructors an opportunity to update content and delivery, if necessary.

The technology used to create the e-module was Articulate because it was found to be easier than other software to edit the module and recordings.

This course promotes better retention and application of the material because each e-module requires students to complete quizzes and personal assessments, and to answer discussion board questions and put the principles into action.

The MAPP Process: Addressing Rural Childhood Obesity through Community Collaboration in Public Health

Project Director: Patrik Johansson, MD, MPH, College of Public Health, UNMC

Project Members: Kyle Ryan, PhD, School of Education, Peru State College
Jane Ford Witthoff, MBA, Public Health Solutions District Health Department
Shirley Delair, MD, College of Medicine, UNMC

Due to the rise in youth obesity prevalence, diseases associated with obesity and complications — type 2 diabetes, heart disease, kidney failure, cancer — are likely to strike people at younger and younger ages. For the first time in two centuries, the current generation of children in America may have shorter life expectancies than their parents due to the rapid rise in childhood obesity, which if left unchecked, could shorten life spans by as much as five years.

MAPP = Mobilizing for Action through Planning and Partnerships

MAPP is a strategic planning approach used to address complex public health problems with input from multiple stakeholders.

As a result, obesity prevention represents a priority area for many public health agencies, many of whom employ Mobilizing for Action through Planning and Partnerships (MAPP).

This e-module includes individual video testimonials of diverse stakeholders who participated in the MAPP process where they comment on the impact of obesity in their field and ways in which they individually and collectively address obesity through collective impact. In addition to readings on obesity from textbooks and the peer-reviewed literature, the testimonials provide a “real-world” context and application for/of public health practice. The e-module’s use of discussion board and reflection questions promotes the cultivation of critical thinking.

The e-module is taught in the spring of 2015 as a part of the Peru State College’s three-credit course SOC 395 Principles of Community Engagement in Public Health: Service Learning, Community-based Participatory Research, Leadership, and Civic Engagement, and will be assessed using existing online evaluation tools.

Creating Instructor Presence in Asynchronous, Online Learning Environments

Project Director: Suhasini Kotcherlakota, PhD, College of Nursing: Omaha Division

Project Members: Beth Burbach, RN, PhD, College of Nursing: Norfolk Division
Joyce Black, RN, PhD, FAAN, College of Nursing: Omaha Division
Patrick Rejda, MSED, College of Nursing: Omaha Division

Student engagement is of critical importance for success with learning in online environments. Research indicates instructor presence is critical to enhance not only student engagement, but motivation and learning outcomes as well. Lack of face-to-face contact between the student and instructor inherent in the online learning environment often results in the student's sense of disengagement, and may negatively impact learning outcomes.

This e-module addresses the need for educators to develop their online persona and establish meaningful connections with students in order to achieve better learning outcomes.

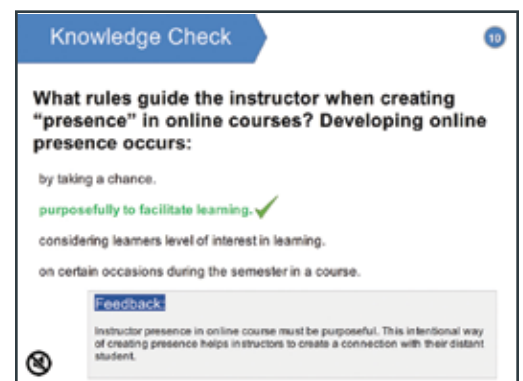
The e-module begins with the story of Ms. Lucy, who is struggling teaching an online course and facing challenges with student disengagement, dissatisfaction and evaluating student learning. Learners watching this digital narrative e-module will gain insights from the dialogue between Ms. Lucy and two of her colleague's providing expert guidance on how to facilitate effective learning. Learners will hear important techniques of personalization, ways of reducing cognitive load and establishing effective communication, and guidance methods when teaching via the new online modality. Learners will also have the opportunity to critically think and check their knowledge on the concepts via interactive quizzes, feedback and examples (good/bad) at various times in the e-module.

During the synchronous class meeting, learners are asked to utilize technology tools and resources to develop and showcase an instructor-presence strategy they learned. Learners will use an assessment rubric to meet the instructor presence criteria in their creation and also receive constructive feedback from their instructor or peer.

We used GoAnimate for creating animations, Articulate Storyline for e-module design and publishing, Adobe Premiere for video editing, and Google Docs for project collaboration.



Picture showing Ms. Lucy (middle) receiving advice from an expert colleague.



Picture showing quiz question and correct answer with feedback.

How to Prepare for an International Elective

Project Director: Oveys Mansuri, MD, FACS, College of Public Health & College of Medicine

Project Members: Sara Pirtle, MBA, College of Public Health
Alexis Bowder, College of Medicine

Clinical experiences in underserved regions provide invaluable experiences for students pursuing a career in healthcare. However, reliable information on how to establish and prepare for such opportunities can be difficult to find. This e-module was designed to aid students in organizing and preparing for such experiences.

The goal of the e-module is two-fold:

1. It is designed to aid students in organizing and preparing for clinical experiences in underserved regions.
2. It aims to help prepare health care professionals for a successful global health experience and share their experiences with others.

The e-module provides a list of international experiences available at UNMC and links to agencies outside the university that provide international opportunities to students pursuing a career in medicine and other allied health professions. In addition, the e-module will provide information on how to:

- Establish the initial contact
- Set up appropriate accommodations
- Travel safely

To improve retention, there is a quiz on key topics given throughout the e-module.

This module is the first of a series of e-learning modules that will be implemented by the UNMC International Health and Medical Education Office to provide a sustainable resource for global health opportunities for the entire UNMC community.

Additionally, the Student Alliance for Global Health at UNMC will also utilize this e-module for their medical mission projects. Global health is a rapidly growing area, and attracts a broad variety of health care professionals at various stages of education, training, and practice.

This e-module aims to help prepare health care professionals for a successful global health experience and, by doing so, allow them to partake in an exciting, growing field and share their experiences with the UNMC community and beyond.

Healthcare Finance for Clinicians in the Era of Healthcare Reform

Project Directors: Oveys Mansuri, MD, College of Public Health & College of Medicine
Fernando Wilson, PhD, College of Public Health

This e-module is designed to improve knowledge and functional understanding of basic concepts in healthcare finance for medical and graduate students and residents. It was conceived after feedback from students and residents that they did not get adequate exposure nor had a basic mastery of the evolving world of healthcare finance, especially in context of healthcare reform.

After a brief outline, the e-module begins with a pretest to gauge baseline understanding of the third-party payer system. Afterward, it briefly presents an overview of how healthcare finance interfaces with our evolving healthcare system. This includes discussion of Affordable Care Act provisions, a timeline of implementation, and evidence of its effectiveness in reducing uninsurance. The e-module concludes with a more in-depth presentation of reimbursement methods, including bundled payment models.

Interactive quizzes assess and reinforce learning of these concepts throughout the e-module. Embedded hyperlinks provide learners with additional resources to enhance learning concepts. These visual and interactive elements supported with assessment tools substantially improve upon traditional teaching methods, such as lecturing, thus increasing learning retention.

As a stand-alone learning experience, the e-module can be readily utilized by a wide range of healthcare professionals seeking to understand fundamental concepts in healthcare finance. However, the e-module can also be easily incorporated into the College of Medicine’s residency program and related courses, such as the College of Public Health’s Health Care Finance with the use of a “flipped classroom” teaching approach supplemented with case-based learning.



An interactive, graphical-based pretest gauges baseline knowledge of the third-party payer system. Learners match each program with a character based on its life story (represented as “thought bubbles”).



A timeline of Affordable Care Act (ACA) provisions is presented. Additional slides describe major provisions of the ACA and empirical evidence of its effectiveness.

Family Medicine Community Preceptorship Orientation Meeting E-Module Development Project

Project Director: Paul Paulman, MD, College of Medicine

Project Members: Tom Birk, PhD, Information Technology Services
Jolene Wees, College of Medicine
Mindy Lacey, MD, College of Medicine
Monty Mathews, MD, College of Medicine
William Hay, MD, College of Medicine

This project was designed to move much of the very dry course logistics information from a lecture format during the Family Medicine Rural Community Preceptorship orientation meeting to an e-module format. This project was started in response to student feedback about the ineffectiveness of the lecture format and the desire by students, faculty and staff to make the outgoing meeting day more interactive.

Results:

Initial feedback by students from the first set of e-modules has been universally positive.

Many students comment, "We like the modules and the shorter orientation day they allow."

An unexpected side benefit of the e-modules is a decreased volume of student questions about the course logistics since the first set of modules have come online.

Currently, the orientation day consists of an opening lecture, followed by hands-on workshop sessions including dealing with angry patients, advanced suturing, and splinting and casting. With the time saved by having students review the course logistics material before or after the orientation day, we plan to add a cardiac arrest simulation and a hands-on diagnostic ultrasound session.

Example e-modules created with project funding include:

- Grading system
- Travel and housing logistics
- Medical and legal aspects
- Professional behavior
- And others

All modules will be integrated into the course effective July 1, 2015.

Clinic Management of an Infant in Respiratory Distress

Project Directors: Peggy Pelish, PhD, APRN-NP, College of Nursing
Katherine Hoffman, MSN, APRN-NP, College of Nursing

Project Members: Sina Linman, DNP, ARNP, College of Nursing
Sahasini Kotcherlakota, PhD, College of Nursing
Patrick Rejda, MSED, College of Nursing

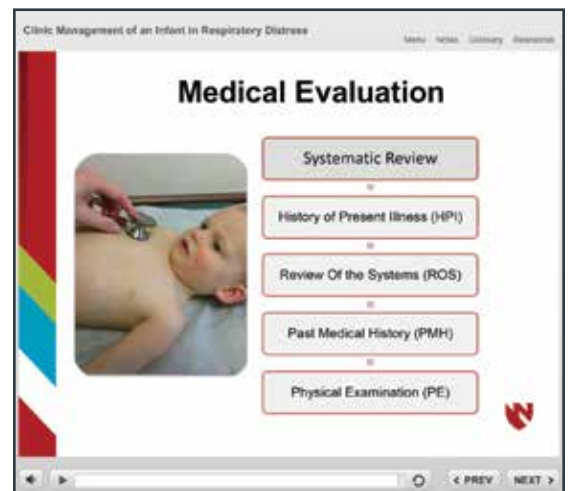
Respiratory distress is a common reason for parents to bring an infant to the pediatric outpatient setting. The severity can range from mild to severe distress, which requires critical thinking and diagnosis. This e-module will allow students the opportunity to use critical thinking related to the management of an infant in respiratory distress.

Objectives:

1. Recognize the clinical signs of an infant in respiratory distress
2. Differentiate the diagnostic variations of an infant in respiratory distress
3. Become aware of the management plan for an infant in respiratory arrest

Students need the opportunity to make decisions related to the severity of the infant's distress and differentiate between mild and severe presentations. The use of testing items and a recorded case allows the student to demonstrate their understanding and experience a simulated experience.

Participants will view the e-learning module prior to class. During the classroom period, discussion of the case and diagnoses would be expanded. The use of a flipped classroom environment will permit interactive discussion with clarification and expansion of the material. An instructor guide is provided for class topics. This project allows for the independence of contemporary learning at a self-paced activity out of the classroom and then application and expansion under the direction of an instructor.



Putting Patients First:

Strategies to Enhance Provider Communication Skills to Improve the Patient Experience

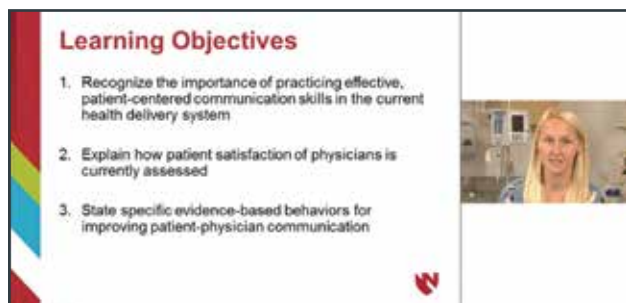
Project Director: Sarah Richards, MD, College of Medicine

Project Members: Christopher Smith, MD, College of Medicine
Katherine Kueny, PhD, LIMFT, LIMHP, College of Medicine

This topic was chosen because there is currently no standardized content for learners in this critical area of patient-centered care. The goal of this e-module is to help future and current health care providers to more effectively practice evidence-based principles of effective patient-centered communication.

In March 2015, this e-module was integrated into the curriculum for internal medicine residents. It combines didactic teaching, role-play with professional actors, and interactive questions for the learner. The didactic portion provides a background on the importance of understanding and practicing effective communication skills as well as evidenced-based behaviors for improving communication (e.g. sitting at eye level, avoiding medical jargon, expressing empathy, patient-directed “teach back,” etc.).

Internal medicine faculty members directly observe residents interacting with patients in the hospital setting, assess each resident’s ability to practice these skills, and provide real-time feedback. The role-play portions engage learners as they are able to see, and then, hopefully, mimic good patient-centered communication skills. The interactive portions challenge learners to report negative behaviors that can lead to a poor patient experience, identify specific communication skills they plan to adopt during future patient encounters, and discuss barriers to providing a positive patient experience.



The e-module starts with an introduction by the instructor who clearly outlines what will be learned.



A video is introduced showing examples of negative and positive communication skills.

Making the Healthy Choice the Easy Choice

Project Director: Jim P. Stimpson, PhD, College of Public Health

This e-module introduces the policy, systems, and environmental approach to behavior change, which seeks to “make the healthy choice the easy choice” by creating sustainable changes to the community environment that enable community members to engage in healthy behaviors by default.

The e-module then makes a clear distinction between this approach and more traditional, programmatic initiatives.

In addition to defining this approach and its rationale, this e-module provides specific examples about how to apply this approach to improving population health at the community and organizational level.

This e-module is designed to be used in both a flipped classroom and online learning. The technology used to create the e-module was Adobe Captivate.



“ We need innovation in
education and dedication
to the task before us. ”

~ Alan Autry
(Actor and Politician)

Student E-Learning Projects

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A Face of Care:

A Patient's Journey Through Breast Cancer Therapy

Project Directors: Tyler Chonis, M1, College of Medicine
Michaela Klesitz, M1, College of Medicine
Jackson Wagoner, M1, College of Medicine

Faculty Advisor: Geoffrey Talmon, MD, College of Medicine

This project topic was chosen with the aim of teaching second-year medical students a more empathetic outlook on the diagnosis and treatment of a patient with breast cancer. The viewers are not only tested on the objective material regarding breast cancer, but are also asked to reflect on a more personal level regarding the emotions and experience a patient has to go through during this process.

The emotional aspect that is tied into this project greatly enhances the viewer's ability to retain information of the course material. Instead of just reading information out of a book, the content is presented in an emotional aspect, which not only grabs the viewer's attention, but also challenges them to think about the content with a more empathetic outlook.

Goal:

The goal of this project is that the viewers gain a better understanding not just of the science and etiology of breast cancer, but also the physical and emotional tolls it places on the patient.

Along with the videos, some of the other mediums that are used in the e-module include audio files, chart images, and several essay and multiple choice questions. These tools help present the content in an interactive manner that ensure the viewer is following along. The personal reflective questions are a key component in challenging the viewer to think critically and even possibly better relate to the content presented. The multiple choice questions not only require the viewer to analyze the content presented, but also to go out and search for some of the answers with the goal of providing additional resources to aid in the viewer's understanding of the content.

Through this e-module, viewers gain a much stronger empathetic view on the challenges and difficulties patients face during a cancer diagnosis. This is a vital skill for health care professionals as it has a direct effect on the patient's overall well-being and treatment.

Defeating Antibiotic Resistance: Mastering Drugs and Bugs

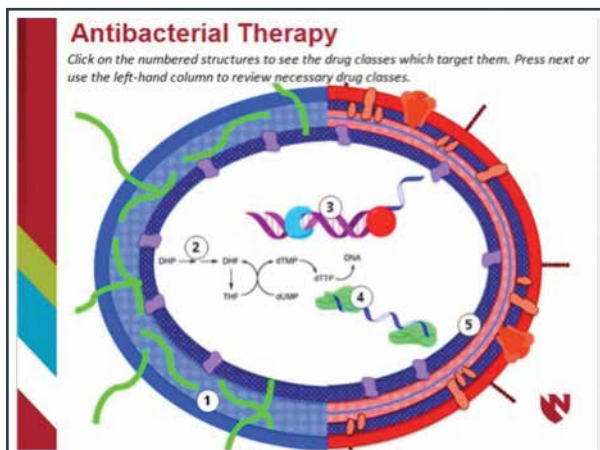
Project Directors: Caitlin Fee, Class of 2017, College of Medicine
Beau Ehlers, Class of 2017, College of Pharmacy

Faculty Advisor: David McMillan, PhD, College of Medicine

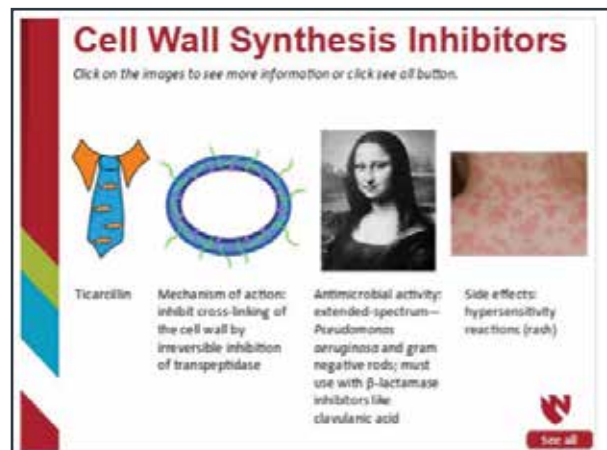
One of the most important medications second-year biomedical professional students must learn is antibiotic drugs. As they progress into their clinical years, students must be able to retain this knowledge and integrate it with other basic and clinical sciences to effectively guide infectious disease management.

Students often struggle to master this topic because of the relatively short period of time in which to memorize large quantities of drugs, their mechanisms of action, their target pathogens and their common side effects. Clinical preceptors commonly complain third-year students are slow to recall this information and lack confidence in applying it to their clinical cases.

This interactive, self-paced Articulate Storyline e-module promotes retention of antibiotic drugs and their mechanisms of action, target pathogens and side effects by creating easier-to-remember associations using memorable images, relevant colors and pictures. Application and reinforcement of this information is reviewed throughout the e-module with a variety of practice questions, including matching-style, multiple choice, and drag-and-drop questions.



This is a self-assessment slide where participants can attempt to identify which drug classes and specific drugs are acting at the differently numbered locations.

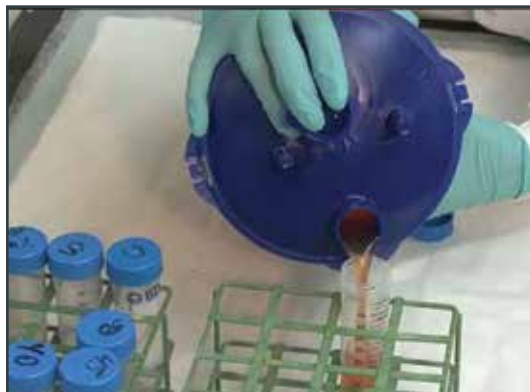


This is an example of the memorable images and associations for the drug ticarcillin, or a printed tie with cars, most often used to treat Pseudomonas, or Mona Lisa.

Preparatory Techniques in Cytology

- Project Directors:** Arixa Herrera, School of Allied Health Professions
Halah Alhawil, School of Allied Health Professions
- Project Members:** Amber Donnelly, PhD, MPH, SCT(ASCP), School of Allied Health Professions
Troy Matthias, CT(ASCP), Nebraska Medicine
Jessica Holmstrom, Nebraska Medicine
Jean Lien, Nebraska Medicine
- Faculty Advisor:** Maheswari Mukherjee, PhD, MS, CT(ASCP)^{CM}, School of Allied Health Professions

The aim of this e-module is to improve the cytotechnology students' and/or pathology residents' understanding of the preparatory and staining techniques of cytology glass slide specimens. The Cytopreparation course is the first to be covered during the Cytotechnology program. It is very important to have a solid base in this



The e-module includes short video clips to demonstrate preparatory and staining techniques of cytology glass slide specimens.



Also included are self-assessment tools, like quizzes, to encourage critical thinking and understanding.

topic to be able to better understand important preparatory concepts in later courses. Students may or may not have had laboratory experience before the program, therefore it is important to cover information in a way that concepts can be fully understood. For students with less laboratory experience, it can be hard to understand processes before being introduced to the laboratory.

This e-module helps clarify and give a full description of the techniques covered. It includes video clips that demonstrate the process of receiving, centrifugation, slide preparation with Cytochrome, Diff Quik and Papanicolaou staining, and coverslipping of the cytology specimens. This allows students to excel and be better prepared for the laboratory. It also gives students the opportunity to visualize these preparatory techniques before having to apply them. The e-module provides visual and auditory input, which will improve retention and comprehension. It also includes multiple choice questions and multiple response questions that work as self-assessment tools to encourage critical thinking and understating. Also included are survey questions for assessment of the e-module itself.

The e-module will be used during the initial Cytopreparation course, but it may also be used in later courses for reviewing or clarification, which can be helpful for future testing or certification exams.

What to Do Next:

An interactive journey combining behavioral health and medical-surgical nursing

Project Director:	Amanda Hug, BSN Student, College of Nursing
Project Members:	Lauren Awe, BSN Student, College of Nursing Crystal Epstein, MSN, APRN-NP, PMHNP-BC, PhD Student, College of Nursing
Faculty Advisors:	Heidi Keeler, PhD, RN, College of Nursing & Behavioral Health Education Center of Nebraska Lyndsay Dean, MSN, FNP, APPMH, College of Nursing Marlene Lindeman, MSN, RN, CNS, College of Nursing

Nearly 1 in 4 persons struggles with a mental health problem in their lifetime. Therefore, all nurses, regardless of specialty or setting, need to be well trained on the potential impact of these issues on the overall health and well-being of the person. Accordingly, all nurses must be able to recognize, assess, and appropriately respond to mental health issues in any health care setting.

This e-module is designed for an undergraduate nursing curriculum. The purpose of the e-module is to sharpen students' understanding of mental health needs in medical-surgical settings regardless of specialization; and that behavioral and mental health needs must be properly assessed in all areas of nursing practice.

This goal is achieved by presenting an online simulated case experience. The learner is able to view interactions between a patient and nurse, and choose how to advance the interaction, leading to another set of choices. The learner's knowledge is evaluated at the end of the e-module using targeted assessment questions. The interactive nature of this e-module helps to encourage critical thinking, promote engagement, and foster better retention and application of course material by providing real-time feedback on the choices made by the learner.



Objective:

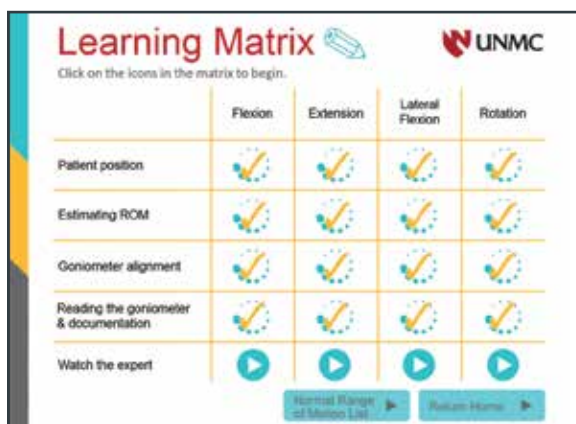
This e-module will help student nurses recognize that physical factors can precipitate mental health problems, and likewise, mental health problems can complicate physical conditions. It will give students the skills to recognize, assess, and respond to mental health problems outside of traditional mental health care settings.

Range of Motion Examination of the Cervical Spine

Project Directors: Marisa Johnson, SPT, School of Allied Health Professions
Taylor Majerus, SPT, School of Allied Health Professions

Faculty Advisor: Betsy J. Becker, PT, DPT, CLT-LANA, School of Allied Health Professions

Range of Motion (ROM) measurements are an integral component of a thorough Physical Therapy examination, and are used across medical professions as an objective measurement for determining functional mobility status, developing treatment plans, and communicating progress. Therefore, it is vital for a Doctor of Physical Therapy student to develop the correct measurement techniques and standard procedure for measurement, which are important for inter-rater and intra-rater reliability. To address these needs, an e-learning module has been developed to enrich the instruction of Cervical Spine ROM.



It is important an e-learning module be accessible to the student on-demand (available anytime and on any electronic device) and interactive, which enables self-directed learning. In turn, this opens up opportunities for group instruction to become more collaborative, with an emphasis on application and critical thinking.



The Cervical ROM module is designed to be very interactive, allowing the learner to choose the pace and order from the learning matrix home page. Content includes video clips of an examination performed by a professional, including step-by-step explanations of the measurement process. The learner will be instructed through the videos on use of all three methods used in Cervical Spine ROM measurements, which are the goniometer, inclinometer, and tape measure.

Additionally, animated images of functional movement and interactive study questions allow the learner to self-check for understanding, leading to better retention.

Each section may be repeated as many times as is necessary, allowing the learner to work toward mastery of these measurement techniques.

Rheumatology Remedy Stand

Project Director: Tate Johnson, M3, College of Medicine

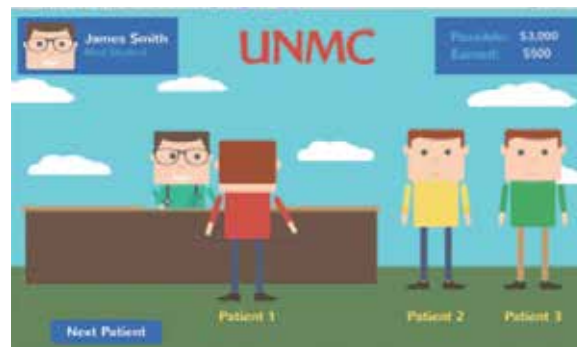
Project Members: Kaleb Michaud, PhD, College of Medicine
Zac Fowler, College of Information Science & Technology, University of Nebraska-Omaha
Brett Bass, University of Nebraska-Omaha
Myron Toews, PhD, College of Medicine
Jessica Downes, PharmD, BCACP, College of Pharmacy
Darwin Brown, MPH, PA-C, School of Allied Health Professions
Laura Bilek, PT, PhD, School of Allied Health Professions

Faculty Advisor: Amy Cannella, MD, MS, College of Medicine

For a student in the health profession, pharmacology can be a difficult subject to retain and integrate with related pathophysiology and clinical presentations. As such, it is easy to fall prey to rote memorization of drug characteristics when preparing for written examinations. This project was chosen to attempt to bridge the gap between some of this required memorization and help the student apply pharmacologic content (as well as some non-pharmacologic therapeutics) to high-yield clinical scenarios in Rheumatology.

In cooperation with UNO's College of Information Science & Technology, we've developed a e-module that places the student in charge of running their "Rheumatology Remedy Stand," where they earn money by correctly addressing the questions and presentations of patients that come to their stand. Each response given in the game prompts initial detailed feedback on correct and incorrect responses. Additionally, they are provided with a "billing summary" at the end of their shift at the stand that summarizes the dollars earned during that shift, as well as the objectives covered to re-emphasize important learning points.

This e-module will be made available to students during their Rheumatology cores or rotations as a supplemental study aide. The gaming format serves as a useful memory tool, as it provides an interactive environment and a change in perspective from traditional PowerPoint slides and lecture notes often used to present material. We hope the material can even serve as a useful review for internal medicine residents on their Rheumatology months.



Patients line up at the stand for assessment. The student's name and specialty are shown in top left corner.



After seeing each patient, the user is able to select "details" from the previous question to receive feedback on the information covered in that encounter.

EKGs: Basics of Rate & Rhythm

Project Director: Cory Rohlfson, M4, College of Medicine

Faculty Advisor: David O'Dell, MD, College of Medicine

Interpretation of EKGs is a skill expected of every medical resident, nurse practitioner, and physician's assistant. Because of the innate complexity involved, most students find application of EKG knowledge frustratingly difficult in the clinical arena. Part of this frustration stems from the lack of consolidation of knowledge throughout various stages of learning.

Ultimately, students will be challenged at every level of learning.

To our knowledge, there is currently no video lecture series that systematically teaches EKGs. We hope to fill this void. By using Camtasia software as a dynamic platform for video lecture, students will be actively engaged in content taught from a clinical perspective. Retention of material will be optimized through the use of clinical vignettes and real world experiences. Repetition of fundamental material will enable content to build in a systematic fashion.

The benefits for students include MP4 video formatting with the ability to speed up, fast forward, and rewind material across a variety of mobile platforms. This will not only expedite the learning experience for advanced learners, but also reinforce important material for beginners. Because students will be repeatedly queried throughout the e-module, they will begin to develop a sense of confidence in independent EKG interpretation.



Rhythm	Regularity	QRS complex	P-waves	Rate
NSR	Regular	Narrow	Present	60-100
Atrial Fibrillation	Irregularly Irregular	Narrow	Absent	<100



RESPECT Clinic: A “Crash Course” in STDs

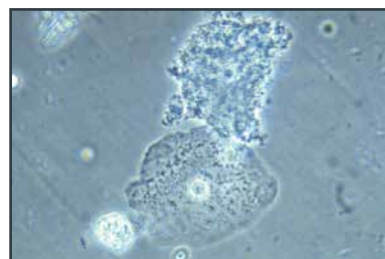
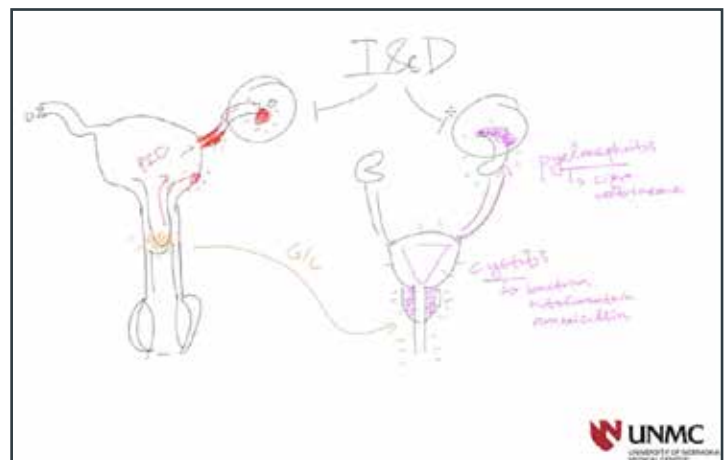
Project Director: Cory Rohlfson, M4, College of Medicine
Faculty Advisors: Jim Medder, MD, MPH, College of Medicine
Paul Paulman, MD, College of Medicine

RESPECT is an interdisciplinary, student-led clinic dedicated to providing affordable care to patients in need. Through service to various indigent populations in the community, students learn to be both competent and compassionate providers. There is a problem, though: students are not prepared for what is to ensue when they first step through the door.

Medical and PA students are expected to interview young, sexually active patients and ask deeply personal questions only to follow it up with a speculum exam that may be the first experience for both the student and the patient. Naturally, this can lead to some anxiety for both parties. Furthermore, many students have not yet been introduced to the fundamental material required to think about, treat, and counsel patients on sexually transmitted diseases. As a result, what should be a positive learning experience for students can quickly turn into an overwhelming and discouraging one.

In order for students to feel more prepared, we have created an e-module that will serve as a “crash course” in STDs. By using Camtasia software, we have condensed material that would take hours to learn into a 15-minute presentation. Graphic images are utilized with zoom features to engage the learner and increase retention. Material is organized in a clinical manner and delivered in a dynamic fashion to inspire critical thinking. Because the video lecture is produced in MP4 format, learners can speed up, fast forward, and rewind to expedite learning.

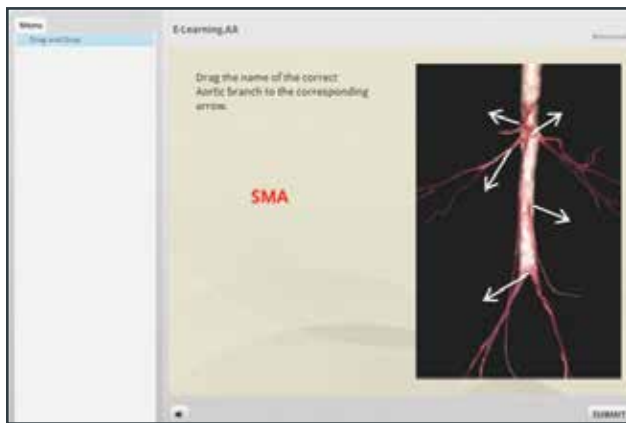
Our goal for this e-module is to close the curricular “gap,” thereby enabling students to feel more empowered to provide quality care to patients in need.



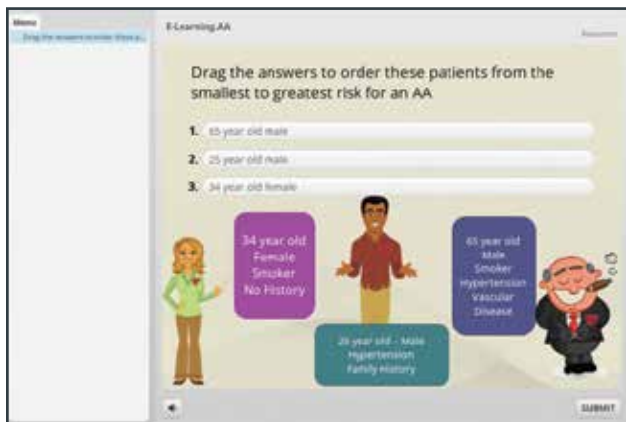
Abdominal Aortic Aneurysm

Project Director: Elizabeth Truhe, BS, RT(R), School of Allied Health Professions
Project Member: Tanya Custer, MS, RT(R)(T), School of Allied Health Professions
Faculty Advisor: Kim Michael, MA, RT(R), RDMS, RVT, School of Allied Health Professions

This e-module focuses on abdominal aortic aneurysms, a common pathology seen by medical imaging and other health care professionals. The e-module will be used to educate students in regard to normal anatomy, risk factors, signs and symptoms, and the evaluation of the aorta based on imaging case studies.



This image is used in the e-learning module to demonstrate normal abdominal aorta anatomy while quizzing the student on the normal branches of the aorta.



This image on the module helps quiz the student on risk factors of different patients clinically and how it increases their chances for an aneurysm.

The e-module was created using Articulate software along with animations and videos from the Anatomage Table and accompanying Invivo Software.

The e-module begins with a review of virtual gross anatomy images. It then provides students with an interactive experience, helping them to associate risk factors and clinical symptoms with the noted pathology. Students have the ability to scroll through or manipulate the DICOM data in both the 2-D and 3-D formats. Pathology-based case reports have also been included in the e-module.

The aim of the e-module is to develop higher-order thinking skills (application, integration, synthesis), which makes the learning process more applicable to the clinical setting as opposed to simply memorizing factual data.

The e-module will be used as part of a new Pathology for the Health Care Professionals course. This online course will incorporate various pathology-based e-learning modules and will be part of the Bachelor of Science in Radiation Science Technology degree advancement option.

The e-module can also be incorporated into the flipped classroom approach. By using this teaching style, faculty can combine the use of case studies in an active, student-centered learning environment while also applying real world problems.

ABCs of Chest X-Ray for Health Professionals

Project Director: Alex Walker, MS3, College of Medicine

Faculty Advisor: Matthew DeVries, MD, College of Medicine

Medical imaging is an increasingly important tool used throughout medicine to investigate patient symptoms and to follow the course and treatment of a multitude of diseases. Over the years, imaging modalities have increased in sophistication — ultrasound, CT scans, MRI, etc.

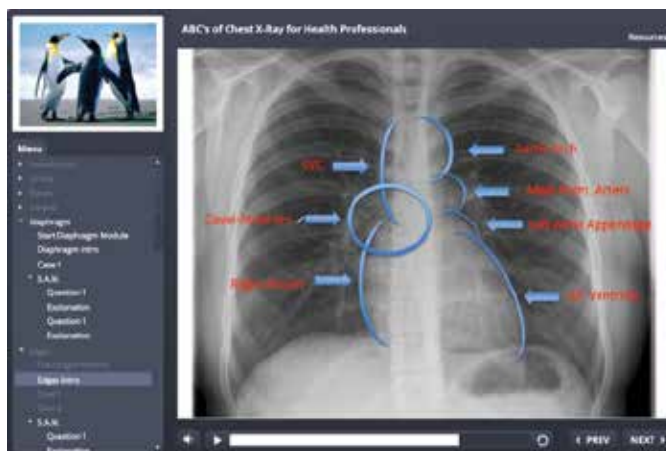
Despite those advances, the X-ray, particularly the chest X-ray, continues to be a workhorse for health care providers. As such, being comfortable reviewing a chest X-ray is an important skill for health professionals to develop. We wanted to address this need for health care professionals, whether they are in school, on the wards, or further along in their practice.

Our e-module contains narrated direct instruction via Articulate software and leads learners through the “ABCs of Chest X-Rays,” a mnemonic designed to help the learner systematically review a film:

- Airways
- Bones
- Cardiac
- Diaphragm
- Edges
- Fields
- Gas
- Hila
- Instrumentation

We have included on-screen drawing and labeling to highlight specific features of various X-ray findings to provide better visual reinforcement and understanding throughout the e-module.

By presenting the X-rays in this interactive display, we hope to provide an engaging way for learners to practice their chest X-ray reading skills.



Screenshot of video displaying anatomy of the cardiac silhouette.

We have also included self-assessment e-modules that take advantage of the intrinsic role of images in radiology. These show various pathologies the learners are challenged to identify by clicking within a defined boundary before an explanation of the finding or basic principles of the pathology are given.

A Practical Guide to Lease Financing Decisions within Health Services Organizations

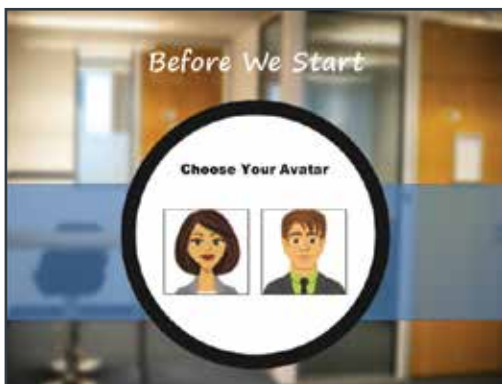
Project Director: Yang Wang, 3rd-Year PhD Student, College of Public Health

Project Members: Rajvi Wani, 1st-Year PhD Student, College of Public Health
Sankeerth Rampa, 1st-Year PhD Student, College of Public Health
He Zhu, 4th-Year PhD Student, College of Public Health

Consultant: Analisa McMillan, MEd, College of Public Health

Faculty Advisors: Fernando A. Wilson, PhD, College of Public Health
Jim P. Stimpson, PhD, College of Public Health

Medical equipment cost is probably one of the largest capital expenses incurred by any health care provider. To buy the equipment or to lease it is a crucial decision that has to be made keeping in mind funds availability and long-term financial impacts. A detailed understanding of Health Care Financial Management and related concepts is essential to make the right decisions.



Learners choose an avatar before starting the e-learning module.



The module introduces basic terminologies in a leasing relationship based on a real-world scenario.

Currently, UNMC offers only one course, Health Care Finance, which involves training on leasing decision-making. Considering the critical importance health care finance holds, an additional interactive e-learning module that provides training on medical equipment leasing and related financial decision-making would better help the UNMC community understand the concepts.

The application component of this e-learning module will involve use of an Excel spreadsheet with hyperlinks to perform lease financial analysis based on a realistic scenario involving the financial management of a health care provider. It would also provide a comparative analysis of the better choice between leasing and buying medical equipment. The e-module with relevant visual and audio demonstration, along with quiz assessments, will make the knowledge session interactive for the learners and emphasize higher order thinking skills. The educational material would be delivered more strongly and memorably through creative, self-explanatory and digestible chunks that would keep the learner engaged.

Because the e-module is web-based training, it will be convenient for busy health care professionals to access the content anywhere, anytime. In addition, we plan to integrate it in the College of Public Health course, Health Care Finance.

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