AN INTERACTIVE, WEB TOOL TO ENHANCE CARDIOPULMONARY CLINICAL SKILLS OF MEDICAL STUDENTS IN INTRODUCTION TO PHYSICAL EXAM COURSE

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STATEMENT OF PROBLEM

Teaching physical exam skills to medical students is increasingly difficult as teachers face multiple barriers including recruitment of patients, changing physical exam findings and subjective assessments by different raters.

PROGRAM OBJECTIVE

- Enhance the knowledge and skills of second year medical (M2) students in cardiopulmonary physical exam.
- Assess their ability to accurately identify normal and abnormal cardiac and lung sounds.
- Provide web resources to access cardiac and pulmonary databases.

CONTENT OF THE MODULE

CURRICULUM:

•Using the computer platform ANGEL, we introduced an interactive web-based module to M2 students during their Introduction to Physical Exam course.

•Once students access the module via web, a tutorial teaches cardiopulmonary physical exam psychomotor skills, physical exam findings and relationship to pathophysiology. Features include hyperlinks to physical exam videos and clinical skills websites.

•Five blended cases are used to promote problem based learning with interactive window pop-ups of pictures, Xray findings and audio of physical exam findings.

•Students are asked to identify various physical exam findings, interpret abnormal cardiac and lung sounds, and make a diagnosis during the case based portion of the tutorial.

DESIGN OF MODULE

OUTCOME MEASURES

PRE-TEST/POST-TEST KNOWLEDGE QUIZ:

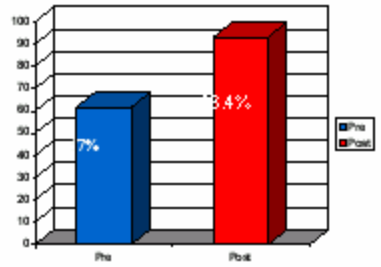
- M2 students completed an 8-item pre/post sound recognition quiz using the e-learning module asynchronously to a lecture.

SATISFACTION SURVERY:

- Students also responded to a *satisfaction survey* that asked them to rate various aspects of the web-based curriculum including content, navigability and engagement techniques.

FINDINGS TO DATE

KNOWLEDGE QUIZZES(n=184):



PROGRAM EVALUATION (n=126):

➢Quantitative Data

•The e-learning module took 61.4 minutes to complete.

•M2 ratings for online curriculum helping to identify abnormal breath sounds and heart tones were 4.1 and 4.0, respectively (Likert scale: 1= Strongly Disagree, 5 = Strongly Agree).

•94.4% of students found the audio and video files useful.

•Overall, 60% of students rated the web-based module as very good or excellent.

➢Qualitative Data

•Strengths/Weaknesses of Technology:

"It was hard to find computer where I could listen to files"
"difficult to download on dial-up connection"
"not all links worked"
"audio not loud enough"
"excellent video links for heart & lung exam; audio files clear & helpful; animation with audio links for heart also very good"

•Strengths/Weakness of Module:

"self-directed study, one more chance to here different sounds"
"strength care audio files, giving a case based format"
"practical, interactive"
"basic, comprehensive, short and concise"
"accessibility and clarity of material"
"kind of hard to maneuver around it on ANGEL"

KEY LESSONS LEARNED

- Our results indicate web based tools can enhance student's clinical skills, specifically with regard to cardiac and pulmonary auscultation.
- Students perceive their exposure to the computer-based curriculum to be a positive experience despite the lack of face to face patient or teacher contact.
- For an optimal learning environment and successful navigation of our e-learning module students must have access to the computers, appropriate software and speakers with headphones.
- Satisfaction with e-learning modules is directly linked to ease of navigability, successful access to audio and video files. Students respond better to short, concise, and case-based content.

FUTURE DIRECTIONS

•The web-based curriculum is going to be a permanent aspect of the Introduction to Physical Exam course at our institution.

•Plans are underway to use the e-learning module in other aspects of the curriculum in the clinical years, specifically during Inpatient Medicine clerkship and Ambulatory Medicine clerkship