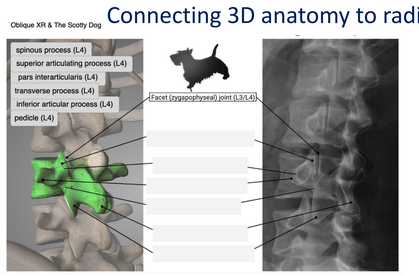
Imaging-Based Modules for Musculoskeletal Anatomy & Pathology in Preclinical Medical Education

Ameen Suhrawardy, BS | Tarek Almsaddi, BS | Sarah Fried, BS | Sayf Al-katib, MD | Drew Moore, MD | Malli Barremkala, MBBS

Introduction

- Reported underpreparedness of undergraduate medical students to assess imaging and MSK pathology[1]
- Disconnect between proficiency in cadaver anatomy and radiologic anatomy
- Module-based learning supported by literature[2]

Connecting 3D anatomy to radiographic imaging



Aims and Objectives

Research Question: *Can radiology in a module format be used to better teach medical students MSK anatomy and related orthopedic pathology?*

Goals:

1. Design modules that incorporate radiological images with gross anatomy and anatomical illustrations to teach anatomical relationships & high yield concepts.
2. Collect and analyze data from student usage and assessment performance to determine how the resource improves students' proficiency in written & practical anatomical examinations.

Approach/Process

Module creation: 2 modules (upper limb and back/spine) created connecting 3D anatomy to radiographic anatomy and cross-sectional imaging through interactive interfaces, practice questions, and recall exercises.

Imaging used: Cross-sectional imaging (MRI/CT), XR, 3D CT Recon.

Other images used: Cross-sectional cadaver images, anatomy illustrations.

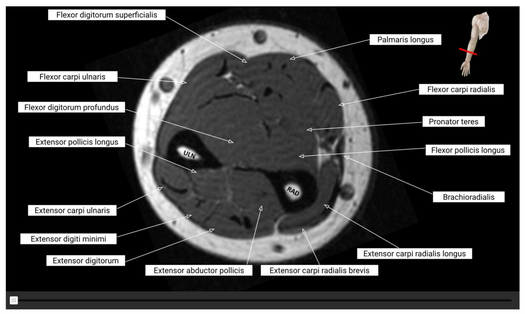
IRB approval: IRB-FY2022-153

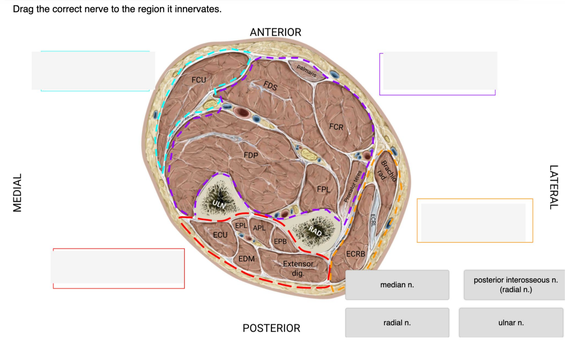
Evaluation Plan

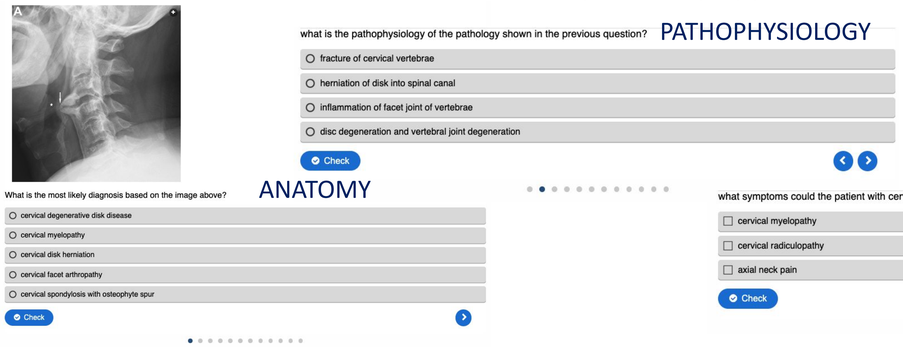
Study recruitment: voluntary participation from students enrolled in M2 MSK course.

Evaluation: particpiation and usage on modules compared with student performance on course assessments

Translating cross sectional anatomy knowledge







Results

- **Module usage**: 72 (62%) and 55 (45%) of 122 students used upper limb module and back/spine module respectively. High participation rate.
- **Assessment performance**: Students who used upper limb module scored 2.9 pts higher (*p=0.046*) on final MSK course exam.
- **Pending data collection**:
  - One more year of MSK course data
  - Subjective feedback on perceived efficacy
  - Performance on assessment items relating to specifically upper limb and back/spine

Discussion

- Integrating MSK concepts with imaging in module format can help students to learn MSK anatomy and orthopaedic concepts at own pace
- Increasing exposure to cross-sectional imaging alongside traditional anatomy instruction can help with transition into clinical clerkships
- More data to be collected

Limitations: Completion of only one of two modules shown statistical improvement.

References

1. Heptonstall NB, Ali T, Mankad K. Integrating Radiology and Anatomy Teaching in Medical Education in the UK--The Evidence, Current Trends, and Future Scope. *Acad **Radiol***. 2016;23(4):521-526. doi:10.1016/j.acra.2015.12.010

2. Kumar PA, Jothi R, Mathivanan D. Self-directed learning modules of CT scan images to improve students' perception of gross anatomy. *Educ Health (Abingdon)*. 2016;29(2):152-155. doi:10.4103/1357-6283.188778

Information Mastery eCourse for Millennial & Gen Z Life-Long Learners

Charlotte O'Sullivan MS-3[1], Rajavi Patel MS-3[1]. Misa Mi, PhD[2]
[1]Class of 2024, Oakland University William Beaumont School of Medicine
[2]Department of Foundational Medical Studies, Oakland University William Beaumont School of Medicine

Introduction

Rapid expansion of medical knowledge increases the need for physicians to translate research into clinical practice. Physicians must be able to use the best clinical evidence from resources and develop information skills. ACGME[1] upholds core competencies that medical students must achieve throughout their medical education to be best prepared for residency. It is important to provide medical students opportunities to learn about resources and develop information skills to meet these core competencies.

Figure 1: ACGME Core Competencies[1]

Aims and Objectives

1. To create a self-directed (figure 2) Information Mastery eCourse geared toward millennial & Gen Z students.
2. To help students acquire and practice important information searching skills and self-assess their progress.

Figure 2: Self-Directed Learning Criteria

*Note: Rajavi Patel (rajavipatel@oakland.edu) and Charlotte O'Sullivan (cosullivan@Oakland.edu) contributed equally to this project.

Approach/Process

- ADDIE Model (figure 3) analysis of existing course: Lack of interactive self-assessments. Today's learners value using various modalities of learning that suit their individual needs.
- Multimedia Learning Design Theory: Engaging learners with multimedia design components (figure 4).

Module Name	Module Content
Module 1: Fundamentals	• Virtual Library Tour • Tour of OUWB Medical Library Website • How to Find Print Books Tutorial • Requesting Full-Text Articles Tutorial
Module 2: Intro to EBM	• Introduction to Evidence Based Medicine (EBM)
Module 3: Background Information	• Internet Resources vs. Library Resources • AccessMedicine Tutorial • ClinicalKey Tutorial • DynaMed Tutorial • Micromedex Tutorial • UpToDate Tutorial • Resources for Team-Based Learning
Module 4: Clinical Resources	• Introduction to EBM Resources Tutorial • ACCESSSS Federated Search Tutorial • Cochrane Library Tutorial
Module 5: Lit. Search I (Biomedical Lit)	• Fundamentals of Successful Literature Search Tutorial • Searching PubMed (Basic) Tutorial • Advanced Search with PubMed Tutorial • Embase Tutorial • Cochrane Central Register of Controlled Trials Tutorial
Module 6: Lit. Search II	• CINAHL Tutorial • ERIC Tutorial • PsycINFO Tutorial
Module 7: Measurements	• Health and Psychosocial Instruments Tutorial • PsycTests Tutorial
Module 8: Patient Ed. Resources	• CareNotes via Micromedex Tutorial • MedlinePlus Tutorial • Finding Patient Education Resources Tutorial
Module 9: Copyright Basis	• Copyright and Plagiarism Video • Multimedia Resources
Module 10: Reference Management	• Introduction to RefWorks Tutorial • How to Use Mendeley Tutorial

Figure 5: eCourse modules

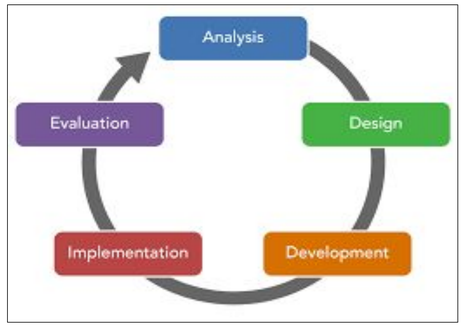


Figure 3: ADDIE Model of Instructional Design[2]

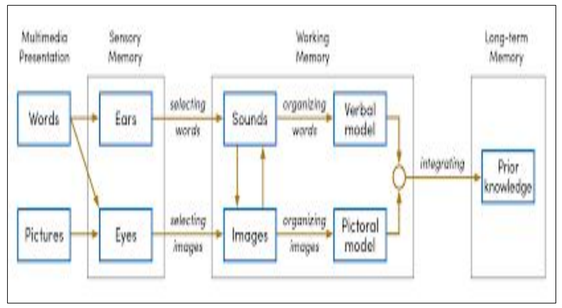


Figure 4: Cognitive Theory of Multimedia Learning[3]

Information Mastery eCourse Content:

- 10 modules (figure 5)
- Pre-test & Post-test
- Scavenger Hunt Game
- Application Questions in each module
- 2 database games

The revamped eCourse was piloted by 2nd year medical students who provided feedback on each of the 10 modules.

The eCourse is available to medical students via:

- e-Space
- OUWB Medical Library website
- YouTube

Evaluation

The eCourse has over 200 learners enrolled and is integrated into the medical curriculum:

- modules linked and referenced in specific courses (i.e. Art & Practice of Medicine)
- Used as resources during team based learning (TBLs) assessments

Future plans to assess efficacy of the eCourse will consist of qualitative survey and feedback from users.

Expected Results

We expect students to gain competency and confidence in their information search skills. Survey feedbacks will guide our quality improvement of the eCourse. We will continue to revise modules as new resources become available and student needs change. Future follow-up research is warranted to assess the long term impact of the eCourse.

Discussion

Medicine is a dynamic field and physicians must embody lifelong learning to provide effective patient care. The Information Mastery eCourse presents medical students with self-directed learning opportunities to practice information search skills. These skills are crucial for physicians to possess in order to address patient concerns/problems and keep abreast of what is new in their field.

References

1. LCME virtual visit: Competencies help Medical School evaluate the 'whole' student. Michigan Medicine Headlines. https://mmheadlines.org/2020/05/lcme-virtual-visit-competencies-help-medical-school-evaluate-the-whole-student/. Published May 28, 2020. Accessed June 24, 2021.
2. ADDIE Model. InstructionalDesign.org. https://www.instructionaldesign.org/models/addie/. Published November 30, 2018. Accessed June 24, 2021.
3. Richard Mayer's Cognitive Theory of Multimedia Learning. McGraw Hill Canada. https://www.mheducation.ca/blog/richard-mayers-cognitive-theory-of-multimedia-learning. Published May 13, 2021. Accessed June 24, 2021.

Navigating Expectations following the Transition of USMLE Step 1 to Pass/Fail Scoring – A Summary and Ongoing Recommendations from the NEXT Step 1 working group at the American Association of Medical Colleges(AAMC)

Riya Chhabra BS, Ryan Ko BS, Berkley Browne Ph.D.

Introduction

Historically, the USMLE STEP 1 has been used to gauge the competitiveness of an applicant. However, on February 12, 2020, the National Board of Medical Examiners (NBME) and Federation of State Medical Boards (FSMB) announced that STEP 1 will transition from a three-digit score to P/F starting January 2022. Their goal was to lower student anxiety and discourage the use of STEP 1 as a residency selection criteria.

With this change, there has been increased reliance on Step 2, clinical grades, and other metrics (research etc.). Furthermore, since STEP 1 has become P/F there has also been a higher failure rate (4% to 7% in 2022).

The NEXT Step 1 group is studying the subsequent issues that have arisen, especially in regards to application fever and increasing inequities for students from lesser-known programs in comparison to historically prestigious programs.

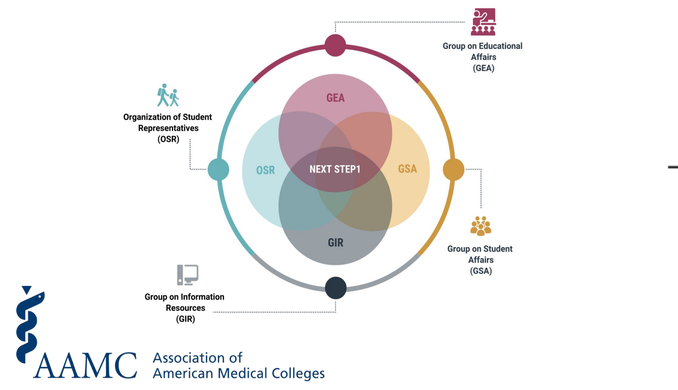
The group is presenting at conferences around the country to seek feedback and shareholder perspectives. They hope to learn of and suggest new innovations in this post-P/F world, and present them as future scholarly work and in meetings with the NRMP, AAMC, and other national organizations in medical education.

National Decrease in Step 1 Pass Rate

Examinees from US/Canadian Schools	2021 Number Tested	2021 Percent Passing	2022 Number Tested	2022 Percent Passing
MD Degree	23,078	95%	24,251	91%
1st Takers	22,280	96%	22,762	93%
Repeaters*	798	66%	1,489	71%
All Examinees	**2021 Number Tested**	**2021 Percent Passing**	**2022 Number Tested**	**2022 Percent Passing**
All Takers	47,653	88%	53,881	82%

- Potential explanations:
  - Change to Pass/Fail
  - Increased passing standard from 194 to 196 at same time
  - COVID-19
  - Shift in examinee scheduling patterns

NEXT STEP1 AAMC Group Collaboration



Aims and Objectives

1. Understand the issues that have arisen due to the change in Step 1 grade reporting from a three-digit score to pass/fail.
2. Learn about consensus opinions for these issues developed by the NEXT Step 1 working group within the American Association of Medical Colleges (AAMC) which is comprised of medical educators and learners across the continuum.
3. Identify urgent priorities established by the working group and efforts our institution can take in the short-term.

Approach/Process

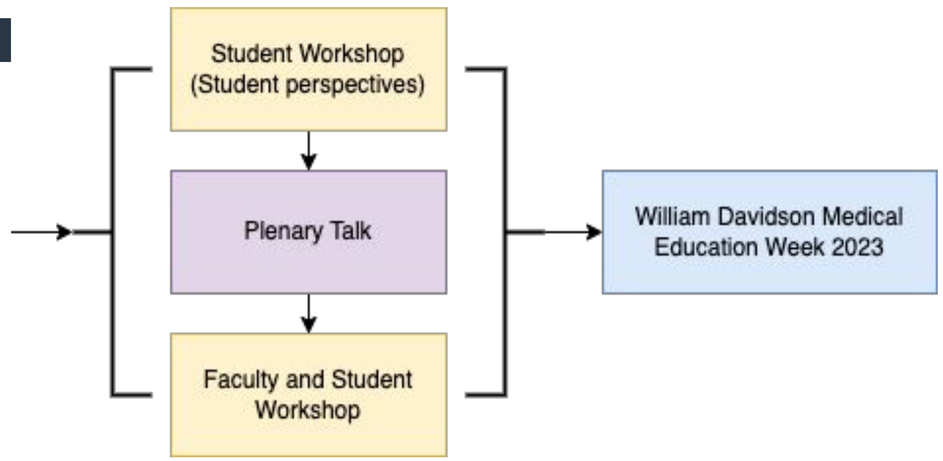
This poster will provide historical context of the USMLE Step 1 change to pass/fail grading followed by the findings from a series of webinars and workshops at national conferences hosted by the NEXT Step 1 working group at the Association of American Medical Colleges (AAMC).

During these webinars and workshops, the working group brought together learners, student affairs staff, and faculty from around the country to contribute to ongoing, dynamic discussions on issues in three domains: curriculum, student advising, and the residency application process.

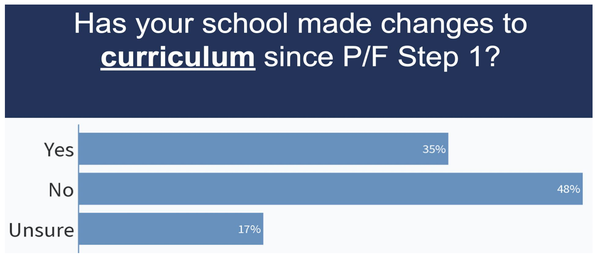
We will discuss highlights and recommendations in each of these domains, followed by suggestions of how future policies at OUWB may align with the recommendations.

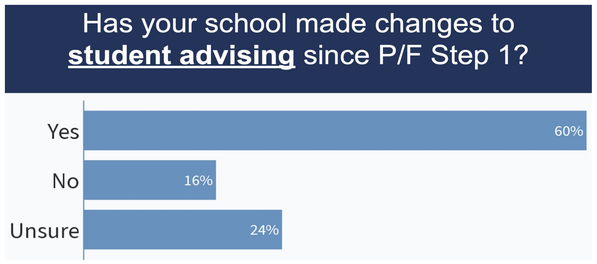
Evaluation Plan

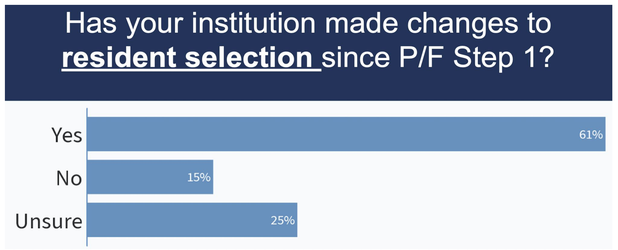
Participants will have full autonomy of how they should incorporate these recommendations into their line of work. This session serves as an educational opportunity for proactive innovation in curriculum, advising, and residency applications.



Results and Discussion







N=100 students

Select Recommendations from the Conference:

- Earlier exposure to specialties. More schools moving towards 1-1.5 year preclinical curriculum
- Earlier exposure to research opportunities. Some schools expanding advertisement of summer internships at neighboring institutions and academic centers
- Resource database about school policies (remediation) and ongoing STEP 1 and ERAS changes.
- Formal residency interview preparation. Ex. TCU school of medicine started "Elevator Pitch/Media training"

References

AAMC Central/Southern Regional Conference 2023