

GRANT PROPOSAL

The Acute Abdomen Small Group On-Call Simulation: A Flipped Classroom Approach To Teaching Radiology.

Project Description:

The goal of this project is to utilize the flipped classroom approach and role-play on-call simulations to teach medical students, as well as radiology and non-radiology residents, how to utilize and interpret radiologic studies in patients with acute abdominal pathology.

Rationale:

The flipped classroom is a more effective and engaging learning model where students cover material on their own before class, and class time is transformed into a more valuable dynamic, immersive and interactive workshop.

Pilot Data: NA

How the project supports/promotes diversity:

Radiology is at the intersection of multiple medical specialties and patient populations. We treat male and female, adult and children, disabled and able-bodied, minority and nonminority, and all socioeconomic classes. The case mix will be designed to reflect that. Additionally, the structure of this proposal lends itself to supporting diversity. Specifically, the use of video and other digital media allows students to control lectures at their own speed, and to replay as needed. This is of value to learners with a variety of accessibility concerns. From personal experience living with a cervical spinal cord injury, this control is very helpful when one cannot write quickly because of upper extremity dysfunction. Digital media is also helpful for those with hearing impairments for whom traditional classroom volume is an issue, as well as for those who are less fluent in English. Using class time to interact and apply concepts gives faculty an opportunity to detect and counteract errors or misconceptions in material. Finally, collaborative efforts facilitate inter-learner instruction, which is beneficial to those both above and below average mastery of the material.

Methods of Design:

The project is designed to be primarily used as part of the Rad 301A radiology clerkship, and will have two components.

1. Online interactive instructional course-*Radiology of the Acute Abdomen*. The online modules will be created and hosted using Lagunita, Stanford's Open EdX platform, and will consist of short video lectures, written materials, interactive data sets, and self-assessment questions. The learners will complete the course modules prior to their scheduled small group "lectures."
2. On-call simulation. During the four hours of face-to-face class time, learners will be immersed in an on-call experience, which can be tailored to the level and specialty of the learner. They will employ role-play to simulate workflow in a busy emergency department. This would include receiving virtual orders, triaging and protocolling exams, exam interpretation, and result communication.

Importantly, both components of the project can be adapted to be used as a part of other clerkships where evaluation of the acute abdomen is important (surgery and emergency medicine, for example), as well as in our radiology "boot camp" held each July for beginning radiology residents.

Timeline and Implementation Plan:

1. Video production utilizing PowerPoint (free) and GoAnimate software (\$795 for five months subscription) to be done on my own using Instructional Technology "self-capture booths" in LKSC. Video editing to be done on my own using Educational Technology video editing station in LKSC.
2. Online class construction to be done on the Lagunitas platform. I will need TA support (\$1800) to help create the

class, which will include embedding video, uploading documents, constructing questions, and creating an evaluation system.

3. Case collection and editing will be done on my own. Cases will need to be uploaded into Osirix MD (\$699) on a dedicated Macintosh computer (\$2500), and then synced with the iPad Pro (\$949), which the students will take turns using during the classroom simulation to review anonymized cases "in real time."
4. The script writing for the simulation portion will be done on my own with the assistance of the Center for Immersive and Simulation-based Learning (free of charge). The scripts will be loaded onto the iPads (\$538) as keynote presentations. Students will pass around the iPads as they take turns switching roles.

All of these will be completed by August 1 in time to be piloted in the radiology boot camp. The radiology clerkship will be held at the end of that month.

Anticipated work product:

1. Online course-*Radiology of the Acute Abdomen*.
2. Full simulation of radiology on-call experience.

Evaluation Plan:

The pilot group of radiology residents will evaluate both the online and classroom portions of the course. All subsequent groups will do the same. Learner feedback and instructor experience will inform improvements in subsequent iterations.

Dissemination of results:

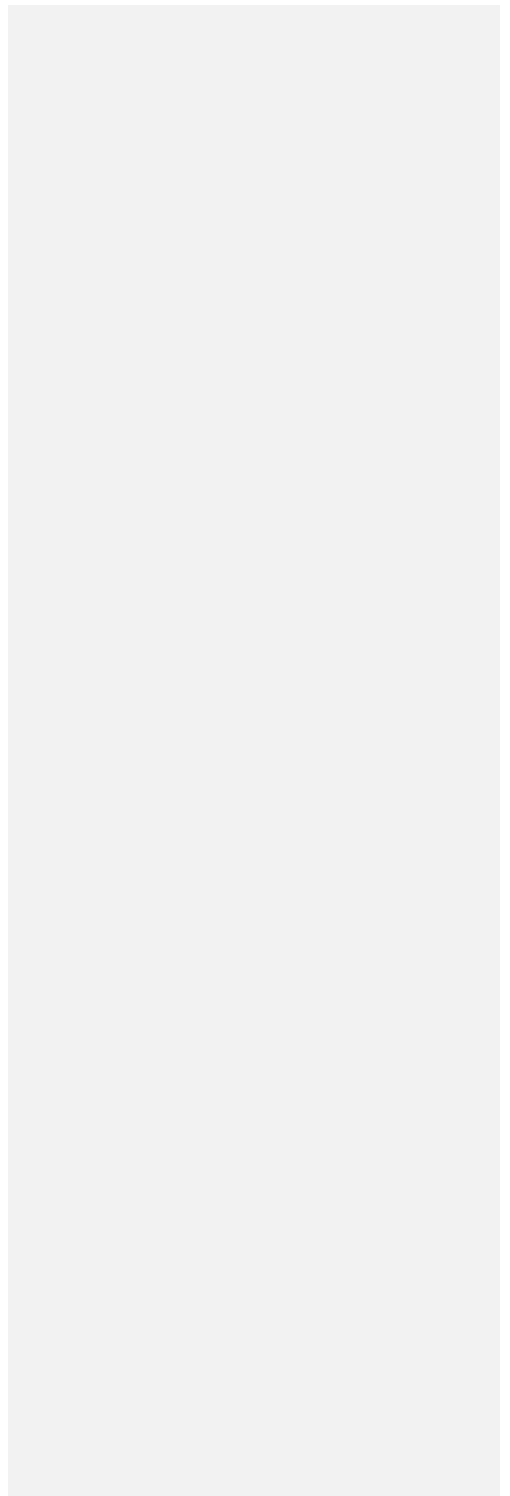
- The project will be presented as an educational exhibit at the Radiologic Society of North America Annual Meeting in November 2016.
- The online course could be eventually made available online, potentially having a worldwide impact.

Anticipated impact of the project on education and/or mentoring:

The online course will make it possible for learners to learn about Radiology of the acute abdomen at their own pace, receiving feedback by answering questions. The in-person simulation will build on that knowledge to instill mastery.

Specific Educational Aims:

- To learn the fundamentals of radiology as it pertains to the diagnosis of the acute abdomen in the emergency department. This will include radiography, CT, MRI, and ultrasound diagnoses of the abdomen and pelvis in diverse patient groups.
- Use history, physical, and laboratory data to obtain relevant clinical information to inform and modify exam triage, protocolling and image interpretation.
- Learn basics of ultrasound, CT and MRI scanning protocols and contrast media usage.
- Recognize radiologic findings of the most common life threatening conditions and their management.
- Simulate team-based coordination of activities in the reading room, including basic exam protocolling, exam triage, and consultation with clinical services.
- Learn pertinent concepts for image interpretation of common studies. Make core observations, formulate differential diagnoses, and management recommendations.
- Differentiate normal from abnormal anatomic structures on radiologic studies.
- Diagnose more common pathologic conditions in the abdomen and pelvis and understand their pathophysiology.
- Understand the role of imaging in the evaluation of specific diseases and among varied patient populations, and how image interpretation affects patient care.
- Recognize how accurate and timely interpretations can improve patient outcomes.
- Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.



III. BUDGET

Budgets MUST include a budget table

COMPENSATION SALARY AND BENEFITS	% FTE	COST PER 100% FTE (SALARY AND BENEFITS)	COST
1. Teaching Asst.	NA	\$20/h x 90h	\$1,800
SUBTOTAL COMPENSATION ITEMS			
NON-COMPENSATION ITEM	QUANTITY OF ITEM	COST PER ITEM	COST
1 Osirix HD PACS For i pad	1	\$49.99	\$49.99
2 Osirix MD PACS	1	\$699	\$699
3 ipad pro 128 GB	1	\$949	\$949
4. iPad mini 2 16GB	2	\$269	\$538
5. 15 inch MacBook Pro	1	\$2499	\$2499
6. GoAnimate Software	5 mos	\$159	\$795
SUBTOTAL NON- COMPENSATION ITEMS			\$5529
TOTAL OF COMPENSATION AND NON-COMPENSATION ITEMS			\$7329

Budget Justification: Please see timeline and implementation plan.