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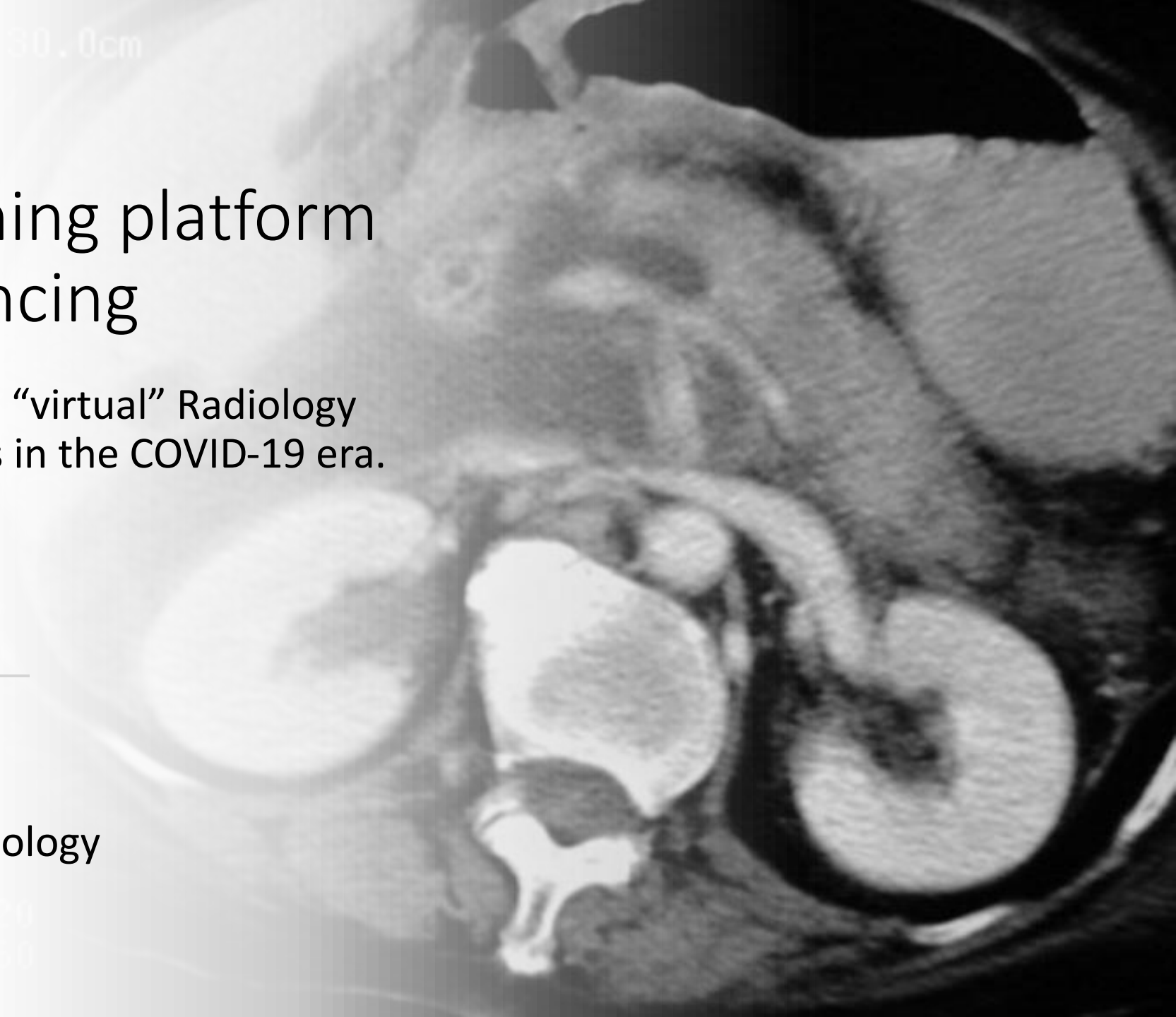


# Combining e-learning platform with web conferencing

a novel approach to running a “virtual” Radiology  
Workshop for undergraduates in the COVID-19 era.

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# Introduction

# Radiology Workshop

- Medical Students have traditionally little exposure to radiology in their undergraduate curriculum.
- Radiology workshops are held to supplement student experience and allow them to gain intuitive understanding of imaging modalities.
- E-learning platform developed to address of the need for a more interactive classroom and improve student learning experience.
- The emerging pedagogy of online teaching

# Teaching in the COVID-19 Era

- Class suspension at HKU from January 25<sup>th</sup>
- Online Teaching for medical students
- Radiology workshops are interactive face-to-face hands-on session

# Novel Solution

- Application of an experimental “virtual” radiology workshops
- Combination of Zoom meeting and eLearning platform

# eLearning Platform

- Implantation of Open edX, including LMS (student-facing, delivering courseware), and Studio (course authoring) components
- Multifunctional framework supporting various types of questions
- Anonymized feedback from students
- Radiology specific functions like image scrolling and disease localization

# Multifunctional framework

Google Calendar

Google Document

LTI Consumer

Mentoring Questions

Poll

Staff Graded Assignment

Survey

Cancel

Text

Announcement

Anonymous User ID

Full Screen Image Tool

IFrame Tool

Raw HTML

Zooming Image Tool

Cancel

	Yes	No	Unsure
I use the benefits of E-learning everyday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm familiar with E-learning completely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use the eLearning regularly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-Learning is useful in medical education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-Learning must be more prevalent in medical education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Submit

Text

EDIT

Attitude towards e-Learning

Duplicate of 'Survey'

EDIT

	Absolute Agree	Agree	Neutral	Less Disagree	Disagree	Absolute Disagree
E-learning has an effective role in medical education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-learning can replace lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-learning must has a complementary role in medical education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-learning do not offer anything more than regular methods of education (books and notebooks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-Learning is an effective method in teaching Radiology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Submit

Add New Component

Advanced

Discussion

HTML

Problem

Video

# Various Question Types

Common Problem Types	Advanced
Blank Common Problem	
Dropdown	
Multiple Choice	
Numerical Input	
Text Input	
Checkboxes with Hints and Feedback	
Dropdown with Hints and Feedback	
Multiple Choice with Hints and Feedback	
Numerical Input with Hints and Feedback	
Text Input with Hints and Feedback	
Cancel	

Common Problem Types	Advanced
Blank Advanced Problem	
Circuit Schematic Builder	
Custom Javascript Display and Grading	
Custom Python-Evaluated Input	
Drag and Drop	
Image Mapped Input	
Math Expression Input	
Molecular Structure	
Peer Assessment	
Problem with Adaptive Hint	
Cancel	



# Immediate Feedback and anonymized Polling System



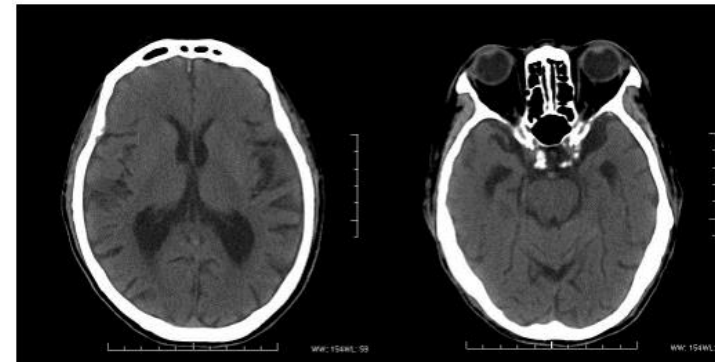
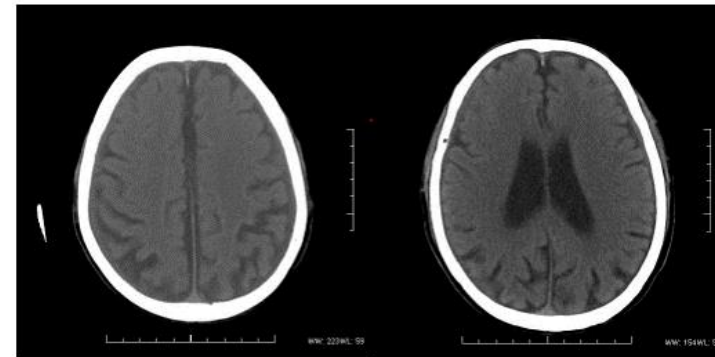
[VIEW UNIT IN STUDIO](#)

What does the CT show?

- Subdural haemorrhage 58%
- Cerebral infarction 32%
- Subarachnoid haemorrhage 11%
- Cerebellar Infarction 0%
- Epidural haemorrhage 0%

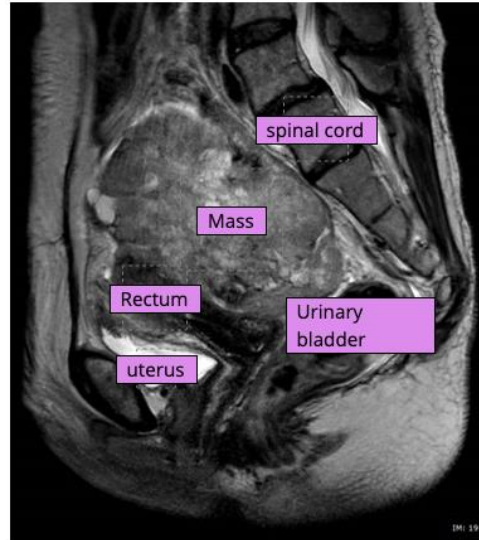
Submit

Results gathered from 59 respondents.



# Radiology Specific Functions

Drag and Drop with Outline  
Label the hydrogen atoms connected with the left carbon atom.



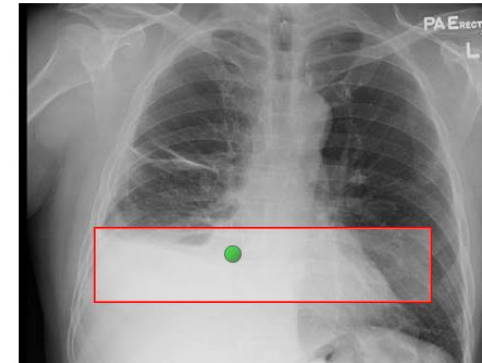
CHECK

[VIEW UNIT IN STUDIO](#)

IMAGE MAPPED INPUT (1/1 point)

There are 3 pertinent findings on the CXR. Please identify them on each image.

Pleural effusion



CHECK

HIDE ANSWER

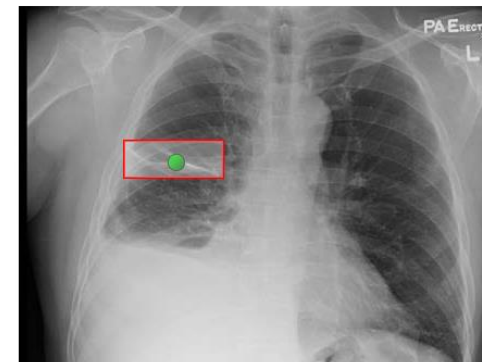
[SUBMISSION HISTORY](#)

[STAFF DEBUG INFO](#)

IMAGE MAPPED INPUT (1/1 point)

Please identify 3 pertinent findings on the CXR

Opacity in the right mid zone



CHECK

HIDE ANSWER

Methodology

# Running the 'Virtual' Radiology Workshop (1)

- Four workshops involving a total of 246 medical students were held
- On-line web conference
- The students were also invited to participate in a pre- and post-workshop questionnaire exploring their attitude towards e-learning.

# Running the 'Virtual' Radiology Workshop (2)

- Students were separated into five groups, each tackling a clinical “vignette”.
- The vignettes included interactive components such as multi-choice questions, image clicking, and “drag and drop” functions, with individual results logged anonymously.
- Teaching switches between whole class tutorials and “break-out” groups
- The tutors were able to “drop in” to each group to guide discussions at any time

# Findings

# Evaluation from Students

197 (80.1%) students replied to the questionnaire

## Pre-Questionnaire

	Absolute Agree	Agree	Neutral	Less Disagree	Disagree	Absolute Disagree
E-learning has an effective role in medical education	19%	58%	19%	0%	2%	2%
E-learning can replace lectures	9%	38%	28%	17%	4%	4%
E-learning must has a complementary role in medical education	15%	68%	17%	0%	0%	0%
E-learning do not offer anything more than regular methods of education (books and notebooks)	4%	21%	28%	21%	25%	2%
E-Learning is an effective method in teaching Radiology	8%	57%	32%	0%	2%	2%

## Post-Questionnaire

	Absolute Agree	Agree	Neutral	Less disagree	Disagree	Absolute disagree
E-learning must has more effective role in medical education	22%	55%	14%	2%	5%	2%
E-learning can replace lectures at class	7%	41%	27%	16%	7%	2%
There isn't any important reasons for e learning in medical education	5%	9%	20%	18%	36%	11%
E-learning must has a complementary role in medical education	16%	57%	23%	0%	2%	2%
E-learning do not offer anything more than regular methods of education (books and notebooks)	5%	9%	25%	30%	25%	7%
E-learning is an effective method in teaching Radiology	11%	60%	25%	2%	0%	2%

# Evaluation from Students

- In medical students, 81% used e-learning regularly and 87% considered e-learning has a complementary role in medical education
- Specifically, 65% found e-learning effective in teaching radiology before the workshop ,which increased to 71% at the end of the workshop
- The students' acknowledgement of eLearning replacing typical class improved from 47% to 58%



# Conclusion

- The COVID-19 pandemic has fundamentally changed how medical teaching is being delivered.
- In our experience, the use of interactive e-learning combined with web conferencing can be a novel and alternative method to traditional workshops with excellent student experience.

Thank You

I would like to thank my fellow colleagues:

- Dr. Elaine Lee
- Dr. Vince Vardhanabhuti
- Dr. Esther Wong
- Dr. Kathy Wong
- Dr. Gordon Wong