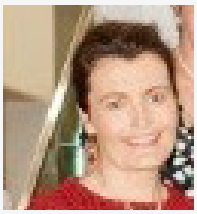
Chapter 6: “I’m a busy distance learner” – Engage me!



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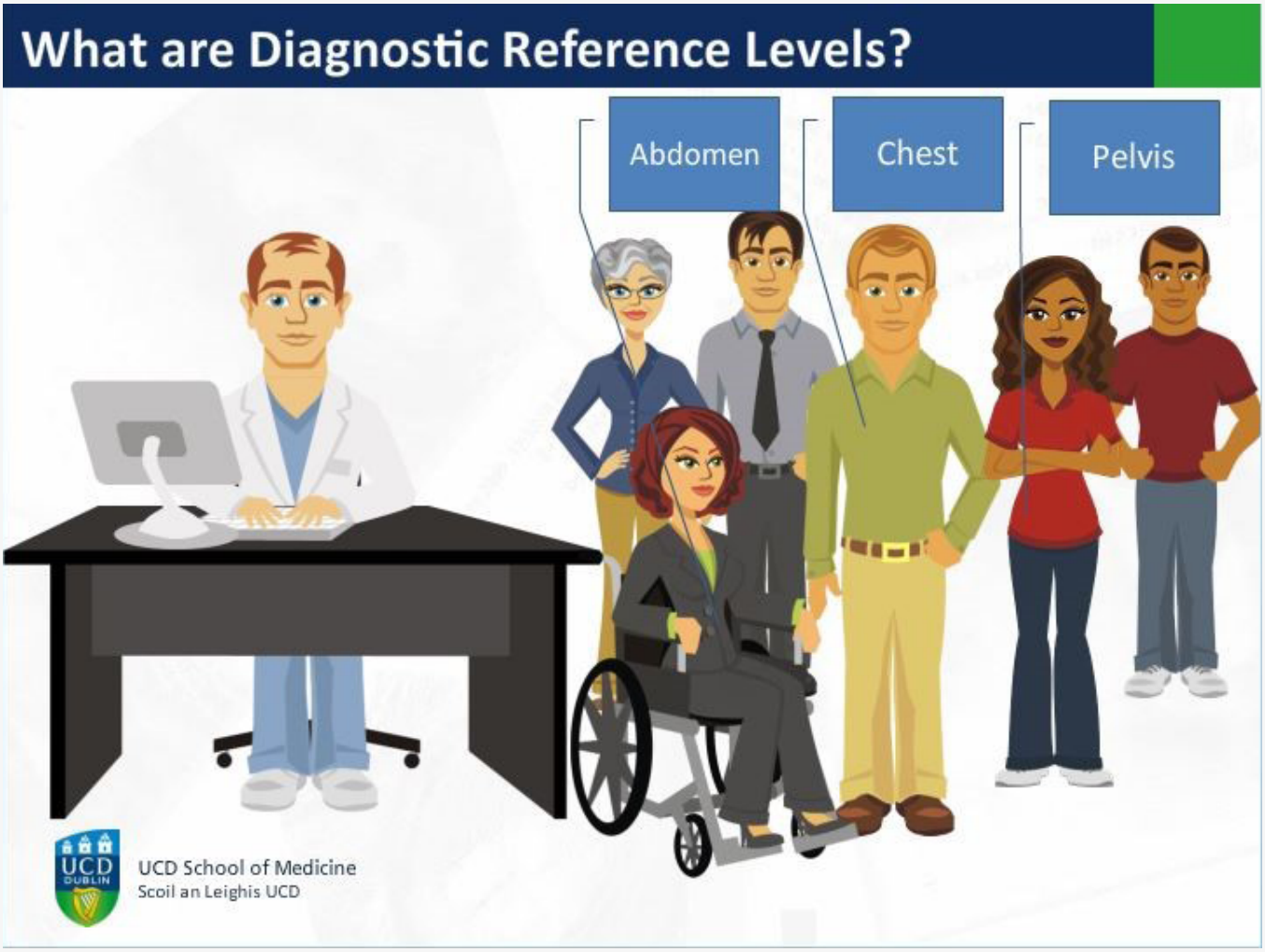


Module Name	Patient Care & Interventional Radiology [RDGY 41250] Technology of Interventional Radiology [RDGY 41260]
Universal Design Principles	- Simple & intuitive - Flexibility in use - Tolerance for error - Community of learners
Discipline	Radiology
Level	UCD levels 4
College	Health and Agricultural Sciences
Learning Outcomes	**Patient Care & Interventional Radiology [RDGY 41250]** On successful completion of this module, the student should be able to: - competently discuss a wide range of procedural aspects of interventional procedures within the context of service provision and patient outcomes. - demonstrate an awareness of the need to adapt all aspects of procedural technique in individual procedures based on patient presentation, case history and procedural environment. - critically reflect on the advantages of using interventional radiology to develop and improve the quality of service provision in the Imaging Department **Technology of Interventional Radiology [RDGY 41260]** On successful completion of this module, the student should be able to: - challenge and optimise the application of IR technology across a range of clinical contexts - appraise IR safety and facility design issues from diverse perspectives from angiography suites to hybrid operating theatres - isolate and focus on the challenges associated with the evolving nature of IR technologies and suggest appropriate solutions

Introduction

Our distance learners, like many others, are very busy people. We decided to engage our diverse group of students through implementing Universal Design principles in our modules. These modules are designed for radiographers working in the area of interventional radiology. They aim to provide students with an in depth knowledge of the procedures provided by interventional radiology. There is a systematic approach to discussing the interventional procedures currently performed in Irish hospitals focussing on promoting both professional knowledge and quality of service in the interventional radiology (IR) environment. These modules aim to develop each student's knowledge and understanding of the aetiology of the disease processes that present in the IR department, their compatibility with radiological intervention, the possible procedural risks and complications and the expected outcomes for each patient.

Why Universal Design for these online modules?

Students on this course are graduate radiographers who work in a clinical setting. This course is studied out of hours or in very limited amounts of time that students might have available during working hours.

The majority of students would not have previously studied online. We also had a small number of international students taking this module for whom English is a second language. With a diverse group of students, studying in challenging circumstances, a Universal Design approach helped us to work towards meeting the needs of as many students as possible.

Our intention was to be able to structure the content into small segments so that learners felt that they could complete a section even with limited time and in this way they would be given a sense of making real progress (Hart, 2012). We also wanted to help learners to put the learning into context and to be able to transfer the learning to their work environment. The principles of Universal Design in the context of e-learning emphasise the need for learning to be presented in the simplest format possible, allowing for learning to be prioritised over the need to acquire additional digital skills (Elias, 2011).

Design and implementation of the module

We particularly focused on **Flexibility in use**, ensuring that there are multiple means of representation through audio, visuals, transcript and text, as well as interactivity to promote transfer of learning.

We also included multiple means of action and expression, through the inclusion of resources, notes and a variety of quiz types. We aimed to improve student engagement through combining some live online tutorials with the main content of the course.
As well as a visual explanation given through the slides and a voiceover explaining the content, we include a transcript in all of our modules to ensure that the content is accessible to all learners (ensuring the use of sans serif font throughout). The transcript can be seen on the left of the slide shown in Figure 1.

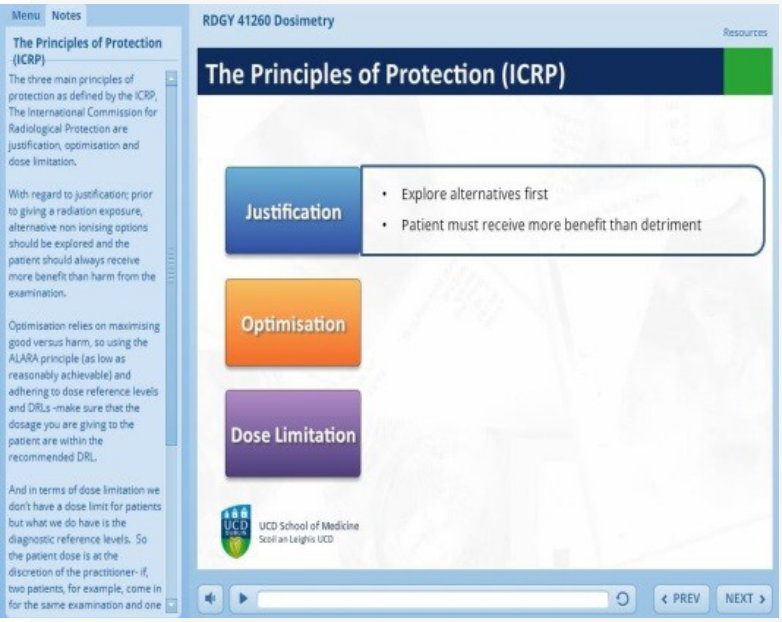


Figure 1: Transcript (on the left of the slide) and voiceover are available for all slides

We also use video, where appropriate, to provide further illustration of complex topics. This provides another media format to meet the principle of multiple means of representation as shown in the video still in Figure 2.

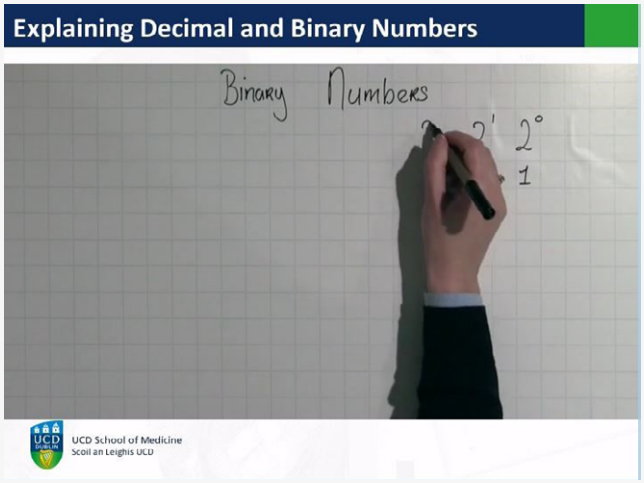


Figure 2: Video explaining Decimal and Binary Numbers

Video is particularly effective for maths as voiceover and text alone can be difficult to follow in maths education.

'Big Ideas' are highlighted through text or illustrations to reinforce the key points being described on each slide. Figure 3 shows how relationships between key areas or ideas can be clearly shown in an illustration improving the learning process.

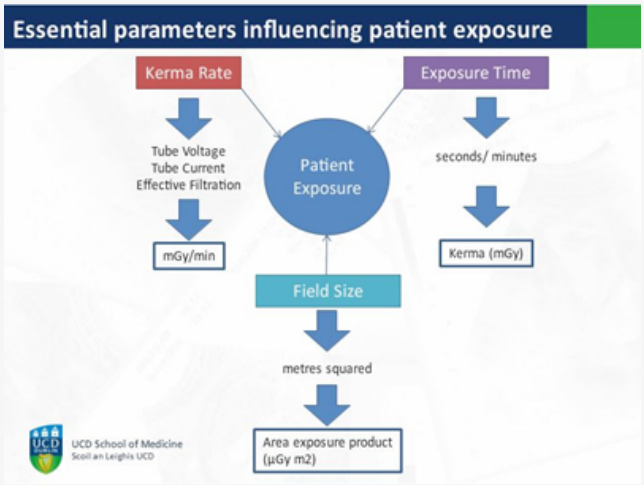


Figure 3: Big ideas and relationships are clearly shown in illustrations allowing for visual learning

Relationships can be explained more clearly by requiring learners to move through the steps of a process as shown in Figure 4.

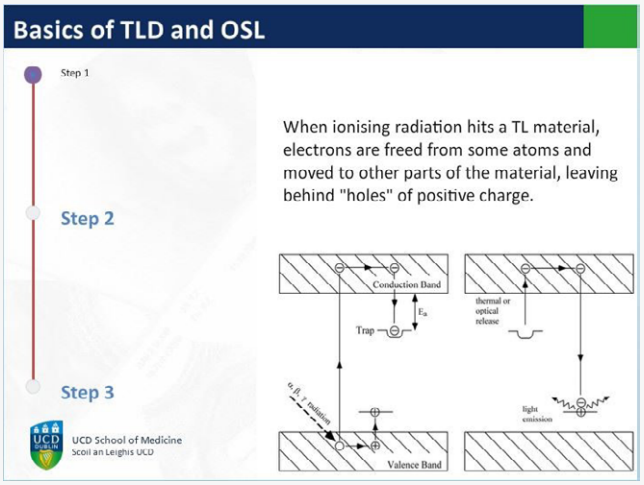


Figure 4: Students can move through the steps of a process to view the content and listen to audio material

Learners can click on each step to view content and listen to the audio explanation of that part of the process. In order to highlight patterns, where there are a number of comparative concepts or procedures in a topic, each will be broken into separate learning objects and chapters. The same structure and similar slide layouts are used in each section to ensure the approach is **Simple and intuitive** and to highlight to students the similarities and differences between each concept.

Branching or layered slides are used to emphasise the critical features and connections between two subtopics. For example, in Figure 5, the learner clicks the buttons to learn about employer and employee responsibilities - connected but different information.

Figure 5: Branching slides allow students to click through to see connected information

Content is released progressively each week and, as previously mentioned, is further 'chunked' into smaller topics where appropriate as shown in Figure 6. Each section is clearly labelled and easy to navigate for students.

In this way the content is made more accessible to learners. A full notes document is also included for each lecture in Blackboard. These consist of a screenshot of each slide and space for note taking as shown in Figure 7.

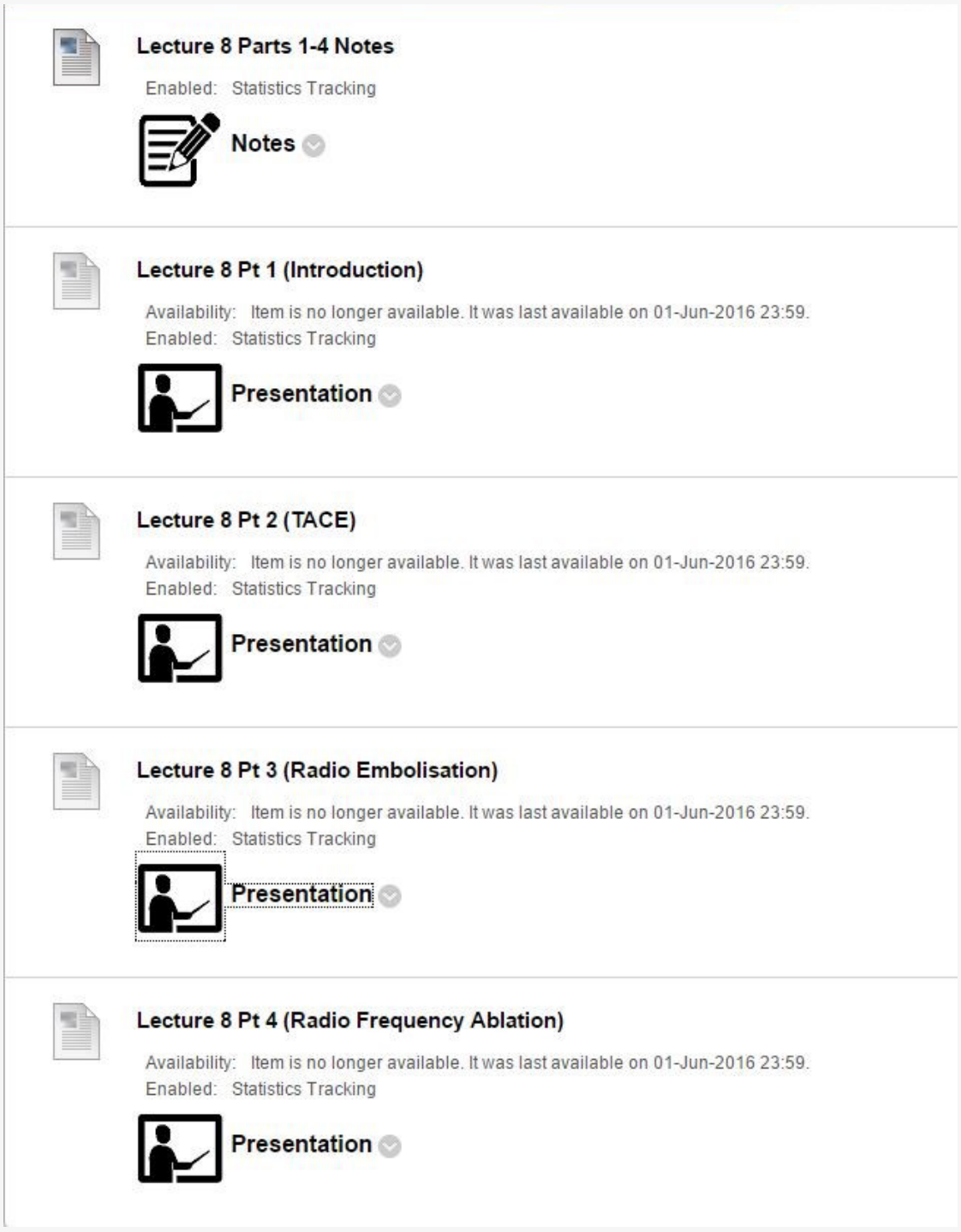


Figure 6: Information is chunked in small sections

1.2 Learning Objectives

Figure 7: Students can use these notes sheets to take notes on each slide

Learners can take notes on each slide as they view the lecture.

Tabbed slides, as shown in Figure 8, can be used to further break down topics 'chunking' information while still demonstrating the relationship between the sub-topics.

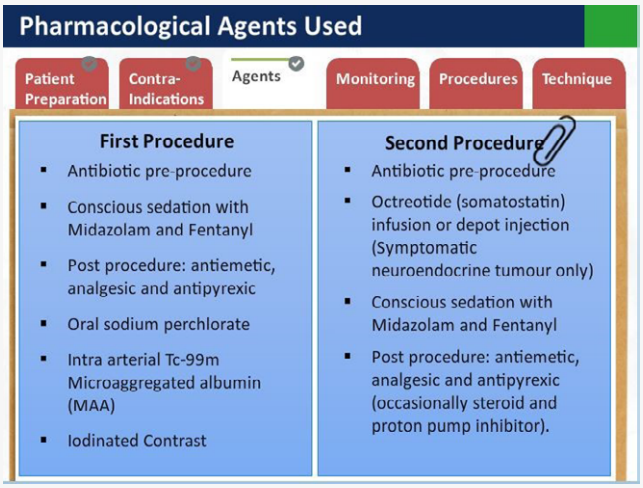


Figure 8: Tabbed slides are used to break down information in to management chunks

Formative quiz questions also assist learners in processing information into usable knowledge and allow for **Tolerance for error**. In the Drag and Drop interaction shown in Figure 9 symptoms jump back to their starting point until they are dropped into the correct folder. In order to provide scaffolds which will help to improve memory and transfer of content, we include elements of active learning where possible. With interactions such as these, it is important to check whether they are accessible for learners using a screen reader or other assistive technology.

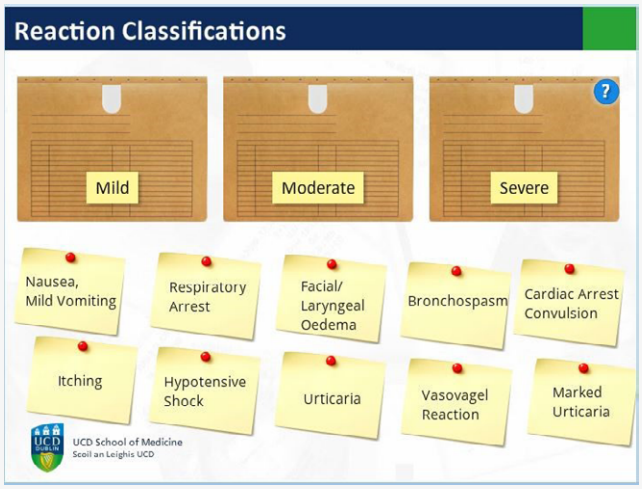


Figure 9: A drag and drop quiz allowing for interactive learning and self-testing

You should be prepared to provide the additional equivalent content in an alternative, accessible format (Mestre, 2006). In the interaction shown in Figure 10, the learner drags the radiographer different distances from the patient, in order to see how this affects the dose of radiation received by the radiographer.

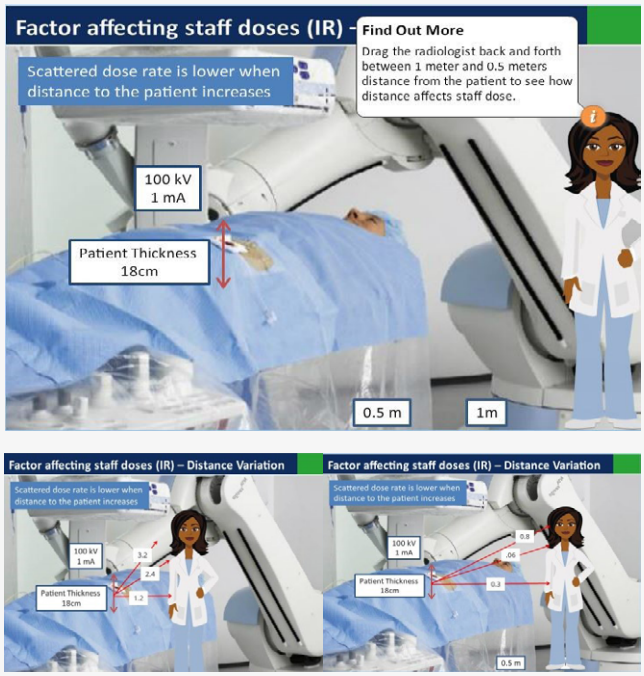


Figure 10: Interactive slide demonstrating staff doses – the learner can drag the radiologist back and forth to see how the dose is affected by distance to see connected information

This facilitates knowledge acquisition, more so than telling the learner the effects directly. Simply using appropriate images for labelling and description can help the learner to transfer the information and put it into context.

Slider functionality can also be used. This illustrates the comparisons by requiring the learner to drag the slider to different options. Not all content will lend itself to this approach but even simple interactions can help to make the content more memorable and transferable by encouraging active rather than passive learning.

A flip card approach, as shown in Figure 11, allows learners to click on each procedure to see the radiation dose. This communicates the information but can also be used by students to test their learning.

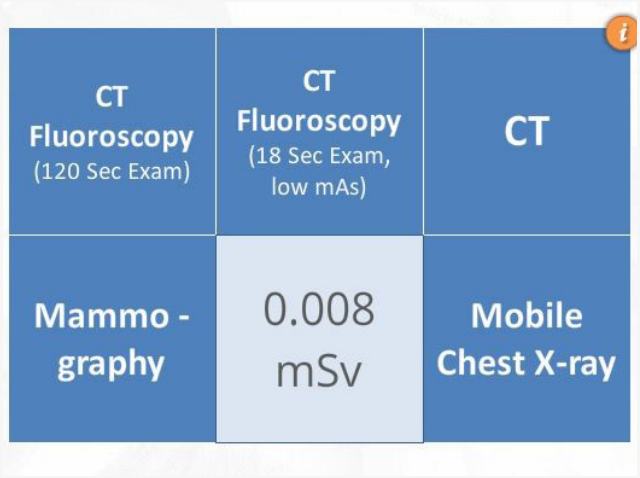


Figure 11: A series of flip cards which reveal the information when clicked

Where resources such as policy documents, regulations or hospital forms are referred to, a copy is made available in the Resources section of the Learning Object. If a journal article is relevant, a link is provided to the article in the UCD library. This can be accessed from the slide itself but is also included in the resources section.

Interaction with faculty and among students is encouraged in order to create a **Community of learners**. Through Blackboard Collaborate students can raise their hand and the academic can enable their microphone or students can use the text box to speak to the lecturer or each other.

The whiteboard in Collaborate is also used to demonstrate samples of exam questions as shown in Figure 12.

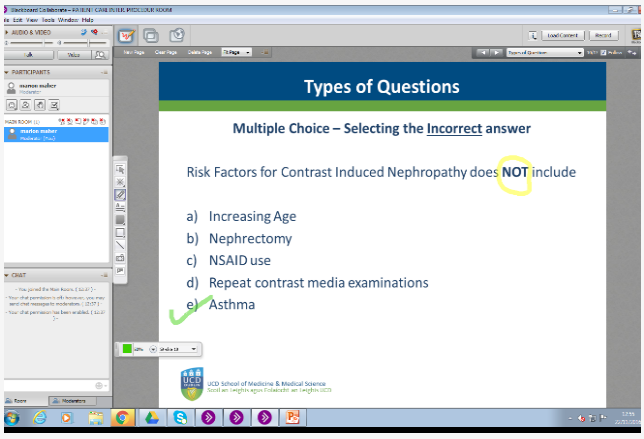
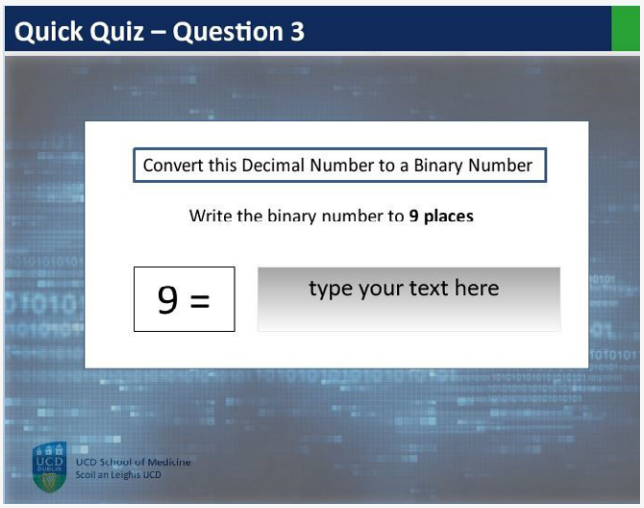


Figure 12: Whiteboard in Blackboard Collaborate used to demonstrate exam questions and to allow for interaction with students.

Different types of quiz questions are included where appropriate. These are formative and learners are given several attempts at each question. If the answer is incorrect, the correct answer is provided or learners are directed back to the relevant slide where they can review the information. A variety of quiz types are used to appeal to different learners.



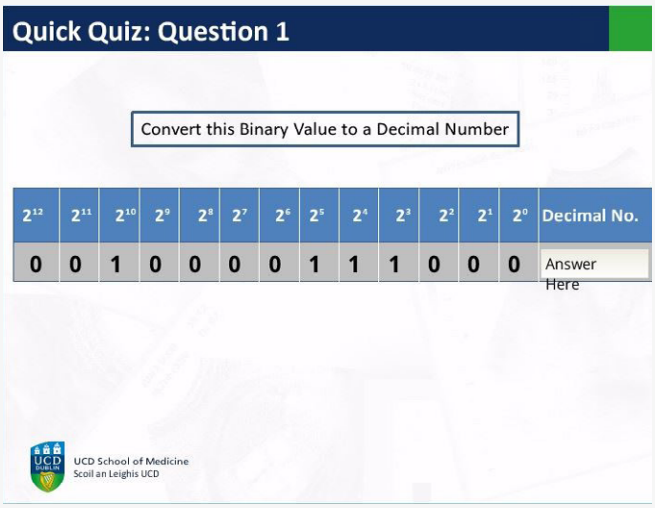
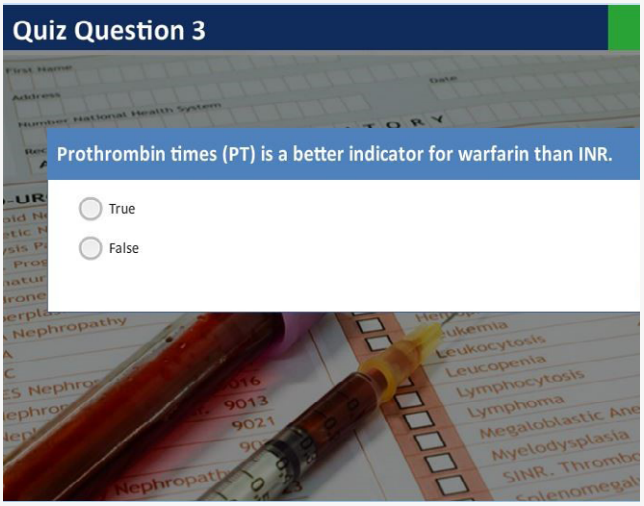


Figure 13: Gapfill – A series of fill in the gap style questions



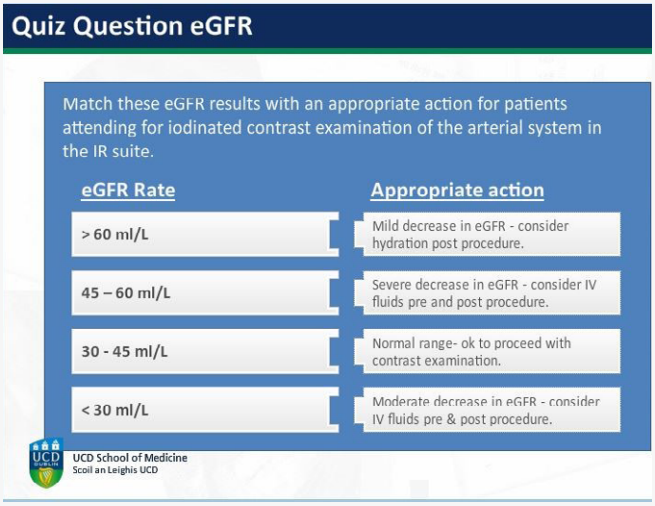
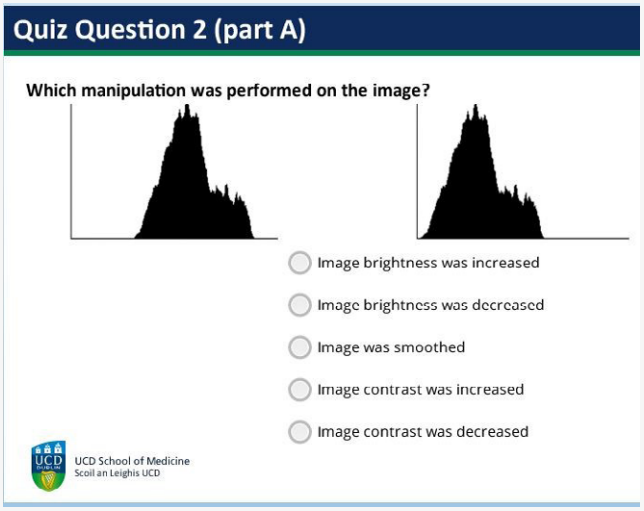


Figure 14: True & False and Matching Pairs



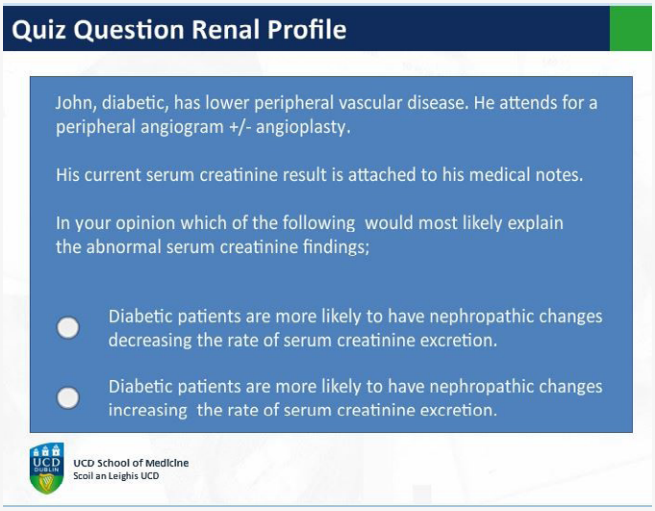


Figure 15: Multiple Choice based on scenario/based on images

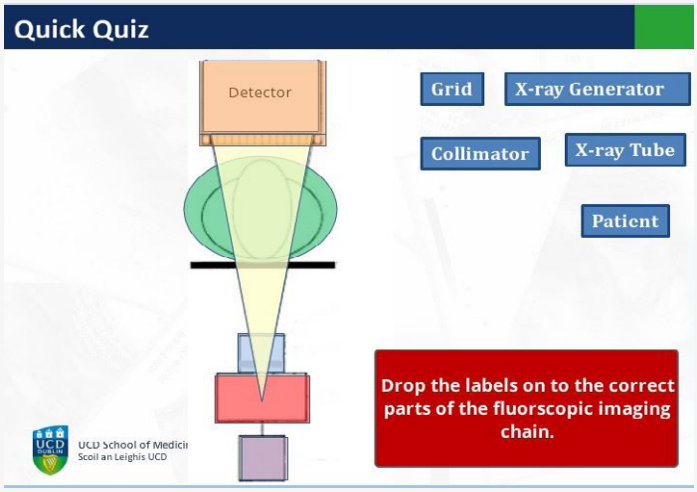


Figure 16: Drag and Drop

“I think the module was well structured.”

“Tutorials gave me confidence in the MCQ exam.”

“I really enjoyed the tasks in the lectures.”

“Shorter lectures are easier to tackle than the lengthy ones.”

STUDENT FEEDBACK

Evidence of impact. How do you know it worked?

This is the second iteration of the course and it was in the most recent release that we really focused on inclusion of interaction, different quiz types and branching as well as the online tutorials.

The feedback we have had is positive with all respondents stating that they were satisfied (40%) or very satisfied (60%) with the course. Students said the following:

Advice to others for implementation

Some interactions such as Drag and Drop will not be accessible to learners using a screen reader. It's important to check the accessibility of templates and activities, however if you feel that it is beneficial to include it, just be sure to include an equivalent, alternative task that is accessible. Implementing Universal Design does not mean having to compromise learning but rather ensuring that there are equivalent options for all learners.

It does take time to include these aspects and to add interactivity to the course so this should be considered in the development process. However, the time taken in development can transform the module from a didactic delivery method to an engaging learning experience. Universal Design also makes the content more accessible to all learners and this should be reflected in students' understanding of the content. Hopefully, because of this, the material will need less work in the future so it is time that is well-invested. Also, once templates for interactions and quizzes are created they can be reused for other learning materials. If changes are needed in the future, the fact that the content is broken down into manageable 'chunks' should mean that any changes will be manageable. We did not include alt-text with our images, mainly due to time restrictions. This is something that we will add in the future, to ensure that content is accessible for learners using a screen reader.

We would recommend in a purely online course, including online tutorials earlier in the course and possibly to do so at regular intervals as students felt that it was helpful to get to know that there are other students on the course. The social aspect of learning and peer learning are particularly beneficial for graduate students who all bring their own experience to the course. A discussion forum would also be beneficial in this regard, although this will require some moderation which may not always be possible.

References

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Mestre, L. (2006). **Accommodating diverse learning styles in an online environment. Reference & user services quarterly, 46(2), 27-32**

Hart, C. (2012). **Factors associated with student persistence in an online program of study: a review of the literature. Journal of Interactive Online Learning, 11(1), 19-42**

Resources

The Joint Information Systems Committee (JISC). (2007) **'Effective Practice with e-Assessment', JISC**

Edyburn, D. L. (2010). **Would you recognize Universal Design for learning if you saw it? Ten propositions for new directions for the second decade of UDL. Learning Disability Quarterly, 33(1), 33-41**

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