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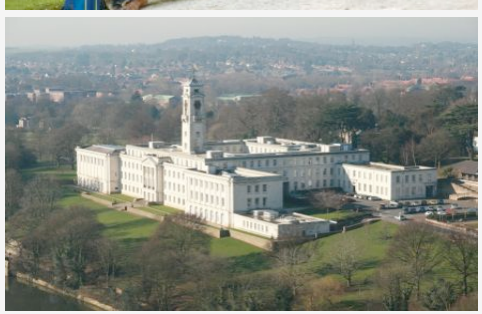
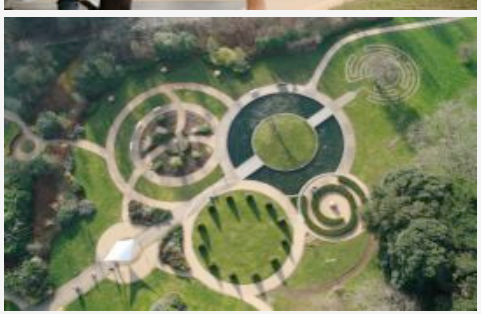
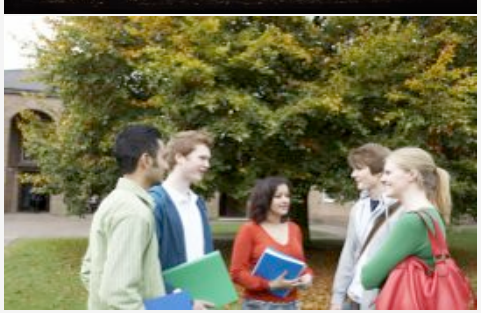
Abandoning the Silos: An Integrated Approach to Pharmacy Education







Barrie Kellam
School of Pharmacy
University of Nottingham

Pharmacy Education Symposium 2013
Prato, Italy

8-10 July 2013

Initial education and training of pharmacists

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Initial education and training of pharmacists

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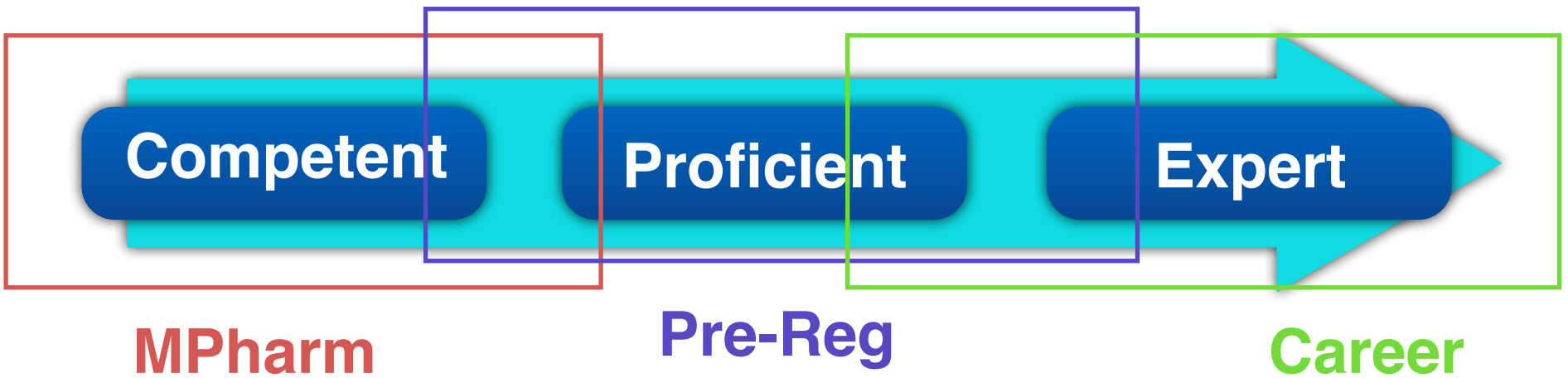

The Nottingham Graduate: A Stakeholder's Perspective

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Skills and Attitudes

- Good theoretical knowledge but often don't apply it well.
- Students need to use initiative and judgement; not too risk-adverse, but aware of consequences of actions (or inaction).
- A need to appreciate the wider picture.
- Attention to detail good and must remain.
- Need to instill sense of personal and professional responsibility and pride.
- Knowledge of and attitudes towards others in the pharmacy team.

The Nottingham Experience: A Stakeholder's Perspective

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Ethos of the Course

- Don't be too focussed on the 'right' answer. There may not be one.
- Think about how decisions are made (not just whether it was the correct decision).
- Don't let over-cautiousness outweigh caring and commitment.
- Challenge where appropriate.
- Questioning and curiosity.
- Be patient-focussed rather than disease focussed.
- Be aware of considerations other than just clinical (economic, business, political etc.).

Boots
Pfizer
NHS
Lloydspharmacy
AstraZeneca
gsk GlaxoSmithKline
MOSS PHARMACY
WELDRICKS PHARMACY

The Pharmacist:
A True Multidisciplinarian

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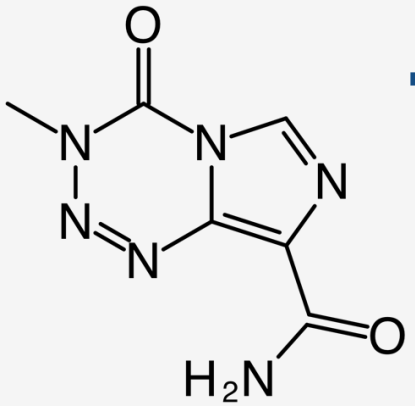
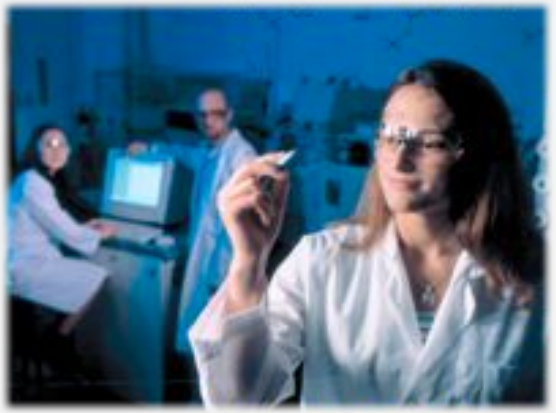


The Drug



The Medicine

The Patient

MPharm Course Overview

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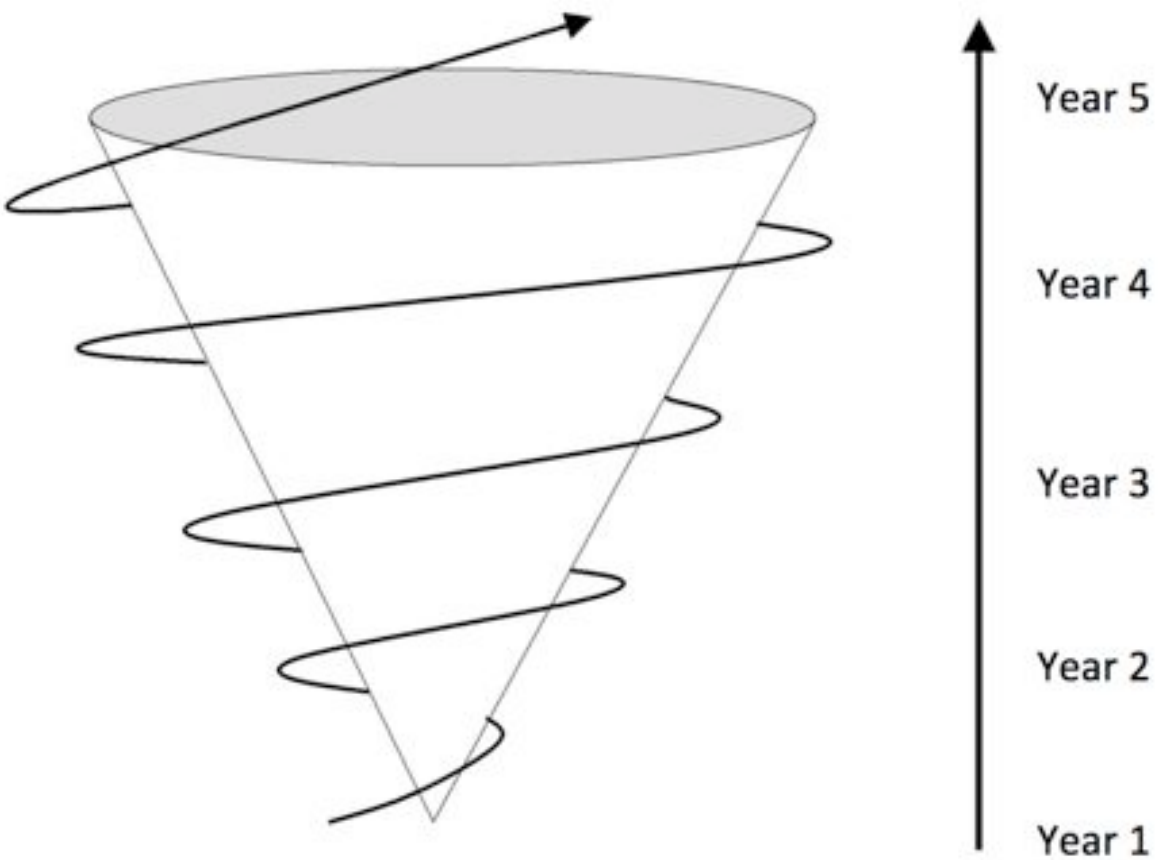
	Semester 1	Semester 2
Year 1	Transition to Higher Education and the Pharmacy Profession	Drug, Medicine and Patient Integrated Modules (DMP)
Year 2	Drug, Medicine and Patient Integrated Modules (DMP)	Drug, Medicine and Patient Integrated Modules (DMP)
Year 3	Drug, Medicine and Patient Integrated Modules (DMP)	Research and Broadening Horizons
Year 4	Advanced Studies in Clinical Pharmacy, Pharmacy Practice and Science	Advanced Studies in Clinical Pharmacy, Pharmacy Practice and Science

Vertical Theme Integration



Curriculum must be progressive (the spiral curriculum).

Deal with issues in an increasingly complex way until the right level of understanding is attained.

Provide opportunity for continuous contextualised exposure

Level 2 Plan

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	Semester 1	Semester 2
Year 1	**Transition to Higher Education and the Pharmacy Profession** **B31BHP: Being a Pharmacist. Convenor: Dr Colin Melia** *30 credits* **B31ESP: Essential Skills for Pharmacists: Dr Helen Boardman** *30 credits*	**Drug, Medicine and Patient Integrated Modules** **B31DYS: Dyspepsia. Convenor: Dr Cristina de Matteis** *30 credits* **B31BFI: Bacterial and Fungal Infections. Convenor: Dr Felicity Rose** *30 credits*
Year 2	**Drug, Medicine and Patient Integrated Modules** **B32GIL: Gastrointestinal and Liver Disorders. Convenor: Dr Snow Stolnik** *20 credits* **B32AAI: Asthma, Allergies and Immune Diseases. Convenor: Dr Steve Alexander** *20 credits* **B32CVS: Cardiovascular. Convenor: Professor Michael Randall** *20 credits*	**Drug, Medicine and Patient Integrated Modules** **B32RED: Renal and Endocrine Diseases. Convenor: Professor Dave Barrett** *20 credits* **B32SHP: Sexual Health and Pregnancy. Convenor: Professor Phil Williams** *20 credits* **B32PAI: Pain. Convenor: Dr Roger Knaggs** *20 credits*
Year 3	**Drug, Medicine and Patient Integrated Modules** **B33VPI: Viral and Parasitic Infections. Convenor: Dr Franco Falcone** *20 credits* **B33CNS: Central Nervous System Disorders. Convenor: Professor Dave Kendall** *20 credits* **B33CAN: Cancers. Convenor: Dr Keith Spriggs** *20 credits*	**Research and Broadening Horizons** **B33RPJ: Research Project** *40 credits (60 credits if external option selected: B33RPE)* **Optional modules:** *20 credits of optional modules to be selected if 40 credit project chosen*
Year 4	**Advanced Studies in Clinical Pharmacy, Pharmacy Practice and Science** **B34IP1: Integrated Pharmaceutical and Patient Care 1. Convenor: Dr Roger Knaggs** *30 credits* **B34ADD: Advanced Drug Discovery. Convenor: Dr Barrie Kellam** *20 credits*	**Advanced Studies in Clinical Pharmacy, Pharmacy Practice and Science** **B34IP2: Integrated Pharmaceutical and Patient Care 2. Convenor: Lyneth Hicks** *30 credits* **B34FME: Future Medicines. Convenor: Professor Kevin Shakesheff** *20 credits*
	B34PLM: Pharmacy Leadership & Management: Professor Claire Anderson *20 credits, full year*	


Dr Colin


Dr Charlie


Dr Sue


Prof Claire

Vertical Theme Integration

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MPharm 2012: Dyspepsia (B31DYS)
Summary of the vertical themes

Pharmacology & Therapeutics	Biology & Physiology	Pharmaceutics	Chemistry	Absorption, Distribution, Metabolism and Elimination	Clinical and Pharmacy Practice	Professionalism and Leadership
Diseases and Symptoms • Causes of 'chest pain' • The process of peptic ulceration • Drug (especially NSAID)-induced ulceration • ANAEMIAs and full blood counts • Gastro-oesophageal reflux disease • Evidence for the role of diet, lifestyle, environmental factors **Targets** • H_2 receptors • Proton pumps • G-proteins and second messenger systems • Membranes • Steroids – signpost only • Arachidonic acid metabolism **Therapeutic Classes and Drug Examples** • Antacids • PPIs • H_2RAs • Misoprostol • Prokinetic drugs • Antibiotics - signpost only • Immunological tests for H. pylori infection • NICE guidance • Relevant drug interactions and pharmacokinetics	**Anatomy and Function of the Human Body** • Structure & function of the stomach & GI tract • Physiology/biology of parietal cells • Digestion • Epithelial membrane /epithelial cells • Autonomic nervous system **Cell Biology** • Introduction to bacterial infections • Microbiology of *Helicobacter pylori* infection **Proteins** • enzymes, role in membrane transport, and drug targets	**Physical and Chemical Properties Relevant to Formulation** • Solubility and solutions • Suspensions • pH and its impact on solubility, partition and buffering • The Henderson-Hasselbalch equation (link to chemistry) • Buffers (also as type of antacid medicine) • Basic polymer properties (polymer characterisation, solubility, swelling & viscosity/rheology) • Solution properties of polymers **Formulation Design and Manufacture of Medicines** • Powders and suspension dosage forms • Rafting agents • Oral solutions • Enteric tablet coating: polymer and pH effects **Practical Pharmaceutics** • Formulation of antacid powders and suspensions for testing in chemistry practicals	**Mechanism of Drug Action** • Antacids • Raft-forming agents • Antiflatulants • PPIs **Fundamental Concepts** • Further molecular structure, functional groups, nomenclature, stereochemistry & molecular properties • Introduction to simple heterocycles (including histamine & H_2RA) and naming **Physical Chemistry & Analysis** *Acid-base chemistry* • Fundamental acid-base chemistry; including dyspepsia based material • Buffers • pH and solubility *Mass spectrometry (MS)* • ^{13}C urea breath test for *H. pylori* **Chemical Mechanisms** • Protonation of heteroatoms • Mechanism of ester hydrolysis (introductory treatment) **Practical Chemistry** • Analysis of antacids (including those produced by students), raft-forming agents and anti-foaming agents	**Absorption** • Local and systemic effects of drugs (e.g. antacids *vs* PPIs) • Acid/base effects, buffers, ionisation, pH partition, diffusion partition theory, lipid permeability, drug solubility and salts. • Inhibition of gastric acid secretion – effect on absorption of other drugs. • Gastric emptying times. • Acid compartment trapping (PPIs) **Metabolism** • Cyt P450 early introduction to primary metabolic transforms. • Cyt P450 inhibition (ranitidine *vs* cimetidine; complex effects of omeprazole on Cyt P450).	• Responding to symptoms of dyspepsia • Differential diagnosis • Health promotion advice with dyspepsia. Role of diet & lifestyle in causing/aggravating /alleviating symptoms • OTC product selection e.g. symptoms, other conditions, drug interactions, choice of products type (drug and formulation), special patient groups (infants -reflux) • Giving advice with OTC and dispensed medicines • OTC – treatment of dyspepsia including distinguishing dyspepsia and MI • When to refer and speed of referral • Antacids, raft-forming agents, H_2RAs, PPIs, Prostaglandin analogues, prokinetic drugs, antibiotics • Symptoms in the mouth – e.g. ulcers, gingivitis • NICE guidance on triple therapy	**Personal Development and Professionalism** • Communication skills • Reinforcement of calculations • Reinforcement of CPD opportunities • Start of reflective portfolio (and link to placements) • Placements – link to module through activities in pharmacies • Independent learning/working independently • Collaborative learning/working in teams • Reading scientific /technical texts • Laboratory report writing • Scientific enquiry / problem solving • Pharmacist as public understanding of science expert **Law, Ethics and Dispensing** • Practical dispensing of dyspepsia- related products • GSL, P and POM • Labelling requirements • Decision-making: product selection; use of drugs in pregnancy

Case Studies: A Hybrid PBL

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- Students will encounter about 25 Case Studies.
- Each Case Study begins with the description by a patient of their symptoms.
- This initiates a series of on-line videos or text based scenarios that students consider in small groups.
- As the Case Study progresses over the week, the clinical and scientific content becomes more complex providing excellent examples of how science underpins the clinical interventions of the pharmacist.
- Each Case Study is embedded in a DMP with lectures providing some of the information required.
- Students work through and debate Case Studies in small groups with staff acting as facilitators of discussions.
- In Year 4, Case Studies increase in complexity with 10 examples being explored across the year and students playing

Case Studies

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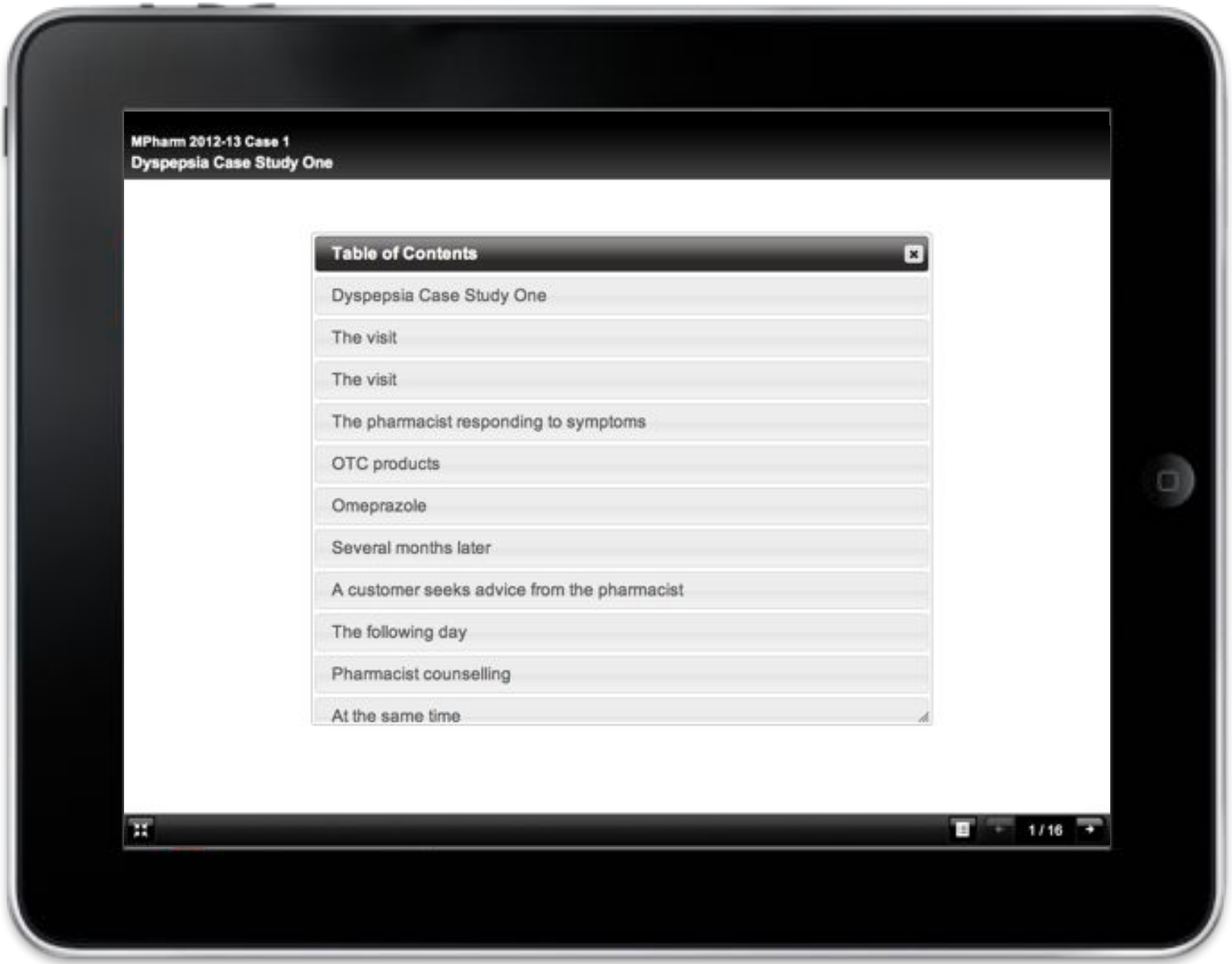

Case Studies

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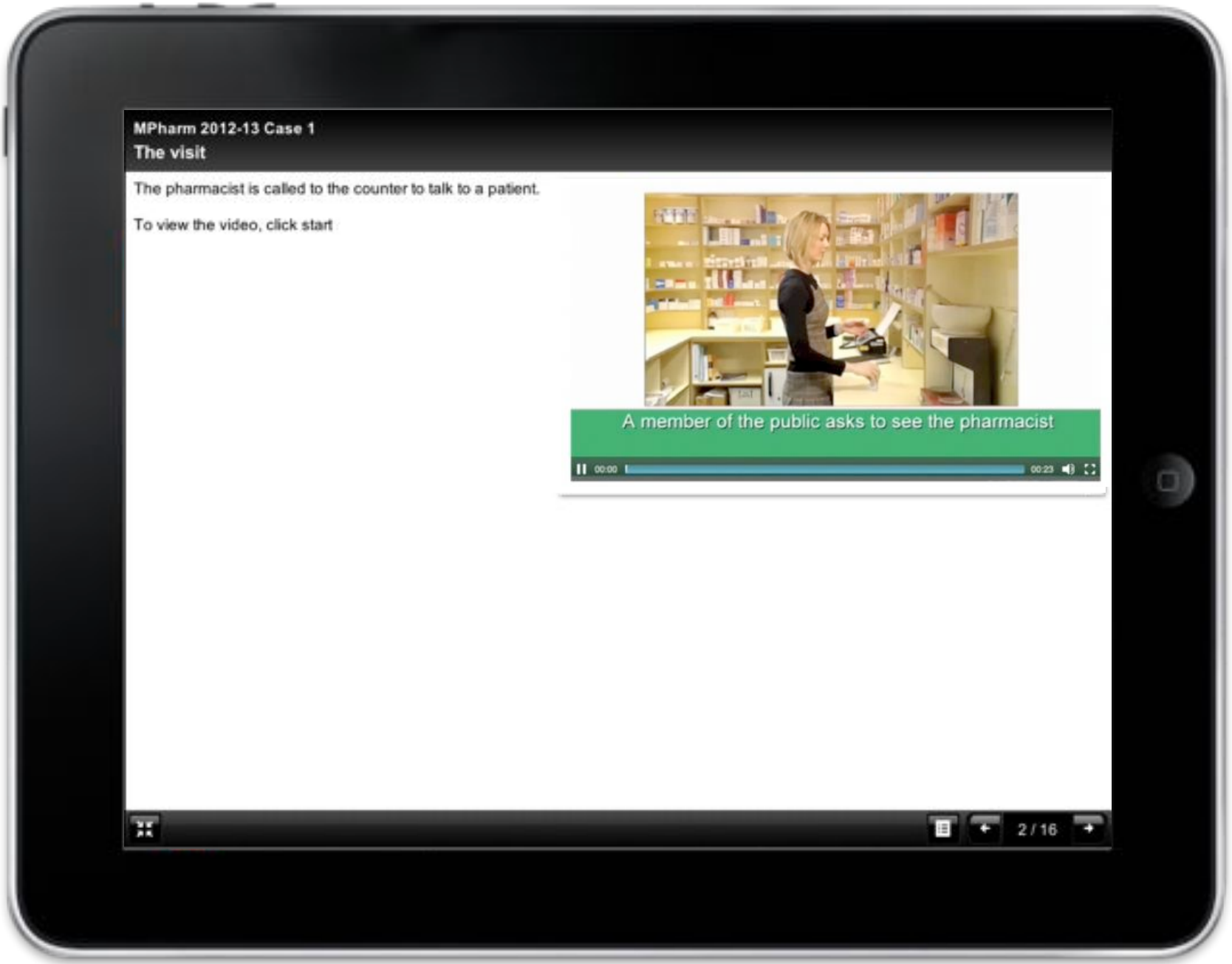

Case Studies

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MPharm 2012-13 Case 1
The visit

Mrs Thomas visits your community pharmacy and complains of 'discomfort' in the chest.

1. What questions should you ask this patient in order to aid a diagnosis?

2. What conditions could she be presenting with?

3. When would you make a referral to her GP?

Case Studies

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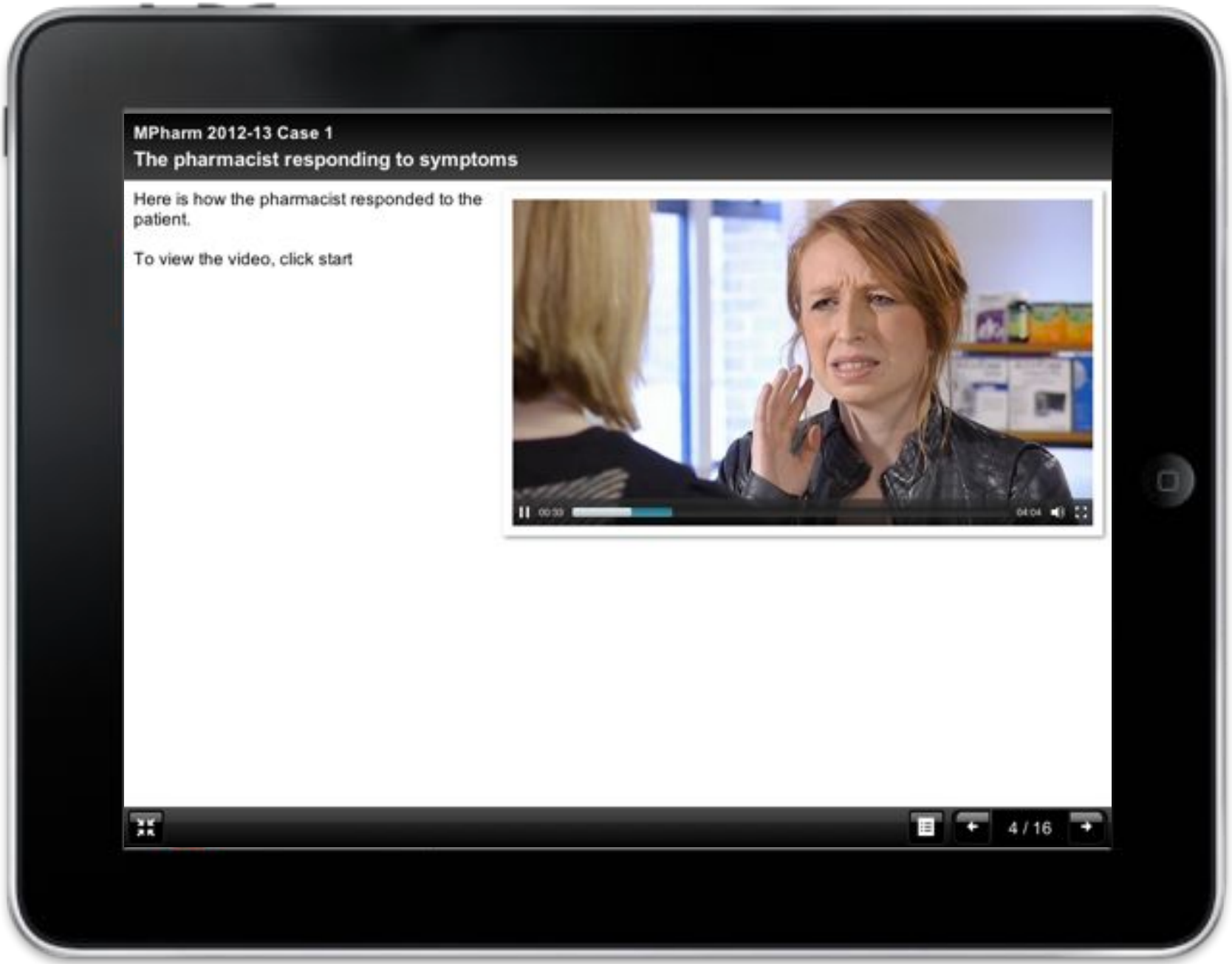

Case Studies

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MPharm 2012-13 Case 1
OTC products

It transpires that Mrs Thomas is a 27 year-old and is twenty weeks pregnant with her first child. She complains of a burning feeling which is made worse by eating and bending forward.

4. Evaluate the consultation, considering each question and the response.

5. Explain why she is experiencing these symptoms.

6. Why do you think that she is taking folic acid?

7. What advice should you give this woman?

8. Here are some OTC products; why did the pharmacist choose Gaviscon? Would any of the other products have been suitable?

Gaviscon | Rennie | Ranitidine | Maalox

Gaviscon is an alginate-based raft-forming preparation, that generally also contains antacid. Here is the Patient Information Leaflet and the Summary of Product Characteristics.

5 / 16

Case Studies

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7. What advice should you give this woman?

8. Here are some OTC products; why did the pharmacist choose Gaviscon? Would any of the other products have been suitable?

Gaviscon | Rennie | Ranitidine | Maalox

Rennies are antacids which generally contain calcium and magnesium carbonates.

5 / 16

Case Studies

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OTC products

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Gaviscon | Rennie | Ranitidine | Maalox

Ranitidine (sold as Zantac) is an histamine H2 receptor antagonist. Here is the Patient Information Leaflet and the Summary of Product Characteristics.

5 / 16

Case Studies

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MPharm 2012-13 Case 1
OTC products

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8. Here are some OTC products; why did the pharmacist choose Gaviscon? Would any of the other products have been suitable?

Gaviscon | Rennie | Ranitidine | Maalox

Maalox is an antacid which contains aluminium and magnesium hydroxides. Here is the Patient Information Leaflet and the Summary of Product Characteristics.

5 / 16

Case Studies

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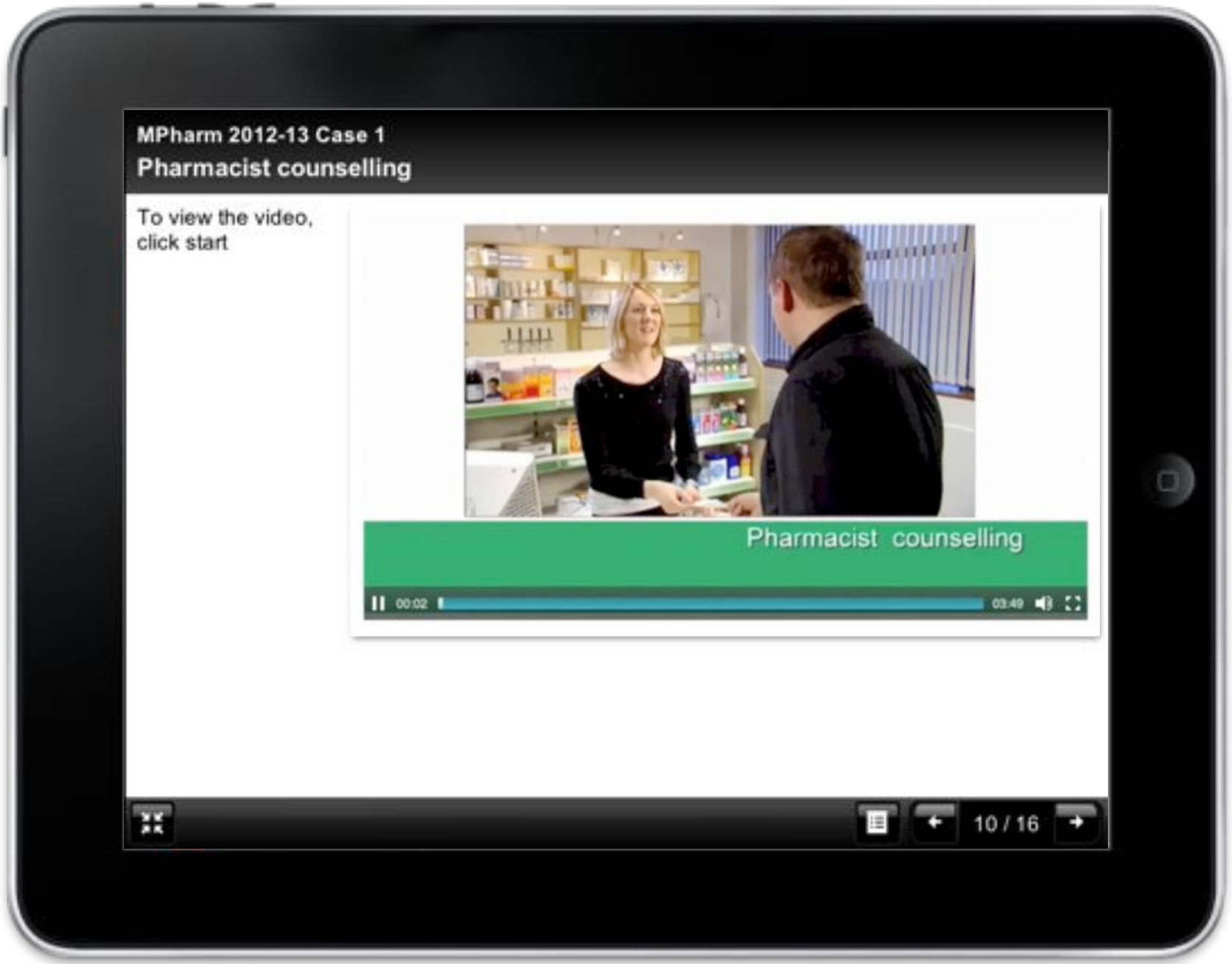

Case Studies

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MPharm 2012-13 Case 1

At the same time

The dad also makes a request for ranitidine (Zantac).

19. What are the issues with the pharmacist's response to the request?

20. What questions should you now ask Mr Thomas?

You are happy for a sale of ranitidine to be made.

21. How should you counsel this patient?

22. How does this drug act?

23. Why is ranitidine preferred to cimetidine?

Case Studies

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MPharm 2012-13 Case 1
Evaluation

24. Evaluate the consultation with the pharmacist.

25. The conversation also considered lifestyle advice, why?

26. The consultation introduced smoking cessation and there was discussion concerning both cessation and 'cutting down'. What advice would you give a patient who is a smoker?

13 / 16

The student & staff experiences so far

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- MPharm I students extremely receptive to and positive about the case study experiences.
- The use of iPads as a delivery medium was very popular.
- Staff time is significant.
- Some mixed experiences with different staff members.
- Need to be cognisant of the "Speedy Gonzales".

- Need to deal with the domineering student/personality clashes
- Need to deal with students taking shortcuts
- Review is critical