

# Analysis and Design of E-learning Module

## Analyse

### Learners – PACT Framework

PACT framework	Consideration	Analysis of learner	Implication for e-learning module
People	Physiological	The learner may be visually impaired	All slides of the e-learning module will have audio narration
		The learner may be colour blind	Avoid clashing colours (eg. Red and green together)
		The learner may have a learning disability or physical condition	The learner will be able to use buttons to move through the e-learning module at their own pace. The e-learning module will not contain any timed activities.
	Psychological	The learner will be a UK medical student.	Medical terminology can be used (instead of lay terms). It will be assumed that the learner has prior knowledge on how to take a patient history. The language used throughout the e-learning module will be English as it is an official language of the United Kingdom.
		The learner may have a short attention span and struggle to concentrate for long periods of time.	The e-learning module should take approximately 30 minutes to complete. The learner will be able to leave the module at any point and can return to the point they were at before by using the contents page. The e-learning module will pose questions to the learner and the learner will need to press a button to reveal the answers – the aim of this interactivity is to increase engagement and concentration.
	Social and Cultural	The learners may be from different ethnic backgrounds	When creating patient cases, use names that are representative of different ethnic backgrounds to improve inclusivity. Where a generic image is needed, choose an image that is not specific to a certain race, culture or community.
		It is not mandatory/obligatory for the learner to complete the e-learning module in order to become a	All parts of the e-learning module are optional. For example, the learner can skip any slides that they do not want to view.

		doctor. However, the e-learning module would be beneficial to complete as the General Medical Council/Medical Schools Council Achieving Good Medical Practice guidance is essential for the learner to know.	
Activities	Learning goals	All learners will be UK medical students. They will want to know what the learning goals of the e-learning module are so that they know whether they wish to complete it.	The aim and learning objectives will be stated at the start of the e-learning module.
	Learning tasks	The task will be used infrequently as it is an optional e-learning module.	It will be a one-off e-learning module, but the learner can complete it multiple times. There will be a contents page so that the learner can find their place again if they choose to pause partway through.
		The brief for the e-learning module was that it should only take 30 minutes to complete, so activities will have to be brief.	The activities will be relatively simple and short. Most interactivity will be in a question and answer format.
Context		As the e-learning module will be accessed online, the learners will complete it remotely. Therefore, we cannot control their physical environment. The e-learning module can be completed at a time and place convenient to the learner.	The learners will be advised of the best conditions to complete the e-learning module in (eg. quiet environment).
		As it is an e-learning module, learners will not be able to interact with a teacher during the session.	The email address of an appropriate point of contact within the General Medical Council will be included at the end of the e-learning module so that the learners can contact them if they have any queries.
Technologies		Devices the learners used to access the e-learning module may vary.	Microsoft PowerPoint will be used as it is compatible with both Windows and Mac. Learners will be advise to complete the e-learning module on a computer rather than a mobile phone.

		The learner may have a poor internet connection.	After it has been downloaded, the learners can complete the e-learning module offline.
		The learner's speaker quality may be poor.	The e-learning module can be used without listening to the audio narration – audio narration will be activated on each slide by pressing a button. Audio narration is there to help those that are visually impaired. Record high quality audio narration (no background noise, clarity of expression, clear voice) so that it is easier to understand on low quality speakers.
		The learners may not be familiar with using an e-learning made on PowerPoint	Bespoke buttons will be used in the e-learning module.
		The e-learning module may be used for years to come and technology may continue to evolve.	A QR code/link to a feedback form will be included at the end of the e-learning module.

## Intended learning outcomes

Choice of verb was influenced by Bloom's taxonomy and blueprinting against the appropriate level of Miller's pyramid.

Learning objective number	Verb	Object	Context
1	Argue	why good communication is an important aspect of professionalism	for medical students
2	Reflect	on the qualities that [make a doctor] a good communicator	[make a doctor]
3	Identify	elements of poor communication	
	And discuss	how poor communication can be improved	in a healthcare setting
4	Describe	how communication style may be adapted	depending on the audience in a healthcare setting
5	Recognise	potential barriers to communication	including in consultations involving Personal Protective Equipment or telecommunications
	and suggest	possible solutions to these barriers	
6	Explain	when a remote consultation is and is not appropriate	in a healthcare setting
7	Explain	the principles of confidentiality	

	And recall	when information can be shared, with who and where	in a healthcare setting
8	Recall	the do's and don'ts of social media use	as a doctor

## SWOT analysis

What is my possible project?	
<p>The brief is to create an online teaching session lasting a maximum of 30 minutes to engage medical students in a conversation about the importance of good communication with patients and those close to them. The session can be in any format that can be delivered remotely – eg. narrated presentation, video, quiz, online workshop, etc. There should be a clear, detailed session plan which includes 3 key takeaway messages for the session.</p>	
Strengths	Possible areas for development
<p><i>e.g. What skills / qualities / resources do we have already that will help? Do we have existing topic knowledge or interest?</i></p> <ul style="list-style-type: none"> <li>All 3 medical students creating the session have previously made e-learning modules, either as part of an intercalated degree or as part of a project in collaboration with a local tutor based within the medical school/School of Biosciences.</li> <li>One of the medical students creating the session has an iBSc in Medical Education – one of the modules for this was on Learning Environments and was heavily focused on the learning theories underpinning e-learning design.</li> <li>One of the medical students creating the session has worked for the patient experience team in a hospital during COVID19, so has first-hand experience of the challenges of communicating with patients whilst wearing Personal Protective Equipment.</li> </ul>	<p><i>e.g. What are we less confident about? What might be our development and support needs?</i></p> <ul style="list-style-type: none"> <li>We will be including information on remote consultations, but we have not conducted any remote consultations ourselves.</li> </ul>
Opportunities	Threats
<p><i>e.g. What opportunities exist or might become available that will help us complete the project?</i></p> <ul style="list-style-type: none"> <li>Our medical school is providing communication skills teaching in early September 2020 focused on remote consultations, with scenarios on telephone, video and email consultations.</li> </ul>	<p><i>e.g. What constraints might we come across to inhibit progress of the project? What factors or people might get in the way?</i></p> <ul style="list-style-type: none"> <li>There are government guidelines and restrictions in relation to COVID19. We plan to record a video to demonstrate poor communication, but dependent on the guidelines, this may not be able to be done in person. At time of writing, two of the medical students creating the session are within the same extended household, so the recording is currently possible.</li> <li>How to ensure that the session is kept up to date – eg. if GMC/MSC guidance alters.</li> </ul>

## JISC effective practice planner

<b>Issues to take into account</b> <i>Many of these issues will be 'given' and you will have to decide how best to work with them</i>	<b>Your situation</b>
<p>Who are your learners?  <i>Consider: number of learners in class, mode of access, any special needs.</i>  <i>Consider also: prior experience (especially pre-requisite skills and knowledge), competences (including learning skills and ICT), motives and goals, preferred learning styles and approaches</i></p>	<ul style="list-style-type: none"> <li>• The learners are medical students studying in the United Kingdom.</li> <li>• They should already be aware of who the General Medical Council and Medical Schools Council are.</li> <li>• They should have prior experience of communicating with patients, though this is more likely for students in clinical years and may be pre-COVID19.</li> <li>• They may have prior experience of communication skills session at their medical school.</li> <li>• They should be competent at ICT and have experience using powerpoint. However, they may be unfamiliar with using an e-learning that was created on powerpoint, so we will need to train them on the buttons we use.</li> <li>• Learners may be more motivated to use the e-learning if it is advertised to them during parts of their course where they are focusing on communicating with patients – eg. communication skills or PPE training</li> </ul>
<p>What are your intended learning outcomes?  <i>Consider: knowledge, skills and values.</i>  <i>If relevant consider also: how these relate to the overall curriculum; any outcomes relating to motivation, learning-to-learn and progression</i></p>	<ol style="list-style-type: none"> <li>1. Argue why good communication is an important aspect of professionalism for medical students</li> <li>2. Reflect on the qualities that make a doctor a good communicator</li> <li>3. Identify elements of poor communication and discuss how poor communication can be improved in a healthcare setting</li> <li>4. Describe how communication style may be adapted depending on the audience in a healthcare setting</li> <li>5. Recognise potential barriers to communication, including in consultations involving Personal Protective Equipment or telecommunications, and suggest possible solutions to these barriers</li> <li>6. Explain when a remote consultation is and is not appropriate in a healthcare setting</li> <li>7. Explain the principles of confidentiality and recall when information can be shared, with who and where in a healthcare setting</li> <li>8. Recall the do's and don'ts of social media use as a doctor</li> </ol>
<p>Where does learning take place?</p>	<ul style="list-style-type: none"> <li>• It will be an e-learning module. It will be accessed either via the GMC/MSC website or could be sent</li> </ul>

<p><i>Consider both taught and self-study elements of the learning. What choices do you have? If relevant consider also: learning advantages and opportunities in this environment</i></p>	<p>to medical schools for uploading onto their respective virtual learning environments (eg. Learning Central).</p> <ul style="list-style-type: none"> <li>• Internet may be needed to access the e-learning module initially, but once open/downloaded, it can be completed offline.</li> <li>• Advantages of an e-learning module include that it can be completed at a time and place convenient to the learner, it is easily accessible, it can be used remotely (particularly helpful with COVID19 restrictions), it is easy to link to other resources or references, the module can be completed at the learners own pace and can be used multiple times.</li> <li>• As the e-learning module will be completed remotely, we will not be able to control the learner’s physical environment. Could advise that it should be completed in a quiet environment to help facilitate good concentration.</li> </ul>
<p><i>What learning technologies are available? Consider: tools, facilities and services available to you and available to your learners. In a blended context, consider both face to face and distance technologies.</i></p>	<ul style="list-style-type: none"> <li>• Microsoft PowerPoint – our University provides us with a license for Microsoft Office, so all creators of the e-learning module have free access to this software.</li> <li>• Our University has a Learning Technology Officer that we could contact if we want training or more information about creating e-learning modules.</li> <li>• The learners may access the e-learning module on different devices and browsers – eg. laptop/computer vs. phone; Windows vs. Mac; Internet browser (Chrome, Microsoft Edge, Safari, Firefox, etc.). We will need to advise that the e-learning module is best viewed on a computer/laptop with the browser on full screen.</li> </ul>
<p><i>What learning resources are available? Consider: resources you prepare yourself and those you or your learners will source from elsewhere.</i></p>	<ul style="list-style-type: none"> <li>• GMC/MSC Achieving Good Medical Practice guidance – domain 3 is on communication</li> <li>• GMC/MSC competition guidance and rules</li> <li>• Other references online – eg. Royal College guidance, articles in journals, etc.</li> <li>• One of the creators of the e-learning module studied how to make e-learning modules during their iBSc in Medical Education – they have access to their notes from this module.</li> </ul>
<p><i>What are the challenges? Do any of the above – or other issues – present particular challenges?</i></p>	<ul style="list-style-type: none"> <li>• Finding a way to include interactivity on PowerPoint to increase learner engagement with the e-learning module</li> <li>• How to control the learner’s environment when they are using the e-learning module remotely.</li> <li>• Creating relevant case examples to illustrate the GMC Achieving Good Medical Practice communication guidance in action.</li> </ul>

<b>Issues to decide</b> <i>Your decisions will be based on the requirements and constraints you have already described</i>	<b>Your decision</b>
<p>What will learners do (learning activity/ies)?  How will this help them towards the outcomes?  Consider the order of activities. Is this important (e.g. scaffolding) or should learners have choices?  Are there alternatives for different levels (remedial or progression activities) and for different learner needs?</p>	<ul style="list-style-type: none"> <li>• The learners will be posed questions and will have to click on a button to reveal the answer. Hopefully, they will take time to think of the answer themselves before clicking the button so that they are engaging in active (rather than passive) learning.</li> <li>• The learners will be asked to watch a video and identify elements of good communication that are missing and consider how poor communication can be corrected/improved.</li> <li>• The learners will be asked to read a case about a myocardial infarction and describe how they would explain the diagnoses and management plan to a patient/carer/relative/friend vs. a healthcare professional.</li> <li>• The learners will be asked to look at photos and identify the facial expression the individual in the photo is making whilst wearing a mask.</li> <li>• The learners will be asked to identify breaches of confidentiality guidance – examples will be including identifiable information in a logbook entry and taking medical notes home in their bag.</li> <li>• The learners will be asked to identify inappropriate use of social media using a fake twitter profile as a case example.</li> <li>• The learners will be asked to complete a quiz.</li> </ul>
<p>How will they be supported?  (How) will learners be supported by a tutor or mentor?  (How) will learners support one another (e.g. peer mentoring; specific roles in collaborative learning)?</p>	<ul style="list-style-type: none"> <li>• Colour blind – the colour scheme will be carefully chosen to avoid colours that would be difficult for learners with colour blindness, such as red and green.</li> <li>• To help learners with visual impairments, all slides will have audio narration.</li> <li>• Learners will be able to click a button to reveal the answer to all questions posed in the e-learning module.</li> <li>• During the quiz, learners will be provided with feedback. Incorrect answers will be highlighted, and an explanation will be given for why the answer is incorrect. Correct answers will be highlighted, and an explanation will be given for why the answer is correct.</li> <li>• If the learners have issues accessing the e-learning module on their virtual learning environment, they should contact their University/Medical Schools' IT support. If the learners have issues accessing the e-learning module on the GMC/MSc website, they should contact the GMC/MSc directly.</li> </ul>

	<ul style="list-style-type: none"> <li>• The email address for a member of staff at the GMC/MSC will be included on the summary slide so that learners can get in contact with them if they have any queries.</li> <li>• The creators of the e-learning module and very happy to be contacted if there are any issues – GMC/MSC competition guidance says not to include their details on the learning materials though.</li> </ul>
<p>How will learners receive feedback? Will feedback come from learners (self or peer), from you, or is it intrinsic to the activity itself? Will there be any formal assessment associated with the activity? How will you monitor learners' progress?</p>	<ul style="list-style-type: none"> <li>• There will be no formal assessment during the e-learning module.</li> <li>• A quiz will be included at the end of the e-learning module to provide the learner with a formative assessment of their learning.</li> <li>• During the quiz, learners will be provided with feedback. Incorrect answers will be highlighted, and an explanation will be given for why the answer is incorrect. Correct answers will be highlighted, and an explanation will be given for why the answer is correct.</li> <li>• To encourage active learning, learners will be posed questions throughout the quiz. If they would like to view the model answers, they will click a button to reveal these.</li> </ul>
<p>What resources will they use? Are these appropriate to the outcomes? Are they accessible to all learners? Are they available and low cost to use?</p>	<ul style="list-style-type: none"> <li>• References will be listed at the end of the e-learning module.</li> </ul>
<p>What technologies will they use? Are these accessible to all learners? Do learners have the skills to use them, and will you be supporting or assessing these skills? What technical support will you need, if any?</p>	<ul style="list-style-type: none"> <li>• All students should have access to Microsoft PowerPoint as most Universities provide students with a license for Microsoft Office. Therefore, they should have access to the e-learning module for free.</li> <li>• The learners may not know how to use an e-learning module created on PowerPoint. We will include a slide at the start of the e-learning module training the learners on how to use it (eg. what each button does).</li> <li>• The lesson plan will advise the staff at each medical school on how to upload the e-learning module onto their respective virtual learning environment (eg. Learning Central).</li> </ul>
<p>What is the e-learning advantage? How will your use of electronic resources or technologies support learning effectively? Consider accessibility, inclusion, motivation, personalisation.</p>	<ul style="list-style-type: none"> <li>• As mentioned previously, advantages of an e-learning module include that it can be completed at a time and place convenient to the learner, it is easily accessible, it can be used remotely (particularly helpful with COVID19 restrictions), it is easy to link to other resources or references, the module can be completed at the learners own pace and can be used multiple times.</li> </ul>

	<ul style="list-style-type: none"> <li>We will try to increase inclusivity by audio narrating all slides and avoiding colours that are difficult for those with colour blindness.</li> </ul>
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## Design

### Storyboarding

See storyboard attached as a separate document.

### Educational theory

Cognitive theory of Multimedia Learning Principle	Slide of storyboard applied to	How it informed our e-learning module design
Multimedia principle	5, 8, 15, 16, 25	Decorative images that are relevant to the slide content will be included, so that the slides don't just contain words.
Coherence principle	All slides	Audio narration will be optional. To hear the audio narration for each slide, the learner must press the 'audio narration' button.
	18	A summary table will be used to summarise the different types on remote consultations and ensure that the information provided is concise.
Signalling principle	2, 3	Subheadings will be highlighted in blue boxes.
	3	The learning objectives will be included to highlight the content that will be covered in the e-learning module.
	4	A contents slide will be included to highlight the content that will be covered in the e-learning module.
	5 - 25	Questions that are posed to the learner will be highlighted in bold text.
	2 - 32	A title will be included in the top left corner of each slide to highlight what content will be covered on that specific slide.
Spatial contiguity principle	2	The images of the navigation buttons and the label explaining the function of each button will be presented next to each other.
	4	For the contents slide, the text and corresponding images will be presented next to each other.
	12, 13	Words within the case example that are related to the term (eg. blockage related to layman's terms) will be underlined.
	17	The answer for which facial expression the individual is doing will be presented directed underneath the photo.
	24	The text boxes including an explanation of where the twitter profile is inappropriate according to GMC guidelines will be presented next to the part of the profile they are referring to, and arrows will be used to enhance clarity.
	26, 28, 29	For the quiz, feedback will be provided on the same slide as the question to ensure that the contiguity principle is not violated.
Temporal contiguity principle	7	There will be a video of a simulated consultation between a doctor and patient. The video will feature both graphics and narration.
Segmenting principle	5, 6, 7, 12, 13, 14, 15, 16, 19, 24, 25	The answers to the questions posed will be presented in separate boxes. This means that the learner will be able to read them at their own pace.

	8, 9, 10, 11, 18, 20, 21, 22, 23, 25	There will be several questions posed on the same slide. However, there will be a separate button to reveal the answer for each question individually so that the learner will be able to reveal the answer to each question one at a time.
Pre-training principle	2	The learners may not know what the buttons of the e-learning module do. We will include a slide at the start that includes images of the navigation buttons and has labels explaining the function of each button.
Voice principle	All slides	All audio narration will be recorded by one of the medical students creating the e-learning module. Therefore, the words will be spoken in a human voice, rather than a machine voice.

Gagne Event of Instruction	Slide of storyboard applied to	How it informed our e-learning module design
Gaining attention	1	Medical students will know the e-learning module is relevant to their learning as the GMC and MSC logos will be displayed, and the title will include reference to the Achieving Good Medical Practice guidance. Bold colours will be used.
Informing learner of the objective	3	The aim and learning objectives of the e-learning module will be stated.
Stimulating recall of prerequisite learning	5	Learners will be asked to recall why good communication is an important aspect of professionalism for medical students.
	6	Learners will be asked to reflect on the qualities that make a doctor a good communicator.
	5 – 25	The learners will be posed questions that they should think about, before revealing the answers.
Presenting the stimulus material	5-25	By clicking the 'reveal answer' button, the learners will reveal the answers to the questions and further explanatory information.
Providing learning guidance	2	There will be a slide on how to use the e-learning module. To guide the learner on how to use the e-learning module there will be images of the navigation buttons with labels explaining the function of each button.
	7, 10, 11, 23, 24, 26, 28, 29	Case studies will be included to help learners to apply the knowledge to scenarios.
Eliciting the performance	7, 10, 11, 23, 24, 26, 28, 29	The learner will be asked to apply their knowledge to case studies/scenarios.
Providing feedback about performance correctness	26, 28, 29	The end of the e-learning module will feature a quiz. The learner will be informed if their answer is correct or incorrect, and an explanation will be given.
Assessing the performance	26, 28, 29	The end of the e-learning module will feature a quiz. The quiz will include a Single Best Answer question and a Situational Judgement Test style ranking question.