Section 1

TEACHING, TESTING AND LEARNING

Co-Authored by Abigail Cole

You learn something every day if you pay attention.

Ray LeBlond

Introduction

The main purpose of being at medical school is to learn. This learning includes a huge amount of knowledge, a wide range of skills (including high-order thinking skills such as clinical reasoning) and the attitudes consistent with being a medical professional. This whole book is focused on learning in the clinical learning environment, of course, but the first section specifically clusters together some submissions, giving a range of different approaches to learning in your spare moments on the wards.

Most of the submissions in this section relate to learning knowledge. Clearly there is overlap with other sections, and we have cross-referenced to highlight this e.g. with the prescribing and data interpretation sections.

The themes within this section include reading around patients whom you see, suggestions involving mnemonics and memory aids, a wide variety of different approaches to quizzes and testing yourself and others, and some suggestions for e-learning/useful websites. These suggestions are not exhaustive. We hope that they will be useful and, indeed, that they may act as a trigger for you to find even more approaches. We have to note that, although the references were correct at the time of going to press, by the time you read this some of the web addresses may be out of date; if so, we have no doubt that you will be able to find and evaluate similar sources.

As people interested in education of medical students, we would like to reflect on some themes that run through these submissions, and some that are less evident. One of the most important concepts that comes through these submissions loud and clear is that of 'active learning', which is a widely used term with various definitions. At its most basic level it involves the student actively engaging with the learning material. This engagement usually, but not always, involves a peer and includes debating, teaching, testing, reorganising information, linking it with other learnt information, and manipulating it and applying it to new contexts. As a concept it contrasts nicely with more 'passive' approaches, such as trying to soak up information by sitting in a lecture and reading the words of a book without actually digesting the contents or the meaning. If you would like to read more, the article by John Spencer (1999) under

101 Things to Do with Spare Moments on the Ward, First Edition. Dason E Evans, Nakul Gamanlal Patel.

Further reading is a good start, and there are plenty of study skills books for higher education (a number of good ones by Stella Cottrell, Tony Buzan and one specifically for medical students by Dason Evans and Jo Brown are listed in Further reading).

There is a great deal of evidence that active learning results in deeper learning – which includes both a better understanding and also better recall of the information learnt. So it is worthwhile thinking about your education and ensuring that you have an active approach. Many of the submissions in this section use peers to ensure active learning (through quizzes, explaining, 'doing', presenting, etc.), and many of the approaches are innovative and fun. Some approaches will be useful on those days when you are feeling more solitary.

Summary

The vast amount of knowledge that you will need to learn as a medical student and a doctor can be daunting. This section provides practical suggestions from other students, graduates and teaching staff on how to learn effectively and efficiently, ensuring active learning and with attention to your own motivation and having fun.

Theme: memory aids and mnemonics

Background

A widely accepted theory, proposed in the 1950s by George A Millar, was that short-term memory can process only seven units of information at any one time. Memory aids work by grouping these units of information, and associating them with an easy to remember word or poem. Often these associations are aided through being humorous, exaggerated or absurd, or with a sexual connotation, because these concepts are easier to remember!

Practising the ability to recall information is obviously key to performing well in exams. However, even in a ward setting, being able to recall information, e.g. the causes of pancreatitis (I GET SMASHED – **I**diopathic, **G**allstones, **E**thanol, **T**rauma, **S**teroids, **M**umps, **A**utoimmune disease, **S**corpion stings, **H**ypercalcaemia/ **h**yperlipidaemia, **E**RCP, **D**rugs) can help aid diagnosis and treatment of a patient, and is well worth getting to grips with early on in your career. Everyone learns information in different ways: although one person may prefer visual representations, another may associate medical terms with a poem; the wide variety of suggestions compiled in this section may be of use to you, but the list is not exhaustive. There are many websites out there where you can find the type of learner that you are, and they make suggestions for the best way in which you may study.

Requirements

Something that you wish to recall, and a piece of paper to write your mnemonics down.

1. Creating memory aids – mnemonics, diagrams and poems

Creating your own memory aids has benefits in both the creating process by which you have to revise your knowledge and being able to use them later on as a device to recall facts.

When revising for exams we try to make our own funny medical mnemonics and try to teach these to our friends. These can be along the same as those that are commonly used in medicine/surgery in different contexts. They can be used throughout medical education, e.g. in anatomy a mnemonic for the carpal bones that I was taught:

- some
- Lovers
- Try
- Positions
- That
- They
- can't
- Handle
- scaphoid
- Lunate
- Triquetrum
- Pisiform
- Trapezium
- Trapezoid
- capitate
- Hamate

Rohit Ghuyre, Medical Student, UK

Note

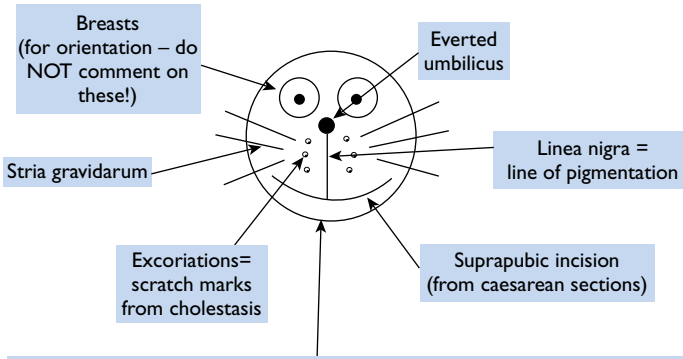
1. If you don't wish to create your own mnemonics, some medical mnemonic books are available.

There are some good mnemonic aids available that are light to carry and can be used for quick revision. Why not flip to the relevant chapter to the rotation you are on and test your colleagues out! This will widen your knowledge and rather than read it yourself puts you on the spot.

Laura Geddes, Medical Student, UK

You could make pictures/doodles that would help remind you of a particular pattern of clinical signs, e.g. a picture of a cat's face might serve as a memory aid to remember which signs to look for during the obstetric exam.

Gaurav Semar, Medical Student, UK



Common diseases including their signs and symptoms and management are put in the form of poetry so that we can recall them quickly. We sit in a ring and write the signs and symptoms, investigations and treatment outlines. Then each one tries to put each item into a phrase and the other completes it … then we take all our contributions and formulate them into one coherent poem which collates all about the disease.

Omayma Aly, Doctor, Egypt

2. Look into the origin of medical terms and diseases

By researching the origin of medical terms this may help relate the words with literal meanings. An example of this is 'diabetes' meaning 'a siphon'. Greek physician, Aretus the Cappadocian, named the condition 'diabetes' and explained that patients with it had polyuria and 'passed water like a siphon'. Knowing the etymology may help to recall this knowledge later on, when put on the spot and asked 'what is … ?'.

Look up the etymology of medical terms – helps remember what they mean.

Duncan Davidson, Medical Student, Columbia

Taking it a step further

Look up the names of eponymous syndromes, i.e. who is Paget? How about Wilson of Wilson's disease? You will find some excellent books on medical eponyms in the library that make easier reading than the internet.

Theme: building quizzes

Background

Repetition is essential for the process of learning to take place. However, sometimes this process can feel tedious, and you may become demotivated, making it difficult to learn. Having more interesting ways to revise material can help improve your learning process. 'Quizzes' can come in all shapes and sizes, and vary from fun 'game' such as exercises, to more traditional question-and-answer-type structures. Quizzes focus on active learning, and require the learner to become engaged in thinking about the task. This may done as part of a group, or you may prefer to study alone; the tasks suggested in the section can be manipulated to suit the way in which you learn best.

Requirements

Material that you wish to revise.

3. Create a crossword

Notes

1. Creating a crossword could be used to learn any material relevant to you.

2. If creating your own crossword is too time-consuming, there are lots of online resources for medical crosswords and other games. Try **www.doctorslounge.com** and search on their website for crosswords. For more e-learning suggestions see the theme 'e-learning resources' in this chapter.

3. For those more technologically minded, you will find plenty of software downloads and websites that will help you construct crosswords or word searches from lists of words.

4. Radiological quiz

Testing yourself and/or others on radiology is really easy with the availability of lots of different images in the hospital catalogues. Make sure that you look only at patients' pictures that are relevant to you or your colleague.

Taking it a step further

1. As a group look at a radiograph and separately write down your observations and ultimately a diagnosis. Each discusses what he or she thought and why, and then confirms this with the radiographer's report. Make a note of anything that you didn't observe on the radiograph, to remember to look out for this next time.

2. Create a template of things that you will look at on a radiograph based on headings, i.e. time, date, rotation, penetration, airways, lung fields, etc. Use this as a checklist for you and colleagues to base your presentation. When quizzing each other on presenting the image, do you comment on all the areas of the template?

See also

Other suggestions around imaging, including Tasks 82 onwards.

5. Study using flash cards

Look up drug names and learn why they are used etc. If you make flashcards these can be carried in your pocket and turned over for the use/drug class and action from the name.

Ruth Bird, Medical Student, UK

Carry Gray's Anatomy flashcards around with you at all times. Use any 'empty' time to quiz your clinical partner on any aspect of anatomy. In 10 minutes you'll be surprised how much you can learn.

Laura Kendal, Medical Student, UK

Taking it a step further

1. Flash cards can be made to have any information on them that you want to learn. Why not create some for signs and symptoms of diseases.

Improve your knowledge of skin lesions – Carry flash cards or images on your phone of common skin lesions (benign and malignant). Most patients, particularly the elderly, will have at least one skin lesion. Try to identify the lesion by taking a quick history and

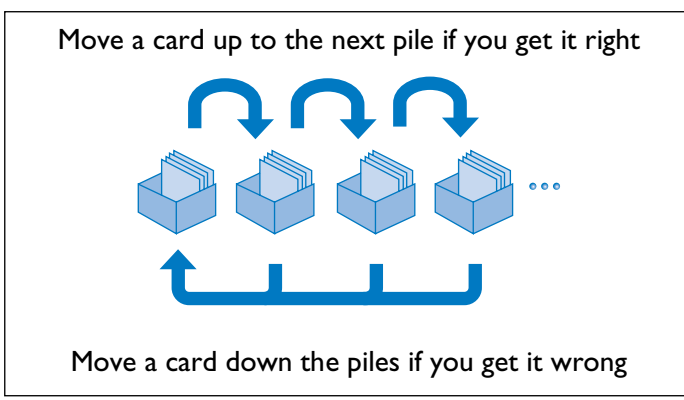
examination. If you come across something you cannot classify this could lead to a further learning opportunity, through independent research. You may even find undiscovered skin cancers.

Sophia Haywood, Work Experience Student, UK

2. Optimise your learning time, and learn specific flash cards for specific learning experiences, e.g. if you are about to watch hip replacement surgery, in the spare 10 minutes while waiting for the consultant to scrub up, refresh your mind on the anatomy of the hip.

Note

To use flashcards more efficiently, a specific method can be employed, to maximise your learning potential. The method works by recalling a fact from a flash card; if you recall the fact correctly you put it into the next pile. If you don't then the card goes back into the pile. You move the cards up and down the piles as you get them right or wrong. Your study can then be directed with the appropriate time allocated to learning each group, i.e. the pile that you don't know so well you may choose to revise every day, and the pile you do know well revise every 5 days.



6. Look up fundoscopy appearance

Look at a couple of fundoscopy slides, found in clinical examination books, and compare your knowledge to what you find in a patient. Even if there is no abnormality, it's good to practice knowing where the optic disc, macula, etc are.

Guarav Asal, Medical Student, UK

Taking it a step further

1. Test a friend by using clinical pictures as flash cards; can they tell you whether this is macular degeneration or a normal eye?

2. Look at clinical examination books for pictures of the tympanic membrane, and learn these along side the technique of using a otoscope (see Section 4).

7. Quiz yourself in theatre

If you are in surgery and you do not have the opportunity to scrub up, or there is no space at the table, take the time to test your knowledge of the surgery.

For example, during a thyroidectomy try to recite everything you know about thyroid diseases. This includes types and prevalence, symptoms, clinical signs, treatment and if possible the examination for it. Once you have exhausted your thoughts look through a clinical handbook for things you have missed. 10 minutes later try and remember them all again reciting them to a partner.

Kayur Patel, Medical Student, UK

Taking it a step further

1. Carry out this task in pairs, with one person trying to recite everything that he or she knows about the disease, and the other checking it in a clinical reference book, then swap over for a different topic.

2. Ask the consultant to talk you through the anatomy that you will be seeing throughout the surgery.

Theme: e-learning resources

Background

Early on in your placements, scout out where you can access a computer and the internet. Hospitals invariably have an education suite for junior doctors, which will more than likely have computers available to students, or even more conveniently have internet access on the wards. With hundreds of medical websites online, varying from tutorials to workshops, to medical games or journals, it really means that even on the quietest day on the wards, there is always something constructive you could do with your time to broaden your understanding and increase your learning of medical matters.

Requirements

A computer with internet access.

8. Websites for information

When I was a foundation year 1 house officer, I found myself getting bored on most surgical nights. As I am not one of those who could sleep their way through the night knowing the bleep might just go off any time, I prefer to stay awake doing something constructive but not too taxing. I would go to **www.emedicine.com** or **www.bmjlearning.com** and choose a module to do. It only takes about 10–15 minutes to update myself on a certain topic and at the end of the module, I get a certificate from the website which I could proudly compile into my portfolio as evidence of my learning! By doing just a few modules, I have never failed to learn something on my nights! Not to mention that it is easier at night when most computers are free and you don't get as many calls!

Saw Sian Khoo, Doctor, Malaysia

www.instantanatomy.net for nuggets of anatomy knowledge in brief, simple style that is good for quick learning and revision. Covers whole body in general.

www.wikipedia.org for lots of information on all aspects of medical science. Good for quick look up of information.

Ravinder Pabla, Doctor, UK

9. Websites for revision

Get to a computer with internet access and log on to **www.joint-zone.org.uk**. It is a website looking at the core knowledge required for those undergraduate rheumatology placements and exams. So no longer will you be wandering the hospital wards for those rheumatology inpatients that don't exist, you will be brushing up on your knowledge, preparing to diagnose that next stiff joint.

Log on to **www.surgical-tutor.org.uk**. It's a great website aimed at those preparing for undergraduate and postgraduate surgical examinations. Great if you are interested in surgery and want to learn more about a specific field, and even better if you just want to brush up on your surgical knowledge and revise. No longer will you be caught out on the surgical ward round during consultant interrogation, and termed for the rest of your placement 'stupid boy!'.

Ashley Simpson, Medical Student, UK

10. Research national guidelines

www.nice.org.uk and **www.sign.ac.uk** for guidelines in management of wide range of conditions with evidence base to justify practice. Easy to search as categorised by topic, speciality and alphabet.

Ravinder Pabla, Doctor, UK

In my recent paediatrics placement the consultants often recommended the junior doctors to check the protocols of certain treatments, for example treatment for a seizing child. Sometimes protocols can differ between Trusts, and hospitals. In a spare 5 minutes check the protocols for the treatment of some of the patients on your ward, or that have been discussed at hand over.

Abigail Cole, Medical Student, UK

Taking it a step further

1. Patient websites are often very good at presenting information in a clear and concise way, and although you may not get an in-depth account of pathology, a brief overview can often be very useful. Try **www.patient.co.uk** and **www.cks.nhs.uk/information_for_patients**.

2. Check out videos of patients with certain diseases to give another perspective on how it can affect their life. Check out **www.childrenfirst.nhs.uk** for the Great Ormond Street Hospital website, which has some useful videos.

3. Enter medical symptoms into **YouTube** to get videos of symptoms and how they can present. An example is croup; this gives some good videos of children with a typical 'barking' cough.

3. Online forums are great places to gain an idea of patients' experiences of certain medical procedures. For example, typing 'ileostomy' into **Google** brings up several forums where the patients' personal experiences of having this procedure is

documented, and is a useful tool as a medical student to have some understanding of the day-to-day difficulties/issues faced by these patients.

4. Professional bodies tend to publish their own lists of guidelines – examples include the British Association for Sexual Health and HIV (**www.BASHH.org**) and the Royal College of Obstetricians and Gynaecologists (**www.RCOG.org.uk**).

Cross-references

As stated in the introduction to this section, there is overlap between this section and other sections of the book; you may wish to look explicitly at the following themes for more tips on learning effectively.

For peer practice of physical examination skills	Section 3
For peer practice of practical skills	Section 4
Using and improving peers as a source of feedback	e.g. Tasks 15, 24, 40
Data interpretation – learning from test results, investigations	e.g. Tasks 79 onward, Section 7
Some excellent suggestions related to prescribing and pharmacology	see Section 5

References/further reading

An introduction to concepts of active learning

Spencer JA, Jordan RK (1999). Learner centred approaches in medical education. *BMJ* **318**:1280–3.

Study skills for higher education, for medical education

Cottrell S (2003). *The Study Skills Handbook*. Basingstoke: Palgrave Macmillan.

Cottrell S (2003). *Skills for Success: The personal development planning handbook*. Basingstoke: Palgrave Macmillan.

Buzan T (1995). *Use your Head*. London: BBC.

Evans D, Brown J (2009). *How to Succeed at Medical School: An essential guide to learning*. Oxford: Wiley-Blackwell.

Mnemonics and memory

Brown M (1977). *Memory Matters*. Newon Abbot: David & Charles.

Miller GA (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychol Rev* **63**:81–97.

What kind of learner are you?

For finding that learning style suits you best try filling in the questionnaire at **www.vark-learn.com**.