A guide for students by students
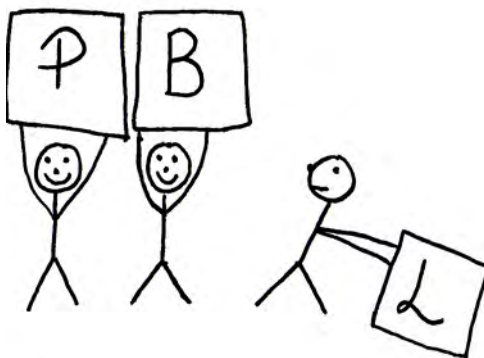
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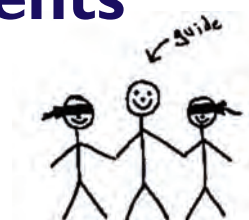
Problem-Based Learning at HYMS

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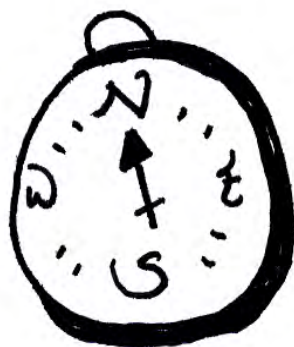
Introduction

"Students should be oriented to the philosophy of problem-based learning, the rationale for its use and their role in a tutorial." **Davis (2004)**

The purpose of this booklet is to give to you an overview of Problem-Based Learning (PBL) at HYMS. As a guide written by students for students our aim is to give to you the basic information needed to go in and 'do' PBL. In addition, we hope to provide an overview of the motivation behind a Problem-Based Learning curriculum, the objectives it is designed to achieve, how it fits into the broader HYMS curriculum and an introduction to group work. It would be helpful if you could read this booklet before the start of term and make sure you have access to it in the first few weeks of your first term at HYMS.

Why to Read and How to use this Booklet

It is commonly held that the transition from conventional teacher centred education to problem-based learning can be difficult. We hope that the information provided here will go some way to making that transition smoother and less daunting. This booklet will be just one of the resources of an 'Induction to PBL' programme delivered by HYMS in your first few weeks at medical school. We suggest that you keep it as a reference source and that you enrich your understanding of PBL by taking some time to pursue the referenced further reading included at the end.

It is strongly recommended that you read the induction material and attend the two induction workshops at the start of term. As students with some experience of PBL we can not emphasise enough how valuable it is to try and understand the reasoning behind it and what results it is designed to achieve. A true understanding of PBL will only come with time and by engaging in the process in class, yet knowledge of the methods and objectives of a PBL course can significantly aid this understanding. Considering the basis for PBL will give you a good foundation to work within its structure and provide you with a suitable knowledge base to handle better any problems you encounter with the process.

This pamphlet is designed as a workbook with areas for you to fill in yourselves. Some of the instructions may at first seem a little tenuous but they should hopefully start you thinking about how to work within and what to expect, from a problem-based learning curriculum. Thought questions are also included throughout the document to give you opportunity to reflect on what you have read and consolidate your ideas. There is no reason why you shouldn't work through this with your class mates or indeed take it with you to the pub. The more discussion you have about PBL the better.

An Introduction to PBL

What is it and where did it come from?

80 Days around
PBL.
Guides Available
here

HYMS

PBL in Context: Reforms in UK Medical Education

The past few decades have seen the beginning of substantial reform in medical schools across the UK and abroad. Problem-based learning, a new educational method, has been proposed as a potential solution to the accepted limitations of conventional medical education and the changing demands made on doctors in the modern world.
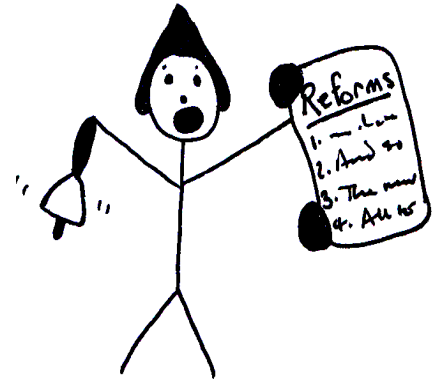
Key Educational Reforms Endorsed by the GMC

1- Reduce 'information overload'. Stop students from learning huge amounts of unnecessary scientific detail that will not assist them in medial practice.
2- Innovate teaching practices by replacing traditional 'didactic' teaching methods with PBL.
3- Make undergraduate education a platform for life long learning. Medical education should reflect the fact that doctors should be able and prepared to continually build on and update their knowledge in accordance with ongoing developments in the field of medicine.
4- Improve students' control over their learning- give them more opportunity to be self directed, to locate what they need to know and give them possession of their learning.
5- Improve doctor's interpersonal skills- train students to be empathic and relate better to their patients.

In short, it is believed that a medical curriculum using Problem-Based Learning is particularly successful in engendering in students the key skills required for the practice of medicine. Before we consider what PBL is, take a few minutes to think about what sorts of skills these may be and write some suggestions below.

1-

2-

3-

Perhaps you mentioned being able to understand and absorb scientific information, or to be able to communicate well? Perhaps you thought that a problem solving ability was important or the capacity to continually learn and take on board new information and assimilate it with your existing stock of information? The range of skills that a doctor needs is very broad, the possession of scientific knowledge being

only one aspect. Doctors must be able to make judgements when faced with uncertainty, to develop the characteristics of a 'lifelong learner', to be able to work both as part of a team and independently.

It was the recognition of the multifaceted nature of these skills and the inadequacies of conventional medical education in efficiently attaining them that led to the development and spread of PBL. The model itself comes from a few medical schools, notably McMaster in Canada, where, more than 25 years ago, they questioned how well traditional preclinical science courses equipped students to become doctors. Information-dense lectures presented by a series of content experts to passive student audiences seemed disconnected from the practice of medicine that required integration of knowledge, decision making, working with others, and communicating with patients. A new system was proposed which made the common problems that people take to the doctor the prime focus of learning. The aim of this method or 'Problem-Based Learning' was that the relevance of the course content would be clear and its application to clinical practice more direct. Of the fifty medical courses within the UK, approximately nine are now using some model of PBL. These include both old and established and brand new medical schools.

Key Points

- Problem-Based Learning (PBL) has been introduced to UK medical schools as part of a broader context of educational reform.
- PBL is designed to improve the efficiency of medical education and to help students develop the wide range of skills needed to practice medicine.
- These skills include the ability to work as a team, make judgements when faced with uncertainty and to develop the characteristics of a lifelong learner.

Questions:
Where did PBL come from and why is it being used in UK Medical Schools?

Overview PBL in a nutshell

" Problem-Based Learning: the most important development since the move of professional training into educational institutions[1]" (Davis 2004)

Each week for the first two years within your PBL group you will study one or more scenarios, usually a clinical problem and decide what information you need to understand and possibly resolve the problem. Once you have identified the nature of this information you draw up a set of learning objectives for the group and use the next few days before the second meeting to undertake the learning required. At the second meeting you bring the results of this private study back to the group for further discussion. The days until the next meeting you use to pursue further any learning difficulties located in the previous session.

The goals of these sessions are to use both the materials provided by HYMS and the group as resources:
The materials (usually a scenario) should aid learning by:
   1- Stimulating interest, thought and discussion.
   2- Providing a realistic context for learning.
   3- Activating, elaborating and restructuring existing knowledge.
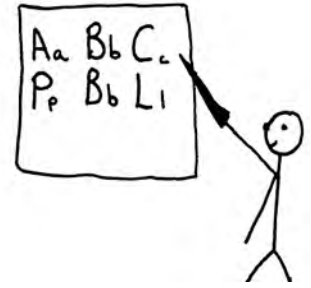
The group is equally as valuable as a resource and should aid learning by:
   1- Facilitating the sharing of knowledge.
   2- Stimulating reflection.
   3- Providing a pool of different skills of the group members to be drawn out and utilised.
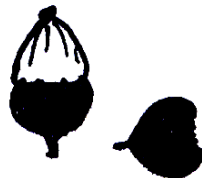
Problem-Based Learning: A Closer Look

Having provided an overview of PBL we shall look now in more detail at its most important features.

Defining PBL: An educational approach where the problem comes first and learning is conducted in a context

The defining feature of PBL is that it reverses the traditional approach to teaching and learning. The idea is that the starting point (rather than end point) for learning should be a problem that the learner wishes to solve. The aim however is not primarily to **solve** the problem, but rather to get students themselves to identify and search for the knowledge that they need to obtain **in order to approach the problem.**

For example
 If you were presented with a case where a 'virtual patient' has had a heart attack, the idea would not be for you to work out how to treat the patient, but to see what knowledge you would need to understand the condition. You may need to know how the heart works, where it is and what it does. By looking at its normal form and function and filling these gaps in your knowledge you are then in a position to consider what could go wrong and what the outcome would be.

The reason this is different to normal school or university education is that usually you are not presented with a problem until you have the knowledge to solve it. Think for instance of questions at the end of chapters in text books. You read the chapter and only then are provided with a set of questions which require you to apply the knowledge gained from your reading. You know that what you need to solve the questions is contained in the chapter and the test is to **apply** your knowledge.

The problems or cases you encounter in PBL may not be resolved, but this is not crucial to the process. Contrary to what you may expect it has been shown that the methodology does not actually improve problem solving abilities. The function of the cases is to enable students to realise the gaps in their knowledge and to stimulate them to direct their learning towards filling these gaps. What matters is that the learning has been encapsulated within the problem and a context has been provided to draw out the required learning. The method follows the principle of adult learning which proposes that learning works best when related to a task that the learner considers to be important and relevant to their lives.

Questions:
Provide a definition of Problem-Based Learning.
How does PBL differ from conventional school education?

Problem-Based Learning at HYMS: The Guided Discovery Model

Where the name **Problem**-based learning has caused some confusion and misunderstanding a further source has been the fact that there is not one fixed model of PBL. It refers to a continuum of teaching approaches based around this central idea of the problem coming first rather than a set or immutable approach. Amongst these models, two extremes of approach are called Open Discovery and Guided Discovery.
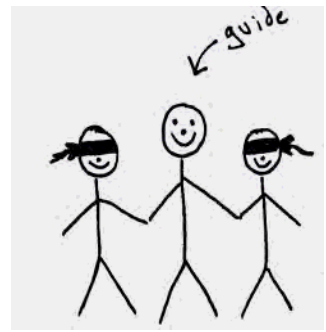
In the Open Discovery model, the outcomes that the students derive from the cases become the outcomes for the course as a whole and form the basis of the assessments. In the Guided Discovery model, students are guided either by staff or written material to the outcomes considered important by the staff.

HYMS has adopted the Guided Discovery as its model because it is most favoured by current thinking on the subject. In addition it provides more assurance to both staff and students that the correct outcomes are being identified and studied. As a result there are clear outcomes expressed for the course as a whole and for each block within the course. Your task when confronted by a new problem is to define the learning outcomes required by that presentation which are part of the outcomes prescribed for the block. Assessment is based on the block learning outcomes.

Illustration of the differences between Methods

The guided Discovery Model

You are presented with a case reporting on the uptake of breast cancer screening in certain UK regions. Your PBL group may think that the incidence, aetiology and pathology of breast cancer may be relevant to the weeks learning. Others in the group may note that perhaps how the statistics are calculated, what screening is and how it is rationed are relevant.

A way of mediating what learning the material is triggering is to look at the block outcomes and ascertain whether either statistics or the breast are being studied in this block. You may note that there is no mention of breast anatomy or pathology but a few outcomes relating to basic medical statistics. You would thus set the latter as a learning objective and defer investigation of the breast for a later date.

The Open Discovery Model

On an open discovery model there are no block learning outcomes written for you, it is the students' job to write these themselves as they progress through the course. In this model students may thus decide on either statistics or investigation of the breast as learning objectives after discussing their learning needs.

As you will hopefully see the process of learning is the same but the guided discovery model offers a skeleton of guidance and structure that the students work within. In the open discovery, the students decide on this skeleton themselves.

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Key Points

- Problem-Based Learning is an educational method.
- PBL has two defining features: The problem comes first and learning is conducted in context.
- The aim of the cases used in PBL is not to get students to solve the problems they illustrate, but to get students themselves to identify and search for the knowledge that they need to obtain **in order to approach the problem.**
- There are many strains of PBL. At HYMS you will be using the Guided Discovery Model.

Questions
1-What is the purpose of the cases/ scenarios used in PBL?
2-How does the Guided Discovery Model differ from the Open Discovery Model of PBL and which strain does HYMS use?
3-Explain how your PBL group and the materials provided by HYMS can be used as resources.

Problem Based Learning is NOT:

Case based learning
Cases are used to start the process but the emphasis not on the specific case but on the problems that students identify as they try to understand the case.

Clinical-Problem solving
It may improve ability to solve clinical problems but emphasis should be on the gaps students discover in their knowledge and skills and how these can be remedied.

Being taught
The aim is to allow students to learn for themselves not be given formal tuition. The facilitator facilitates discussion and learning rather than leading it.

Logistics: When and how does it all happen?

Hopefully by now you should have grasped the theoretical fundamentals of PBL. The aim of this next section is to draw you a clearer picture of how the theory translates into practice. The roles of PBL players will be described, the weekly PBL cycle outlined and the seven steps of the PBL process explained.

Your PBL Group

- PBL involves teaching in small groups of 8-10 students. You will be allocated to a group at the beginning of the year and not normally allowed to change for the duration.
- One facilitator is allocated to each group, again, for the entire year. The facilitator does not change as their secondary role is as your personal advisor and consistent contact is essential to building a relationship with them.
- The effectiveness of the group depends on all its members and thus attendance is compulsory. Failure to attend less than 80 per cent of the sessions will lead to referral to the Academic Progress Committee.

More information on being part of a group follows at the end of this booklet.

The PBL Weekly Cycle

The HYMS 'PBL week' for first year students starts on a Thursday. This is because the clinical placement is on a Tuesday and therefore aside from Wednesday's Special Studies Module (SSC), the clinical experience ends the week's work. The advantage of ending the week this way is that the placement serves to summarise, cement and contextualise your work in a real clinical context.
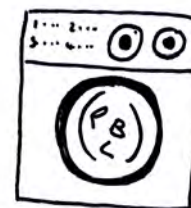
Within the week you attend 2 PBL Tutorials, each lasting 1 1/2 hrs. PBL follows seven steps over two sessions. These steps are outlined more fully in the next section.

In the Year 1 timetable these sessions will take place on Monday and Thursday afternoon. In outline, the weeks study for PBL is conducted as follows:

Thursday PBL (Steps 1-5)	Meet new virtual patients, identify learning outcomes.
Thursday- Monday (Step 6)	Private study in relation to these outcomes using a variety of learning resources such as plenary and resource sessions, biopractical, self directed learning, clinical skills and clinical placement sessions
Monday PBL (step 7)	Reconvene in a group- identify and test conclusions reached, identify any outstanding issues or uncertainties.
Monday- Thursday (Step 7)	Further private study relating to Monday's session.
Thursday PBL (Steps 1-5)	Review any outcomes, review clinical placement, reflect on working process. See next patients

The Who's Who
of PBL
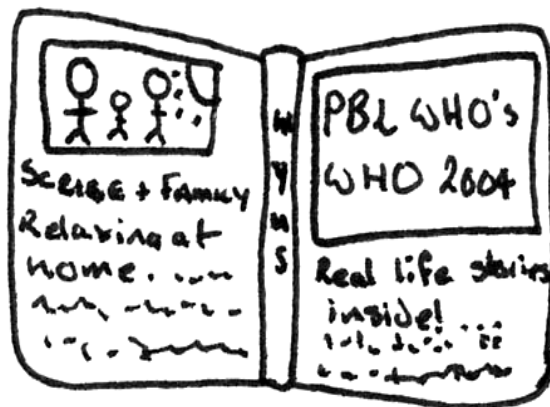
The Who's Who of PBL
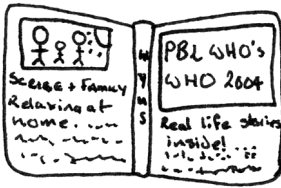
The Facilitator

The facilitator is usually a doctor or professional with a link to health care that joins the group at each meeting. As noted earlier, groups keep the same facilitator for one year.

The role of the 'Facilitator' is to facilitate group discussion, create a healthy environment that allows all members to contribute to discussion, provide feedback and monitor the group's progress. The facilitator is not there to provide easy answers and it will be of no benefit to the group to try and obtain the week's learning objectives from them. For PBL to be effective students need to arrive at the objectives themselves and bypassing this part of the process will only be detrimental to your learning, no matter how tempting it is.

Where the facilitator is present not to teach you but to assist the group in learning for themselves, you may find them guiding you towards the depth and breadth of a subject. Instead of telling you what you should be learning they may guide you towards recognising it yourself with statements such as; 'Are there any other aspects of the case we need to discuss?' or 'Does that comment sufficiently explain this part of the problem?'

The facilitator is as much a member of the group as anyone else and it is important that students feel able to reflect on the facilitator's role and contribution. If for example, the group feels that the facilitator is leading the discussion too much or it is dissolving into an hour long lecture, it is important that the students diplomatically raise their concerns. Openness and honesty is a vital part of group dynamics and failure to raise issues can lead to discord and poor group dynamics.

At HYMS, your PBL facilitator also acts as your personal advisor for the year and a first point of contact for any academic or personal problems or concerns you may have. Usually this arrangement works very well and groups build up a close and strong relationship with the facilitator. At the end of each term you will have a progress review with the facilitator where together you draw up an Educational Prescription of skills or tasks you would like to achieve in the next term. Close contact with your advisor through PBL puts them in a good position to be able to

advise on your performance and progress. In addition to providing academic advice and support you will find that it is common practice for facilitators to attend PBL Group social activities. Do not be surprised if you find that the facilitator has greater stamina at these events than the rest of the group!

Job Description of the Facilitator

- Models behaviour that the student will adopt
- Promotes student interaction as a group
- Guides the groups learning
- Motivates the students to learn
- Monitors the progress of each student in the group
- Monitors attendance
- Provides feedback to management/ planning group
- Helps students to identify learning resources
- Provides support and a first point of contact for academic or welfare problems.

Top Tip for Students Working Alongside a Facilitator

Remember that the facilitator is a member of the group as much as anyone else and it is important that they are included in both academic and social discussion within the group. Facilitators who obey the rules of PBL and respect the autonomy of the group by not interrupting can end up feeling excluded. This is wasting a valuable resource so try and involve them by showing appreciation if they make helpful comments and invite them to contribute if you think it might help. This does not mean getting them to tell you the answers but inviting them to join in the process. When you discuss how the group is functioning or how the process has been running, ask their views on it too. They often have a fresh and valuable perspective to contribute.

wallflower!
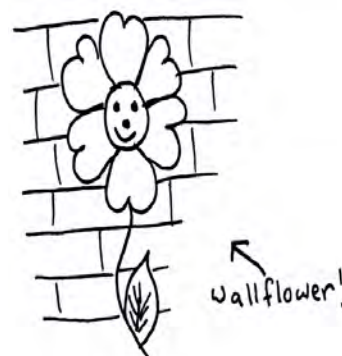
The Scribe

Students rotate the role of scribe each week. The function of the scribe is to write an account of the group discussion on the white board and to order ideas and problems as they are raised. The scribe has to pay close attention to what the group is saying and keep a good record so no discussion is lost and wasted. The challenge for the scribe is to ensure that as well as writing down discussion, they are contributing to it.
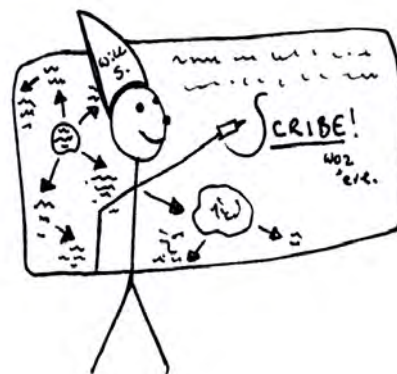
 A good scribe tries to be objective about what is being said and not ignore ideas and thoughts in favour of their own ideas and agenda. The account kept must be a true account of the whole group's discussion. Sometimes the group can go too fast and the scribe cannot keep up. If this happens it is important the scribe speaks up and asks the group to slow down. At the end of the first PBL meeting it is the scribe's responsibility to write up the group's learning objectives on blackboard. There is an area specifically allocated for PBL outcomes. As students gain more experience of scribing they will find that it becomes easier to group and organise ideas on the white board and this in itself will aid the efficiency and direction of the group work.

Job Description for Role of the Scribe

- Listens carefully
- Notes down ideas and concepts even if apparently trivial
- Organises the notes by categorizing concepts
- Checks the accuracy of the notes with other group members
- Continues to contribute to the group
- Posts the learning objectives the group has decided upon on blackboard after the session.

Top Tips for a Scribe
1- When the group reflect on the process at the end of the session try and persuade the others to give you feedback on how useful your work as a scribe has been. This is the best way to improve your scribing skills and the performance of the group as a whole.
2- Don't try to write down everything word for word. This will slow the session down too much. Try and develop a succinct way of making clear notes on what has been said. It should seldom be necessary to write a complete sentence.
3- Do not be afraid to tell the group to slow down.

The Chairperson

Like the role of the scribe this position should be rotated weekly between the group members. It is important that everyone has a chance at experiencing the role of chair. It is more than likely that at some point in your career you will be required to chair or run some form of group discussion. The skills you can develop from chairing a group at this early stage in your education could be invaluable.

Chairing a group can be quite daunting at first so outlined below are a few directives that should help you grasp the nature of the role.

1- **Agreeing the process for the group.** It is the chair's responsibility to ensure that all group members have agreed on how the session will be run, what tasks need to be achieved, what time is to be kept, what breaks will be taken, how discussion will be conducted and so on. For example, if there are more than two cases to cover, rules may need to be set about how long is going to be spent on each. Ground rules such as only one person to speak at a time or no business other than the task in hand to be discussed outside of the breaks are common process issues.

2- **Introduces the case for discussion.** It is important that all group members know what is to be discussed. If the chair spends a few moments introducing the case it is often effective way to set the tone for discussion and focus the group on the task. Try and motivate the group members during the introductory discussion and be sure that everyone is interested and ready to begin.

3- **Invites Participation.** You will find different group members contribute in different ways and to different degrees than others. It is the chair's responsibility to ensure that everyone is involved and feels able to contribute. It is good practice to encourage or draw the quieter members into the discussion and to ensure that they have opportunity to speak. Sometimes it can be difficult to quieten the louder members but do remember that this is your job and you do have a license to diplomatically call them to order. If people respect the rules of the group and process they should not take it personally. Remember also the presence of the facilitator and the point made earlier that they should not be made to feel like a wallflower. The chair should be ultimately responsible for involving them. Sometimes the problem is not getting people to talk more, but to talk less. Sometimes the discussion can move off onto tangents or dissolve gossip. If you set an example and do not go down this road yourself it will be easier to bring the group back on track.

4- **Stimulates and Summarise.** The chair should ideally try and keep the group interested, motivated and stimulated. Remember that it is more fun to be in an upbeat than perfectly serious group. The more involved and interested people are in the case and the discussion, the better it will be. Keeping people on the point can also prevent boredom and distraction setting in. As well as stimulating the group, the chair is required to summarise. Regular short and clear summaries of what has been said can help to keep people interested, stimulate new ideas, deepen discussion and create an opportunity for the group to recap and ensure that the content of preceding discussion has been correct.

5- **Elaborates or reformulates discussion.** When opinions or ideas have not been clearly formulated or expressed it is important that those who voiced them are encouraged to elaborate. Try to reflect back to people your understanding of what they have said in order to provide them with opportunity to clarify or expand on the point they have made. Saying things like "Can I just clarify that you meant this…" "Would you mind expanding a little on that point"? Elaborating or reformulating discussion helps keep to the subject, deepen and stimulate discussion and also to illustrate that you are listening. Many ideas need coaxed out of people and being a good chair means the ability to assist people in expressing and clearly formulating their ideas. If the discussion seems to be stuck in a rut, paraphrasing or rewording the topic at hand can help group members seek new direction in the same topic area. Always check that the reformulation is a reflection of the discussion and that everyone agrees with the content. This is essential to ensuring that everyone knows what is being discussed and that people are not at cross purposes.

6- **Oversees the timekeeping.** It is very important that the group uses their time effectively. Sessions should not run over the full hour and a half as students will become disinterested and annoyed. Use summaries to clarify where the group has got to and what they need to cover in order to move the group on. If the group appears tired or frustrated a five minute coffee break can be a very effective way of increasing the performance of the group. It is your responsibility to monitor how the group are progressing and issue a break if or when one is needed.

7- **Monitor and pass observations on the process.** Sometimes the group can get very involved and it may require the chair to pass observations on how the group as a whole is functioning. Say what you see happening in the group, notice patterns such as 'everybody is talking to me' or 'everybody is trying to talk over each other'. The chair should also pass comment if they notice any problems developing. For example if people seem to be annoyed

with one person who is always talking too much then drawing this to the groups attention can prevent problems developing. Passing comments on the 'here and now' of the group and generating discussion about group dynamics can prevent members from arguing about the content of the cases when there are really other issues bothering them.

8- **Propose evaluative comments on the group's performance and your own as chair for general discussion**. As chair you should evaluate the session both during its process and at its close by asking open ended questions such as "How does everybody feel about what we are doing and the way it is done?" or: "Is everybody satisfied with our progress?" Asking the group to provide feedback on how you performed as chair will be very useful for how you progress in this role.

9- **Structure the session by bringing it and the stages that comprise it to a conclusion.** Providing a commentary on where the group is within the process and checking with group members that each step has been satisfactorily concluded helps structure the session and ensures that all members agree with any conclusions made.

Job Description for the Chair
- Agrees the process for the group
- Introduces the case for discussion
- Invites participation and ensures that everyone is contributing equally and that no one is too quiet or too dominant
- Stimulates and Summarises
- Elaborates or reformulates the discussion.
- Oversees the timekeeping and moves discussion on where necessary.
- Monitors and passes observations on the process.
- Proposes evaluative comments on the group's performance and your own as chair for general discussion.
- Structures the session by bringing it and the stages that comprise it to a conclusion.

Top Tips for Successful Chairing
- Try and find a balance between keeping people focused on the task and keeping the session fun. This can be a challenge but produces the most enjoyable and productive working environment.
- Read the cases before the session. This will give you opportunity to estimate the time needed for each case and to be prepared for leading the group into discussion.
- Set an example: If you believe it is important that the group members say what they want to say, take the first step and say what you think and feel. This can stimulate others to say what they think and express their feelings as well as their thoughts.

Everyone Else:
The Adult Learner and Group member

"Although successful discussion of a PBL case in a tutorial has been attributed to several factors including the flow and design of the case and PBL tutor skills, the key for successful PBL discussion remains in the hands of the students" **(Patel 1999)**

Although the chairperson will try to regulate the process of the meeting, each individual group member must recognise their equal responsibility to contribute as fully as they can. PBL works exceedingly well if all group members are committed to the task and the process but problems can occur if some students are disengaged or not contributing properly. Being a member of a group can be a rewarding but sometimes difficult role. It is important to try and develop the habit of regularly reflecting upon your own contribution to the group. No matter how hard you prepare yourself academically for the PBL sessions, the work you do will only pay off fully if you and the rest of the students on your tutorial are functioning as a unit.

Key Points for Group Members
- The success of each meeting is the responsibility of all the group members.
- All group members must respect the roles of the scribe and the chair and assist them in their roles.
- The group should be about shared ownership. Try and keep a balance between dominating the discussion and sitting on the sidelines saying nothing. Neither of these positions will help you or the group.
- Students should not be shy to contribute ideas, especially during the brainstorming session. All ideas are equally valid. Even if an idea or answer is refuted the act of discussing and refuting it is as valuable as an answer whose validity was accepted.

"Problem-Based Learning is an educational approach that is particularly designed for active self directed learners, something that doctors are expected to be throughout their professional lives" **(Patel 1999)**

As well as being a group player all students will be expected to develop the characteristics of an 'adult' learner. Given the emphasis on self directed learning within the course, many students may find the need to re-evaluate and modify past learning techniques and strategies. It is difficult to provide an estimate of how much private or additional study students should aim to do on top of scheduled classes. Different students have different learning capacities, strengths and weaknesses. It is suggested that a minimum sixteen hours a week private study will be required but that could vary according to the student. An important challenge is to identify your own learning needs and experiment with the techniques and time that will enable you to address them.

Problem-Based learning encourages students to take charge of their education. It emphasizes critical thinking skills, understanding, learning how to learn, and working cooperatively with others. Having to decide what to learn and how to learn it can be difficult at first, but developing an active and independent learning style is essential for a career in medicine. It is rare that medical graduates will find supervisors with the time, inclination, or knowledge to tell them what to do and thus it is essential that they are able to assess and meet their own educational needs. The Problem-Based Learning model also enables students to develop other skills. On completing your training you should be able to:

- Clearly define a problem
- Develop alternative hypotheses
- Access, evaluate, and utilize data from a variety of sources
- Alter hypotheses given new information
- Develop clearly stated solutions that fit the problem and its inherent conditions, based upon information and clearly explicated reasoning

These skills will prepare you well for the realities of a career in medicine and especially, for the explosion of knowledge which gluts the field today.

Top tips for Self Directed Learners
- Be patient with the adaptation process and recognise that it may take you some time to settle in fully to group work and self directed learning.
- Do not be afraid to try new learning techniques. If you have problems it is often more productive to rethink ones approach to study rather than the suggesting the course is redesigned! If your old study methods produced results at school it may be tempting to pursue them even in face of evidence that they don't deliver.
- If you fall behind with work on a PBL course it is very difficult to catch up. It is certainly not possible to survive by cramming a few days before the exams so try and develop and consistent and disciplined timetable for your study. It will help you in the long run and make the weekly work more enjoyable.
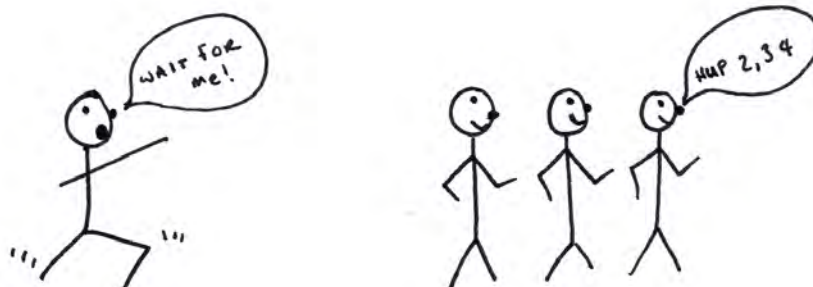
The Seven Steps of PBL

The 7 steps of PBL.

Having hopefully now provided you with an understanding of the objectives and logistics of PBL, we introduce now the 'Seven Steps of PBL'. To illustrate these process steps we have written a short PBL case and shall explore each one giving sample dialogue from a PBL group discussing the case. We have made the case as short and simple as possible so do please note that it will not exactly mirror the detail of those you will encounter in class. It is also a guideline, its function to illustrate the **PROCESS** rather than the exact content of a PBL session. The dialogue we have included is thus only a very small sample of the sort of discussion that occurs at each step and is far from comprehensive. In the first workshop you will see a video of second year students performing a mock PBL session using this case. The aim is to reinforce what you will read here and give you opportunity to raise questions about particular parts of the process that you may not fully understand by reading about them.

The Process Steps

1- **Read out the problem and identify and clarify words and phrases that are unknown to you.**

2- **Define the problem or problems.**

3- **Using the problem list brainstorm possible explanations.**

4- **Arrange explanations into tentative solutions.**

5- **Define the learning objectives needed to test the validity of your explanations.**

6- **Members of the group go away and study privately using all sources of information available.**

7- **Share the results of your private study with the rest if your group. See how far your explanations are justified and what further knowledge is required. Cite the resources used.**

The Seven Steps of PBL

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Example of a PBL case

Mrs Khan rings up the surgery about her husband. She sounds anxious and reports that he was complaining of indigestion but she thinks it may be something more serious. His pain has been getting progressively worse and now he is suffering from persistent crushing chest pains which radiate down his left arm.
Mr. Khan is a regular patient of yours and you know he suffered from a myocardial infarction a year ago and is currently on a waiting list for a coronary artery bypass.
You advise Mrs Khan to call an ambulance immediately and to inform the paramedics of his conditions.

</div>

Step 1 – Clarify Unfamiliar Terms

Aims
- To engage all members of the group
- To focus students on the task
- To start the process of learning
- Encourage clarity in the use of language and technical terms, an important medical skill.
- Reading out loud ensures slower readers are not left behind.
- Provides a definition for any term whose unfamiliarity is an obstacle to group work.
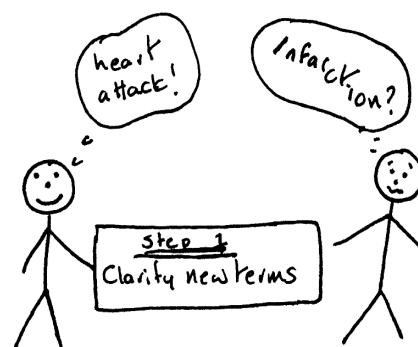
Process
Read out the problem and identify words whose meanings or pronunciation are unclear. They can be looked up directly in a medical dictionary and the prior knowledge of the whole group should be pooled. If they remain unclear they become a learning objective.

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Example Dialogue
Student 1- Does any one know what an infarction is?
Student 2- Isn't it something to do with a heart attack?
Student 1- I'll look it up in the dictionary.
Student 3- I know something about that. It's the death of a segment of heart muscle which follows interruption of its blood supply. What the patient experiences is a heart attack.
Student 1- I don't fully understand that so can we make that a learning objective?
**Chair-** That sounds like a good idea.
Scribe- So I'll write on the board 'Be able to define and understand what a myocardial infarction is.'
All- Yes, thank you!

</div>

Step 2- Define the Problem or problems

Aims
- To define the task ahead and further engage the whole group in it.
- To stimulate intrinsic interest and curiosity.
- To encourage people to think deeply rather than just memorise.
- To broaden the horizons of the discussion.
- To provide a crude framework and starting point for the rest of the discussion.
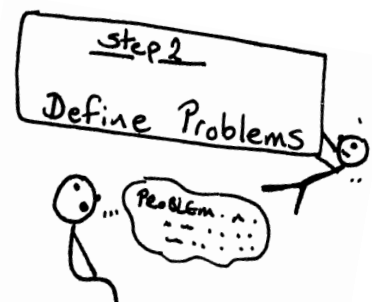
Task
Ideally this should be a fast moving and involved analysis where the group contributes their views and thoughts to problems under discussion. In the HYMS system this step is always defined in terms of the diagnostic problems with which the patient presents. A problem in this sense is anything relevant to the care of the patient and may include social or psychological issues as much as biomedical ones.

It is important that you feel comfortable to raise whatever points you feel relevant and not be inhibited by thinking there is a right and wrong answer. Each student will have a different perspective on the problem, all of which being equally valid. The pooling of ideas will stimulate others and allow comparison and discussion which is an essential part of the process. The result is a list of problems to be discussed in the next stage. Note that this 'problem list' should not be a definitive list of learning objectives but rather a list of problems to form the basis for further discussion. The problems should be taken from all aspects of the case: normal form and function, aetiology, disease presentation, epidemiology and psycho-social aspects.

Example Dialogue

Chair: Can anybody suggest any problems?

Student 1: Mr Kahn's history of a myocardial infarction sounds like one.

Student 2: Yes, and the pain he is feeling in his arm.

Student 3: What about his being on a waiting list, that implies there aren't enough operations to go round at the minute?

Scribe: Perhaps, but its not really a clinical problem.

Chair: But remember we should be looking at all problems relating to the case even if they are social or economic.

Scribe: Yes I think you're right, so shall we just say that the need for a waiting list is a problem?

Student 1; That sounds like a good idea. The fact that he is suffering from indigestion is one too.

Student 2: We don't know of he is suffering from indigestion or his wife just thinks he is so why don't we reword it to 'Mr Kahn's complaints of indigestion.'

Student 3; What about why the pain is in his left arm?

Chair: Perhaps that would be more appropriate when we move onto step 5 and draw up the learning objectives?

Step 3- Brainstorm possible hypotheses of explanations
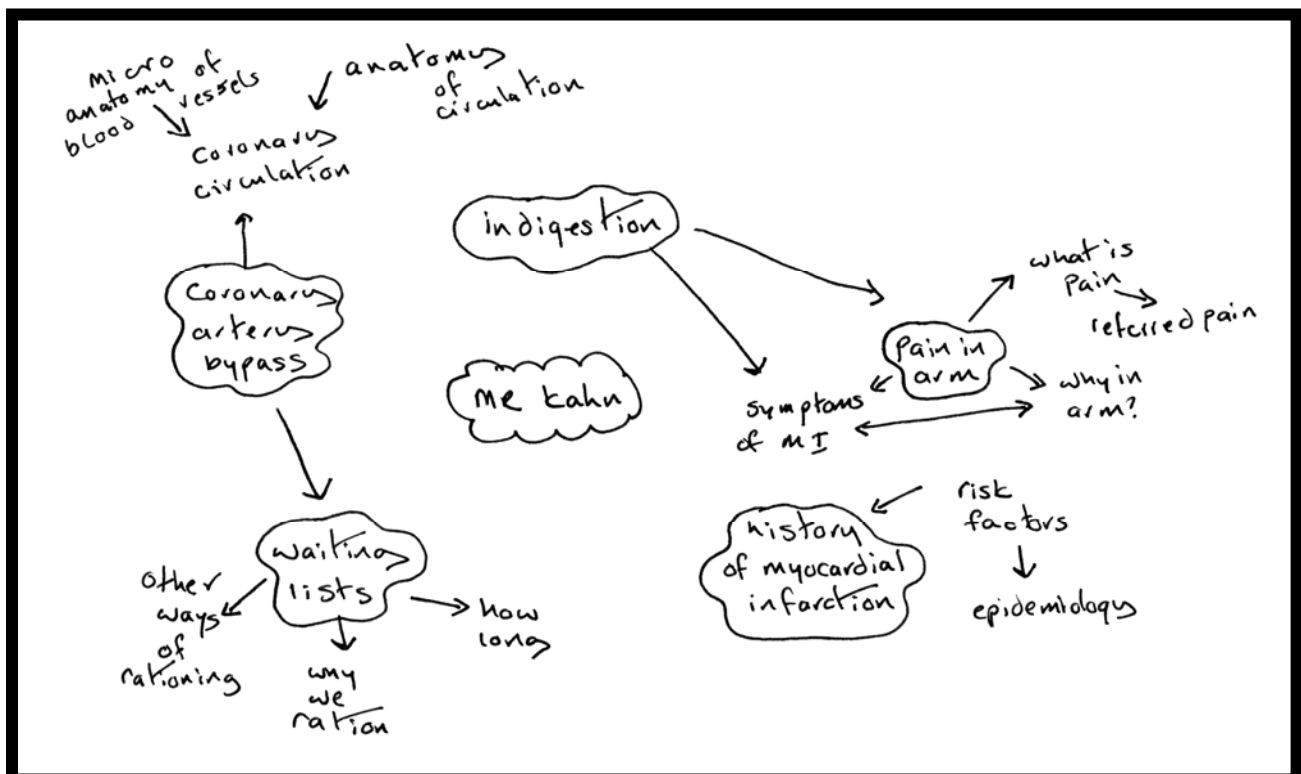

Aims

- Draw existing knowledge out of memory and apply it.
- Form and test links between items of knowledge.
- Encourage deeper thinking by analysing and synthesising recalled knowledge.
- Pool the knowledge of everyone in the group.
- Streamline and organise the list of items identified.

Task

All members of the group should talk about the case together and brainstorm possible hypotheses or explanations of problems in the case study in order to test and compare them. Firstly, work out what you already know about the various parts of the scenario and how they fit together. Many groups find this easiest by drawing a 'mind map' or spider diagram on the white board. This step is vital because it is where you make the link with previous learning and start to draw on each other's understanding. Ideally it should get beyond the level of recording facts to that of understanding. You should be cautious not to rush on to define (often unmanageably large) chunks of learning. You should discipline yourself to address each HYMS theme explicitly and ask if there are relevant outcomes relating to that theme. This step should end with a list of possible hypotheses or explanations.

A Mind Map

Step 4 -Arrange explanations into a tentative solution

STEP 4.
Arrange Explanations.

Aims
- To actively process and restructure existing knowledge.
- To define the limits of knowledge
- To Prepare to define learning objectives
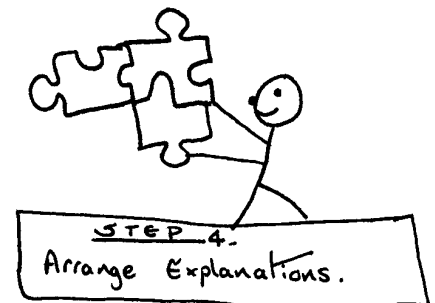
Task
By this stage the group should have thought of many different explanations of what is happening in the case study. The problem should be looked at in fine detail and compared against the proposed explanations to see whether they match or if further explanation is needed. All students should be involved in the discussion as it continues the activation of prior knowledge and is the stage when it is most extensively explored and restructured. As well as restructuring existing knowledge this process leads to the identification of gaps in understanding. Some concepts will need to be linked and priority areas identified. It should end with a schematic representation of the problems and their explanation. This process starts to define

learning objectives but writing them down too soon should be resisted as they could be misleading.

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Example Dialogue

Student 1: So from today's plenary we know that the arteries are blood vessels that transport oxygenated blood around the body to the tissues
Student 2: And if the tissues of the body don't get blood, they die?
Student 3: Yes, so if Mr Khan has had a myocardial infarction and a bit of his heart muscle has died that means that there has been something wrong with the circulation of his blood to the heart.
Student 1: And it'll specifically be the failure of oxygenated blood to get to the heart as it is the oxygen not the blood that his heart muscle requires.
**Student 2:** So we need to know exactly what blood vessels take oxygenated blood to the heart and where they run from and to.
Chair: That sounds like we're getting somewhere. So let's move on a bit but the scribe note that we need to be looking at the circulation to the heart and how oxygenated blood gets there. This sounds like a priority area for us to look at as we can't comment on the pathology or risk of heart attacks until we know how the body normally works. We can cement this in the next stage when we draw up the learning outcomes.

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Step 5- Define Learning Objectives

Aims
- Define the Learning agenda in terms of knowledge and skills.
- Define appropriate resources for self directed learning.
- Motivate students to learn from plenaries, resource sessions, biopracticals and clinical placements.
- Produce a list of learning objectives, mostly in the form of questions that will have to be answered.
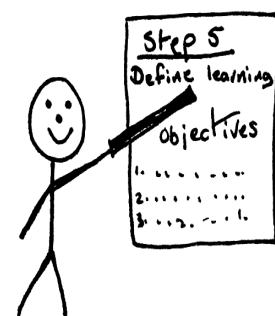
Task
The group should now agree on a set of focused and achievable learning outcomes. This stage uses the expertise of entire tutorial group to discuss appropriate and attainable learning outcomes and concludes the discussion. The learning outcomes should where possible be in the form of **specific** questions that address the problems/ hypotheses and attend to the gaps that students have identified in their knowledge. The outcomes produced can be divided into three categories, primary, secondary and deferred to assist structuring and prioritising learning.
Primary outcomes are those which every member of the group should study. They are of direct importance to the issues raised by the case and support the objectives laid out in the course study guide.
Secondary outcomes are issues of lesser importance to the case and the week's objectives but that may hold interest for some students. These can be researched by those of the group who wish to pursue them.

Deferred outcomes are important issues that will be addressed later in the course and thus they can be deferred until later.

Examples of Potential Learning Outcomes from the case

(Note that normal human physiology and anatomy feature in the primary learning outcomes and clinical abnormalities of form and function are often relegated during the first year to secondary learning outcomes)

Primary Learning Outcomes
1- Describe the gross and micro anatomy of the coronary arteries. What are they made of, where do they go and what do they do?
2- What is health care rationing, why is it necessary, who decides how to do it and how is it achieved?
3- Describe the heart cycle.

Secondary Learning Outcomes
1- What are the common risk factors for a myocardial infarction?
2- What if any differences are there in the epidemiology of myocardial infarctions across global populations?
3- What is referred pain? What is the referred pain of a myocardial infarction, where is it felt, why is it experienced and how is it experienced or commonly described?

Deferred Learning Outcomes
1- What is a coronary artery bypass, how is it performed and what surgical technique does it involve?

Example Dialogue
Student 1: I think we should look at heart attacks.
Student 2: I agree, but we can't just write up 'heart attacks', that's too vague.
Student 3: Yes, I think so too. We need to work out what it is about heart attacks that we want to know.
Student 1: Well, what they are and who is at risk of getting one?
Scribe: So the outcome is what is a heart attack and what are the risk factors for a heart attack?
Chair That sounds good but do you think this should be a primary learning objective.
Student 2: I think we need to know about the normal structure and function of the heart before we consider what goes wrong with it.
Student 3; I agree, perhaps we should put that as a secondary and focus on the anatomy and physiology of the heart and circulation as a primary outcome?

Top tip for Producing Learning Outcomes
A common problem is the setting of outcomes that are unclear or too broad to be realistically covered. Writing an outcomes as say 'jaundice' or 'heart attacks' is a waste of the preceding discussion and will present great difficulties when you set about tackling it. When setting the outcomes try to make them focussed, not on broad areas of study, possible to achieve in the time available and clearly phrased. It is good practice to focus learning by phrasing the outcomes as questions. This gives direction to students and aids the attainment of a deeper level of understanding during private study. The other advantage of phrasing the outcomes as questions is that you know you have accomplished the task when you have found a good answer! Do not be afraid to leave some objectives to be formulated on the Monday for feeding back Tuesday. This is a good way to avoid work overload.
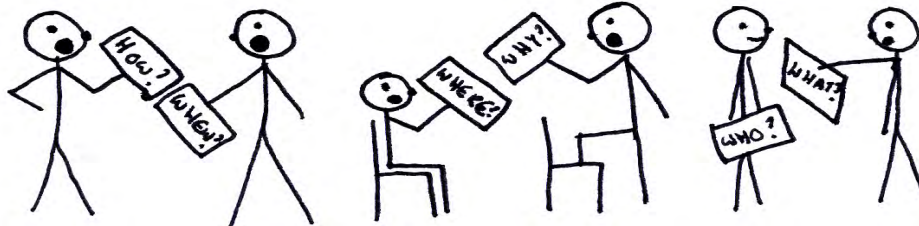
Step 6- Information gathering and private study
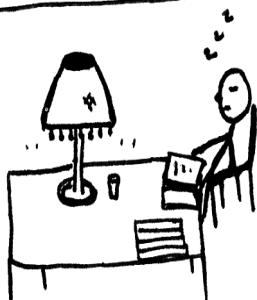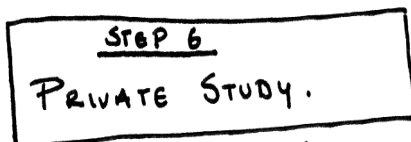
Aims

- Develops students ability to research, pursue their individual learning needs and provides material for pooling, discussion and critique at the following Monday session.

- Private study is an essential complement to the PBL group sessions. Where the first PBL meeting serves to activate and explore prior knowledge, private study provides the real opportunity to enhance the depth and breadth of your knowledge.

- The aim of medical education is to produce graduates who can acquire and assimilate appropriate knowledge, skills and attitudes and apply them effectively to clinical situations. A particular strength of problem-based learning is its ability to integrate and encourage the actual application of learning. To make the most of PBL students must acquire knowledge in parallel with skills and attitudes. Self directed learning combined with the PBL sessions facilitates students to build up their own repertoire of competence.

Task

At step six, students end the PBL session and begin their private study for the week. Students should use a range of resources to meet the learning outcomes set in step five. The study guides list recommended reading for the week, blackboard has a bank of web based learning resources and the computers in both the multifunction labs and PBL rooms have a number of CAL computer programmes on them that can be accessed. In addition to these the week's plenaries, biopracticals and resource sessions may all contain material that can assist in pursuing the learning outcomes. It is recommended that students research the web and the library. There are no 'right' or 'wrong' resources; students should use whatever they personally find useful. It is important however that you keep a note of all resources you use as you will need to be able to reference the material used when you feedback at step seven on the Monday tutorial. Notes should be made and adequate active learning conducted to be able to feedback your answers to the rest if the group.

Top Tips for Private Study

1- Try and make sure that you don't make notes blindly but know the material in sufficient detail to talk about it. The feedback session does not work if people are just reading from their notes. It should be a discussion in which you consolidate, challenge and enhance the knowledge gained from your private study not simply an opportunity to read information to others.
2- Don't be afraid to form study groups with people in you PBL group or outside of your group if your objectives marry. One of the most valuable resources you have is each other and learning together and sharing notes can be a very efficient and effective way to learn.

Step 7- Sharing the results of information gathering and private study
Aims

- To consolidate knowledge by putting it into words and discussing it.
- To assist each other in understanding difficult concepts: A student who has come to understand a difficult concept is often the best person to help a peer who is struggling with it.
- To elaborate and enhance each student's pool of knowledge: Sharing different answers to the same questions elaborates upon the learning of individual students and produces a sum that is greater than its component parts.
- To critique and correct any misconceptions. Pooling information provides opportunity for students and the tutor to correct each other, resolve conflicts raised by the literature found and add new learning.
- To define new questions and the limits of existing knowledge through critical reflection on the answers the group has found.

- To train students in the discipline of citing and criticising resources. Students should start to be able to judge the validity of information by its source, critically appraise strength of evidence and learn 'triangulation' of information by cross checking different sources.

Task

After conducting private study on the learning outcomes, students reconvene on Monday afternoon to pool and synthesise the information they have gathered. Each student should come prepared to talk through and share the work they have done on each of the set learning outcomes. Again, it should be noted that students should not return with a set of unanalysed notes. The aim of poling information from private study is to help each other with difficult concepts, to expand on each individual's knowledge base and to identify areas where confusion or uncertainty still exists. It is probable that not all issues will be resolved and new ones may appear. These are dealt with in the same way as for the first session, by identifying fresh learning outcomes. These are then studied privately for the remainder of the week and the results brought back and shared with the group on the following Thursday before the new patients are seen.

Top Tips for a successful feedback session

How you run the feedback session is up to you as a group. Many different methods have been tried and it is up to the individual group to find a method that works best for them. Some groups go round the class asking an individual to lead the discussion on an outcome and the rest of the group follow. Some groups experimented with having each person 'major' in a particular outcome and making a short presentation on it with group discussion following. This was found useful in developing presentation skills but some found that they concentrated too much on one outcome and neglected the others. In addition, leaving other students to teach you is not an advisable learning method. Where the topic of the week may be anatomy, some groups used games or cards with key words or concepts to define written on them to test each other and other imaginative ways of making the feedback more interactive and challenging.

The key point to note is that it may pay to experiment with different methods, to talk to other groups about how they are 'feeding back' and to consider different methods according to the subjects that have been pursued. For example you may find that you require a different way of discussing anatomy learning outcomes to ethics based outcomes. It would be very useful if students felt able to feedback how their group conducts this session on a thread on the PBL outcomes board on blackboard.

Questions
For each of the seven steps of PBL, write a few sentences to explain what it entails and why the step is necessary to the process.

PBL in the

HYMS Curriculum
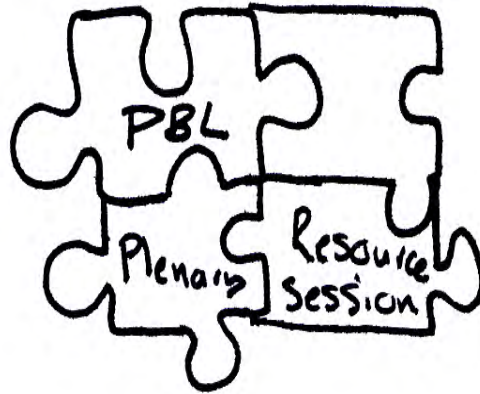
PBL and the HYMS Curriculum

It is essential to take a wide view of how the course at HYMS fits together and to keep this in mind when you conduct your study. The following few paragraphs will explain in greater detail how PBL fits into the HYMS curriculum as a whole.

An important feature of Problem-Based Learning that you must recognise, is that it is not just a learning method or tool. It is more aptly described as a 'curriculum concept', encompassing scope and sequence, syllabus, course outline, learning materials, course of study and planned experiences. The use of problem-based learning facilitates the delivery of an integrated curriculum: Basic and clinical sciences can be taught and learnt together and socioeconomic aspects of health can be considered alongside clinical problems and the basic science underpinning them.

The learning you do in the PBL sessions and the self directed study between these must not be viewed as separate from the other learning opportunities you have during an academic week. In addition to the PBL sessions there are five forty-five minute plenaries, one or two clinical skills sessions for learning communication skills or clinical examination techniques, a resource session and a clinical placement. These sessions are all meticulously designed to reinforce, elaborate upon or introduce you to the issues raised in the PBL cases you have seen that week. The best way to get the most from all these additional sessions is to keep in mind the PBL cases and relate the material you are given to the case to supplement, deepen and enhance your understanding of the issues you have   located as arising from it.

that a distinctive feature at HYMS is the integration of seven academic themes running through all aspects of the curriculum. These 'seven themes' are; life sciences, patient centred care, clinical sciences, evidence based decision making, clinical skills and techniques, population health and medicine and managing resources for quality and efficiency. These themes are included in the course in recognition of the fact that conventional medical education has typically neglected the fundamental human and social dimensions to patient care. In addition, evidence based decision making and managing resources for quality and efficiency reflect the changing demands on the modern day doctor. Doctors need to be able to make clinical decisions within the constraints of a limited budget and an available bank of evidence on the efficacy and efficiency of certain treatments. A problem-based learning curriculum facilitates the integration and reinforcement of all these themes into a single learning package.

HYMS runs what is called a spiral curriculum. Content material is revised as students progress through the course but the nature of their learning moves progressively from theory to practice and they spend progressively more time in clinical practice.

Phase 1, years 1 and 2 lays the foundations of theory and practice; the clinical scenarios in PBL are used to 'trigger' learning and give it practical relevance. This means that in the first year students should focus on producing learning objectives associated with normal form and function of the body and in the second year, the emphasis shifts towards producing more clinically oriented learning objectives based around the HYMS themes.

How these seven themes and PBL translate into a working week is perhaps best explained by example. We will consider a hypothetical week studying blood pressure as part of a four week block on the cardiovascular system.

Illustration
In your PBL session you may meet a virtual patient with say a high blood pressure or a problem with their circulation. This provides opportunity to consider the basic science of the circulatory system and also serves as a context to see what happens when the normal anatomy and physiology goes wrong. You may consider what normal blood pressure is, what happens when it goes wrong and why it does. These areas of study may be raised by the PBL case and touched upon on plenaries running through the week. In the resource session you may find scientific information relating to the case or further clinical examples of what happens when things go wrong. Both the PBL case and a plenary on issues relating to person centred care may lead you to consider the feelings a patient may have about such a condition, the impact it has on their lives and how you may wish to tailor your communication with a patient. A clinical skills session where blood pressure is measured and a patient examined may follow as practice for the clinical placement where a real patient with such a problem may be encountered. From these sessions you will be able to reinforce what you read initially in the PBL case and see what the condition means in reality. The case and further plenaries may lead you to consider the relevance of the condition to population health and medicine and consequently the resources available to manage it. Where the PBL case may have led you to question how common the problem was or the risk factors for it, the resource session may provide you with opportunity to look at data on the incidence and prevalence of the condition in different societies. A plenary on physiology and pharmacology may give you opportunity to think about how you would wish to treat the patient. This may lead you to think about how you would assess the evidence for your proposed treatment of choice. Returning to the case after the week's study you should have gained a real and rich picture of the clinical problem and found a context on which to hang all your learning on these different aspects of the problem.

Key Points

1- There are seven themes at HYMS integrated throughout the curriculum reflecting the scientific and socioeconomic aspects of medicine.

2- In the first year PBL triggers outcomes relating to the normal form and function of the human body, in the second year, the outcomes are more clinically oriented.

3- HYMS runs a spiral curriculum where topics are frequently revisited to enable students' to reinforce and develop their knowledge of an area.

4- PBL forms the basis of the weeks learning and is supplemented with other learning opportunities such as plenaries, resource sessions, clinical skills training and clinical placements.

5- The best way to make the most of the PBL sessions and cases is to continually relate them to, and explore them with not only self directed study time but these other learning opportunities.

6- In summary, PBL is not a stand alone tool but a whole curriculum concept designed to structure your learning effectively and realistically in relation clinical realities.

Questions

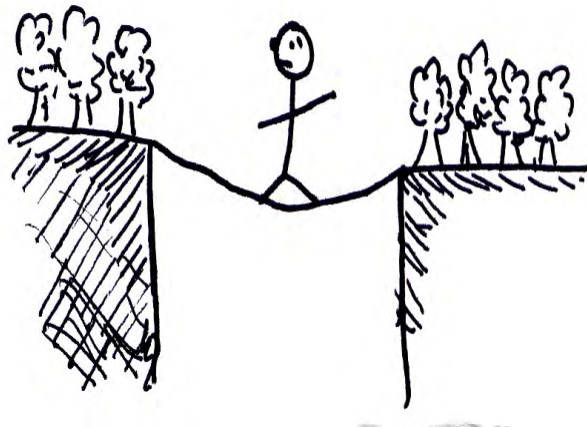**Explain in a few sentences how PBL fits into the curriculum at HYMS.**

Name the other learning opportunities that students have to supplement their PBL private study.

Name the seven curriculum themes at HYMS and explain how these are covered in PBL.

PBL: A Critique

Advantages. Common Problems and Pitfalls to be avoided

Why do PBL?
Does Problem-Based Learning Work and if so, How?

You should now have grasped the philosophy behind PBL and the logistics of how it is conducted. For those of you who are interested we have outlined in the following section more detail on the educational objectives of PBL and how it achieves them. Having an understanding of the goals of Problem-Based Learning and how it is designed to meet them can help students if at any time they find the process difficult or frustrating. To gain a clear picture of the objectives of PBL and how it works, it is useful to compare it with the conventional form of medical education it has been is replacing. The table below outlines the main drawbacks of this method.

Some Drawbacks of Traditional Medical Curricula
Creates an artificial divide between basic science and clinical medicine.
Time is wasted acquiring knowledge that is subsequently forgotten or found to be irrelevant.
Acquisition and retention of information that has no apparent relevance can be boring and demoralising for students.
There can be a strong focus on individual disciplines which makes students feel overwhelmed and disengaged.

Before we explore in more detail the educational objectives of PBL and how it achieves them, it may be worthwhile to think back to what you have read so far and to jot down three points about PBL that you feel attend to these shortfalls of conventional medical education.

1.

2.

3.

Now read through the following pages on the objectives and advantages of PBL and see how your ideas compare.

Key Points
The Educational Objectives of PBL
- Enhance students' skills to acquire principle and key concepts that should be better retained by the learners and allow them to use information learnt in other similar situations.
- Develop students' clinical reasoning skills, critical thinking and decision making strategies.
- Develop students' skills in integrating knowledge across disciplines and better understanding of the role of a humanistic attitude towards professional performance. Prepare students to pursue lifelong learning.
- Promote small group learning, the need for effective teamwork and collaborative learning

Advantages of Problem-Based Learning:
How it can achieve the educational objectives?

Relevance: By using case studies of clinical problems the relevance of curriculum content in made clear. Students are not faced with a frequent problem of abstract scientific learning where it can be initially unclear why certain things are being taught.

Identification of core: The case studies provide opportunity to direct students to the core of what they need to learn and steer them away from getting too bogged down in the intricacies of biochemistry and other subjects which although interesting are not strictly necessary for the practice of medicine. Problem-Based Learning is believed to have the potential to make an important contribution to the information overload that overburdens many students on medical programmes.

Generic Competencies : Using the cases and working in groups enables students not only to develop the knowledge to do medicine but broader transferable skills such as communication, problem solving and team working, all of which being essential for a successful transition from university to workplace.

Student Centred: PBL demands that students take responsibility for their learning. It engenders an independent and active approach to learning rather than endorsing passive and rote learning. The student becomes actively engaged in the learning process and consequently develops a deeper understanding of the work and improved retention of the information.
In addition, students are prepared for continuing education in their professional lives where the speed of innovation and development in medicine means that doctors are personally responsible for continually reviewing and updating their knowledge.

Motivation: PBL is fun, sociable and thought enjoyable by both staff and students. There is significantly less scope for students to become distracted or disengaged from the work as in conventional teacher centred education. The nature of the work means that students will find little use in rote learning information and thus are freed from this notoriously tedious aspect of medical education.

Deep Approach to Learning: During the PBL process students interact with the learning material more than in an information gathering approach (ie. sitting in a lecture). Concepts and conclusions are related to experience and contexts provided which aid attainment of a deeper level of understanding and retention rate of the information.

PBL utilities existing knowledge: While generating learning issues students make use of their own and other group members existing knowledge to identify what they need to learn. This involves activating existing knowledge and then fitting new knowledge into the framework. This serves to continually reinforce and develop what students know and is seen as a very efficient way to learn. The more you return to a topic the more you remember it and students are not left with the problem of conventional medical education where topics are returned to up to two years after they were initially approached and recall is limited and difficult.

Prototype Learning: By using case studies it is thought that PBL captures the most successful elements of adult learning. In short that students learn best when they are ready to learn, when they are involved in setting goals and in deciding on the content to be learned and when they actively participate in decisions affecting their learning.

Key Points
Problem Based Learning helps medical students by:
- Promoting deeper rather than superficial learning.
- Improving retention and recall of information.
- Increases motivation for and enjoyment of learning by providing an active, stimulating and sociable learning environment.
- Fostering self directed learning skills which is likely to lead to medical graduates becoming life-long learners.
- Helping students develop interpersonal and team work skills essential for a career in medicine.

Common problems with PBL

Hopefully, for many of you reading this booklet and especially those amongst you emerging from teaching centred and didactic A level education, PBL may be an attractive idea. The opportunity to learn at your own pace, make your own decisions and accept responsibility for it may sound a welcome break from the prescriptive nature of your previous education. It may also sound rather daunting, and many students will have concerns about whether they will cope, will they manage to learn what they need to learn and so on.

PBL is undoubtedly hard at first and adapting fully to the process can take a long time. The following section is written to illuminate the most common problems that students encounter with PBL. We don't attempt to solve the problems you may encounter; it is an essential part of the process that you do this yourselves, but we hope that by highlighting some common areas of concern that you will be reassured if or when they occur.

PBL can be time consuming

Some may find it frustrating that a lot of time is spent just drawing up objectives and then having to search out resources to meet these objectives. You may feel at first that the process plays games with you. 'Tell us what we need to learn and we will go away and learn it' may be your response. This is to misunderstand the nature of the process and if or when you feel these sentiments over the year it may be advisable to come back and read through this document. The discovery of what you need to know, and why, is an essential
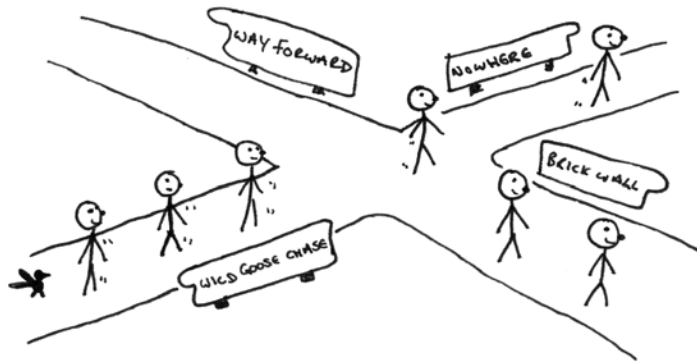
step in owning, retaining and using the knowledge necessary.

Settling in can be difficult

The transition from secure, teacher-pupil to secure, self directed adult learner takes longer than you might expect. Six to twelve months is a realistic estimate, although most students have made sufficient progress in the first four to six weeks to recognize the advantages. Do not be disheartened if some sessions do not seem to be going well or if you are finding the self directed learning hard work. There are bound to be ups and downs during the 'settling in period' and indeed, throughout the course. This is all part of the challenge and the learning curve you are on.

Coping with uncertainty

Uncertainty is probably the biggest problem faced by students 'doing PBL' and often at the root of doubts, concerns and worries on a PBL course. A school environment protects a student well from uncertainty: You are told what to learn and how to learn it. You have the assurance of a set of unspoken rules: 'Learn well what is given to you and you will get the grade that will take you to the next stage in the academic race.' It can be stressful but at least you know what you are supposed to be doing!

Problem-based learning raises all sorts of questions for students rooted in uncertainty. Am I using the right kind of learning resources, am I using enough of them? Am I learning things in sufficient depth and do I understand things sufficiently? Do I know enough and how am I doing?

These are all worries you will have throughout the course, this is normal and part of the PBL process. Uncertainty is an inherent part of life and in short, unavoidable. Medicine is a field dominated by uncertainty and change. One of the key skills a doctor must possess is the ability to use judgement, available knowledge and experience in situations of uncertainty. There is frequently no right or wrong answer and treating a patient may be a process of informed and guided trial and error. Learning is similar in many ways. There is no right or wrong way to understand information, it is a personal journey of discovery. Some subjects you may learn well alone, others you may benefit from working in a group. It is about finding your own way and learning to cope with the fact that one of the few things that is certain is uncertainty.

Workloads and Weekends

The loudest concern students voice about PBL is the volume of work and the fact that most of it falls on the weekend. The answer to this is simply time management. You will find that in some weeks there will be more work than others but it should all be manageable. If you are not coping it

may be advisable to look at how you are spending your study time, ask whether you are using it effectively. Are you doing two hours solid work or fifteen minutes and chatting for the rest/ The more disciplined you are with how you use your time the more you will find that you have. Finding the right level of detail to go into when conducting self directed learning is a big problem for most people on a PBL course. Key ways to minimise these problems are to tighten up the learning outcomes your group sets, discuss fully whether they are realistic in the time attainable and use past exam papers, the resource sessions and the plenaries to help you gage what detail you should be going into. In addition, saving setting some outcomes to the Monday and setting them to be achieved by the Thursday can secure a more manageable workload.

How to Destroy Problem-Based Learning:
## Common pitfalls to be avoided.

When students stick rigidly to the seven steps, do the appropriate amount of study and work hard at their group dynamic, PBL can be extremely successful and rewarding. Sometimes people complain that 'PBL' doesn't work or that they find it exasperating. Blaming the course structure, PBL or your group is an easy way to avoid looking at the real reasons that why your group meetings are not working well. Outlined below are common pitfalls to be avoided when conducting a PBL session. These should be born in mind or perhaps referred to if or when you feel your group time is not progressing as fruitfully as it should.

1- Not understanding how Problem-Based Learning Works

If students are to get the best out of PBL, they have to understand how and why it works. The steps of the tutorial operate best if one understands why the steps are there. It is common to find that the most disgruntled students have no idea of how PBL works or why it is used and consequently feel that the method has been imposed. Spending time reading this booklet or researching PBL further from other resources may save students a lot of time and worry in the future.

2- Bypassing Steps 2 to 4 of the PBL process
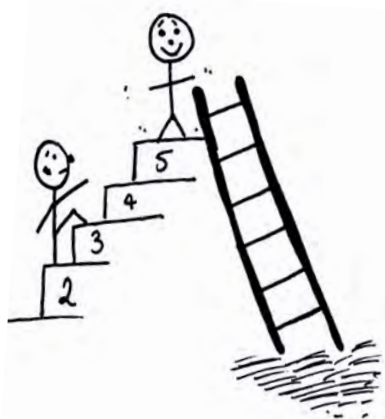
As students grow complacent with the process some find it tempting to simply read through the problem and then spend only a few minutes deciding on what topics to study. Failure to engage in all steps of the process means that students fail to access their own and the rest of the group's prior knowledge. This wastes resources and failure to brainstorm properly makes subsequent reading on and around the problem, less productive. Skipping these steps will lead to a more superficial

understanding and less information is likely to be retained.

3- Being Insufficiently critical

This may come as a surprise to you but much information in text books is incorrect. The pace of change of medical knowledge is so rapid that even new editions may be many years behind current research. An essential task for the group now and later for you in your career, is to evaluate the reliability of information. When a member of the group offers information a reflex action should be to ask 'how do I know that is true?' Students should get into the habit of always noting their information source and consistently evaluating them.

4-Confusing consensus with critical appraisal

Critically appraising the information and knowledge that a PBL group pools is an essential part of the process. Students should be cautious however not to confuse group consensus or agreement with critical appraisal. The latter is not a form of agreement but a type of questioning- what is the evidence, how reliable is the evidence, is the evidence consistent with other information and do sources of information agree? It is more useful to identify and understand areas of disagreement than to achieve consensus as this permits more rigorous discussion and investigation of the facts being disputed.

5-Splitting main learning tasks

It was noted earlier that one way of running the Monday feedback session is to allocate one outcome to each group member to 'major' in and present back to the group. If students manage to do each primary outcome as well as their major topic this has potential to work but students should be very cautious when taking this approach. A common result is that most students fail to address the majority of the core learning objectives, the group stops concentrating whilst each member gives their presentation and the whole group loses the value of synthesising different perspectives into a common understanding. Students should be aware of this as it can be detrimental to all students learning.

6- Not doing enough or the right sort of study

There is no escaping the fact that a Problem-Based learning medical course requires students to work hard. Students need to be disciplined and motivated to carry out the necessary self directed learning. The easiest way to destroy the potential success of Problem-Based Learning is for students to come unprepared for the Monday feedback sessions. Students should also note that spending hours diligently writing out notes will be of no use to the discussion session. Students must be familiar enough with their notes to be able to discuss them fluently with other group members.

Group Work

A short Guide for Beginners
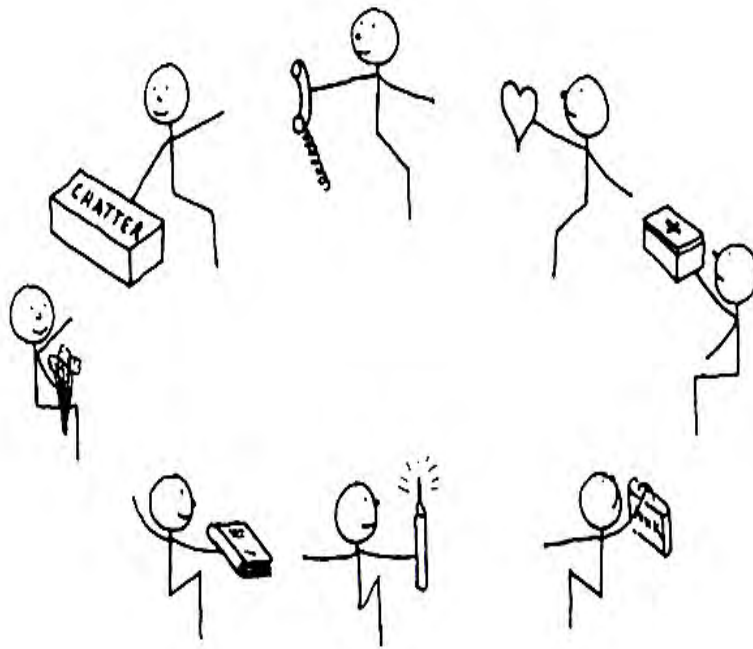
The PBL Group

As you have heard, one of the driving reasons behind using a PBL system is its ability to equip students with the transferable skills, not only 'knowledge'. Being able to work successfully as part of a team is an essential requirement of a doctor. There are few if any occasions in medical practice when you will be working alone thus developing the ability to work well as part team is invaluable. The PBL group you are placed in may be your first real experience of group work and perhaps one of the largest challenges you will face in your fist two years at medical school. Being part of this group can be a hugely rewarding experience both academically and in terms of the relationships you form with others. It is important to recognise that your ability to work in this group is as important as the knowledge you gain from the group itself. Being able to critically evaluate your contribution to and relationship with the group is an essential part of your professional development. Outlined below are some essential tips for working in a group. It is advised that you consider these both as your group forms and throughout the year as part of your ongoing commitment to the health of your group.

Tips on Group Work
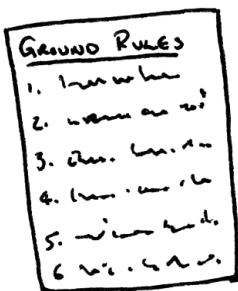
1- Making and Keeping Ground Rules

Laying down ground rules at the beginning of the group's life sets a precedent for the year and establishes the norms that everyone must play by. Having a set of group rules can help towards creating a safe environment where people feel comfortable contributing to the group discussion and know what is expected of them. Ground rules can both prevent and solve problems occurring within the group and generally make for a more harmonious and effective working team.

Examples of ground rules include punctuality, respecting others' views or having mobile phones switched off. Spend a few minutes now thinking of some ground rules you think would help the functioning of a PBL group and that you may want to suggest to the group in your first PBL session.

1-
2-
3-
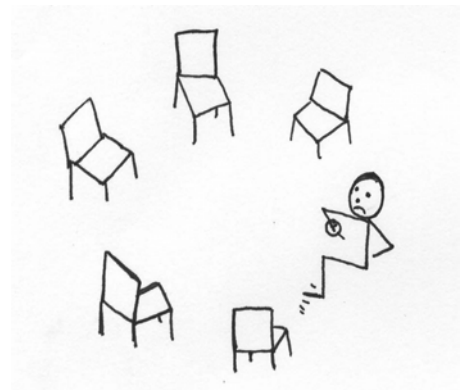
2- Being self aware and reflective

Try and be continually self reflective and think about what good qualities you bring to your group and how you can accentuate these to improve your group relationships and performance. Consider also any potentially negative characteristics you may have, the effects they may have on the group and what strategies you could adopt to minimise them.

List three positive qualities you think you could bring to a group:
1.
2.
3.

Now list three qualities you have that you think may cause you or others difficulties in a group and some ways you could go about managing them. For example you may feel that you are shy and that setting yourself increasing goals of ways to contribute to the group may help you manage this characteristic.
1.
2.
3.

Group Dynamics

As well as reflecting on your own performance it is important to remain sensitive and reflective to the working of the group as a whole. Taking note of the ongoing dynamic within the group, noting for instance if some people seem left out or others too dominant and finding a way to address these issues is key to maintaining a healthy working group.
A good team requires regular evaluation and it would be advisable to use the last ten minutes on a Monday to reflect upon how the group is functioning, how people are feeling within the group or what goals the group would like to aim for. You will find that putting a little time and attention into group dynamics is well worth the effort. A healthy reflective group works far better than a fragmented one.
Write down two ways by which you could ensure that you monitor and improve your group's dynamic throughout the year.
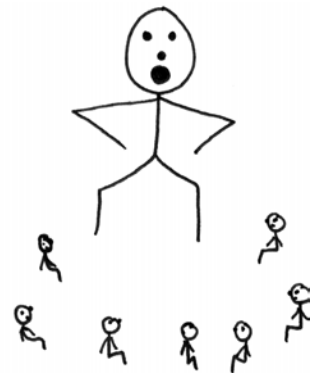
Group maintenance

Similar to group dynamics is the matter of group maintenance. Maintenance is the building up and nurturing of the relationships between all members of the group. The task that the PBL group has to achieve requires the cooperation of everyone and thus putting time and effort into maintaining the group will achieve a better outcome. If the maintenance of relationships is concentrated upon at the expense of the task however, the completion of the task suffers setbacks. Students should be aware of the need to achieve this balance and will find that the group naturally evolves ways to attain it. Taking at least one evening a term for the group to socialise together and let off steam is a good way to maintain a happy working group.
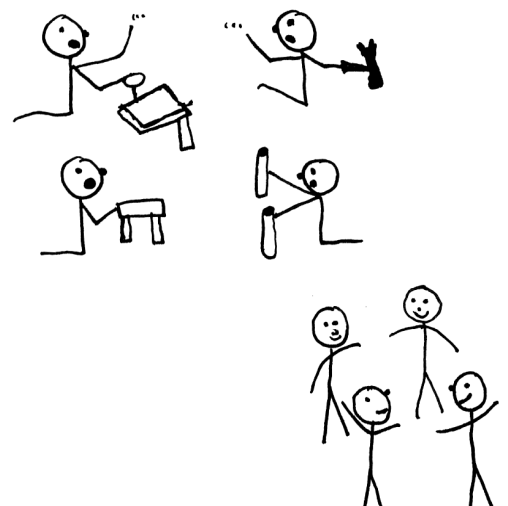
No two groups are the same

The nature of each group depends on the individuals that comprise it and also the 'whole' that these individuals amount to when put together. Some groups may be more creative than others, some more light hearted, some more serious. Different

does not mean better or worse so try not to focus too much on comparing your group to others but concentrate instead on how your group feels to you and the others in it.
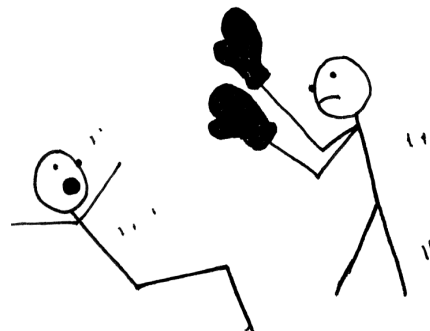
The Group Life Cycle
It is almost certain that the behaviour and mechanics of your group will change over time. There are many theories and models on how groups develop and evolve and although it is not necessary for you to know the details of these, having an overview of the process of group development may be helpful for you when such changes occur.

One theory on group development proposes a four stage process:

1- **Forming:** At the beginning of the group members are on their best behaviour, courteous, friendly and accommodating. Each member holds back any irritations and strong personal opinion.

2- **Storming:** After a period of time, usually a few weeks but often more or less, group members are no longer strangers. As people struggle to establish their roles, the individual differences or frustrations about the group's activities surface in a variety of ways: arguments, withdrawal from the group, attempts to dominate and expressions of discomfort are all common.

3- **Norming:** After a time interpersonal issues are resolved and the group arrives at an understanding of how to behave.

4- **Performing:** The group members work together productively on the task.
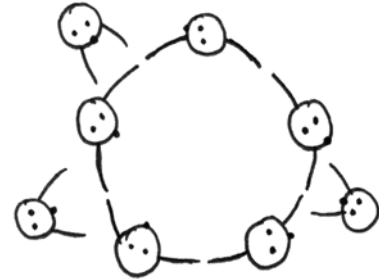
These stages should be seen as a model rather than a definitive prediction of how a group will develop. There is no need for a group to progress through all the stages or to pass through them only once. You may find that your group seems to move in cycles from harmonious 'performing' to less harmonious 'storming'. This is simply the nature of group work and students should not be surprised nor disheartened if the group sometimes goes through a difficult patch. Learning to resolve tensions and restore group dynamics is an essential part of group work and an important skill to grasp.

 An important thing to remember throughout the life cycle of your group is that all members have equal responsibility for how well the group is functioning. It is easy to blame any problems on a scapegoat, be that another student, the facilitator or the course as a whole but blaming will do little to help the group back on its feet. All members should be reflective, and observe what is really happening within the group. Ask yourself whether there is anything you could do to relieve tensions, consider whether you have withdrawn from the group and whether you are giving it a

hundred percent of your efforts. Creating a culture of openness and honesty within the group makes it easier for students to address problems or conflicts quickly and effectively. A group where all members take equal responsibility for their roles and are committed to the success of the group is usually not only the most successful group but also, the group that has the most fun.

Encourage and Utilise feedback: It is a vital part of the process

Learn how to get the best out of your tutor's and group's feedback. Focus on issues raised in the feedback and don't take it personally! Learning to take criticism and use it constructively to grow and develop is fundamental to your personal and professional development. It may be difficult at first but the rewards it brings are great.

Develop a culture of trust

A culture of trust and openness is vital for a group to run successfully. It is essential that members feel able to contribute freely to discussion and not be inhibited by the thought that their contribution may be derided either inside or outside of the group. Setting clear ground rules about confidentiality and what may or may not leave the group is a foundational step in developing this sort of culture. In addition, group members should make a joint commitment to be open and honest with each other as this is a key way to building and maintaining strong and trusting group relationships.

"We'll meet again"
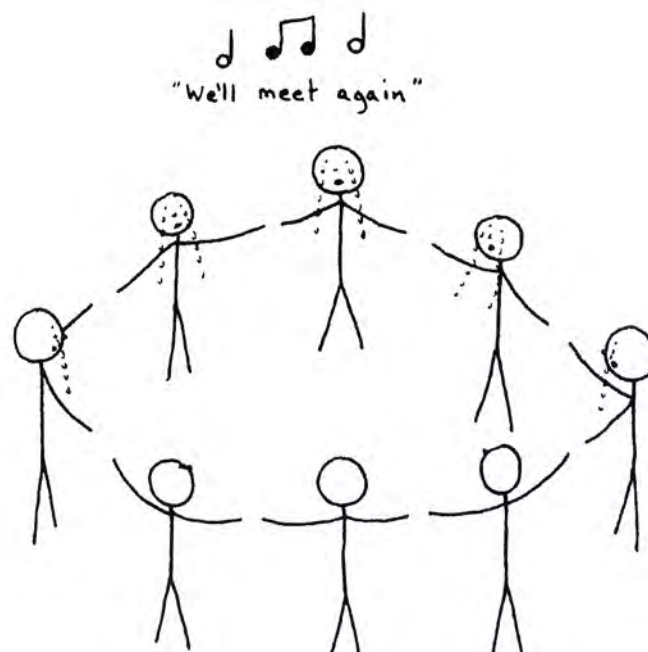
Conclusion

There has been a lot of information in this booklet, some you may find relevant now, some after you have had some experience of the PBL process and some which may not affect your particular PBL experience at all. We hope that at minimum it has given you some opportunity to think about PBL and whetted your appetite for what should be a hugely formative and exciting learning experience. Included below are the top tips that our year group wished to share with you as you start the process. We wish you the best of luck for the coming term and hope you find PBL at HYMS as enjoyable as we do.

Top Tips for Surviving PBL
• Learn to share not compete. Your most valuable resources are each other. Learn to use each other. Studying together and supporting each other can be both an enjoyable and an effective way to work.
• Resist the temptation to SOLVE the case. You are trying to identify the knowledge you need to solve it, not actually trying to solve it!
• Be reflective. Part of PBL is about working as a group. A 'Healthy Group Dynamic' can be the make or break for a happy and successful learning experience.
• Do the work the group sets. It is easy to fall behind and feel left out of the group. A little and often is better than a lot too late.
• Don't worry if the group next door are doing things differently. This is the nature of PBL. Different groups will evolve their own way of doing things.
• Be brave and don't be intimidated if you feel that people know more than you. Usually they don't! Remember that you are all in the same boat and it is likely that people are experiencing the same feelings. If you are honest about your concerns it is most likely that others will follow your lead. Saying you don't know something is also the best way to begin finding it out.
• Do spend time filling in the block evaluations. This may seem tedious but it is the best way to improve the course and have your say in how it should change. Our year did it for you and hopefully you can take on the baton to do the same for next year's intake.
• Make the most of the other people in your group and the mix of different ethnic and cultural experiences that they will have. PBL is a great way to start exploring the richness of beliefs and values held in a multicultural society. Not only will you learn more about other religions and lifestyles, this sort of knowledge and understanding will be invaluable to you in real clinical practice.
• Remember that all work and no play makes students burn out! Try and ensure that the PBL group socialises together or has some opportunity to focus on group relationships, not just work throughout the year.

References and Further Reading.

We don't attempt to be comprehensive in this guide and would strongly recommend that you used your first few weeks at medical school to read a bit more about PBL, to talk about it with your peers, PBL groups and second year students.

A lot of the information given in this guide is taken from David T, Patel L et al *Problem-Based Learning in Medicine* The Royal Society of Medicine Press(1999). We recommend that you have a look at this book. There are many copies in the library.

http://www.pbli.org. Howard Barrows, Southern Illinois School of Medicine (A medically focused analysis of PBL.)This page serves as a good starting point to research further web resources on PBL and includes lots of useful links.

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Glossary of PBL terms

Try and find the time to read through the following terms and provide a one line definition for each. This will help to consolidate your understanding of the information contained in this booklet and provide a reference source for the early weeks of your PBL experience. Most of the words are contained within the text, a few may require you to use a dictionary, the internet or even your new PBL group.

- Self directed learner
- Scribe
- Chairperson
- Teacher centred education
- Didactic
- Student Centred education
- Deep understanding
- Context Learning
- Problem-Based Learning
- Guided Discovery Model
- Open discovery model
- Formative assessment
- Summative assessment
- Facilatator
- Feed back session
- Case studies
- Virtual Patients
- PBL process
- Brainstorming
- Aetiology
- Structure and function
- Disease presentation
- Psycho-social
- Epidemiology
- Pathology
- The GMC's vision of 'Tomorrow's Doctors'
- Confidentiality

The End.