



THE UNIVERSITY OF
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A U S T R A L I A

Problem Based Learning Manual
School of Medicine, Fremantle

Acknowledgements

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Introduction

Problem-based learning in the School of Medicine, Fremantle

Welcome to the School of Medicine, Fremantle at The University of Notre Dame Australia, and congratulations on being successful in the selection process. As you are aware, the key educational approach in the first two years is constructed around a Problem Based Learning (PBL) curriculum model.

PBL is a learning process that places you, the student, at the centre. Unlike traditional teaching methods, PBL will not seek to open your brain and fill it with facts and figures so that you can regurgitate them in an exam. Instead, the process mimics the natural learning process whereby you learn through action, through making connections with what you already know, through collaboration with others and through making mistakes.

If you are new to PBL, the process can be a bit daunting at first. Experienced Problem Based Learners, however, have found the process to be liberating, more appropriate and more challenging, providing them with a deeper understanding of the issues that are at the heart of being a medical student. Their focus of learning has been on becoming an excellent professional rather than on passing an exam. Certainly, those who have graduated from the School of Medicine Fremantle (SOMF) believe it has provided them with an edge not evident in their peers who have graduated from medical schools with a traditional curriculum.

The purpose of this booklet is to give you an overview of the PBL Program at SOMF. Its aim is to give you the basic information needed to not only 'survive' PBL, but to thrive as a result of it. To be of maximum benefit, you should read it prior to commencing your course. We also recommend that you keep it handy during the first six months of MED100 as, no doubt, there will be aspects that you will want to refer to as you come to learn the PBL process. We also recommend that you take the time to think through and answer the focus questions peppered throughout this booklet. While actually doing PBL will give you an in-depth understanding of what it's all about, reflecting on the principles underpinning this method will significantly enhance this understanding and will hopefully provide you with insight as to why the School employs a PBL curriculum model.

Ponder this ...

Why did you choose to study medicine at the School of Medicine, Fremantle?

What do you understand about the structure of the MD Course?

What do you understand about the PBL approach to learning in a medical degree?

How do you think you will manage learning via this approach?

Are you genuinely committed to giving it a go?

What is PBL?

PBL originated in medical education over 30 years ago in the United States, aligned with a graduate entry medical school model. Since then, it has been adapted by medical schools all over the world. As such, there are many variations of PBL. Some schools have adopted it as a total curricular approach, whilst others utilize it in certain elements of their courses (e.g., one or two units are PBL only); some schools have adapted a hybrid version of PBL whereas others stick to an authentic PBL approach. In the SOMF, the first two years are fully driven by a hybrid PBL Program.

Simply speaking, PBL is an approach to education in which a paper-based clinical case forms the foundation of your quest for knowledge. Some people confuse PBL with problem solving, but there is a key difference. In problem solving, students are 'taught' the knowledge and skills in advance, and then apply this knowledge to the case in an effort to solve the problem. With PBL, however, the problem comes first before any learning takes place; the problem is used to help students identify their own learning needs. Initially students formulate hypotheses that might explain the problem, and then determine what further information is required to better understand the problem. Students then independently research and gather information to clarify their hypotheses, which ultimately help them generate new personal understandings about the problem. These personal understandings are then shared with the group, and a collaborative understanding is arrived at.

Underpinning this process is a very structured framework – it is not simply the process of handing students a clinical problem and hoping for the best. The PBL problems are crafted very carefully

by all four domains (see Box 1) such that they unfold in a logical manner without losing the uncertainty and complexity that is characteristic of real life clinical situations. Also, each problem has a clear set of learning objectives. A key role for your tutor is to guide your group towards the learning objectives and support the group's process of enquiry.

Why bother with PBL? Is it really worth all the extra effort?

Traditional approaches to learning are certainly much cheaper, and running a PBL curriculum is resource intensive. For example, to organize a didactic series of lectures you only need one lecture room, the lecturer/s, and one set of resources (computer, projector etc.). To successfully run a PBL Program however, the process is more involved: staff from the four domains must firstly come together to develop the learning objectives for the year, write problems (as clinical scenarios) around these learning objectives, and decide upon the types of resources that students will need to address the learning objectives. Furthermore, a large number of tutors are required to facilitate multiple small groups of students, a large number of PBL rooms are required to accommodate those groups (each fitted out with a computer, audiovisual equipment, furniture and whiteboards). Tutors must undergo rigorous training before they can take a PBL group and they are required to attend regular refresher sessions thereafter; they are also required to meet each week prior to the new problem to review and prepare for it. Finally, students need to be coached in the PBL process and have access to on-going support in attempting to understand and master it.

The outcomes in PBL are far superior to traditional approaches such as lectures. There is a substantial body of research confirming that having a concrete, real-life scenario as the focus for knowledge acquisition helps students retain their learning and comprehend it better (Woods, 1994). This is what is referred to in educational literature as deep, meaningful learning. When students learn in context, the content takes on more relevance and they are able to link it to similar information that they already know about. This linking of new information with existing information results in the content being filed away in the long-term memory as a meaningful understanding, rather than an isolated bit of knowledge or fact. As such, this new understanding is easier to remember (either for an exam, or for a clinical encounter with a patient) and is retained longer (long after the exam is over). In other words, the knowledge is much more valuable and much more useful.

Also, a well-prepared and executed PBL Program will directly help students develop interpersonal skills that they will be able to draw on for the rest of their lives. Collaborative learning requires well-honed listening skills, negotiation skills, communication skills, and reasoning skills. All of these skills (and more) are learned as students grapple to understand the problem. They provide the tools necessary for becoming an independent, self-motivated and savvy lifelong learner. Not a bad outcome.

Box 1 – An integrated model

Traditionally-structured medical education has a discipline-based syllabus in which different disciplines are presented and learnt in relative isolation (e.g., Anatomy 101). The syllabus in the SOMF is different. The traditional organisation has been replaced by an *integrated* syllabus in which students are presented with the wide range of knowledge and skills necessary for competent medical practice from the very beginning of their studies. The PBL curriculum model uses a series of clinical scenarios to define what students should learn. Essentially, these problems are the catalyst for accessing the content of the course and provide the context that will provide real life meaning to the science of medicine.

Discussion and analysis of the problems prompt students to learn from a whole range of disciplines (scientific and clinical), as relevant to any given problem. Problems also prompt students to develop appropriate personal and professional attributes required for effective interaction with patients and colleagues. Analysis of the problem also teaches students to apply their knowledge and skills to find solutions to clinical problems – much like what experienced doctors do. Therefore, in a PBL curriculum, all of these aspects of competent medical practice are learnt *simultaneously* from the beginning of medical studies.

In the SOMF, the responsibility for decisions about the syllabus (the content) rests with four Domain Committees instead of the discipline-based departments that govern the syllabus in traditional curricula.

The Domains are:

- (a) Basic and Clinical Sciences (BCS)
- (b) Communication and Clinical Practice (CCP)
- (c) Population and Preventive Health (PPH)
- (d) Personal and Professional Development (PPD).

The Domain Committees work in concert to design and resource the syllabus for the four years of the Course. The membership of these Committees represents all disciplines and subject areas that traditionally contribute to medical education, those at the cutting-edge of knowledge generation relevant to medical practice, and some that have not contributed in the past, such as ethics, philosophy and business management.

What PBL isn't

Case-based learning

In case-based instruction, students are given a realistic case relevant to the course (medicine, management, etc.). Students work through the case, typically away from the class, and decide what should be done. After that they meet with the class and discuss the case with one another and the teacher.

While cases are excellent learner-centered instructional strategies, they tend to define the learner's educational pathway, and diminish the learner's role in setting the goals and outcomes for the 'problem'. When the expected outcomes are clearly defined, there is less need or incentive for the learner to set his/her own parameters. In the real world it is recognized that the ability to both define the problem and develop a solution (or range of possible solutions) is important.

Problem-solving

Within a project-based approach, learners are usually provided with specifications for a desired end product (build a rocket, design a website, etc.) and the learning process is more oriented to following correct procedures. While working on a project, learners are likely to encounter several 'problems' that generate 'teachable moments'. Teachers are more likely to be instructors and coaches (rather than facilitators) who provide expert guidance, feedback and suggestions for 'better' ways to achieve the final product.

Other models of problem solving require students to have the information required to 'solve' the problem in advance. The problem is presented to the students and students apply what they have been previously taught to solve, explain, resolve and / or answer a question. In PBL, students do not have the information in advance. The focus is on the problem and the information is learned whilst attempting to understand the problem better.

Small-group, cooperative learning

Cooperative learning is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities and *teach* each other in an effort to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. Students work through the assignment until all group members successfully understand and complete it. This is very different to collaborative group learning (as in PBL) where all students learn the content then pool their ideas and thoughts in an effort to develop a collective understanding of a concept.

A do-it-yourself course

At times, some students have complained that PBL in the School of Medicine, Fremantle is nothing more than a 'do-it-yourself medical course'. Students who have held these sentiments have not understood the process of PBL, the principles underpinning it, nor the value it adds to their learning. Those who do understand it fully appreciate the solid structure that holds it together, and that although students are encouraged to discover learning objectives for themselves, the process is closely monitored and guided by their tutor.

The PBL Process

How the PBL tutorial works

The preceding section has hopefully given you an insight into the theory behind PBL. The aim of the next section is to give you an idea of how this theory translates into practice.

Your PBL Group:

You will be allocated to a group at the beginning of each semester. There will be no more than 10 students in this group (including you) and you will stay together for the semester. You will have a PBL tutor who will guide you through the problems each week and make sure you stay on track. You will change groups and tutors in Semester 2.

The effectiveness of the group depends on all its members' contributions and so attendance is **compulsory**. The reason for this is simple. Medicine is as much about the 'process' as it is about the 'content'. You cannot learn skills of clinical reasoning, communication, team work etc. from a book. You can only do so through sustained interaction with people (including patients).

Your PBL Room:

You and your group will be allocated a room where you will meet for the semester. Treat this room well and it will become your home away from home during your preclinical years. Providing you take care of the resources in it, you will find that this room caters to your needs whilst studying on-campus.

Resources in the PBL room consist of:

- Two whiteboards (one for the MEDI6100 group and one for the MEDI6200 group)
- Whiteboard markers and cleaning materials (use only the cleaning cloths on the wall whiteboards)
- A desktop computer with access to the Internet
- A Smart TV for use as a visual display screen
- Wireless access if you wish to use laptops
- A kettle (bring in your own mugs and coffee etc.)
- Tables and chairs
- Security access to the room (swipe card entry).

We recommend that you divide your whiteboard according to the following categories to make sure you capture all the information you need:

Cues	Hypos	Mechanisms	Need to Know	LOs
<div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0; width: fit-content; margin: 0 auto;"> What these categories actually mean will become clearer when you read the section on the PBL process </div>				

The PBL Weekly Cycle:

Students work through a problem each week over the course of three tutorials.

The PBL timetable is as follows:

MEDI6100			MEDI6200		
Tutorial 1	Monday	9.30 – 11.30	Tutorial 1	Monday	2.30 – 4.30
Tutorial 2	Thursday	8.30-10.30	Tutorial 2	Thursday	3.00 – 5.00
Tutorial 3	Monday	8.30 – 9.30	Tutorial 3	Monday	1.30 – 2.30

The PBL week starts on a Monday and ends on a Monday. Your second PBL tutorial for the week will fall on the Thursday. In between the Monday and the Thursday, you will attend lectures / labs / tutorials at Murdoch and at Notre Dame, and carry out your own independent study.

There are four main objectives of the PBL process. Each PBL tutorial is designed to:

1. help you activate and articulate your prior knowledge
2. help you apply that knowledge
3. help you identify what you don't know
4. identify the group learning objectives

For the first year, you will need to follow a fairly rigid pattern to ensure that you address all of the learning issues within each problem. By the time you move into MEDI200, this pattern will become less conscious and more habitual. However, this is not to say that in MEDI200 you can do away with the principles of PBL. You will still adhere to them but the process by which you do so will reflect the idiosyncrasies of the group.

The pattern that we use in the SOMF is an adaptation of the seven-step technique developed by the University of Maastricht (e.g. clarify, define, analyse, sift and sort, identify learning objectives, go and learn, comeback and talk). These seven steps occur iteratively throughout the three tutorials, as outlined below:

PBL Tutorial 1

What is the patient's problem?

Aim of this tutorial:

1. To identify the important features (cues) of the presentation
2. To clarify and define technical terms
3. To brainstorm explanations for the causes (hypotheses) of the presenting complaints
4. To tease out the mechanisms underlying the sequence of events associated with the hypotheses (articulate prior knowledge)
5. To identify learning issues that are relevant to understanding the problem better (learning objectives)

Look for the cues:

- Read the first trigger and identify the important, known features of the presentation. Jot these down in the 'cues' column on the whiteboard.

Clarify uncertain terms:

- Identify words whose meanings or pronunciations are unclear. Use a medical dictionary to clarify if necessary.

Brainstorm hypotheses:

- Draw on your prior knowledge to hypothesise possible causes of the presenting complaint – the sequence of events in the human body / mind that seems to have occurred.
- Spend considerable time on this phase and try to exhaust all possibilities.

Tip 1

- Hypotheses are educated guesses about the cause of the problem. They are explanations based on the knowledge you already have about the presenting complaint.
- Do not judge each other's' suggestions; nor should you apologise for your own.
- Write all ideas on the board even if they appear to overlap – they can be modified later. You might like to draw a 'mind map' on paper.
- Hypotheses may not pan out when they are tested against further information from the history, from physical examinations and from data resulting from investigations. Having a go, however, means that you are learning to reason in a logical and systematic way, and you learn to test your thinking powers.
- As you gain more knowledge throughout the year, your educated guesses will get better for two reasons, 1) they will be based on greater knowledge, and 2) they will be based on improved abilities to apply knowledge and to reason.

Explain the mechanisms underlying the hypotheses:

- Attempt to explain the mechanisms underpinning the hypotheses, that is, tease out the causes underlying the sequence of events at the tissue, cellular, molecular, behavioral and population/ environment/social levels as appropriate.
- Don't be afraid to say that you don't know, or that you are not sure. These will become your Learning Objectives.

Tip 2

- Being clearly aware of where the gaps are in your knowledge is good for you - it is an excellent basis on which to learn more.
- This exercise is not about being smarter than anyone else; it is about learning to always be conscious of, and willing to admit to deficits in your knowledge because you will face this situation for the rest of your career. There is just no way you can learn everything there is to know in medicine, not only because there is too much, but also because it changes so rapidly.

Identify what you don't know:

- Make sure you take your explanations of what you already know (the mechanisms) as far as you can, down to the cellular and molecular level when necessary.

- Wherever you get stuck, write up a learning objective (LO).
- Write LOs as clearly as you can so that they say exactly what you want to find out to understand the 'problem'.
- Write your LOs as *specific questions* that address the gaps that the group has identified in its knowledge. Writing an LO as 'heart attack' or 'diabetes' will lead to problems when you try to tackle it as it is just too broad and too vague.
- Use the four domains (refer to page 6)

Tip 3

- Make your LOs specific to what you need to know to understand the problem better. You cannot learn the anatomy of the whole digestive system in one week, and we don't expect you to. The patient's problem should indicate how far to go in any week, and you can be assured that you can and will build on this in subsequent cases.
- The LOs can be divided into three categories: Essential, Recommended and Optional. "Essential" LOs are those which every member of the group should study. They are of direct importance to the issues raised by the case. "Recommended" LOs 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 in the group who wish to pursue them. "Optional" LOs are important issues that will be addressed later in the course and so they can be deferred until later.

Additional information:

- Decide what further information from the history, examination and investigations might help to eliminate or confirm your hypotheses.
- Access this information in the other triggers.

Revise hypotheses:

- Analyse the evidence from the additional information (triggers) and refine your list of hypotheses.
- Remove those that are no longer relevant in the light of the new information.
- Prioritise those that remain such that the most likely ones are at the top.

Refine learning objectives:

- Revisit your LOs and ensure they are written concisely and in relation to the patient's problem.

Tip 4

- Don't divide the LOs amongst the group. Everyone in the group has to learn everything and will ultimately benefit in doing so. Remember, this is NOT cooperative group learning, rather it is collaborative group learning. Also, when you learn in context, you remember better and are more easily able to retrieve the knowledge from your memory. The danger with dividing up LOs and then swapping notes on the ones that you haven't covered is that you will tend to leave the others to learn later, out of context. Then you won't have too much of a clue about depth needed, and won't benefit from being able to apply this knowledge to a clinical case; to a patient.

Summarise the case:

Using your notes on the whiteboard, orally summarise the case in terms of:

- a) The presenting problem (what you know, e.g. the cues, relevant 'positives' and 'negatives')
- b) What you think the problem might be (hypotheses)
- c) What further information has been provided (history, physical, tests)
- d) What your learning issues are between now and Tutorial 2.

Make sure it is not the same person conducting this case summary each week. Take turns so that everyone has an opportunity to practise this skill.

Between PBL Tutorial 1 and PBL Tutorial 2

Independent study

Aims:

1. To develop students' abilities to research, pursue their individual learning needs and access material for sharing, discussion and critique at PBL Tutorial 2.
2. To search for appropriate information in fixed learning resources scheduled during the week that will enable students to address their learning objectives.
3. To develop sound personal study habits and strategies that allows students to enhance the depth and breadth of their knowledge and their understanding of the problem.

Recommended resources for independent study are:

- Texts and computer assisted learning devices (CALs) available in the library
- Electronic resources (journal articles etc.) as suggested in the resource descriptions
- Lectures
- Laboratory classes
- Clinical skills sessions
- Expert tutorials
- Search the Internet and browse the library

Tip 5

- There are no 'right' or 'wrong' resources. However, those that have been scheduled each PBL week are important as they have been explicitly identified by the Domain Chairs as relevant to the problem.
- Try to make sure that you don't make notes blindly but know the material in sufficient detail to talk about it. Tutorial 2 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.
- Don't be afraid to form study groups with people in your PBL or from outside your group (if your objectives are similar). 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.

PBL Tutorial 2

Applying what you have learnt to the 'problem'

The aim of this tutorial is:

1. To figure out how students can make use of what each person has learned in an effort to understand the patient's problem better.
2. To consolidate knowledge learned during independent study, put it into words and discuss it with the group.
3. To assist each other in understanding difficult concepts.
4. To elaborate and enhance each other's pool of knowledge. Sharing different answers to the same questions (LOs) allows students to look at concepts from a range of different perspectives, thus elaborating upon their initial thoughts. This is at the heart of the saying "the sum is greater than its component parts".
5. To correct any misconceptions. Sharing information allows students and the tutor to correct each other.
6. To provide students with the experience in critiquing resources. Students should start to be able to judge the validity of information, critically appraise the strength of evidence and learn 'triangulation' of information by cross checking different sources.

Review progress:

- Begin the tutorial by recapping where you left off in Tutorial 1. Ask someone to volunteer a brief summary using the notes on the whiteboard.
- Practice giving two types of summaries:
 - A brief 30 – 40 second summary
 - A longer more detailed summary

Share and apply learning:

- This step is not primarily about showing how much you have discovered. It is an opportunity to pool your knowledge, discuss it, weigh it up and decide how relevant it is to the hypotheses about the patient's problem generated in Tutorial 1.
- Each student should come prepared to talk through and share the work they have done on each of the set learning objectives.

- The aim of sharing information from independent 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 should be worked through using the same process identified for Tutorial 1.

Review hypotheses:

- Based on the groups' new understanding of the problem, decide which hypotheses should be eliminated or altered.

New triggers:

- Consider new information provided by the triggers. Reconsider hypotheses. Identify new learning objectives (if any).

Tip 6

- How you run the 'sharing' component of Tutorial 2 depends on your group. Remember, you should not have divided the LOs amongst the group so no one person should be responsible for a single LO. **The allocation of LOs runs the risk of students concentrating too much on one objective, at the expense of other objectives.** Some groups conduct Tutorial 2 by working around the room, with each individual opening the discussion on an objective of choice. All group members are expected to contribute. Although the sharing of information by a walk-through of slides may be useful in the development of presentation skills, it is often time consuming to prepare, reducing the amount of time available to dedicate to the other objectives. **Leaving other students to teach you is not an advisable learning method. You retain more if you teach yourself.**
- The key point 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 being discussed. For example, you may find that you require a different way of discussing anatomy learning outcomes to ethics based objectives.

Between PBL Tutorial 2 and PBL Tutorial 3

Independent study

Hit the resources again to learn new things and clarify those that are not yet clear.

PBL Tutorial 3

What are our decisions – finalising the case.

Review progress:

- Begin the tutorial by recapping where you left off in Tutorial 2. Ask someone to volunteer a brief summary using notes on the board.
- Share and apply learning.
- Discuss and debate both what has been learned and how it is relevant to the hypotheses about the patient's problem generated in Tutorial 1.
- In some sort of ordered fashion, such as running through the LOs for the whole case, see if any new insights you have gained from further study can add to the understanding of the patient's problem.
- Finalise any issues or concepts that are still not clear.

Review hypotheses:

- Decide which should be eliminated or altered, justified by the new learning.

Conclude the case:

- Take turns each week to conclude the case by carrying out a patient case summary (patient's history, tests and physical examinations performed, diagnosis and outcome).
- Mind maps are particularly useful for this.
- Take the opportunity to practice presenting the case to the class. This will help prepare you for case presentations in your clinical years.

Reflect:

- Reflect on the week's activities and give feedback to each other about the PBL process (what went well; what didn't go so well).
- Evaluate the problem and its effectiveness in helping you identify important objectives.

Tip 7

- The final trigger is designed to let you know what happens to the patient. In Year 1, you are not expected to examine management of patient cases in depth, but it is good to know what the outcome for the patient is. What the experienced doctor does is also often just what you need to bring all the pieces of the case together. Don't forget the patient!!

The Team

The Tutor

The tutor is usually a professional with a link to health care (MEDI6100) or a doctor (MEDI6200). This person is integral to the success of the PBL process and the harmonious functioning of the group. What they actually 'do' in PBL is a contentious issue and is directly influenced by the model of PBL adopted by the medical school (i.e., authentic or hybrid). People sometimes question whether tutors should just mediate and contribute to group dynamics, or whether they should lecture extensively. Generally, students have found the most effective style of tutoring is somewhere in the middle: as a facilitator of group dynamics and a neutral party, as well as content expert who could bring their experience to the table in a way which would not dominate and prohibit student-directed learning. This is generally done through clever questioning of the students rather than simply answering students' questions.

Of course, every tutorial group develops its own style and group norms, and every tutor has their own style as well. Some tutors are very informal while others are more guarded. Some talk a lot, others hardly at all. There have, of course, been many controversies over the years regarding the varying abilities between tutors and their skill in the unique art of small-group PBL. You should be relaxed in knowing that all PBL tutors at Notre Dame are trained in an effort to achieve consistency. For PBL to be effective, students need to honor the process of enquiry and attempt to arrive at the LOs themselves (rather than relying on the School's curriculum map, Prudentia, to identify the LOs). Overlooking this step of the PBL process will be detrimental to their learning, no matter how tempting it is.

Essentially, the role of the PBL tutor is to create a healthy environment that allows all members to contribute to discussion and provide feedback. He / she will also closely monitor the group's progress and guide students towards the depth and breadth of the subject at hand. In doing so, they may ask questions 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?' Go with it!

Your tutor is as much a member of the group as anyone else and it is important that students feel able to reflect on his / her role and contributions. If, for example, the group feels that the tutor 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 SOMF, your PBL tutor also acts as your first point of contact for any academic or personal problems, or any concerns you may have. Usually this arrangement works very well and groups build up a close and strong relationship with their tutor. At the end of each semester you will have a progress review with your tutor where he / she will provide you with feedback about your professional progress and contributions to the PBL process.

Job Description of the Facilitator (the Tutor)

- Models behaviour that the student will adopt
- Promotes student interaction as a group
- Guides the group's learning
- Motivates the students to learn
- Monitors the progress of each student in the group
- Monitors attendance
- Provides feedback to each student on their progress in the PBL process
- Provides support and a first point of contact for academic or welfare problems

The Scribe

Students rotate the role of scribe each week. The function of the scribe is to record the group discussion on the whiteboard and to order ideas and problems as they are raised (according to the categories described earlier). 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 record 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. As students gain more experience of scribing they will find that it becomes easier to group and organise ideas on the whiteboard 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 categorising concepts
- Checks the accuracy of the notes with other group members
- Continues to contribute to the group

The rest of the Group

Depending on the tutor, the remaining members of the group may also be assigned roles. These roles include Facilitator, Time keeper, Researcher, Librarian and Food monitor.

Although the tutor will try to regulate the process of the tutorial, 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 in your group are functioning as a unit.

Shortcomings of PBL

PBL is time-consuming

Often the exasperated catch cry from first year students in the course is, “Just tell us what we need to know!” It seems that much of your time will be spent trying to uncover learning objectives, searching for the appropriate resources that will allow you to address them, and then discussing what you have learned with your group. Certainly, the process would be a lot simpler and more time-efficient in a traditional curriculum, where the teacher gathers all students in one location, tells them what the objectives are, then transmits information for the students to absorb in some fashion.

However, hopefully once you have understood the principles behind PBL and the value it adds to your goal of becoming a doctor, you will be less inclined to want the teacher to ‘Tell you what you need to learn’. If this sentiment persists, however, then it is advisable to speak to your tutor or year coordinator as perhaps you haven’t fully grasped the meaning behind this instructional process.

Student-centered learning is harder than teacher-directed learning

Student-centered learning requires more effort from you, the student. It requires that you actually think, re-think, question, ponder, research, negotiate meaning, listen to others, reorganise your thoughts – in short it is more mentally taxing. Compared to the traditional teacher-centered approaches to learning where the teacher does all the thinking up front and presents it to the students to memorise and later regurgitate, student-centered learning asks that the students determine what is important for them to learn, when to learn it, how to learn it and how to make sense of it. Thankfully, this process and the outcome is highly rewarding and satisfying so that once students learn how to manage this process, it becomes a lifetime habit and a preferred way of learning.

PBL casts doubt over learning

‘Are we on the right track?’ ‘To what depth should I take my learning regarding this LO?’ ‘How can I be sure that the others in my group know what they are talking about – why should I listen to them?’ ‘Do I know enough?’ These are all common concerns voiced by students year after year. They generally stem from a fear of the unknown and tend to dissipate after the mid-year exams

when students' grades reflect the fact that they are actually learning things and that everything is going fine. Students need to know that these concerns are normal and that once they learn to trust the PBL process, they can actually put all their efforts into the process and enjoying everything it has to offer.

PBL creates heavy workloads

The loudest concern students voice about PBL is the volume of work. 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 and ask whether you are using it effectively. Are you trying to use learning strategies from your previous study (eg, rote learning)? If so, you will be wasting your time. It is not possible to be successful in this course by memorising lots of isolated facts. As the course is an integrated one, you are advised to use learning strategies that allow you to look for the relationship between facts in an effort to understand what the greater meaning is.

Group Work

(taken from Hulls York Medical School p. 45-50 with permission)

The PBL Group

As you have read, one of the driving reasons behind using a PBL system is its ability to equip students with 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. So developing the ability to work well in a 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 first 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

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, etiquette on leaving a room, silence means assent etc. 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

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 the key to maintaining a healthy working group.

A good team requires regular evaluation and it would be advisable to use the last ten minutes of each week 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.

1

2

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:

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.

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.

Norming:

After a time interpersonal issues are resolved and the group arrives at an understanding of how to behave.

Performing:

The group member's 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 tutor 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.

Conclusion

The aim of this booklet has been to give you insight into problem-based learning from a theoretical point of view, as well as a practical hands-on perspective. The advantages of PBL, and its shortcomings have been discussed as well as your role in making the PBL process work. This information is only the tip of the iceberg and we strongly encourage you to do some independent research into PBL (given that you will be spending the first two years of your course in a PBL program). In conducting your own private research, you will quickly come to realise there are those who are strong advocates of this contemporary approach to medical education, and those traditionalists who are firmly against it. The latter camp have been known to circulate 'myths' about PBL a few of which are listed below:

Myth 1

Students are left to their own devices

The School will facilitate the processes of identifying LOs, and provide the necessary resources or direction to assist students in mastering those LOs. The PBL process is carefully monitored both by students, and by specially trained tutors to ensure that the outcomes are appropriate to the ability of students, and to the stage of the course.

Myth 2

Lecturers no longer lecture

They do, and they also provide and deliver many other forms of learning resources, to help students learn necessary details in the context of interesting clinical cases.

Myth 3

Students divide up learning objectives among themselves and teach each other

It is in each student's interest to **make sure this does not happen**. Every student in the PBL group is expected to learn most things, and be prepared to discuss, argue and justify their understanding (see Myth 4).

Myth 4

The students don't know anything when they enter the clinical years

They do - but not necessarily the same thing as 'traditional students' at the equivalent time in their

career. This is because some basic science is better learnt in a clinical context, and we expect the basic sciences to be learnt throughout the course, not just in MEDI6100 and MEDI6200.

Myth 5

When they graduate, students aren't as good as the 'traditional students'

They are - according to our external examiners and the many GPs and hospital clinicians we talk to.

Tips for Surviving PBL

As a final word, students at Hulls York Medical School offer the following 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 is 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.
- Make the most of the other people in your group and the mix of different career experiences that they will have. PBL is a great way to start exploring the richness of beliefs and values held by multiple perspectives. This sort of knowledge and understanding will be invaluable to you in real clinical practice.

Further Reading for Students

We don't attempt to be comprehensive in this guide and would strongly recommend that you use 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.

1. 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.
2. <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.
3. Azer.S. 'Becoming a student in a PBL course: twelve tips for successful group discussion' *Medical Teacher*, Vol.26, No.1, (2004) pp.12-15.
4. Albanese, M. A. and Mitchell, S. (1993) Problem-based learning: a review of literature on its outcomes and implementation issues. *Academic Medicine*, 68, 52-81.
5. Blake, J. M., Norman, G. R. and Smith, E. K. M. (1995) Report card from McMaster: student evaluation at a problem-based medical school. *The Lancet*, 345, 899-902.
6. Boud, D. and Feletti, G. (Eds.) (1991) *The Challenge of Problem-Based Learning*. St Martin's Press, N. Y.
7. Davies.M 'AMEE Medical Education Guide No.15: Problem Based Learning: a practical guide'. *Medical Teacher*, Vol.21, No.2, 1999.
8. Vernon, D. T. and Blake, R. L. (1993) Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine*, 68, 550-563.

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